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4. Request from the Applicant a summary of the steps taken to comply with the requirements of Section 106 as set forth in this Nationwide Agreement, particularly the application of the Criteria of Adverse Effect;

5. Request from the Applicant copies of any documents regarding the planning or construction of the Facility, including correspondence, memoranda, and agreements;

6. If the Facility was constructed prior to full compliance with the requirements of Section 106, request from the Applicant an explanation for such failure, and possible measures that can be taken to mitigate any resulting adverse effects on Historic Properties.

D. If the Commission concludes that there is a probable violation of Section 110(k) (*i.e.*, that ''with intent to avoid the requirements of Section 106, [an Applicant] has intentionally significantly adversely affected a Historic Property''), the Commission shall notify the Applicant and forward a copy of the documentation set forth in Section X.C. to the Council and, as appropriate, the SHPO/THPO and other consulting parties, along with the Commission's opinion regarding the probable violation of Section 110(k). The Commission will consider the views of the consulting parties in determining a resolution, which may include negotiating a Memorandum of Agreement (MOA) that will resolve any adverse effects. The Commission, SHPO/THPO, Council, and Applicant shall sign the MOA to evidence acceptance of the mitigation plan and conclusion of the Section 106 review process.

E. Nothing in Section X or any other provision of this Agreement shall preclude the Commission from continuing or instituting enforcement proceedings under the Communications Act and its rules against an Applicant that has constructed a Facility prior to completing required review under this Agreement. Sanctions for violations of the Commission's rules may include any sanctions allowed under the Communications Act and the Commission's rules.

F. The Commission shall provide copies of all concluding reports or orders for all Section 110(k) investigations conducted by the Commission to the original complainant, the Applicant, the relevant local government, and other consulting parties.

G. Facilities that are excluded from Section 106 review pursuant to the Collocation Agreement or Section III of this Agreement are not subject to review under this provision. Any parties who allege that such Facilities have violated Section 110(k) should notify the Commission in accordance with the provisions of Section XI, Public Comments and Objections.

XI. Public Comments and Objections

Any member of the public may notify the Commission of concerns it has regarding the application of this Nationwide Agreement within a State or with regard to the review of individual Undertakings covered or excluded under the terms of this Agreement. Comments related to telecommunications activities shall be directed to the Wireless Telecommunications Bureau and those related to broadcast facilities to the Media Bureau. The Commission will consider public comments and following consultation with the SHPO/THPO, potentially affected Indian tribes and NHOs, or Council, where appropriate, take appropriate actions. The Commission shall notify the objector of the outcome of its actions.

XII. Amendments

The signatories may propose modifications or other amendments to this Nationwide Agreement. Any amendment to this Agreement shall be subject to appropriate public notice and comment and shall be signed by the Commission, the Council, and the Conference.

XIII. Termination

A. Any signatory to this Nationwide Agreement may request termination by written notice to the other parties. Within sixty (60) days following receipt of a written request for termination from a signatory, all other signatories shall discuss the basis for the termination request and seek agreement on amendments or other actions that would avoid termination.

B. In the event that this Agreement is terminated, the Commission and all Applicants shall comply with the requirements of 36 CFR Part 800.

XIV. Annual Review

The signatories to this Nationwide Agreement will meet annually on or about the anniversary of the effective date of the Agreement to discuss the effectiveness of this Agreement, including any issues related to improper implementation, and to discuss any potential amendments that would improve the effectiveness of this Agreement.

XV. Reservation of Rights

Neither execution of this Agreement, nor implementation of or compliance with any term herein, shall operate in any way as a waiver by any party hereto, or by any person or entity complying herewith or affected hereby, of a right to assert in any court of law any claim, argument or defense regarding the validity or interpretation of any provision of the NHPA or its implementing regulations contained in 36 CFR Part 800.

XVI. Severability

If any section, subsection, paragraph, sentence, clause or phrase in this Agreement is, for any reason, held to be unconstitutional

or invalid or ineffective, such decision shall not affect the validity or effectiveness of the remaining portions of this Agreement.

In witness whereof, the Parties have caused this Agreement to be executed by their respective authorized officers as of the day and year first written above.

Federal Communications Commission

_____

Chairman

Date _____

Advisory Council on Historic Preservation

_____

Chairman

Date _____

National Conference of State Historic Preservation Officers

_____

Date _____

[70 FR 580, Jan. 4, 2005]

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

Subpart A—Terminology

Sec.
2.1 Terms and definitions.

Subpart B—Allocation, Assignment, and Use of Radio Frequencies

2.100 International regulations in force.
2.101 Frequency and wavelength bands.
2.102 Assignment of frequencies.
2.103 Federal use of non-Federal frequencies.
2.104 International Table of Frequency Allocations.
2.105 United States Table of Frequency Allocations.
2.106 Table of Frequency Allocations.
2.107 Radio astronomy station notification.
2.108 Policy regarding the use of the fixed-satellite allocations in the 3.6–3.7, 4.5–4.8, and 5.85–5.925 GHz bands.

Subpart C—Emissions

2.201 Emission, modulation, and transmission characteristics.
2.202 Bandwidths.

Subpart D—Call Signs and Other Forms of Identifying Radio Transmissions

2.301 Station identification requirement.
2.302 Call signs.
2.303 Other forms of identification of stations.

Subpart E—Distress, Disaster, and Emergency Communications

2.401 Distress messages.
2.402 Control of distress traffic.
2.403 Retransmission of distress message.
2.404 Resumption of operation after distress.
2.405 Operation during emergency.
2.406 National defense; free service.
2.407 National defense; emergency authorization.

Subparts F–G [Reserved]

Subpart H—Prohibition Against Eavesdropping

2.701 Prohibition against use of a radio device for eavesdropping.

Subpart I—Marketing of Radiofrequency Devices

2.801 Radiofrequency device defined.
2.803 Marketing of radio frequency devices prior to equipment authorization.
2.805 Operation of radio frequency devices prior to equipment authorization.
2.807 Statutory exceptions.
2.811 Transmitters operated under part 73 of this chapter.
2.813 Transmitters operated in the Instructional Television Fixed Service.
2.815 External radio frequency power amplifiers.

Subpart J—Equipment Authorization Procedures

GENERAL PROVISIONS

2.901 Basis and purpose.
2.906 Supplier's Declaration of Conformity.
2.907 Certification.
2.908 Identical defined.
2.909 Responsible party.
2.910 Incorporation by reference.

APPLICATION PROCEDURES FOR EQUIPMENT AUTHORIZATIONS

2.911 Application requirements.
2.915 Grant of application.
2.917 Dismissal of application.
2.919 Denial of application.
2.921 Hearing on application.
2.923 Petition for reconsideration; application for review.
2.924 Marketing of electrically identical equipment having multiple trade names and models or type numbers under the same FCC Identifier.
2.925 Identification of equipment.
2.926 FCC identifier.

CONDITIONS ATTENDANT TO AN EQUIPMENT AUTHORIZATION

2.927 Limitations on grants.
2.929 Changes in name, address, ownership or control of grantee.
2.931 Responsibilities.
2.932 Modification of equipment.
2.933 Change in identification of equipment.
2.935 Electronic labeling of radiofrequency devices.
2.937 Equipment defect and/or design change.
2.938 Retention of records.
2.939 Revocation or withdrawal of equipment authorization.
2.941 Availability of information relating to grants.
2.944 Software defined radios.
2.945 Submission of equipment for testing and equipment records.
2.947 Measurement procedure.
2.948 Measurement facilities.
2.949 Recognition of laboratory accreditation bodies.
2.950 Transition periods.

TELECOMMUNICATION CERTIFICATION BODIES (TCBS)

2.960 Recognition of Telecommunication Certification Bodies (TCBs).
2.962 Requirements for Telecommunication Certification Bodies.
2.964 Pre-approval guidance procedure for Telecommunication Certification Bodies.

CERTIFICATION

2.1031 Cross reference.
2.1033 Application for certification.
2.1035 [Reserved]
2.1041 Measurement procedure.
2.1043 Changes in certificated equipment.
2.1046 Measurements required: RF power output.
2.1047 Measurements required: Modulation characteristics.
2.1049 Measurements required: Occupied bandwidth.
2.1051 Measurements required: Spurious emissions at antenna terminals.
2.1053 Measurements required: Field strength of spurious radiation.
2.1055 Measurements required: Frequency stability.
2.1057 Frequency spectrum to be investigated.
2.1060 Equipment for use in the amateur radio service.

SUPPLIER'S DECLARATION OF CONFORMITY

2.1071 Cross reference.
2.1072 Limitation on Supplier's Declaration of Conformity.
2.1074 Identification.
2.1077 Compliance information.

RADIOFREQUENCY RADIATION EXPOSURE

2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
2.1093 Radiofrequency radiation exposure evaluation: portable devices.

Subpart K—Importation of Devices Capable of Causing Harmful Interference

2.1201 Purpose.
2.1202 Exclusions.
2.1203 General requirement for entry into the U.S.A.
2.1204 Import conditions.
2.1207 Examination of imported equipment.

Subpart L [Reserved]

Subpart M—Advance Approval of Subscription TV Transmission Systems

ADVANCE APPROVAL PROCEDURE

2.1400 Application for advance approval under part 73.

Subpart N [Reserved]

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

SOURCE: 28 FR 12465, Nov. 22, 1963, unless otherwise noted.

EDITORIAL NOTE: Nomenclature changes to part 2 appear at 63 FR 54077, Oct. 8, 1998.

Subpart A—Terminology

§ 2.1 Terms and definitions.

(a) Where a term or definition appears in this part of the Commission's Rules, it shall be the definitive term or definition and shall prevail throughout the Commission's Rules.

(b) The source of each definition is indicated as follows:

CS—Annex to the Constitution of the International Telecommunication Union (ITU)

CV—Annex to the Convention of the ITU

FCC—Federal Communications Commission

RR—ITU Radio Regulations

(c) The following terms and definitions are issued:

Accepted Interference.[1] Interference at a higher level than defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations. (RR)

Active Satellite. A satellite carrying a station intended to transmit or retransmit radiocommunication signals. (RR)

Active Sensor. A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by transmission and reception of radio waves. (RR)

Adaptive System. A radiocommunication system which varies its radio characteristics according to channel quality. (RR)

Administration. Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations. (CS)

Aeronautical Earth Station. An Earth station in the fixed-satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service. (RR)

Aeronautical Fixed Service. A radiocommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport. (RR)

Aeronautical Fixed Station. A station in the aeronautical fixed service. (RR)

Aeronautical Mobile Off-Route (OR) Service. An aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes. (RR)

Aeronautical Mobile Route (R) Service. An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. (RR)

Aeronautical Mobile-Satellite Off-Route (OR) Service. An aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes. (RR)

Aeronautical Mobile-Satellite Route (R) Service. An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes. (RR)

Aeronautical Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Aeronautical Mobile Service. A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. (RR)

Aeronautical Radionavigation-Satellite Service. A radionavigation-satellite service in which earth stations are located on board aircraft. (RR)

Aeronautical Radionavigation Service. A radio-navigation service intended for the benefit and for the safe operation of aircraft. (RR)

Aeronautical Station. A land station in the aeronautical mobile service.

NOTE: In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. (RR)

Aircraft Earth Station. A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft. (RR)

Aircraft Station. A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft. (RR)

Allocation (of a frequency band). Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term

[1] The terms *permissible interference* and *accepted interference* are used in the coordination of frequency assignments between administrations.

shall also be applied to the frequency band concerned. (RR)

Allotment (of a radio frequency or radio frequency channel). Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical area and under specified conditions. (RR)

Altitude of the Apogee or Perigee. The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth. (RR)

Amateur-Satellite Service. A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service. (RR)

Amateur Service. A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. (RR)

Amateur Station. A station in the amateur service. (RR)

Assigned Frequency. The centre of the frequency band assigned to a station. (RR)

Assigned Frequency Band. The frequency band within which the emission of a station is authorized; the width of the band equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface. (RR)

Assignment (of a radio frequency or radio frequency channel). Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. (RR)

Base Earth Station. An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service. (RR)

Base Station. A land station in the land mobile service. (RR)

Broadcasting-Satellite Service. A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public.

NOTE: In the broadcasting-satellite service, the term *direct reception* shall encompass both individual reception and community reception. (RR)

Broadcasting Service. A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission. (CS)

Broadcasting Station. A station in the broadcasting service. (RR)

Carrier Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation. (RR)

Characteristic Frequency. A frequency which can be easily identified and measured in a given emission.

NOTE: A carrier frequency may, for example, be designated as the characteristic frequency. (RR)

Class of Emission. The set of characteristics of an emission, designated by standard symbols, e.g., type of modulation, modulating signal, type of information to be transmitted, and also if appropriate, any additional signal characteristics. (RR)

Coast Earth Station. An earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service. (RR)

Coast Station. A land station in the maritime mobile service. (RR)

Community Reception (in the broadcasting-satellite service). The reception of emissions from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennae larger than those for individual reception, and intended for use: (1) by a

group of the general public at one location; or (2) through a distribution system covering a limited area. (RR)

Conterminous United States. The contiguous 48 States and the District of Columbia. (FCC)

Coordinated Universal Time (UTC). Time scale, based on the second (SI), as defined in Recommendation ITU–R TF.460–6.

NOTE: For most practical purposes associated with the ITU *Radio Regulations*, UTC is equivalent to mean solar time at the prime meridian (0° longitude), formerly expressed in GMT. (RR)

Coordination Area. When determining the need for coordination, the area surrounding an earth station sharing the same frequency band with terrestrial stations, or surrounding a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

Coordination Contour. The line enclosing the coordination area. (RR)

Coordination Distance. When determining the need for coordination, the distance on a given azimuth from an earth station sharing the same frequency band with terrestrial stations, or from a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

Deep Space. Space at distance from the Earth equal to, or greater than, 2×10^6 kilometers. (RR)

Differential Global Positioning System (DGPS) Station. A differential RNSS station for specific augmentation of GPS.

Differential Radionavigation Satellite Service (Differential RNSS) Station. A station used for the transmission of differential correction data and related information (such as ionospheric data and RNSS satellite integrity information) as an augmentation to an RNSS system for the purpose of improved navigation accuracy.

Direct Sequence Systems. A spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the ''modulating function'' and is the direct cause of the wide spreading of the transmitted signal.

Duplex Operation. Operating method in which transmission is possible simultaneously in both directions of a telecommunication channel.[3] (RR)

Earth Exploration-Satellite Service. A radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which:

(1) Information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites;

(2) Similar information is collected from airborne or Earth-based platforms;

(3) Such information may be distributed to earth stations within the system concerned; and

(4) Platform interrogation may be included. This service may also include feeder links necessary for its operation. (RR)

Earth Station. A station located either on the earth's surface or within the major portion of earth's atmosphere and intended for communication:

(1) With one or more space stations; or

(2) With one or more stations of the same kind by means of one or more reflecting satellites or other objects in space. (RR)

Effective Radiated Power (e.r.p) (in a given direction). The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction. (RR)

Emergency Position-Indicating Radiobeacon Station. A station in the mobile service the emissions of which are intended to facilitate search and rescue operations. (RR)

Emission. Radiation produced, or the production of radiation, by a radio transmitting station.

[3] In general, duplex operation and semi-duplex operation require two frequencies in radiocommunication; simplex operation may use either one or two.

NOTE: For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a radiation. (RR)

End Product. A completed electronic device that has received all requisite FCC approvals and is suitable for marketing.

Equivalent Isotropically Radiated Power (e.i.r.p.). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain). (RR)

Equivalent Monopole Radiated Power (e.m.r.p.) (in a given direction). The product of the power supplied to the antenna and its gain relative to a short vertical antenna in a given direction. (RR)

Equivalent Satellite Link Noise Temperature. The noise temperature referred to the output of the receiving antenna of the earth station corresponding to the radio-frequency noise power which produces the total observed noise at the output of the satellite link excluding the noise due to interference coming from satellite links using other satellites and from terrestrial systems. (RR)

Evaluation Kit. An assembly of components, subassemblies, or circuitry, including software, created by or for a component maker, system integrator, or product developer for the sole purpose of facilitating: (i) End product developer evaluation of all or some of such components, subassemblies, or circuitry, or (ii) the development of software to be used in an end product.

Experimental Station. A station utilizing radio waves in experiments with a view to the development of science or technique.

NOTE: This definition does not include amateur stations. (RR)

Facsimile. A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. (RR)

Feeder Link. A radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed-satellite service. The given location may be at a specified fixed point, or at any fixed point within specified areas. (RR)

Fixed-Satellite Service. A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services. (RR)

Fixed Service. A radiocommunication service between specified fixed points. (RR)

Fixed Station. A station in the fixed service. (RR)

Frequency Assignment Subcommittee (FAS). A subcommittee of the Interdepartment Radio Advisory Committee (IRAC) within NTIA that develops and executes procedures for the assignment and coordination of Federal radio frequencies. (FCC)

Frequency Hopping Systems. A spread spectrum system in which the carrier is modulated with the coded information in a conventional manner causing a conventional spreading of the RF energy about the frequency carrier. The frequency of the carrier is not fixed but changes at fixed intervals under the direction of a coded sequence. The wide RF bandwidth needed by such a system is not required by spreading of the RF energy about the carrier but rather to accommodate the range of frequencies to which the carrier frequency can hop. The test of a frequency hopping system is that the near term distribution of hops appears random, the long term distribution appears evenly distributed over the hop set, and sequential hops are randomly distributed in both direction and magnitude of change in the hop set.

Frequency-Shift Telegraphy. Telegraphy by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values. (RR)

Frequency Tolerance. The maximum permissible departure by the centre frequency of the frequency band occupied by an emission from the assigned

frequency or, by the characteristic frequency of an emission from the reference frequency.

NOTE: The frequency tolerance is expressed in parts in 10^6 or in hertz. (RR)

Full Carrier Single-Sideband Emission. A single-sideband emission without suppression of the carrier. (RR)

Gain of an Antenna. The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization.

NOTE: Depending on the choice of the reference antenna a distinction is made between:

(1) Absolute or isotropic gain (Gi), when the reference antenna is an isotropic antenna isolated in space;

(2) Gain relative to a half-wave dipole (Gd), when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;

(3) Gain relative to a short vertical antenna (Gv), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction. (RR)

General Purpose Mobile Service. A mobile service that includes all mobile communications uses including those within the Aeronautical Mobile, Land Mobile, or the Maritime Mobile Services.

Geostationary Satellite. A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a geosynchronous satellite which remains approximately fixed relative to the Earth. (RR)

Geostationary Satellite Orbit. The orbit in which a satellite must be placed to be a geostationary satellite. (RR)

Geosynchronous Satellite. An Earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis. (RR)

Government Master File (GMF). NTIA's database of Federal assignments. It also includes non-Federal authorizations coordinated with NTIA for the bands allocated for shared Federal and non-Federal use. (FCC)

Harmful Interference. Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the ITU] Radio Regulations. (CS)

High Altitude Platform Station (HAPS). A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth. (RR)

Hybrid Spread Spectrum Systems. Hybrid spread spectrum systems are those which use combinations of two or more types of direct sequence, frequency hopping, time hopping and pulsed FM modulation in order to achieve their wide occupied bandwidths.

Inclination of an Orbit (of an earth satellite). The angle determined by the plane containing the orbit and the plane of the Earth's equator measured in degrees between 0° and 180° and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the orbit. (RR)

Individual Reception (in the broadcasting-satellite service). The reception of emissions from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennae. (RR)

Industrial, Scientific and Medical (ISM) (of radio frequency energy) Applications. Operation of equipment or appliances designed to generate and use locally radio-frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications. (RR)

Instrument Landing System (ILS). A radionavigation system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing. (RR)

Instrument Landing System Glide Path. A system of vertical guidance embodied in the instrument landing system which indicates the vertical deviation of the aircraft from its optimum path of descent. (RR)

Instrument Landing System Localizer. A system of horizontal guidance embodied in the instrument landing system which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway. (RR)

Insular area. A jurisdiction that is neither a part of one of the several States nor a Federal district. The U.S. insular areas are listed in 47 CFR 2.105(a) at notes 2 and 3. (FCC)

Interdepartment Radio Advisory Committee (IRAC). A committee of the Federal departments, agencies, and administrations that advises NTIA in assigning frequencies to Federal radio stations and in developing and executing policies, programs, procedures, and technical criteria pertaining to the allocation, management, and use of the spectrum. The IRAC consists of a main committee, subcommittees, and several ad hoc groups that consider various aspects of spectrum management policy. The FCC serves as a member of the Frequency Assignment Subcommittee and as Liaison Representative on the main committee, all other subcommittees and ad hoc groups. (FCC)

Interference. The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy. (RR)

International Telecommunication Union (ITU). An international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services. The ITU is headquartered in Geneva, Switzerland and its internet address is *www.itu.int.* (FCC)

Inter-Satellite Service. A radiocommunication service providing links between artificial satellites. (RR)

Ionospheric Scatter. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere. (RR)

Land Earth Station. An earth station in the fixed-satellite service or, in some cases, in the mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

Land Mobile Earth Station. A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent. (RR)

Land Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on land. (RR)

Land Mobile Service. A mobile service between base stations and land mobile stations, or between land mobile stations. (RR)

Land Mobile Station. A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

Land Station. A station in the mobile service not intended to be used while in motion. (RR)

Left-Hand (or Anti-Clockwise) Polarized Wave. An elliptically or circularly-polarized wave, in fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left hand or anti-clockwise direction. (RR)

Line A. Begins at Aberdeen, Washington running by great circle arc to the intersection of 48° N., 120° W., thence along parallel 48° N., to the intersection of 95° W., thence by great circle arc through the southernmost point of Duluth, Minn., thence by great circle arc to 45° N., 85° W., thence southward along meridian 85° W., to its intersection with parallel 41° N., thence along parallel 41° N., to its intersection with meridian 82° W., thence by great circle arc through the southernmost point of Bangor, Maine, thence by great circle arc through the southernmost point of Searsport, Maine, at which point it terminates. (FCC)

Line B. Begins at Tofino, B.C., running by great circle arc to the intersection of 50° N., 125° W., thence along parallel 50° N., to the intersection of 90° W., thence by great circle arc to the intersection of 45° N., 79°30′ W., thence by great circle arc through the northernmost point of Drummondville, Quebec (Lat. 45°52′ N., Long 72°30′ W.), thence by great circle arc to 48°30′ N., 70° W., thence by great circle arc through the northernmost point of Compbellton, N.B., thence by great circle are through the northernmost point of Liverpool, N.S., at which point it terminates. (FCC)

Line C. Begins at the intersection of 70° N., 144° W., thence by great circle arc to the intersection of 60° N., 143° W., thence by great circle arc so as to include all of the Alaskan Panhandle. (FCC)

Line D. Begins at the intersection of 70° N., 138° W., thence by great circle arc to the intersection of 61°20′ N., 139° W. (Burwash Landing), thence by great circle arc to the intersection of 60°45′ N., 135° W., thence by great circle arc to the intersection of 56° N., 128° W., thence south along 128° meridian to Lat. 55° N., thence by great circle arc to the intersection of 54° N., 130° W., thence by great circle arc to Port Clements, thence to the Pacific Ocean where it ends. (FCC)

Maritime Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Mobile Service. A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Radionavigation-Satellite Service. A radionavigation-satellite service in which earth stations are located on board ships. (RR)

Maritime Radionavigation Service. A radionavigation service intended for the benefit and for the safe operation of ships. (RR)

Marker Beacon. A transmitter in the aeronautical radionavigation service which radiates vertically a distinctive pattern for providing position information to aircraft. (RR)

Mean Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions. (RR)

Meteorological Aids Service. A radiocommunication service used for meteorological, including hydrological, observation and exploration. (RR)

Meteorological-Satellite Service. An earth exploration-satellite service for meteorological purposes. (RR)

Mobile Earth Station. An earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points. (RR)

Mobile-Satellite Service. A radiocommunication service:

(1) Between mobile earth stations and one or more space stations, or between space stations used by this service; or

(2) Between mobile earth stations by means of one or more space stations.

NOTE: This service may also include feeder links necessary for its operation. (RR)

Mobile Service. A radiocommunication service between mobile and land stations, or between mobile stations. (CV)

Mobile Station. A station in the mobile service intended to be used while in motion or during halts at unspecified points. (RR)

Multi-Satellite Link. A radio link between a transmitting earth station and a receiving earth station through two or more satellites, without any intermediate earth station.

NOTE: A multisatellite link comprises one up-link, one or more satellite-to-satellite links and one down-link. (RR)

National Telecommunications and Information Administration (NTIA). An agency of the United States Department of Commerce that serves as the President's principal advisor on telecommunications and information policy issues. NTIA manages Federal use of the radio spectrum and coordinates Federal use with the FCC. NTIA sets

forth regulations for Federal use of the radio spectrum within its *Manual of Regulations & Procedures for Federal Radio Frequency Management (NTIA Manual)*. (FCC)

Necessary Bandwidth. For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions. (RR)

Non-Voice, Non-Geostationary Mobile-Satellite Service. A mobile-satellite service reserved for use by non-geostationary satellites in the provision of non-voice communications which may include satellite links between land earth stations at fixed locations.

Occupied Bandwidth. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage β/2 of the total mean power of a given emission.

NOTE: Unless otherwise specified in an ITU–R Recommendation for the appropriate class of emission, the value of β/2 should be taken as 0.5%. (RR).

On-Board Communication Station. A low-powered mobile station in the maritime mobile service intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions. (RR)

Orbit. The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity. (RR)

Out-of-band domain (of an emission). The frequency range, immediately outside the necessary bandwidth but excluding the spurious domain, in which out-of-band emissions generally predominate. Out-of-band emissions, defined based on their source, occur in the out-of-band domain and, to a lesser extent, in the spurious domain. Spurious emissions likewise may occur in the out-of-band domain as well as in the spurious domain. (RR)

Out-of-band Emission. Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions. (RR)

Passive Sensor. A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by reception of radio waves of natural origin. (RR)

Peak Envelope Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions. (RR)

Period (of a satellite). The time elapsing between two consecutive passages of a satellite through a characteristic point on its orbit. (RR)

Permissible Interference.[3] Observed or predicted interference which complies with quantitative interference and sharing criteria contained in these [ITU Radio] Regulations or in ITU–R Recommendations or in special agreements as provided for in these Regulations. (RR)

Port Operations Service. A maritime mobile service in or near a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safty of ships and, in emergency, to the safety of persons.

NOTE: Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Port Station. A coast station in the port operations service. (RR)

Power. Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of emission, using the arbitrary symbols indicated:

(1) Peak envelope power (PX or pX);
(2) Mean power (PY or pY);
(3) Carrier power (PZ or pZ).

NOTE 1: For different classes of emission, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no

[3] See footnote under Accepted Interference.

modulation, are contained in ITU–R Recommendations which may be used as a guide.

NOTE 2: For use in formulae, the symbol p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level. (RR)

Primary Radar. A radiodetermination system based on the comparison of reference signals with radio signals reflected from the position to be determined. (RR)

Protection Ratio. The minimum value of the wanted-to-unwanted signal ratio, usually expressed in decibels, at the receiver input determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output. (RR)

Public Correspondence. Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. (CS)

Pulsed FM Systems. A pulsed FM system is a spread spectrum system in which a RF carrier is modulated with a fixed period and fixed duty cycle sequence. At the beginning of each transmitted pulse, the carrier frequency is frequency modulated causing an additional spreading of the carrier. The pattern of the frequency modulation will depend upon the spreading function which is chosen. In some systems the spreading function is a linear FM chirp sweep, sweeping either up or down in frequency.

Radar. A radiodetermination system based on the comparison of reference signals with radio signals reflected, or retrainsmitted, from the position to be determined. (RR)

Radar Beacon (RACON). A transmitter-receiver associated with a fixed navigational mark which, when triggered by a radar, automatically returns a distinctive signal which can appear on the display of the triggering radar, providing range, bearing and identification information. (RR)

Radiation. The outward flow of energy from any source in the form of radio waves. (RR)

Radio. A general term applied to the use of radio waves. (RR)

Radio Altimeter. Radionavigation equipment, on board an aircraft or spacecraft or the spacecraft above the Earth's surface or another surface. (RR)

Radio Astronomy. Astronomy based on the reception of radio waves of cosmic origin. (RR)

Radio Astronomy Service. A service involving the use of radio astronomy. (RR)

Radio Astronomy Station. A station in the radio astronomy service. (RR)

Radiobeacon Station. A station in the radionavigation service the emissions of which are intended to enable a mobile station to determine its bearing or direction in relation to radiobeacon station. (RR)

Radiocommunication. Telecommunication by means of radio waves. (CS) (CV)

Radiocommunication Service. A service as defined in this Section involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.

NOTE: In these [international] Radio Regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication. (RR)

Radiodetermination. The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. (RR)

Radiodetermination-Satellite Service. A radiocommunication service for the purpose of radiodetermination involving the use or one of more space stations. This service may also include feeder links necessary for its own operation. (RR)

Radiodetermination Service. A radiocommunication service for the purpose of radiodetermination. (RR)

Radiodetermination Station. A station in the radiodetermination serviice. (RR)

Radio Direction-Finding. Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object. (RR)

Radio Direction-Finding Station. A radiodetermination station using radio direction-finding. (RR)

Radiolocation. Radiodetermination used for purposes other than those of radionavigation. (RR)

Radiolocation Land Station. A station in the radiolocation service not intended to be used while in motion. (RR)

Radiolocation Mobile Station. A station in the radiolocation service intended to be used while in motion or during halts at unspecified points. (RR)

Radiolocation Service. A radiodetermination service for the purpose of radiolocation. (RR)

Radionavigation. Radiodetermination used for the purposes of navigation, including obstruction warning.

Radionavigation Land Station. A station in the radionavigation service not intended to be used while in motion. (RR)

Radionavigation Mobile Station. A station in the radionavigation service intended to be used while in motion or during halts at unspecified points. (RR)

Radionavigation-Satellite Service. A radiodetermination-satellite service used for the purpose of radionavigation. This service may also include feeder links necessary for its operation. (RR)

Radionavigation Service. A radiodetermination service for the purpose of radionavigation. (RR)

Radiosonde. An automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free ballon, kite or parachute, and which transmits meteorological data. (RR)

Radiotelegram. A telegram, originating in or intended for a mobile station or a mobile earth station transmitted on all or part of its route over the radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelemetry. Telemetry by means of radio waves. (RR)

Radiotelephone Call. A telephone call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelex Call. A telex call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or the mobile-satellite service. (RR)

Radio Waves or Hertzian Waves. Electromagnetic waves of frequencies arbitrarily lower than 3,000 GHz, propagated in space without aritificial guide. (RR)

Reduced Carrier Single-Sideband Emission. A single-sideband emission in which the degree of carrier suppession enables the carrier to be reconstrituted and to be used for demodulation. (RR)

Reference Frequency. A frequency having a fixed and specified position with respect to the assigned frequency. The displacement of this frequency with respect to the assigned frequency has the same absolute value and sign that the displacement of the characteristic frequency has with respect to the centre of the frequency band occupied by the emission. (RR)

Reflecting Satellite. A satellite intended to reflect radiocommunication signals. (RR)

Right-Hand (or Clockwise) Polarized Wave. An Elliptically or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction. (RR)

Safety Service. Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property. (RR)

Satellite. A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body. (RR)

Satellite Link. A radio link between a transmitting earth station and a receiving earth station through one satellite. A satellite link comprises one up-link and one down-link. (RR)

Satellite Network. A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations. (RR)

Satellite System. A space system using one or more artificial earth satellites. (RR)

Secondary Radar. A radiodetermination system based on the comparison of reference signals with radio signals retransmitted from the position to be determined. (RR)

Semi-Duplex Operation.[4] A method which is simplex operation on one end of the circuit and duplex operation at the other. (RR)

Simplex Operation.[4] Operating method in which transmission is made possible alternatively in each direction of a telecommunication channel, for example, by means of manual control.

Ship Earth Station. A mobile earth station in the maritime mobile-satellite service located on board ship. (RR)

Ship Movement Service. A safety service in the maritime mobile service other than a port operations service, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the movement of ships. Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Ship's Emergency Transmitter. A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes. (RR)

Ship Station. A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station. (RR)

Simplex Operation. Operating method in which transmission is made possible alternatively in each direction of a telecommunication channel, for example, by means of manual control.[5] (RR)

Single-Sideband Emission. An amplitude modulated emission with one sideband only. (RR)

Software defined radio. A radio that includes a transmitter in which the operating parameters of frequency range, modulation type or maximum output power (either radiated or conducted), or the circumstances under which the transmitter operates in accordance with Commission rules, can be altered by making a change in software without making any changes to hardware components that affect the radio frequency emissions. In accordance with §2.944 of this part, only radios in which the software is designed or expected to be modified by a party other than the manufacturer and would affect the above-listed operating parameters or circumstances under which the radio transmits must be certified as software defined radios.

Spacecraft. A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere. (RR)

Space Operation Service. A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand.

NOTE: These functions will normally be provided within the service in which the space station is operating. (RR)

Space Radiocommunication. Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space. (RR)

Space Research Service. A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. (RR)

Space Station. A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere. (RR)

Space System. Any group of cooperating Earth stations and/or space stations employing space radiocommunication for specific purposes. (RR)

Space Telecommand. The use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate functions of equipment on a space object, incuding the space station. (RR)

Space Telemetry. The use of telemetry for transmission for a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft. (RR)

Space Tracking. Determination of the orbit, velocity or instanteneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object. (RR)

Special Service. A radiocommunication service, not otherwise defined in this Section, carried

[4] *See* footnote under Duplex Operation.

[5] (See footnote under Duplex Operations.)

on exclusively for specific needs of general utility, and not open to public correspondence. (RR)

Spread Spectrum Systems. A spread spectrum system is an information bearing communications system in which: (1) Information is conveyed by modulation of a carrier by some conventional means, (2) the bandwidth is deliberately widened by means of a spreading function over that which would be needed to transmit the information alone. (In some spread spectrum systems, a portion of the information being conveyed by the system may be contained in the spreading function.)

Spurious domain (of an emission): The frequency range beyond the out-of-band domain in which spurious emissions generally predominate. (RR)

Spurious Emission. Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions. (RR)

Standard Frequency and Time Signal-Satellite Service. A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service.

NOTE: This service may also include feeder links necessary for its operation. (RR)

Standard Frequency and Time Signal Service. A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception. (RR)

Standard Frequency and Time Signal Station. A station in the standard frequency and time signal service. (RR)

Station. One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.

NOTE: Each station shall be classified by the service in which it operates permanently or temporarily. (RR)

Suppressed Carrier Single-Sideband Emission. A single-sideband emission in which the carrier is virtually suppressed and not intended to be used for demodulation. (RR)

Survival Craft Station. A mobile station in the maritime mobile service or the aeronautical mobile service intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment. (RR)

Telecommand. The use of telecommunication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance. (RR)

Telecommunication. Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. (CS)

Telegram. Written matter intended to be transmitted by telegraphy for delivery to the addressee. This term also includes radiotelegrams unless otherwise specified. (CS)

NOTE: In this definition the term telegraphy has the same general meaning as defined in the Convention.

Telegraphy.[5] A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use. (CS)

Telemetry. The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument. (RR)

Telephony. A form of telecommunication primarily intended for the exchange of information in the form of speech. (CS)

Television. A form of telecommunication for the transmission of transient images of fixed or moving objects. (RR)

[5] A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of a fixed image.

Terrestrial Radiocommunication. Any radiocommunication other than space radiocommunication or radio astronomy. (RR)

Terrestrial Station. A station effecting terrestrial radiocommunication.

NOTE: In these [international Radio] Regulations, unless otherwise stated, any station is a terrestrial station. (RR)

Time Hopping Systems. A time hopping system is a spread spectrum system in which the period and duty cycle of a pulsed RF carrier are varied in a pseudorandom manner under the control of a coded sequence. Time hopping is often used effectively with frequency hopping to form a hybrid time-division, multiple-access (TDMA) spread spectrum system.

Transponder. A transmitter-receiver facility the function of which is to transmit signals automatically when the proper interrogation is received. (FCC)

Tropospheric Scatter. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere. (RR)

Unwanted Emissions. Consist of spurious emissions and out-of-band emissions. (RR)

[49 FR 2368, Jan. 19, 1984, as amended at 50 FR 25239, June 18, 1985; 51 FR 37399, Oct. 22, 1986; 52 FR 7417, Mar. 11, 1987; 54 FR 49980, Dec. 4, 1990; 55 FR 28761, July 13, 1990; 56 FR 42703, Aug. 29, 1991; 58 FR 68058, Dec. 23, 1993; 62 FR 26242, May 13, 1997; 65 FR 60109, Oct. 10, 2000; 66 FR 50840, Oct. 5, 2001; 68 FR 74330, Dec. 23, 2003; 70 FR 23039, May 4, 2005; 70 FR 46583, Aug. 10, 2005; 71 FR 15619, Mar. 29, 2006; 72 FR 31192, June 6, 2007; 73 FR 25421, May 6, 2008; 75 FR 62933, Oct. 13, 2010; 78 FR 25161, Apr. 29, 2013; 80 FR 38823, July 7, 2015]

Subpart B—Allocation, Assignment, and Use of Radio Frequencies

SOURCE: 49 FR 2373, Jan. 19, 1984, unless otherwise noted.

§2.100 International regulations in force.

The Radio Regulations of the International Telecommunication Union (Radio Regulations) (Edition of 2012) have been incorporated to the extent practicable in this part, except that the International Table within §2.106 has been updated to reflect the Radio Regulations (Edition of 2016).

[85 FR 38632, June 26, 2020]

§2.101 Frequency and wavelength bands.

(a) The radio spectrum shall be subdivided into nine frequency bands, which shall be designated by progressive whole numbers in accordance with the following table. As the unit of frequency is the hertz (Hz), frequencies shall be expressed:

(1) In kilohertz (kHz), up to and including 3 000 kHz;

(2) In megahertz (MHz), above 3 MHz, up to and including 3 000 MHz;

(3) In gigahertz (GHz), above 3 GHz, up to and including 3 000 GHz.

(b) However, where adherence to these provisions would introduce serious difficulties, for example in connection with the notification and registration of frequencies, the lists of frequencies and related matters, reasonable departures may be made.[1]

TABLE 1 TO PARAGRAPH (b)

Band No.	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision
4	VLF	3 to 30 kHz	Myriametric waves.
5	LF	30 to 300 kHz	Kilometric waves.
6	MF	300 to 3 000 kHz	Hectometric waves.
7	HF	3 to 30 MHz	Decametric waves.
8	VHF	30 to 300 MHz	Metric waves.
9	UHF	300 to 3 000 MHz	Decimetric waves.
10	SHF	3 to 30 GHz	Centimetric waves.

[1] In the application of the ITU *Radio Regulations*, the Radiocommunication Bureau uses the following units:

kHz: For frequencies up to 28 000 kHz inclusive;

MHz: For frequencies above 28 000 kHz up to 10 500 MHz inclusive; and

GHz: For frequencies above 10 500 MHz.

TABLE 1 TO PARAGRAPH (b)—Continued

Band No.	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision
11	EHF	30 to 300 GHz	Millimetric waves.
12		300 to 3 000 GHz	Decimillimetric waves.

Note 1: "Band N" (N = band number) extends from 0.3×10^N Hz to 3×10^N Hz.
Note 2: Prefix: k = kilo (10^3), M = mega (10^6), G = giga (10^9).

(c) In communications between administrations and the ITU, no names, symbols or abbreviations should be used for the various frequency bands other than those specified in this section.

[70 FR 46583, Aug. 10, 2005; 70 FR 53074, Sept. 7, 2005; 75 FR 62933, Oct. 13, 2010; 80 FR 38823, July 7, 2015; 85 FR 38632, June 26, 2020]

§ 2.102 Assignment of frequencies.

(a) Except as otherwise provided in this section, the assignment of frequencies and frequency bands to all stations and classes of stations and the licensing and authorizing of the use of all such frequencies between 8.3 kHz and 275 GHz, and the actual use of such frequencies for radiocommunication or for any other purpose, including the transfer of energy by radio, shall be in accordance with the Table of Frequency Allocations in § 2.106.

(b) On the condition that harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations the following exceptions to paragraph (a) of this section may be authorized:

(1) In individual cases the Commission may, without rule making proceedings, authorize on a temporary basis only, the use of frequencies not in accordance with the Table of Frequency Allocations for projects of short duration or emergencies where the Commission finds that important or exceptional circumstances require such utilization. Such authorizations are not intended to develop a service to be operated on frequencies other than those allocated such service.

(2) [Reserved]

(3) Experimental stations, pursuant to part 5 of this chapter, may be authorized the use of any frequency or frequency band not exclusively allocated to the passive services (including the radio astronomy service).

(4) In the event a band is reallocated so as to delete its availability for use by a particular service, the Commission may provide for the further interim use of the band by stations in that service for a temporary, specific period of time.

(c) Non-Federal stations may be authorized to use Federal frequencies in the bands above 25 MHz:

(1) If the Commission finds, after consultations with the appropriate Federal agency or agencies, that such use is necessary for coordination of Federal and non-Federal activities. Such operations must meet the following requirements:

(i) Non-Federal operation on Federal frequencies shall conform with the conditions agreed upon by the Commission and NTIA;

(ii) Such operations shall be in accordance with NTIA rules governing the service to which the frequencies involved are allocated;

(iii) Such operations shall not cause harmful interference to Federal stations and, should harmful interference result, that the interfering non-Federal operation shall immediately terminate; and

(iv) Non-Federal operation has been certified as necessary by the Federal agency involved and this certification has been furnished, in writing, to the non-Federal licensee with which communication is required; or

(2) Pursuant to the provisions of § 90.25 of this chapter, provided that such operations shall not cause harmful interference to Federal stations and, should harmful interference result, that the interfering non-Federal operation shall immediately terminate.

(d) Aircraft stations may communicate with stations of the maritime mobile service. They shall then conform to those provisions of the international *Radio Regulations* which relate

to the maritime mobile service. For this purpose aircraft stations should use the frequencies allocated to the maritime mobile service. However, having regard to interference which may be caused by aircraft stations at high altitudes, maritime mobile frequencies in the bands above 30 MHz shall not be used by aircraft stations in any specific area without the prior agreement of all administrations of the area in which interference is likely to be caused. In particular, aircraft stations operating in Region 1 should not use frequencies in the bands above 30 MHz allocated to the maritime mobile service by virtue of any agreement between administrations in that Region.

(e) Non-Federal services operating on frequencies in the band 25–50 MHz must recognize that it is shared with various services of other countries; that harmful interference may be caused by skywave signals received from distant stations of all services of the United States and other countries radiating power on frequencies in this band; and that no protection from such harmful interference generally can be expected. Persons desiring to avoid such harmful interference should consider operation on available frequencies higher in the radio spectrum not generally subject to this type of difficulty.

(f) The stations of a service shall use frequencies so separated from the limits of a band allocated to that service as not to cause harmful interference to allocated services in immediately adjoining frequency bands.

(g) In the bands above 25 MHz which are allocated to the non-Federal land mobile service, fixed stations may be authorized on the following conditions:

(1) That such stations are authorized in the service shown in Column 5 of the Table of Frequency Allocations in the band in question;

(2) That harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations.

(h) Special provisions regarding the use of spectrum allocated to the fixed and land mobile services below 25 MHz by non-Federal stations.

(1) Only in the following circumstances will authority be extended to stations in the fixed service to operate on frequencies below 25 MHz.

(i) With respect to aeronautical fixed stations, only when a showing can be made that more suitable facilities are not available.

(ii) With respect to fixed stations, except aeronautical fixed stations, only to:

(A) Provide communication circuits in emergency and/or disaster situations, where safety of life and property are concerned;

(B) Provide standby and/or backup facilities to satellite and cable circuits used for international public correspondence;

(C) Provide standby and/or backup communications circuits to regular domestic communication circuits which have been disrupted by disasters and/or emergencies;

(D) Provide communication circuits wholly within the State of Alaska and the United States insular areas in the Pacific; and

(E) Provide communication circuits to support operations which are highly important to the national interest and where other means of telecommunication are unavailable.

(2) Only in the following circumstances will authority be extended to stations in the land mobile service to operate below 25 MHz.

(i) Provide communication circuits in emergency and/or disaster situations, where safety of life and property are concerned;

(ii) Provide standby and/or backup communications circuits to regular domestic communication circuits which have been disrupted by disasters and/or emergencies;

(iii) Provide communication circuits wholly within the State of Alaska and the United States insular areas in the Pacific; and

(iv) Provide communication circuits to support operations which are highly important to the national interest and where other means of telecommunication are unavailable.

(3) Except in the State of Alaska and the United States Pacific insular areas, the Commission does not intend to seek international protection for assignments made pursuant to paragraphs (h) (1)(ii) and (2) of this section;

this results in the following constraints upon the circuits/assignments.

(i) The Commission will not accept responsibility for protection of the circuits from harmful interference caused by foreign operations.

(ii) In the event that a complaint of harmful interference resulting from operation of these circuits is received from a foreign source, the offending circuit(s) must cease operation on the particular frequency concerned.

(iii) In order to accommodate the situations described in paragraphs (h)(3)(i) and (ii) of this section, equipments shall be capable of transmitting and receiving on any frequency in the bands assigned to the particular operation and capable of immediate change among the frequencies.

[49 FR 2373, Jan. 19, 1984, 70 FR 46585, Aug. 10, 2005, as amended at 78 FR 25161, Apr. 29, 2013; 82 FR 27185, June 14, 2017; 83 FR 19977, May 7, 2018; 85 FR 38633, June 26, 2020]

§ 2.103 Federal use of non-Federal frequencies.

(a) Federal stations may be authorized to use non-Federal frequencies in the bands above 25 MHz (except the 758–775 MHz and 788–805 MHz public safety bands) if the Commission finds that such use is necessary for coordination of Federal and non-Federal activities: Provided, however, that:

(1) Federal operation on non-Federal frequencies shall conform with the conditions agreed upon by the Commission and NTIA (the more important of which are contained in paragraphs (a)(2), (a)(3) and (a)(4) of this section);

(2) Such operations shall be in accordance with Commission rules governing the service to which the frequencies involved are allocated;

(3) Such operations shall not cause harmful interference to non-Federal stations and, should harmful interference result, that the interfering Federal operation shall immediately terminate; and

(4) Federal operation has been certified as necessary by the non-Federal licensees involved and this certification has been furnished, in writing, to the Federal agency with which communication is required.

(b) Federal stations may be authorized to use channels in the 769–775 MHz, 799–805 MHz and 4940–4990 MHz public safety bands with non-Federal entities if the Commission finds such use necessary; where:

(1) The stations are used for interoperability or part of a Federal/non-Federal shared or joint-use system;

(2) The Federal entity obtains the approval of the non-Federal (State/local government) licensee(s) or applicant(s) involved;

(3) Federal operation is in accordance with the Commission's Rules governing operation of this band and conforms with any conditions agreed upon by the Commission and NTIA; and

(4) Interoperability, shared or joint-use systems are the subject of a mutual agreement between the Federal and non-Federal entities. This section does not preclude other arrangements or agreements as permitted under part 90 of the rules. See 47 CFR 90.179 and 90.421 of this chapter.

(c) Federal stations may be authorized by the First Responder Network Authority to use channels in the 758–769 MHz and 788–799 MHz public safety bands.

[63 FR 58650, Nov. 2, 1998, as amended at 68 FR 38638, June 30, 2003; 70 FR 46586, Aug. 10, 2005; 72 FR 48843, Aug. 24, 2007; 79 FR 596, Jan. 6, 2014]

§ 2.104 International Table of Frequency Allocations.

(a) The International Table of Frequency Allocations is subdivided into the Region 1 Table (column 1 of § 2.106), the Region 2 Table (column 2 of § 2.106), and the Region 3 Table (column 3 of § 2.106). The International Table is included for informational purposes only.

(b) *Regions.* For the allocation of frequencies the International Telecommunication Union (ITU) has divided the world into three Regions[1] as shown in Figure 1 of this section and described as follows:

(1) *Region 1.* Region 1 includes the area limited on the east by line A (lines A, B and C are defined below) and on the west by line B, excluding any of the territory of the Islamic Republic of

[1] It should be noted that where the words ''regions'' or ''regional'' are without a capital ''R,'' they do not relate to the three Regions here defined for purposes of frequency allocation.

Iran which lies between these limits. It also includes the whole of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of the Russian Federation which lies between lines A and C.

(2) *Region 2*. Region 2 includes the area limited on the east by line B and on the west by line C.

(3) *Region 3*. Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of the Russian Federation. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits.

(4) The lines A, B and C are defined as follows:

(i) *Line A*. Line A extends from the North Pole along meridian 40° East of Greenwich to parallel 40° North; thence by great circle arc to the intersection of meridian 60° East and the Tropic of Cancer; thence along the meridian 60° East to the South Pole.

(ii) *Line B*. Line B extends from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South; thence along meridian 20° West to the South Pole.

(iii) *Line C*. Line C extends from the North Pole by great circle arc to the intersection of parallel 65°30′ North with the international boundary in Bering Strait; thence by great circle arc to the intersection of meridian 165° East of Greenwich and parallel 50° North; thence by great circle arc to the intersection of meridian 170° West and parallel 10° North; thence along parallel 10° North to its intersection with meridian 120° West; thence along meridian 120° West to the South Pole.

(c) *Areas*. To further assist in the international allocation of the radio spectrum, the ITU has established five special geographical areas and they are defined as follows:

(1) The term ''African Broadcasting Area'' means:

(i) African countries, parts of countries, territories and groups of territories situated between the parallels 40° South and 30° North;

(ii) Islands in the Indian Ocean west of meridian 60° East of Greenwich, situated between the parallel 40° South and the great circle arc joining the points 45° East, 11°30′ North and 60° East, 15° North; and

(iii) Islands in the Atlantic Ocean east of line B, situated between the parallels 40° South and 30° North.

(2) The ''European Broadcasting Area'' is bounded on the west by the western boundary of Region 1, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North so as to include the northern part of Saudi Arabia and that part of those countries bordering the Mediterranean within these limits. In addition, Armenia, Azerbaijan, Georgia and those parts of the territories of Iraq, Jordan, Syrian Arab Republic, Turkey and Ukraine lying outside the above limits are included in the European Broadcasting Area.

(3) The ''European Maritime Area'' is bounded to the north by a line extending along parallel 72° North from its intersection with meridian 55° East of Greenwich to its intersection with meridian 5° West, then along meridian 5° West to its intersection with parallel 67° North, thence along parallel 67° North to its intersection with meridian 32° West; to the west by a line extending along meridian 32° West to its intersection with parallel 30° North; to the south by a line extending along parallel 30° North to its intersection with meridian 43° East; to the east by a line extending along meridian 43° East to its intersection with parallel 60° North, thence along parallel 60° North to its intersection with meridian 55° East and thence along meridian 55° East to its intersection with parallel 72° North.

(4) The ''Tropical Zone'' (see Figure 1 of this section) is defined as:

(i) The whole of that area in Region 2 between the Tropics of Cancer and Capricorn.

(ii) The whole of that area in Regions 1 and 3 contained between the parallels 30° North and 35° South with the addition of:

(A) The area contained between the meridians 40° East and 80° East of Greenwich and the parallels 30° North and 40° North; and

(B) That part of Libyan Arab Jamahiriya north of parallel 30° North.

(iii) In Region 2, the Tropical Zone may be extended to parallel 33° North, subject to special agreements between the countries concerned in that Region (see Article 6 of the ITU *Radio Regulations*).

(5) A sub-Region is an area consisting of two or more countries in the same Region.

(d) *Categories of services and allocations.* (1) Primary and secondary services. Where, in a box of the International Table in § 2.106, a band is indicated as allocated to more than one service, either on a worldwide or Regional basis, such services are listed in the following order:

(i) Services the names of which are printed in ''capitals'' (example: FIXED); these are called ''primary'' services; and

(ii) Services the names of which are printed in ''normal characters'' (example: Mobile); these are called ''secondary'' services (see paragraph (d)(3) of this section).

(2) Additional remarks shall be printed in normal characters (example: MOBILE except aeronautical mobile).

(3) Stations of a secondary service:

(i) Shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

(ii) Cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date; and

(iii) Can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

(4) Where a band is indicated in a footnote of the International Table as allocated to a service ''on a secondary basis'' in an area smaller than a Region, or in a particular country, this is a secondary service (see paragraph (d)(3) of this section).

(5) Where a band is indicated in a footnote of the International Table as allocated to a service ''on a primary basis'', in an area smaller than a Region, or in a particular country, this is a primary service only in that area or country.

(e) *Additional allocations.* (1) Where a band is indicated in a footnote of the International Table as ''also allocated'' to a service in an area smaller than a Region, or in a particular country, this is an ''additional'' allocation, *i.e.* an allocation which is added in this area or in this country to the service or services which are indicated in the International Table.

(2) If the footnote does not include any restriction on the service or services concerned apart from the restriction to operate only in a particular area or country, stations of this service or these services shall have equality of right to operate with stations of the other primary service or services indicated in the International Table.

(3) If restrictions are imposed on an additional allocation in addition to the restriction to operate only in a particular area or country, this is indicated in the footnote of the International Table.

(f) *Alternative allocations.* (1) Where a band is indicated in a footnote of the International Table as ''allocated'' to one or more services in an area smaller than a Region, or in a particular country, this is an ''alternative'' allocation, *i.e.* an allocation which replaces, in this area or in this country, the allocation indicated in the Table.

(2) If the footnote does not include any restriction on stations of the service or services concerned, apart from the restriction to operate only in a particular area or country, these stations of such a service or services shall have an equality of right to operate with stations of the primary service or services, indicated in the International Table, to which the band is allocated in other areas or countries.

(3) If restrictions are imposed on stations of a service to which an alternative allocation is made, in addition to the restriction to operate only in a

particular country or area, this is indicated in the footnote.

(g) *Miscellaneous provisions.* (1) Where it is indicated in the International Table that a service or stations in a service may operate in a specific frequency band subject to not causing harmful interference to another service or to another station in the same service, this means also that the service which is subject to not causing harmful interference cannot claim protection from harmful interference caused by the other service or other station in the same service.

(2) Where it is indicated in the International Table that a service or stations in a service may operate in a specific frequency band subject to not claiming protection from another service or from another station in the same service, this means also that the service which is subject to not claiming protection shall not cause harmful interference to the other service or other station in the same service.

(3) Except if otherwise specified in a footnote, the term ''fixed service'', where appearing in the International Table, does not include systems using ionospheric scatter propagation.

(h) *Description of the International Table of Frequency Allocations.* (1) The heading of the International Table includes three columns, each of which corresponds to one of the Regions (see paragraph (b) of this section). Where an allocation occupies the whole of the width of the Table or only one or two of the three columns, this is a worldwide allocation or a Regional allocation, respectively.

(2) The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.

(3) Within each of the categories specified in paragraph (d)(1) of this section, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.

(4) In the case where there is a parenthetical addition to an allocation in the International Table, that service allocation is restricted to the type of operation so indicated.

(5) The footnote references which appear in the International Table below the allocated service or services apply to more than one of the allocated services, or to the whole of the allocation concerned.

(6) The footnote references which appear to the right of the name of a service are applicable only to that particular service.

(7) In certain cases, the names of countries appearing in the footnotes have been simplified in order to shorten the text.

(8) The international footnotes shown in the International Table are applicable only to the relationships between the United States and other countries (unless a reference to an international footnote has been added to the United States Table of Frequency Allocations).

[65 FR 4636, Jan. 31, 2000, as amended at 70 FR 46586, Aug. 10, 2005; 75 FR 62933, Oct. 13, 2010; 85 FR 38633, June 26, 2020]

FIGURE 1 TO § 2.104—MAP

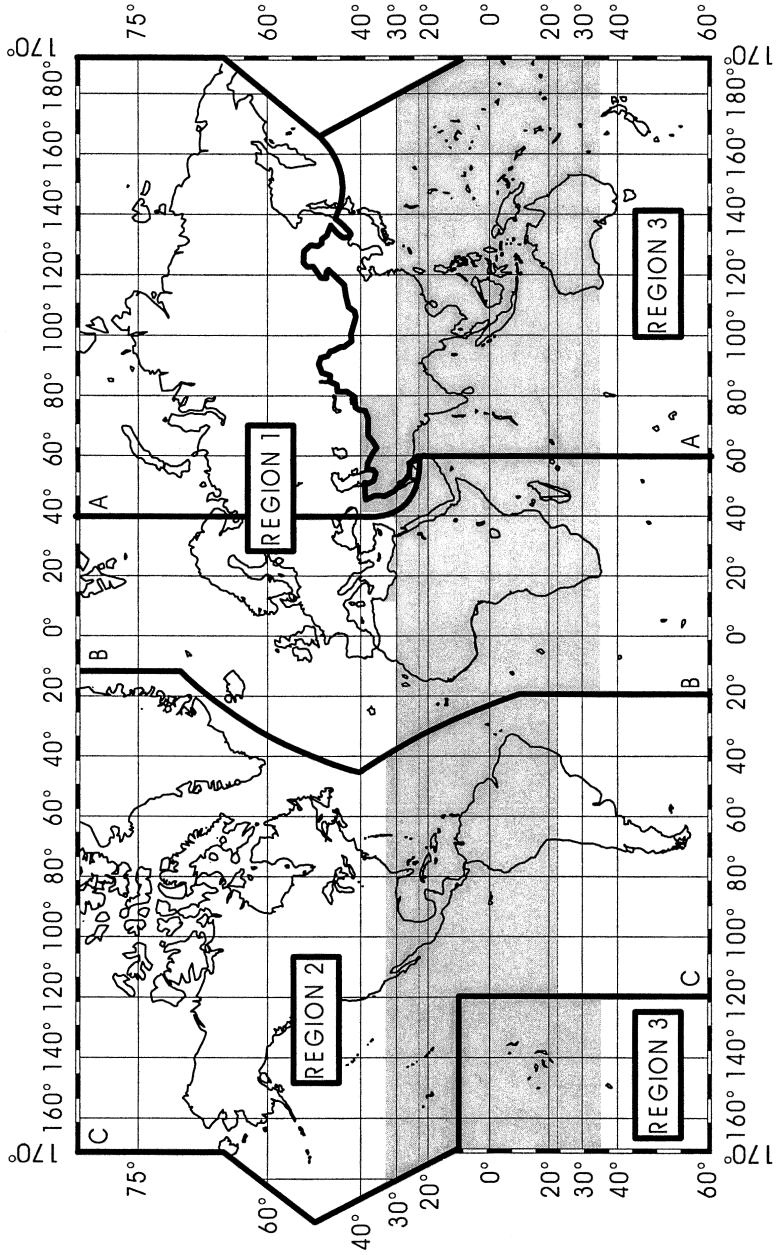

Figure 1: Map identifying Region 1, Region 2, and Region 3, as defined in paragraph 2.104(b), and the Tropical Zone (shaded area), as defined in paragraph 2.104(c)(4).

§ 2.105 United States Table of Frequency Allocations.

(a) The United States Table of Frequency Allocations (United States Table) is subdivided into the Federal Table of Frequency Allocations (Federal Table, column 4 of § 2.106) and the non-Federal Table of Frequency Allocations (non-Federal Table, column 5 of § 2.106). The United States Table is based on the Region 2 Table because the relevant area of jurisdiction is located primarily in Region 2[1] (*i.e.*, the 50 States, the District of Columbia, the Caribbean insular areas,[2] and some of the Pacific insular areas).[3] The Federal Table is administered by NTIA[4] and the non-Federal Table is administered by the Federal Communications Commission (FCC).[5]

(b) In the United States, radio spectrum may be allocated to either Federal or non-Federal use exclusively, or for shared use. In the case of shared use, the type of service(s) permitted need not be the same [e.g., Federal FIXED, non-Federal MOBILE]. The terms used to designate categories of services and allocations[6] in columns 4 and 5 of § 2.106 correspond to the terms in the ITU *Radio Regulations*.

(c) *Category of services*. (1) Any segment of the radio spectrum may be allocated to the Federal and/or non-Federal sectors either on an exclusive or shared basis for use by one or more radio services. In the case where an allocation has been made to more than one service, such services are listed in the following order:

(i) Services, the names of which are printed in ''capitals'' [example: FIXED]; these are called ''primary'' services;

(ii) Services, the names of which are printed in ''normal characters'' [example: Mobile]; these are called ''secondary'' services.

(2) Stations of a secondary service:

(i) Shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

(ii) Cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date; and

(iii) Can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

(d) *Format of the United States Table*. (1) The frequency band referred to in each allocation, column 4 for Federal operations and column 5 for non-Federal operations, is indicated in the left-hand top corner of the column. If there is no service or footnote indicated for a frequency band in column 4, then the Federal sector has no access to that band except as provided for by § 2.103. If there is no service or footnote indicated for a frequency band in column 5, then the non-Federal sector has no access to that band except as provided for by § 2.102.

(2) When the type of service(s) permitted and any applicable footnote(s) are the same for a frequency band in the Federal Table and the non-Federal Table, columns 4 and 5 are merged, indicating that the frequency band is shared between the Federal and non-Federal sectors under the same conditions.

(3) The Federal Table, given in column 4, is included for informational purposes only.

(4) In the case where there is a parenthetical addition to an allocation in

[1] *See* 2.104(b) for definitions of the ITU Regions.

[2] The operation of stations in the U.S. insular areas located in Region 2 is generally governed by the United States Table. The U.S. insular areas located in Region 2 are comprised of the Caribbean insular areas and two of the eleven Pacific insular areas. The Caribbean insular areas are Puerto Rico, the United States Virgin Islands, and Navassa Island. The Pacific insular areas located in Region 2 are Johnston Atoll and Midway Atoll.

[3] The operation of stations in the Pacific insular areas located in Region 3 is generally governed by the Region 3 Table (*i.e.*, column 3 of § 2.106). The Pacific insular areas located in Region 3 are American Samoa, Guam, the Northern Mariana Islands, Baker Island, Howland Island, Jarvis Island, Kingman Reef, Palmyra Island, and Wake Island.

[4] Section 305(a) of the Communications Act of 1934, as amended. *See* Public Law 102–538, 106 Stat. 3533 (1992).

[5] The Communications Act of 1934, as amended.

[6] The radio services are defined in 47 CFR 2.1.

the United States Table [example: FIXED-SATELLITE (space-to-earth)], that service allocation is restricted to the type of operation so indicated.

(5) The following symbols are used to designate footnotes in the United States Table:

(i) Any footnote number consisting of ''5.'' followed by one or more digits,[7] e.g., 5.53, denotes an international footnote. Where an international footnote is applicable, without modification, to both Federal and non-Federal operations, the Commission places the footnote in both the Federal Table and the non-Federal Table (columns 4 and 5) and the international footnote is binding on both Federal users and non-Federal licensees. If, however, an international footnote pertains to a service allocated only for Federal or non-Federal use, the international footnote will be placed only in the affected Table. For example, footnote 5.142 pertains only to the amateur service, and thus, footnote 5.142 is shown only in the non-Federal Table.

(ii) Any footnote consisting of the letters ''US'' followed by one or more digits,[7] e.g., US7, denotes a stipulation affecting both Federal and non-Federal operations. United States footnotes appear in both the Federal Table and the non-Federal Table.

(iii) Any footnote consisting of the letters ''NG'' followed by one or more digits,[7] e.g., NG2, denotes a stipulation applicable only to non-Federal operations. Non-Federal footnotes appear solely in the non-Federal Table (column 5).

(iv) Any footnote consisting of the letters ''G'' followed by one or more digits,[7] e.g., G2, denotes a stipulation applicable only to Federal operations. Federal footnotes appear solely in the Federal Table (column 4).

(6) The coordinates of latitude and longitude that are listed in United States, Federal, and non-Federal footnotes are referenced to the North American Datum of 1983 (NAD 83).

(e) *Rule part cross-references.* If a frequency or frequency band has been allocated to a radiocommunication service in the non-Federal Table, then a cross reference may be added to the pertinent FCC Rule part (column 6 of § 2.106) or, where greater specificity would be useful, to the pertinent subpart. For example, the band 849–851 MHz is allocated to the aeronautical mobile service for non-Federal use, rules for the use of the 849–851 MHz band have been added to part 22—Public Mobile Services (47 CFR part 22), and a cross reference, Public Mobile (22), has been added in column 6 of § 2.106. The exact use that can be made of any given frequency or frequency band (*e.g.*, channeling plans, allowable emissions, etc.) is given in the FCC Rule part(s) so indicated. The FCC Rule parts in this column are not allocations, may apply to only a portion of a band, and are provided for informational purposes only. This column also may contain explanatory notes for informational purposes only.

NOTE 1 TO PARAGRAPH (e): The radio frequency devices authorized pursuant to 47 CFR part 15 are not based on allocated radio services. In the Allocation Table, the cross references to part 15 are used to note those frequency bands that are most typically associated with unlicensed use.

(f) The FCC Online Table of Frequency Allocations is updated shortly after a final rule that amends § 2.106 is released. The address for the FCC Radio Spectrum Home Page, which includes the FCC Online Table and the FCC Allocation History File, is *http://www.fcc.gov/oet/spectrum*.

[65 FR 4640, Jan. 31, 2000, as amended at 70 FR 46587, Aug. 10, 2005; 73 FR 25421, May 6, 2008; 75 FR 62933, Oct. 13, 2010; 85 FR 38633, June 26, 2020]

§ 2.106 Table of Frequency Allocations.

EDITORIAL NOTE: The text of § 2.106 begins on the following page.

[7] In some cases, a letter, or letters, may be appended to the digit(s) of a footnote number in order to preserve the sequential order.

Table of Frequency Allocations			0-137.8 kHz (VLF/LF)		Page 1
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
Below 8.3 (Not Allocated) 5.53 5.54			Below 8.3 (Not Allocated) 5.53 5.54		
8.3-9 METEOROLOGICAL AIDS 5.54A 5.54B 5.54C			8.3-9 METEOROLOGICAL AIDS 5.54A		
9-11.3 METEOROLOGICAL AIDS 5.54A RADIONAVIGATION			9-11.3 METEOROLOGICAL AIDS 5.54A RADIONAVIGATION US18 US2		
11.3-14 RADIONAVIGATION			11.3-14 RADIONAVIGATION US18 US2		
14-19.95 FIXED MARITIME MOBILE 5.57 5.55 5.56			14-19.95 FIXED MARITIME MOBILE 5.57 US2	14-19.95 Fixed US2	
19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)			19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz) US2		
20.05-70 FIXED MARITIME MOBILE 5.57 5.56 5.58			20.05-59 FIXED MARITIME MOBILE 5.57 US2	20.05-59 FIXED US2	
			59-61 STANDARD FREQUENCY AND TIME SIGNAL (60 kHz) US2		
			61-70 FIXED MARITIME MOBILE 5.57 US2	61-70 FIXED US2	
70-72 RADIONAVIGATION 5.60	70-90 FIXED MARITIME MOBILE 5.57 MARITIME RADIONAVIGATION 5.60 Radiolocation	70-72 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59	70-90 FIXED MARITIME MOBILE 5.57 Radiolocation	70-90 FIXED Radiolocation	Private Land Mobile (90)
72-84 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 5.56		72-84 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60			
84-86 RADIONAVIGATION 5.60		84-86 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59			

86-90 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.56	5.61	86-90 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	US2	US2	
90-110 RADIONAVIGATION 5.62 Fixed 5.64			90-110 RADIONAVIGATION 5.62 US18 US2 US104		Aviation (87) Private Land Mobile (90)
110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	110-130 FIXED MARITIME MOBILE MARITIME RADIONAVIGATION 5.60 Radiolocation	110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	110-130 FIXED MARITIME MOBILE Radiolocation		Private Land Mobile (90)
112-115 RADIONAVIGATION 5.60		112-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65			
115-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.66					
117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64		117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64			
126-129 RADIONAVIGATION 5.60		126-129 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65			
129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	5.61 5.64	129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	5.64 US2		
130-135.7 FIXED MARITIME MOBILE 5.64 5.67	130-135.7 FIXED MARITIME MOBILE 5.64	130-135.7 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	130-135.7 FIXED MARITIME MOBILE 5.64 US2		Maritime (80)
135.7-137.8 FIXED MARITIME MOBILE Amateur 5.67A 5.64 5.67 5.67B	135.7-137.8 FIXED MARITIME MOBILE Amateur 5.67A 5.64	135.7-137.8 FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B	135.7-137.8 FIXED MARITIME MOBILE 5.64 US2	135.7-137.8 Amateur 5.67A US2	Amateur Radio (97)

Table of Frequency Allocations			137.8-1800 kHz (LF/MF)		Page 3
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
137.8-148.5 FIXED MARITIME MOBILE 5.64 5.67	137.8-160 FIXED MARITIME MOBILE 5.64	137.8-160 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	137.8-160 FIXED MARITIME MOBILE 5.64 US2		Maritime (80)
148.5-255 BROADCASTING	160-190 FIXED	160-190 FIXED Aeronautical radionavigation	160-190 FIXED MARITIME MOBILE US2	160-190 FIXED US2	
	190-200 AERONAUTICAL RADIONAVIGATION		190-200 AERONAUTICAL RADIONAVIGATION US18 US2		Aviation (87)
5.68 5.69 5.70 255-283.5 BROADCASTING AERONAUTICAL RADIONAVIGATION 5.70 5.71	200-275 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	200-275 AERONAUTICAL RADIONAVIGATION US18 Aeronautical mobile US2		
283.5-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)		275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons) US2 US18		
5.74	285-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73		285-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation (radiobeacons) US2 US18 US364		
315-325 AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radiobeacons) 5.73 5.75	315-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation	315-325 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73			
325-405 AERONAUTICAL RADIONAVIGATION	325-335 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	325-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	325-335 AERONAUTICAL RADIONAVIGATION (radiobeacons) Aeronautical mobile Maritime radionavigation (radiobeacons) US2 US18		Aviation (87)
	335-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile		335-405 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 Aeronautical mobile US2		
405-415 RADIONAVIGATION 5.76	405-415 RADIONAVIGATION 5.76 Aeronautical mobile		405-415 RADIONAVIGATION 5.76 US18 Aeronautical mobile US2		Maritime (80) Aviation (87)
415-435 MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION	415-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.80		415-435 MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION US2		

435-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.82	5.78 5.82		435-472 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.82 US2 US231	435-472 MARITIME MOBILE 5.79 5.79A 5.82 US2 US231	
472-479 MARITIME MOBILE 5.79 Amateur 5.80A Aeronautical radionavigation 5.77 5.80 5.80B 5.82			472-479 US2	472-479 Amateur 5.80A 5.82 US2 NG8	Amateur Radio (97)
479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.82	479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.80 5.82		479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.82 US2 US231	479-495 MARITIME MOBILE 5.79 5.79A 5.82 US2 US231	Maritime (80)
495-505 MARITIME MOBILE			495-505 MARITIME MOBILE		Maritime (80) Aviation (87)
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	505-510 MARITIME MOBILE 5.79	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile	505-510 MARITIME MOBILE 5.79		Maritime (80)
	510-525 MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION		510-525 MARITIME MOBILE (ships only) 5.79A 5.84 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 US14 US225		Maritime (80) Aviation (87)
526.5-1606.5 BROADCASTING	525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION	526.5-535 BROADCASTING Mobile 5.88	525-535 MOBILE US221 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 US239		Aviation (87) Private Land Mobile (90)
	535-1605 BROADCASTING	535-1606.5 BROADCASTING	535-1605	535-1605 BROADCASTING NG1 NG5	Radio Broadcast (AM)(73) Private Land Mobile (90)
5.87 5.87A 1606.5-1625 FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92	1605-1625 BROADCASTING 5.89 5.90	1606.5-1800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION	1605-1615 MOBILE US221 G127 1615-1705 US299	1605-1705 BROADCASTING 5.89 US299 NG1 NG5	Radio Broadcast (AM)(73) Alaska Fixed (80) Private Land Mobile (90)
1625-1635 RADIOLOCATION 5.93	1625-1705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90				
1635-1800 FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92 5.96	1705-1800 FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION	5.91	1705-1800 FIXED MOBILE RADIOLOCATION US240		Alaska Fixed (80) Private Land Mobile (90) Page 4

Table of Frequency Allocations			1800-3230 kHz (MF/HF)		Page 5
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
1800-1810 RADIOLOCATION 5.93	1800-1850 AMATEUR	1800-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation	1800-2000	1800-2000 AMATEUR	Maritime (80) Amateur Radio (97)
1810-1850 AMATEUR 5.98 5.99 5.100					
1850-2000 FIXED MOBILE except aeronautical mobile 5.92 5.96 5.103	1850-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION 5.102	5.97		NG92	
2000-2025 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103	2000-2065 FIXED MOBILE		2000-2065 FIXED MOBILE US340	2000-2065 MARITIME MOBILE US340 NG7	Private Land Mobile (90)
2025-2045 FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104 5.92 5.103					
2045-2160 FIXED MARITIME MOBILE LAND MOBILE 5.92	2065-2107 MARITIME MOBILE 5.105 5.106		2065-2107 MARITIME MOBILE 5.105 US296 US340		Maritime (80)
2160-2170 RADIOLOCATION 5.93 5.107	2107-2170 FIXED MOBILE		2107-2170 FIXED MOBILE US340	2107-2170 FIXED MOBILE except aeronautical mobile US340 NG7	Maritime (80) Private Land Mobile (90)
2170-2173.5 MARITIME MOBILE			2170-2173.5 MARITIME MOBILE (telephony) US340	2170-2173.5 MARITIME MOBILE US340	Maritime (80)
2173.5-2190.5 MOBILE (distress and calling) 5.108 5.109 5.110 5.111			2173.5-2190.5 MOBILE (distress and calling) 5.108 5.109 5.110 5.111 US279 US340		Maritime (80) Aviation (87)
2190.5-2194 MARITIME MOBILE			2190.5-2194 MARITIME MOBILE (telephony) US340	2190.5-2194 MARITIME MOBILE US340	Maritime (80)

2194-2300 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.112	2194-2300 FIXED MOBILE 5.112	2194-2495 FIXED MOBILE US22 US340	2194-2495 FIXED MOBILE except aeronautical mobile US22 US340 NG7	Maritime (80) Private Land Mobile (90)
2300-2498 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.103	2300-2495 FIXED MOBILE BROADCASTING 5.113			
2498-2501 STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)	2495-2501 STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)	2495-2505 STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)		
2501-2502 STANDARD FREQUENCY AND TIME SIGNAL Space research				
2502-2625 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.114	2502-2505 STANDARD FREQUENCY AND TIME SIGNAL	US1 US340		
2625-2650 MARITIME MOBILE MARITIME RADIONAVIGATION 5.92	2505-2850 FIXED MOBILE	2505-2850 FIXED MOBILE US285	2505-2850 FIXED MOBILE except aeronautical mobile US285	Maritime (80) Aviation (87) Private Land Mobile (90)
2650-2850 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103		US22 US340	US22 US340	
2850-3025 AERONAUTICAL MOBILE (R) 5.111 5.115		2850-3025 AERONAUTICAL MOBILE (R) 5.111 5.115 US283 US340		Aviation (87)
3025-3155 AERONAUTICAL MOBILE (OR)		3025-3155 AERONAUTICAL MOBILE (OR) US340		
3155-3200 FIXED MOBILE except aeronautical mobile (R) 5.116 5.117		3155-3230 FIXED MOBILE except aeronautical mobile (R)		Maritime (80) Private Land Mobile (90)
3200-3230 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116		US22 US340		Page 6

Table of Frequency Allocations			3.23-5.73 MHz (HF)		Page 7
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
3.23-3.4 FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118			3.23-3.4 FIXED MOBILE except aeronautical mobile Radiolocation US340		Maritime (80) Aviation (87) Private Land Mobile (90)
3.4-3.5 AERONAUTICAL MOBILE (R)			3.4-3.5 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
3.5-3.8 AMATEUR FIXED MOBILE except aeronautical mobile 5.92	3.5-3.75 AMATEUR 5.119	3.5-3.9 AMATEUR FIXED MOBILE	3.5-4	3.5-4 AMATEUR	Amateur Radio (97)
3.8-3.9 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	3.75-4 AMATEUR FIXED MOBILE except aeronautical mobile (R)				
3.9-3.95 AERONAUTICAL MOBILE (OR) 5.123		3.9-3.95 AERONAUTICAL MOBILE BROADCASTING			
3.95-4 FIXED BROADCASTING	5.122 5.125	3.95-4 FIXED BROADCASTING 5.126	US340	US340	
4-4.063 FIXED MARITIME MOBILE 5.127 5.126			4-4.063 FIXED MARITIME MOBILE US340		Maritime (80)
4.063-4.438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128			4.063-4.438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 US82 US296 US340		Maritime (80) Aviation (87)
4.438-4.488 FIXED MOBILE except aeronautical mobile (R) Radiolocation 5.132A 5.132B	4.438-4.488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A	4.438-4.488 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	4.438-4.488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A US340		Maritime (80) Private Land Mobile (90)
4.488-4.65 FIXED MOBILE except aeronautical mobile (R)		4.488-4.65 FIXED MOBILE except aeronautical mobile	4.488-4.65 FIXED MOBILE except aeronautical mobile (R) US22 US340		Maritime (80) Aviation (87) Private Land Mobile (90)
4.65-4.7 AERONAUTICAL MOBILE (R)			4.65-4.7 AERONAUTICAL MOBILE (R) US282 US283 US340		Aviation (87)
4.7-4.75 AERONAUTICAL MOBILE (OR)			4.7-4.75 AERONAUTICAL MOBILE (OR) US340		

4.75-4.85 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4.75-4.85 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4.75-4.85 FIXED BROADCASTING 5.113 Land mobile	4.75-4.85 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Private Land Mobile (90)
4.85-4.995 FIXED LAND MOBILE BROADCASTING 5.113			4.85-4.995 FIXED MOBILE US340	4.85-4.995 FIXED US340	Aviation (87) Private Land Mobile (90)
4.995-5.003 STANDARD FREQUENCY AND TIME SIGNAL (5 MHz)			4.995-5.005 STANDARD FREQUENCY AND TIME SIGNAL (5 MHz)		
5.003-5.005 STANDARD FREQUENCY AND TIME SIGNAL Space research			US1 US340		
5.005-5.06 FIXED BROADCASTING 5.113			5.005-5.06 FIXED US22 US340		Aviation (87) Private Land Mobile (90)
5.06-5.25 FIXED Mobile except aeronautical mobile 5.133			5.06-5.25 FIXED US22 Mobile except aeronautical mobile US212 US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5.25-5.275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A 5.133A	5.25-5.275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	5.25-5.275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	5.25-5.275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A US340		Maritime (80) Private Land Mobile (90)
5.275-5.3515 FIXED MOBILE except aeronautical mobile			5.275-5.45 FIXED US22 Mobile except aeronautical mobile		Maritime (80) Aviation (87) Private Land Mobile (90) Amateur Radio (97)
5.3515-5.3665 FIXED MOBILE except aeronautical mobile Amateur 5.133B					
5.3665-5.45 FIXED MOBILE except aeronautical mobile			US23 US340		
5.45-5.48 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5.45-5.48 AERONAUTICAL MOBILE (R)	5.45-5.48 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5.45-5.68 AERONAUTICAL MOBILE (R)		Aviation (87)
5.48-5.68 AERONAUTICAL MOBILE (R) 5.111 5.115			5.111 5.115 US283 US340		
5.68-5.73 AERONAUTICAL MOBILE (OR) 5.111 5.115			5.68-5.73 AERONAUTICAL MOBILE (OR) 5.111 5.115 US340		

Table of Frequency Allocations			5.73-11.175 MHz (HF)			Page 9
International Table			United States Table			FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table		
5.73-5.9 FIXED LAND MOBILE	5.73-5.9 FIXED MOBILE except aeronautical mobile (R)	5.73-5.9 FIXED Mobile except aeronautical mobile (R)	5.73-5.9 FIXED MOBILE except aeronautical mobile (R) US340			Maritime (80) Aviation (87) Private Land Mobile (90)
5.9-5.95 BROADCASTING 5.134 5.136			5.9-6.2 BROADCASTING 5.134 US136 US340			International Broadcast Stations (73F)
5.95-6.2 BROADCASTING						
6.2-6.525 MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137			6.2-6.525 MARITIME MOBILE 5.109 5.110 5.130 5.132 US82 US296 US340			Maritime (80)
6.525-6.685 AERONAUTICAL MOBILE (R)			6.525-6.685 AERONAUTICAL MOBILE (R) US283 US340			Aviation (87)
6.685-6.765 AERONAUTICAL MOBILE (OR)			6.685-6.765 AERONAUTICAL MOBILE (OR) US340			
6.765-7 FIXED MOBILE except aeronautical mobile (R) 5.138			6.765-7 FIXED US22 MOBILE except aeronautical mobile (R) 5.138 US340			ISM Equipment (18) Private Land Mobile (90)
7-7.1 AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A			7-7.2 US340	7-7.1 AMATEUR AMATEUR-SATELLITE US340		Amateur Radio (97)
7.1-7.2 AMATEUR 5.142 5.141A 5.141B				7.1-7.2 AMATEUR US340		
7.2-7.3 BROADCASTING	7.2-7.3 AMATEUR 5.142	7.2-7.3 BROADCASTING	7.2-7.3 US142 US340	7.2-7.3 AMATEUR US142 US340		International Broadcast Stations (73F) Amateur Radio (97)
7.3-7.4 BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D			7.3-7.4 BROADCASTING 5.134 US136 US340			International Broadcast Stations (73F) Maritime (80) Private Land Mobile (90)
7.4-7.45 BROADCASTING 5.143B 5.143C	7.4-7.45 FIXED MOBILE except aeronautical mobile (R)	7.4-7.45 BROADCASTING 5.143A 5.143C	7.4-7.45 FIXED MOBILE except aeronautical mobile (R) US142 US340			
7.45-8.1 FIXED MOBILE except aeronautical mobile (R) 5.144			7.45-8.1 FIXED US22 MOBILE except aeronautical mobile (R) US340			Maritime (80) Aviation (87) Private Land Mobile (90)

8.1-8.195 FIXED MARITIME MOBILE			8.1-8.195 FIXED MARITIME MOBILE US340		Maritime (80)
8.195-8.815 MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111			8.195-8.815 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 5.111 US296 US340		Maritime (80) Aviation (87)
8.815-8.965 AERONAUTICAL MOBILE (R)			8.815-8.965 AERONAUTICAL MOBILE (R) US340		Aviation (87)
8.965-9.04 AERONAUTICAL MOBILE (OR)			8.965-9.04 AERONAUTICAL MOBILE (OR) US340		
9.04-9.305 FIXED	9.04-9.4 FIXED	9.04-9.305 FIXED	9.04-9.4 FIXED US340		Maritime (80) Private Land Mobile (90)
9.305-9.355 FIXED Radiolocation 5.145A 5.145B		9.305-9.355 FIXED Radiolocation 5.145A			
9.355-9.4 FIXED		9.355-9.4 FIXED			
9.4-9.5 BROADCASTING 5.134 5.146			9.4-9.9 BROADCASTING 5.134 US136 US340		International Broadcast Stations (73F)
9.5-9.9 BROADCASTING 5.147					
9.9-9.995 FIXED			9.9-9.995 FIXED US340		Private Land Mobile (90)
9.995-10.003 STANDARD FREQUENCY AND TIME SIGNAL (10 MHz) 5.111			9.995-10.005 STANDARD FREQUENCY AND TIME SIGNAL (10 MHz) 5.111 US1 US340		
10.003-10.005 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111					
10.005-10.1 AERONAUTICAL MOBILE (R) 5.111			10.005-10.1 AERONAUTICAL MOBILE (R) 5.111 US283 US340		Aviation (87)
10.1-10.15 FIXED Amateur			10.1-10.15 US247 US340	10.1-10.15 AMATEUR US247 US340	Amateur Radio (97)
10.15-11.175 FIXED Mobile except aeronautical mobile (R)			10.15-11.175 FIXED Mobile except aeronautical mobile (R) US340		Private Land Mobile (90)

Table of Frequency Allocations			11.175-15.1 MHz (HF)		Page 11
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
11.175-11.275 AERONAUTICAL MOBILE (OR)			11.175-11.275 AERONAUTICAL MOBILE (OR) US340		
11.275-11.4 AERONAUTICAL MOBILE (R)			11.275-11.4 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
11.4-11.6 FIXED			11.4-11.6 FIXED US340		Private Land Mobile (90)
11.6-11.65 BROADCASTING 5.134 5.146			11.6-12.1 BROADCASTING 5.134		International Broadcast Stations (73F)
11.65-12.05 BROADCASTING 5.147					
12.05-12.1 BROADCASTING 5.134 5.146			US136 US340		
12.1-12.23 FIXED			12.1-12.23 FIXED US340		Private Land Mobile (90)
12.23-13.2 MARITIME MOBILE 5.109 5.110 5.132 5.145			12.23-13.2 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340		Maritime (80)
13.2-13.26 AERONAUTICAL MOBILE (OR)			13.2-13.26 AERONAUTICAL MOBILE (OR) US340		
13.26-13.36 AERONAUTICAL MOBILE (R)			13.26-13.36 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
13.36-13.41 FIXED RADIO ASTRONOMY 5.149			13.36-13.41 RADIO ASTRONOMY US342 G115	13.36-13.41 RADIO ASTRONOMY US342	
13.41-13.45 FIXED Mobile except aeronautical mobile (R)			13.41-13.45 FIXED Mobile except aeronautical mobile (R) US340	13.41-13.45 FIXED US340	Private Land Mobile (90)

13.45-13.55 FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A 5.149A	13.45-13.55 FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A	13.45-13.55 FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A US340	13.45-13.55 FIXED Radiolocation 5.132A US340	
13.55-13.57 FIXED Mobile except aeronautical mobile (R) 5.150		13.55-13.57 FIXED Mobile except aeronautical mobile (R) 5.150 US340	13.55-13.57 FIXED 5.150 US340	ISM Equipment (18) Private Land Mobile (90)
13.57-13.6 BROADCASTING 5.134 5.151		13.57-13.87 BROADCASTING 5.134 US136 US340		International Broadcast Stations (73F)
13.6-13.8 BROADCASTING				
13.8-13.87 BROADCASTING 5.134 5.151				
13.87-14 FIXED Mobile except aeronautical mobile (R)		13.87-14 FIXED Mobile except aeronautical mobile (R) US340	13.87-14 FIXED US340	Private Land Mobile (90)
14-14.25 AMATEUR AMATEUR-SATELLITE		14-14.35 US340	14-14.25 AMATEUR AMATEUR-SATELLITE US340	Amateur Radio (97)
14.25-14.35 AMATEUR 5.152			14.25-14.35 AMATEUR US340	
14.35-14.99 FIXED Mobile except aeronautical mobile (R)		14.35-14.99 FIXED Mobile except aeronautical mobile (R) US340	14.35-14.99 FIXED US340	Private Land Mobile (90)
14.99-15.005 STANDARD FREQUENCY AND TIME SIGNAL (15 MHz) 5.111		14.99-15.01 STANDARD FREQUENCY AND TIME SIGNAL (15 MHz) 5.111 US1 US340		
15.005-15.01 STANDARD FREQUENCY AND TIME SIGNAL Space research				
15.01-15.1 AERONAUTICAL MOBILE (OR)		15.01-15.1 AERONAUTICAL MOBILE (OR) US340		

Table of Frequency Allocations			15.1-22.855 MHz (HF)		Page 13
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
15.1-15.6 BROADCASTING			15.1-15.8 BROADCASTING 5.134		International Broadcast Stations (73F)
15.6-15.8 BROADCASTING 5.134 5.146			US136 US340		
15.8-16.1 FIXED 5.153			15.8-16.1 FIXED US340		Private Land Mobile (90)
16.1-16.2 FIXED Radiolocation 5.145A 5.145B	16.1-16.2 FIXED RADIOLOCATION 5.145A	16.1-16.2 FIXED Radiolocation 5.145A	16.1-16.2 FIXED RADIOLOCATION 5.145A US340		
16.2-16.36 FIXED			16.2-16.36 FIXED US340		
16.36-17.41 MARITIME MOBILE 5.109 5.110 5.132 5.145			16.36-17.41 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340		Maritime (80)
17.41-17.48 FIXED			17.41-17.48 FIXED US340		Private Land Mobile (90)
17.48-17.55 BROADCASTING 5.134 5.146			17.48-17.9 BROADCASTING 5.134		International Broadcast Stations (73F)
17.55-17.9 BROADCASTING			US136 US340		
17.9-17.97 AERONAUTICAL MOBILE (R)			17.9-17.97 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
17.97-18.03 AERONAUTICAL MOBILE (OR)			17.97-18.03 AERONAUTICAL MOBILE (OR) US340		
18.030-18.052 FIXED			18.03-18.068 FIXED		Maritime (80) Private Land Mobile (90)
18.052-18.068 FIXED Space research			US340		
18.068-18.168 AMATEUR AMATEUR-SATELLITE 5.154			18.068-18.168 US340	18.068-18.168 AMATEUR AMATEUR-SATELLITE US340	Amateur Radio (97)
18.168-18.78 FIXED Mobile except aeronautical mobile			18.168-18.78 FIXED Mobile US340		Maritime (80) Private Land Mobile (90)

18.78-18.9 MARITIME MOBILE	18.78-18.9 MARITIME MOBILE US82 US296 US340		Maritime (80)
18.9-19.02 BROADCASTING 5.134 5.146	18.9-19.02 BROADCASTING 5.134 US136 US340		International Broadcast Stations (73F)
19.02-19.68 FIXED	19.02-19.68 FIXED US340		Private Land Mobile (90)
19.68-19.8 MARITIME MOBILE 5.132	19.68-19.8 MARITIME MOBILE 5.132 US340		Maritime (80)
19.8-19.99 FIXED	19.8-19.99 FIXED US340		Private Land Mobile (90)
19.99-19.995 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	19.99-20.01 STANDARD FREQUENCY AND TIME SIGNAL (20 MHz) 5.111 US1 US340		
19.995-20.01 STANDARD FREQUENCY AND TIME SIGNAL (20 MHz) 5.111			
20.01-21 FIXED Mobile	20.01-21 FIXED Mobile US340	20.01-21 FIXED US340	Private Land Mobile (90)
21-21.45 AMATEUR AMATEUR-SATELLITE	21-21.45 US340	21-21.45 AMATEUR AMATEUR-SATELLITE US340	Amateur Radio (97)
21.45-21.85 BROADCASTING	21.45-21.85 BROADCASTING US340		International Broadcast Stations (73F)
21.85-21.87 FIXED 5.155A 5.155	21.85-21.924 FIXED US340		Aviation (87) Private Land Mobile (90)
21.87-21.924 FIXED 5.155B			
21.924-22 AERONAUTICAL MOBILE (R)	21.924-22 AERONAUTICAL MOBILE (R) US340		Aviation (87)
22-22.855 MARITIME MOBILE 5.132 5.156	22-22.855 MARITIME MOBILE 5.132 US82 US296 US340		Maritime (80)

Table of Frequency Allocations			22.855-27.41 MHz (HF)		Page 15
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
22.855-23 FIXED 5.156			22.855-23 FIXED US340		Private Land Mobile (90)
23-23.2 FIXED Mobile except aeronautical mobile (R) 5.156			23-23.2 FIXED Mobile except aeronautical mobile (R) US340	23-23.2 FIXED US340	
23.2-23.35 FIXED 5.156A AERONAUTICAL MOBILE (OR)			23.2-23.35 AERONAUTICAL MOBILE (OR) US340		
23.35-24 FIXED MOBILE except aeronautical mobile 5.157			23.35-24.45 FIXED MOBILE except aeronautical mobile	23.35-24.45 FIXED	Private Land Mobile (90)
24-24.45 FIXED LAND MOBILE			US340	US340	
24.45-24.6 FIXED LAND MOBILE Radiolocation 5.132A 5.158	24.45-24.65 FIXED LAND MOBILE RADIOLOCATION 5.132A	24.45-24.6 FIXED LAND MOBILE Radiolocation 5.132A	24.45-24.65 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	24.45-24.65 FIXED RADIOLOCATION 5.132A	
24.6-24.89 FIXED LAND MOBILE	24.65-24.89 FIXED LAND MOBILE	24.6-24.89 FIXED LAND MOBILE	US340 24.65-24.89 FIXED MOBILE except aeronautical mobile US340	US340 24.65-24.89 FIXED US340	
24.89-24.99 AMATEUR AMATEUR-SATELLITE			24.89-24.99 US340	24.89-24.99 AMATEUR AMATEUR-SATELLITE US340	Amateur Radio (97)
24.99-25.005 STANDARD FREQUENCY AND TIME SIGNAL (25 MHz)			24.99-25.01 STANDARD FREQUENCY AND TIME SIGNAL (25 MHz)		
25.005-25.01 STANDARD FREQUENCY AND TIME SIGNAL Space research			US1 US340		
25.01-25.07 FIXED MOBILE except aeronautical mobile			25.01-25.07 US340	25.01-25.07 LAND MOBILE US340 NG112	Private Land Mobile (90)
25.07-25.21 MARITIME MOBILE			25.07-25.21 MARITIME MOBILE US82 US281 US296 US340	25.07-25.21 MARITIME MOBILE US82 US281 US296 US340 NG112	Maritime (80) Private Land Mobile (90)

25.21-25.55 FIXED MOBILE except aeronautical mobile			25.21-25.33 US340	25.21-25.33 LAND MOBILE US340	Private Land Mobile (90)
			25.33-25.55 FIXED MOBILE except aeronautical mobile US340	25.33-25.55 US340	
25.55-25.67 RADIO ASTRONOMY 5.149			25.55-25.67 RADIO ASTRONOMY US74 US342		
25.67-26.1 BROADCASTING			25.67-26.1 BROADCASTING US25 US340		International Broadcast Stations (73F) Remote Pickup (74D)
26.1-26.175 MARITIME MOBILE 5.132			26.1-26.175 MARITIME MOBILE 5.132 US25 US340		Remote Pickup (74D) Low Power Auxiliary (74H) Maritime (80)
26.175-26.2 FIXED MOBILE except aeronautical mobile			26.175-26.2 US340	26.175-26.2 LAND MOBILE US340	Remote Pickup (74D) Low Power Auxiliary (74H)
26.2-26.35 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A 5.133A	26.2-26.42 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	26.2-26.35 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	26.2-26.42 RADIOLOCATION US132A US340	26.2-26.42 LAND MOBILE RADIOLOCATION US132A US340	Remote Pickup (74D) Low Power Auxiliary (74H) Private Land Mobile (90)
26.35-27.5 FIXED MOBILE except aeronautical mobile	26.42-27.5 FIXED MOBILE except aeronautical mobile	26.35-27.5 FIXED MOBILE except aeronautical mobile	26.42-26.48 US340	26.42-26.48 LAND MOBILE US340	Remote Pickup (74D) Low Power Auxiliary (74H)
			26.48-26.95 FIXED MOBILE except aeronautical mobile US340	26.48-26.95 US340	
			26.95-27.41	26.95-26.96 FIXED 5.150 US340	ISM Equipment (18)
				26.96-27.23 MOBILE except aeronautical mobile 5.150 US340	ISM Equipment (18) Personal Radio (95)
			5.150 US340	27.23-27.41 FIXED MOBILE except aeronautical mobile 5.150 US340	ISM Equipment (18) Private Land Mobile (90) Personal Radio (95)
5.150	5.150	5.150			

Table of Frequency Allocations			27.41-41.015 MHz (HF/VHF)		Page 17
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)			27.41-27.54	27.41-27.54 FIXED LAND MOBILE US340	Private Land Mobile (90)
27.5-28 METEOROLOGICAL AIDS FIXED MOBILE			27.54-28 FIXED MOBILE US298 US340	27.54-28 US298 US340	
28-29.7 AMATEUR AMATEUR-SATELLITE			28-29.7 US340	28-29.7 AMATEUR AMATEUR-SATELLITE US340	Amateur Radio (97)
29.7-30.005 FIXED MOBILE			29.7-29.89 US340	29.7-29.8 LAND MOBILE US340	Private Land Mobile (90)
				29.8-29.89 FIXED US340	
			29.89-29.91 FIXED MOBILE US340	29.89-29.91 US340	
			29.91-30 US340	29.91-30 FIXED US340	
30.005-30.01 SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH			30-30.56 FIXED MOBILE	30-30.56	
30.01-37.5 FIXED MOBILE			30.56-32	30.56-32 FIXED LAND MOBILE NG124	Private Land Mobile (90)
			32-33 FIXED MOBILE	32-33	
			33-34	33-34 FIXED LAND MOBILE NG124	Private Land Mobile (90)

			34-35 FIXED MOBILE	34-35	
			35-36	35-36 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
			36-37 FIXED MOBILE US220	36-37 US220	
			37-37.5	37-37.5 LAND MOBILE NG124	Private Land Mobile (90)
37.5-38.25 FIXED MOBILE Radio astronomy 5.149			37.5-38 Radio astronomy US342	37.5-38 LAND MOBILE Radio astronomy US342 NG59 NG124	
			38-38.25 FIXED MOBILE RADIO ASTRONOMY US81 US342	38-38.25 RADIO ASTRONOMY US81 US342	
38.25-39 FIXED MOBILE	38.25-39.986 FIXED MOBILE	38.25-39.5 FIXED MOBILE	38.25-39 FIXED MOBILE	38.25-39	
39-39.5 FIXED MOBILE Radiolocation 5.132A 5.159			39-40	39-40 LAND MOBILE NG124	Private Land Mobile (90)
39.5-39.986 FIXED MOBILE		39.5-39.986 FIXED MOBILE RADIOLOCATION 5.132A			
39.986-40.02 FIXED MOBILE Space research		39.986-40 FIXED MOBILE RADIOLOCATION 5.132A Space research			
		40-40.02 FIXED MOBILE Space research	40-41.015 FIXED MOBILE	40-41.015	ISM Equipment (18) Private Land Mobile (90)
40.02-40.98 FIXED MOBILE 5.150			5.150 US210 US220	5.150 US210 US220	Page 18

Table of Frequency Allocations			41.015-117.975 MHz (VHF)		Page 19
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
40.98-41.015 FIXED MOBILE Space research 5.160 5.161			(See previous page)		
41.015-42 FIXED MOBILE 5.160 5.161 5.161A			41.015-41.665 FIXED MOBILE RADIOLOCATION US132A US220	41.015-41.665 RADIOLOCATION US132A US220	Private Land Mobile (90)
			41.665-42 FIXED MOBILE US220	41.665-42 US220	
42-42.5 FIXED MOBILE Radiolocation 5.132A 5.160 5.161B	42-42.5 FIXED MOBILE 5.161		42-43.35	42-43.35 FIXED LAND MOBILE NG124 NG141	Public Mobile (22) Private Land Mobile (90)
42.5-44 FIXED MOBILE 5.160 5.161 5.161A			43.35-44 RADIOLOCATION US132A	43.35-43.69 FIXED LAND MOBILE RADIOLOCATION US132A NG124	
				43.69-44 LAND MOBILE RADIOLOCATION US132A NG124	Private Land Mobile (90)
44-47 FIXED MOBILE 5.162 5.162A			44-46.6	44-46.6 LAND MOBILE NG124 NG141	
			46.6-47 FIXED MOBILE	46.6-47	
47-68 BROADCASTING	47-50 FIXED MOBILE	47-50 FIXED MOBILE BROADCASTING 5.162A	47-49.6	47-49.6 LAND MOBILE NG124	Private Land Mobile (90)
			49.6-50 FIXED MOBILE	49.6-50	
	50-54 AMATEUR 5.162A 5.167 5.167A 5.168 5.170		50-73	50-54 AMATEUR	Amateur Radio (97)

5.162A 5.163 5.164 5.165 5.169 5.171	54-68 BROADCASTING Fixed Mobile 5.172	54-68 FIXED MOBILE BROADCASTING 5.162A		54-72 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
68-74.8 FIXED MOBILE except aeronautical mobile	68-72 BROADCASTING Fixed Mobile 5.173	68-74.8 FIXED MOBILE			
	72-73 FIXED MOBILE			72-73 FIXED MOBILE NG3 NG16 NG56	Public Mobile (22) Maritime (80) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	73-74.6 RADIO ASTRONOMY 5.178		73-74.6 RADIO ASTRONOMY US74 US246		
	74.6-74.8 FIXED MOBILE		74.6-74.8 FIXED MOBILE US273		Private Land Mobile (90)
5.149 5.175 5.177 5.179		5.149 5.176 5.179			
74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180 5.181			74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180		Aviation (87)
75.2-87.5 FIXED MOBILE except aeronautical mobile	75.2-75.4 FIXED MOBILE 5.179		75.2-75.4 FIXED MOBILE US273		Private Land Mobile (90)
	75.4-76 FIXED MOBILE	75.4-87 FIXED MOBILE	75.4-88	75.4-76 FIXED MOBILE NG3 NG16 NG56	Public Mobile (22) Maritime (80) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	76-88 BROADCASTING Fixed Mobile 5.185	5.182 5.183 5.188 87-100 FIXED MOBILE BROADCASTING		76-88 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
5.175 5.179 5.187 87.5-100 BROADCASTING 5.190	88-100 BROADCASTING		88-108	88-108 BROADCASTING NG2 US93 NG5	Broadcast Radio (FM)(73) FM Translator/Booster (74L)
100-108 BROADCASTING 5.192 5.194			US93		
108-117.975 AERONAUTICAL RADIONAVIGATION 5.197 5.197A			108-117.975 AERONAUTICAL RADIONAVIGATION 5.197A US93		Aviation (87)

Table of Frequency Allocations			117.975-150.8 MHz (VHF)		Page 21
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
117.975-137 AERONAUTICAL MOBILE (R) 5.111 5.200 5.201 5.202			117.975-121.9375 AERONAUTICAL MOBILE (R) 5.111 5.200 US26 US28 US36		Aviation (87)
			121.9375-123.0875 US30 US31 US33 US80 US102 US213	121.9375-123.0875 AERONAUTICAL MOBILE US30 US31 US33 US80 US102 US213	
			123.0875-123.5875 AERONAUTICAL MOBILE 5.200 US32 US33 US112		
			123.5875-128.8125 AERONAUTICAL MOBILE (R) US26 US36		
			128.8125-132.0125	128.8125-132.0125 AERONAUTICAL MOBILE (R)	
			132.0125-136 AERONAUTICAL MOBILE (R) US26		
			136-137 US244	136-137 AERONAUTICAL MOBILE (R) US244	
137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 SPACE RESEARCH (space-to-Earth) 5.208		Satellite Communications (25)
137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) US319 US320 5.208		
137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 SPACE RESEARCH (space-to-Earth) 5.208		

137.825-138 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137.825-138 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) US319 US320 5.208		
138-143.6 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	138-143.6 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	138-143.6 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	138-144 FIXED MOBILE G30	138-144	
143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214	143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213			
143.65-144 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	143.65-144 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213			
144-146 AMATEUR AMATEUR-SATELLITE 5.216			144-148	144-146 AMATEUR AMATEUR-SATELLITE	Amateur Radio (97)
146-148 FIXED MOBILE except aeronautical mobile (R)	146-148 AMATEUR 5.217	146-148 AMATEUR FIXED MOBILE 5.217		146-148 AMATEUR	
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221	148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221		148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) US319 US320 US323 US325 5.218 5.219 G30	148-149.9 MOBILE-SATELLITE (Earth-to-space) US320 US323 US325 5.218 5.219 US319	Satellite Communications (25)
149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220			149.9-150.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE		
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	150.05-154 FIXED MOBILE 5.225		150.05-150.8 FIXED MOBILE US73 G30	150.05-150.8 US73	

Table of Frequency Allocations			150.8-174 MHz (VHF)		Page 23
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)	(See previous page)		150.8-152.855 US73	150.8-152.855 FIXED LAND MOBILE NG4 NG51 NG112 US73 NG124	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological aids			152.855-156.2475	152.855-154 LAND MOBILE NG4 NG124	Remote Pickup (74D) Private Land Mobile (90)
154-156.4875 FIXED MOBILE except aeronautical mobile (R) 5.225A 5.226	154-156.4875 FIXED MOBILE 5.226	154-156.4875 FIXED MOBILE 5.225A 5.226		154-156.2475 FIXED LAND MOBILE NG112 5.226 NG22 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227			156.2475-156.5125 5.226 US52 US227 US266	156.2475-156.5125 MARITIME MOBILE NG22 5.226 US52 US227 US266 NG124	Maritime (80) Aviation (87)
			156.5125-156.5375 MARITIME MOBILE (distress, urgency, safety and calling via DSC) 5.111 5.226 US266		
156.5625-156.7625 FIXED MOBILE except aeronautical mobile (R) 5.226	156.5625-156.7625 FIXED MOBILE 5.226		156.5375-156.7625 5.226 US52 US227 US266	156.5375-156.7625 MARITIME MOBILE 5.226 US52 US227 US266	
156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.7625-156.7875 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.111 5.226 5.228	156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.7625-156.7875 MOBILE-SATELLITE (Earth-to-space) (AIS 3) 5.226 US52 US266		Satellite Communications (25) Maritime (80)
156.7875-156.8125 MARITIME MOBILE (distress and calling) 5.111 5.226			156.7875-156.8125 MARITIME MOBILE (distress, urgency, safety and calling) 5.111 5.226 US266		Maritime (80) Aviation (87)
156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.8125-156.8375 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.111 5.226 5.228	156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.8125-156.8375 MOBILE-SATELLITE (Earth-to-space) (AIS 4) 5.226 US52 US266		Satellite Communications (25) Maritime (80)
156.8375-161.9375 FIXED MOBILE except aeronautical mobile	156.8375-161.9375 FIXED MOBILE		156.8375-157.0375 5.226 US52 US266	156.8375-157.0375 MARITIME MOBILE 5.226 US52 US266	Maritime (80) Aviation (87)
			157.0375-157.1875 MARITIME MOBILE US214 5.226 US266 G109	157.0375-157.1875 5.226 US214 US266	Maritime (80)
			157.1875-161.575	157.1875-157.45 MOBILE except aeronautical mobile US266 5.226 NG111	Maritime (80) Aviation (87) Private Land Mobile (90)

				157.45-161.575 FIXED LAND MOBILE NG28 NG111 NG112 5.226 NG6 NG70 NG124 NG148 NG155	Public Mobile (22) Remote Pickup (74D) Maritime (80) Private Land Mobile (90)
			161.575-161.625 5.226 US52	161.575-161.625 MARITIME MOBILE 5.226 US52 NG6 NG17	Public Mobile (22) Maritime (80)
			161.625-161.9625 US266	161.625-161.775 LAND MOBILE NG6 5.226	Public Mobile (22) Remote Pickup (74D) Low Power Auxiliary (74H)
5.226	5.226			161.775-161.9625 MOBILE except aeronautical mobile US266 NG6 5.226	Maritime (80) Private Land Mobile (90)
161.9375-161.9625 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	161.9375-161.9625 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226				
161.9625-161.9875 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B	161.9625-161.9875 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D	161.9625-161.9875 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	161.9625-161.9875 AERONAUTICAL MOBILE (OR) (AIS 1) MARITIME MOBILE (AIS 1) MOBILE-SATELLITE (Earth-to-space) (AIS 1) 5.228C US52		Satellite Communications (25) Maritime (80)
161.9875-162.0125 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 5.229	161.9875-162.0125 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226		161.9875-162.0125	161.9875-162.0125 MOBILE except aeronautical mobile 5.226	Maritime (80)
162.0125-162.0375 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B 5.229	162.0125-162.0375 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D	162.0125-162.0375 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	162.0125-162.0375 AERONAUTICAL MOBILE (OR) (AIS 2) MARITIME MOBILE (AIS 2) MOBILE-SATELLITE (Earth-to-space) (AIS 2) 5.228C US52		Satellite Communications (25) Maritime (80)
162.0375-174 FIXED MOBILE except aeronautical mobile 5.226 5.229	162.0375-174 FIXED MOBILE 5.226 5.230 5.231		162.0375-173.2 FIXED MOBILE US8 US11 US13 US55 US73 US300 US312 G5	162.0375-173.2 US8 US11 US13 US55 US73 US300 US312	Remote Pickup (74D) Private Land Mobile (90)
			173.2-173.4	173.2-173.4 FIXED Land mobile	Private Land Mobile (90)
			173.4-174 FIXED MOBILE G5	173.4-174	

Table of Frequency Allocations			174-400.15 MHz (VHF/UHF)		Page 25
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile	174-223 FIXED MOBILE BROADCASTING	174-216	174-216 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
	216-220 FIXED MARITIME MOBILE Radiolocation 5.241 5.242		216-217 Fixed Land mobile US210 US241 G2	216-219 FIXED MOBILE except aeronautical mobile US210 US241 NG173	Maritime (80) Private Land Mobile (90) Personal Radio (95)
			217-220 Fixed Mobile US210 US241	219-220 FIXED MOBILE except aeronautical mobile Amateur NG152 US210 US241 NG173	Maritime (80) Private Land Mobile (90) Amateur Radio (97)
	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241		220-222 FIXED LAND MOBILE US241 US242		Private Land Mobile (90)
5.235 5.237 5.243		5.233 5.238 5.240 5.245	222-225	222-225 AMATEUR	Amateur Radio (97)
223-230 BROADCASTING Fixed Mobile 5.243 5.246 5.247		223-230 FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION Radiolocation 5.250			
	225-235 FIXED MOBILE		225-235 FIXED MOBILE G27	225-235	
230-235 FIXED MOBILE 5.247 5.251 5.252		230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 5.250			
235-267 FIXED MOBILE 5.111 5.252 5.254 5.256 5.256A			235-267 FIXED MOBILE 5.111 5.256 G27 G100	235-267 5.111 5.256	
267-272 FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257			267-322 FIXED MOBILE	267-322	

272-273 SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254			
273-312 FIXED MOBILE 5.254			
312-315 FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255			
315-322 FIXED MOBILE 5.254	G27 G100		
322-328.6 FIXED MOBILE RADIO ASTRONOMY 5.149	322-328.6 FIXED MOBILE US342 G27	322-328.6 US342	
328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258 5.259	328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258		Aviation (87)
335.4-387 FIXED MOBILE 5.254	335.4-399.9 FIXED MOBILE	335.4-399.9	
387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255			
390-399.9 FIXED MOBILE 5.254	G27 G100		
399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220	399.9-400.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE		Satellite Communications (25)
400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261 5.262	400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261		Page 26

Table of Frequency Allocations			400.15-456 MHz (UHF)		Page 27
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.262 5.264			400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 US324 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.264	400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 MOBILE-SATELLITE (space-to-Earth) US319 US320 US324 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.264	Satellite Communications (25)
401-402 METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile			401-402 METEOROLOGICAL AIDS (radiosonde) US70 SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) US64 US384	401-402 METEOROLOGICAL AIDS (radiosonde) US70 SPACE OPERATION (space-to-Earth) Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US64 US384	MedRadio (95I)
402-403 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile			402-403 METEOROLOGICAL AIDS (radiosonde) US70 EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) US64 US384	402-403 METEOROLOGICAL AIDS (radiosonde) US70 Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US64 US384	
403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265			403-406 METEOROLOGICAL AIDS (radiosonde) US70 US64 G6	403-406 METEOROLOGICAL AIDS (radiosonde) US70 US64	
406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.265 5.266 5.267			406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267		Maritime (EPIRBs) (80V) Aviation (ELTs) (87F) Personal Radio (95)
406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265			406.1-410 FIXED MOBILE RADIO ASTRONOMY US74 US13 US55 US117 G5 G6	406.1-410 RADIO ASTRONOMY US74 US13 US55 US117	Private Land Mobile (90)
410-420 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268			410-420 FIXED MOBILE SPACE RESEARCH (space-to-space) 5.268 US13 US55 US64 G5	410-420 US13 US55 US64	Private Land Mobile (90) MedRadio (95I)

420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271			420-450 RADIOLOCATION G2 G129 5.286 US64 US87 US230 US269 US270 US397 G8	420-450 Amateur US270 5.282 5.286 US64 US87 US230 US269 US397	Private Land Mobile (90) MedRadio (95I) Amateur Radio (97)
430-432 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277	430-432 RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279				
432-438 AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.276 5.277 5.280 5.281 5.282	432-438 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.277 5.278 5.279 5.281 5.282				
438-440 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277 5.283	438-440 RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279				
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286					
450-455 FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E			450-454 5.286 US64 US87	450-454 LAND MOBILE 5.286 US64 US87 NG112 NG124	Remote Pickup (74D) Low Power Auxiliary (74H) Private Land Mobile (90) MedRadio (95I)
			454-456	454-455 FIXED LAND MOBILE US64 NG32 NG112 NG148	Public Mobile (22) Maritime (80) MedRadio (95I)
455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	US64	455-456 LAND MOBILE US64	Remote Pickup (74D) Low Power Auxiliary (74H) MedRadio (95I)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
456-459 FIXED MOBILE 5.286AA 5.271 5.287 5.288			456-459 US64 US287 US288	456-460 FIXED LAND MOBILE US64 US287 US288 NG32 NG112 NG124 NG148	Public Mobile (22) Maritime (80) Private Land Mobile (90) MedRadio (95I)
459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460		
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290			460-470 Meteorological-satellite (space-to-Earth) US73 US209 US287 US288 US289	460-462.5375 FIXED LAND MOBILE US209 US289 NG124	Private Land Mobile (90)
				462.5375-462.7375 LAND MOBILE US289	Personal Radio (95)
				462.7375-467.5375 FIXED LAND MOBILE US73 US209 US287 US288 US289 NG124	Maritime (80) Private Land Mobile (90)
				467.5375-467.7375 LAND MOBILE US287 US288 US289	Maritime (80) Personal Radio (95)
				467.7375-470 FIXED LAND MOBILE US73 US288 US289 NG124	Maritime (80) Private Land Mobile (90)
470-694 BROADCASTING	470-512 BROADCASTING Fixed Mobile 5.292 5.293 5.295	470-585 FIXED MOBILE 5.296A BROADCASTING 5.291 5.298	470-608	470-512 FIXED LAND MOBILE BROADCASTING NG5 NG14 NG66 NG115 NG149	Public Mobile (22) Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H) Private Land Mobile (90)
	512-608 BROADCASTING 5.295 5.297	585-610 FIXED MOBILE 5.296A BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307		512-608 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	610-890 FIXED MOBILE 5.296A 5.313A 5.317A BROADCASTING	608-614 LAND MOBILE (medical telemetry and medical telecommand) RADIO ASTRONOMY US74 US246		Personal Radio (95)

5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312	614-698 BROADCASTING Fixed Mobile 5.293 5.308 5.308A 5.309 5.311A		614-890	614-698 FIXED MOBILE NG5 NG14 NG33 NG115 NG149	RF Devices (15) Wireless Communications (27) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
694-790 MOBILE except aeronautical mobile 5.312A 5.317A BROADCASTING	698-806 MOBILE 5.317A BROADCASTING Fixed			698-758 FIXED MOBILE BROADCASTING NG159	Wireless Communications (27) LPTV and TV Translator (74G)
				758-775 FIXED MOBILE NG34 NG159	Public Safety Land Mobile (90R)
				775-788 FIXED MOBILE BROADCASTING NG159	Wireless Communications (27) LPTV and TV Translator (74G)
5.300 5.311A 5.312				788-805 FIXED MOBILE NG34 NG159	Public Safety Land Mobile (90R)
790-862 FIXED MOBILE except aeronautical mobile 5.316B 5.317A BROADCASTING				805-806 FIXED MOBILE BROADCASTING NG159	Wireless Communications (27) LPTV and TV Translator (74G)
	5.293 5.309 5.311A				
	806-890 FIXED MOBILE 5.317A BROADCASTING			806-809 LAND MOBILE	Public Safety Land Mobile (90S)
				809-849 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
				849-851 AERONAUTICAL MOBILE	Public Mobile (22)
				851-854 LAND MOBILE	Public Safety Land Mobile (90S)
5.312 5.319				854-894 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322					
5.319 5.323	5.317 5.318	5.149 5.305 5.306 5.307 5.311A 5.320		US116 US268	Page 30

Table of Frequency Allocations			894-1400 MHz (UHF)		Page 31
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation	890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.318 5.325	890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation	890-902 US116 US268 G2	(See previous page) 894-896 AERONAUTICAL MOBILE US116 US268	Public Mobile (22)
				896-897.5 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				897.5-900.5 FIXED MOBILE except aeronautical mobile US116 US268	Wireless Communications (27) Private Land Mobile (90)
				900.5-901 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				901-902 FIXED MOBILE US116 US268	Personal Communications (24)
	902-928 FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326		902-928 RADIOLOCATION G59 5.150 US218 US267 US275 G11	902-928 5.150 US218 US267 US275	RF Devices (15) ISM Equipment (18) Private Land Mobile (90) Amateur Radio (97)
	928-942 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation		928-932 US116 US268 G2	928-929 FIXED US116 US268 NG35	Public Mobile (22) Private Land Mobile (90) Fixed Microwave (101)
				929-930 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				930-931 FIXED MOBILE US116 US268	Personal Communications (24)
				931-932 FIXED LAND MOBILE US116 US268	Public Mobile (22)
			932-935 FIXED US268 G2	932-935 FIXED US268 NG35	Public Mobile (22) Fixed Microwave (101)
			935-941	935-936.5 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				936.5-939.5 FIXED MOBILE except aeronautical mobile US116 US268	Wireless Communications (27) Private Land Mobile (90)
5.323	5.325	5.327	US116 US268 G2	939.5-940	

				FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				940-941 FIXED MOBILE US116 US268	Personal Communications (24)
942-960 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323	942-960 FIXED MOBILE 5.317A	942-960 FIXED MOBILE 5.317A BROADCASTING 5.320	941-944 FIXED US84 US268 US301 G2	941-944 FIXED US84 US268 US301 NG30 NG35	Public Mobile (22) Aural Broadcast Auxiliary (74E) Low Power Auxiliary (74H) Fixed Microwave (101)
			944-960	944-960 FIXED NG35	
960-1164 AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 5.328AA			960-1164 AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 US224		Aviation (87)
1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A			1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328A US224		
1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332			1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) G132 SPACE RESEARCH (active) 5.332	1215-1240 Earth exploration-satellite (active) Space research (active)	
1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A			1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 SPACE RESEARCH (active) AERONAUTICAL RADIONAVIGATION 5.332 5.335	1240-1300 AERONAUTICAL RADIONAVIGATION Amateur Earth exploration-satellite (active) Space research (active) 5.282	Amateur Radio (97)
1300-1350 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.149 5.337A			1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation G2 US342	1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 US342	Aviation (87)
1350-1400 FIXED MOBILE RADIOLOCATION	1350-1400 RADIOLOCATION 5.338A		1350-1390 FIXED MOBILE RADIOLOCATION G2 5.334 5.339 US342 US385 G27 G114	1350-1390 5.334 5.339 US342 US385	
			1390-1395 5.339 US79 US342 US385	1390-1395 FIXED MOBILE except aeronautical mobile 5.339 US79 US342 US385 NG338A	Wireless Communications (27)
5.149 5.338 5.338A 5.339	5.149 5.334 5.339		1395-1400 LAND MOBILE (medical telemetry and medical telecommand) 5.339 US79 US342 US385		Personal Radio (95)

Table of Frequency Allocations			1400-1626.5 MHz (UHF)		Page 33
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341A 5.341B 5.341C 5.338A 5.341			1427-1429.5 LAND MOBILE (medical telemetry and medical telecommand) US350 5.341 US79	1427-1429.5 LAND MOBILE (telemetry and telecommand) Fixed (telemetry) 5.341 US79 US350 NG338A	Private Land Mobile (90) Personal Radio (95)
1429-1452 FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 5.342	1429-1452 FIXED MOBILE 5.341B 5.341C 5.343 5.338A 5.341		1429.5-1432 5.341 US79 US350	1429.5-1432 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand) 5.341 US79 US350 NG338A	
			1432-1435 5.341 US83	1432-1435 FIXED MOBILE except aeronautical mobile 5.341 US83 NG338A	Wireless Communications (27)
1452-1492 FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.342 5.345	1452-1492 FIXED MOBILE 5.341B 5.343 5.346A BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.344 5.345		1435-1525 MOBILE (aeronautical telemetry) US338A		Aviation (87)
1492-1518 FIXED MOBILE except aeronautical mobile 5.341A 5.341 5.342	1492-1518 FIXED MOBILE 5.341B 5.343 5.341 5.344	1492-1518 FIXED MOBILE 5.341C 5.341			
1518-1525 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342	1518-1525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344	1518-1525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341	5.341 US84 US343		

1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	1525-1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.351 5.352A 5.354	1525-1535 MOBILE-SATELLITE (space-to-Earth) US315 US380 5.341 5.351	Satellite Communications (25) Maritime (80)
1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.351 5.354	1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354			
1535-1559 MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			1535-1559 MOBILE-SATELLITE (space-to-Earth) US308 US309 US315 US380 5.341 5.351 5.356	Satellite Communications (25) Maritime (80) Aviation (87)
1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341			1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth)(space-to-space) 5.341 US85 US208 US260	Aviation (87)
1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208	Satellite Communications (25) Aviation (87)
1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) US319 US380 RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208 US342	
1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.341 5.364 5.365 5.366 5.367 5.368 5.372 US208	

Table of Frequency Allocations			1626.5-2110 MHz (UHF)		Page 35
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
1626.5-1660 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376			1626.5-1660 MOBILE-SATELLITE (Earth-to-space) US308 US309 US315 US380 5.341 5.351 5.375		Satellite Communications (25) Maritime (80) Aviation (87)
1660-1660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A			1660-1660.5 MOBILE-SATELLITE (Earth-to-space) US308 US309 US380 RADIO ASTRONOMY 5.341 5.351 US342		Satellite Communications (25) Aviation (87)
1660.5-1668 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A			1660.5-1668.4 RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
1668-1668.4 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A			5.341 US246		
1668.4-1670 METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E			1668.4-1670 METEOROLOGICAL AIDS (radiosonde) RADIO ASTRONOMY US74 5.341 US99 US342		
1670-1675 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.379E 5.380A			1670-1675 5.341 US211 US362	1670-1675 FIXED MOBILE except aeronautical mobile 5.341 US211 US362	Wireless Communications (27)
1675-1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341			1675-1695 METEOROLOGICAL AIDS (radiosonde) METEOROLOGICAL-SATELLITE (space-to-Earth) US88 5.341 US211 US289		
1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341 5.381		1695-1710 METEOROLOGICAL-SATELLITE (space-to-Earth) US88	1695-1710 FIXED MOBILE except aeronautical mobile	Wireless Communications (27)

1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341		1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	5.341	5.341 US88	
1710-1930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388			1710-1761 5.341 US91 US378 US385	1710-1780 FIXED MOBILE 5.341 US91 US378 US385	
			1761-1780 SPACE OPERATION (Earth-to-space) G42 US91		
			1780-1850 FIXED MOBILE SPACE OPERATION (Earth-to-space) G42	1780-1850	
1930-1970 FIXED MOBILE 5.388A 5.388B 5.388	1930-1970 FIXED MOBILE 5.388A 5.388B Mobile-satellite (Earth-to-space) 5.388	1930-1970 FIXED MOBILE 5.388A 5.388B 5.388	1850-2025	1850-2000 FIXED MOBILE	RF Devices (15) Personal Communications (24) Wireless Communications (27) Fixed Microwave (101)
1970-1980 FIXED MOBILE 5.388A 5.388B 5.388					
1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F					
				2000-2020 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25) Wireless Communications (27)
2010-2025 FIXED MOBILE 5.388A 5.388B 5.388	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	2010-2025 FIXED MOBILE 5.388A 5.388B 5.388		2020-2025 FIXED MOBILE	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) SPACE RESEARCH (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 5.392 US90 US92 US222 US346 US347	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US92 US222 US346 US347	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2110-2120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388			2110-2120 US252	2110-2120 FIXED MOBILE US252	Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388 2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E	2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2200	2120-2180 FIXED MOBILE NG41	
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F				2180-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE 5.384A Amateur Radiolocation	2300-2450 FIXED MOBILE 5.384A RADIOLOCATION Amateur		2300-2305 G122	2300-2305 Amateur	Amateur Radio (97)
			2305-2310 US97 G122	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US97	Wireless Communications (27) Amateur Radio (97)

		2310-2320 Fixed Mobile US100 Radiolocation G2 US97 US327	2310-2320 FIXED MOBILE BROADCASTING-SATELLITE RADIOLOCATION 5.396 US97 US100 US327	Wireless Communications (27)
		2320-2345 Fixed Radiolocation G2 US327	2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25)
		2345-2360 Fixed Mobile US100 Radiolocation G2 US327	2345-2360 FIXED MOBILE US100 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327	Wireless Communications (27)
		2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed US101	2360-2390 MOBILE US276 US101	Aviation (87) Personal Radio (95)
		2390-2395 MOBILE US276 US101	2390-2395 AMATEUR MOBILE US276 US101	Aviation (87) Personal Radio (95) Amateur Radio (97)
		2395-2400 US101 G122	2395-2400 AMATEUR US101	Personal Radio (95) Amateur Radio (97)
		2400-2417 5.150 G122	2400-2417 AMATEUR 5.150 5.282	RF Devices (15) ISM Equipment (18) Amateur Radio (97)
5.150 5.282 5.395	5.150 5.282 5.393 5.394 5.396	2417-2450 Radiolocation G2 5.150	2417-2450 Amateur 5.150 5.282	
2450-2483.5 FIXED MOBILE Radiolocation 5.150	2450-2483.5 FIXED MOBILE RADIOLOCATION 5.150	2450-2483.5 5.150 US41	2450-2483.5 FIXED MOBILE Radiolocation 5.150 US41	RF Devices (15) ISM Equipment (18) TV Auxiliary Broadcasting (74F) Private Land Mobile (90) Fixed Microwave (101)

Table of Frequency Allocations		2483.5-3500 MHz (UHF/SHF)			Page 39
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 Radiolocation 5.398A 5.150 5.399 5.401 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.401 5.402	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 US391 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41	2483.5-2495 MOBILE-SATELLITE (space-to-Earth) US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 US319 NG147	ISM Equipment (18) Satellite Communications (25)
				2495-2500 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 US319 US391 NG147	ISM Equipment (18) Satellite Communications (25) Wireless Communications (27)
2500-2520 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.412	2500-2520 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.404	2500-2520 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A 5.404 5.415A	2500-2655	2500-2655 FIXED US205 MOBILE except aeronautical mobile 5.339	Wireless Communications (27)
2520-2655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.412 5.418B 5.418C	2520-2655 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418B 5.418C	2520-2535 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.414A 5.415A 2535-2655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C	5.339 US205		
2655-2670 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	2655-2670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B	2655-2670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B 5.420	2655-2690 Earth exploration-satellite (passive) Radio astronomy US385 Space research (passive)	2655-2690 FIXED US205 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Radio astronomy Space research (passive)	

2670-2690 FIXED 5.410 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	2670-2690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	2670-2690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149		US205	US385	
2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.422				2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
2700-2900 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424				2700-2900 METEOROLOGICAL AIDS AERONAUTICAL RADIONAVIGATION 5.337 US18 Radiolocation G2 5.423 G15	2700-2900 5.423 US18	Aviation (87)
2900-3100 RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427				2900-3100 RADIOLOCATION 5.424A G56 MARITIME RADIONAVIGATION 5.427 US44 US316	2900-3100 MARITIME RADIONAVIGATION Radiolocation US44 5.427 US316	Maritime (80) Private Land Mobile (90)
3100-3300 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428				3100-3300 RADIOLOCATION G59 Earth exploration-satellite (active) Space research (active) US342	3100-3300 Earth exploration-satellite (active) Space research (active) Radiolocation US342	Private Land Mobile (90)
3300-3400 RADIOLOCATION 5.149 5.429 5.429A 5.429B 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.429C 5.429D	3300-3400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F		3300-3500 RADIOLOCATION US108 G2	3300-3500 Amateur Radiolocation US108	Private Land Mobile (90) Amateur Radio (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433 5.282	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433 5.282 5.432A		US342	5.282 US342	

Table of Frequency Allocations			3500-5460 MHz (SHF)		Page 41
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B Radiolocation 5.433	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	3500-3550 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3500-3550 Radiolocation	Private Land Mobile (90)
			3550-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3550-3600 FIXED MOBILE except aeronautical mobile US105 US433	Citizens Broadband (96)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435	US105 US107 US245 US433	3600-3650 FIXED FIXED-SATELLITE (space-to-Earth) US107 US245 MOBILE except aeronautical mobile US105 US433	Satellite Communications (25) Citizens Broadband (96)
			3650-3700 US109 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth) NG169 NG185 MOBILE except aeronautical mobile US109 US349	
	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		3700-4200	3700-4000 FIXED MOBILE except aeronautical mobile NG182 NG457A	Wireless Communications (27)
				4000-4200 FIXED FIXED-SATELLITE (space-to-Earth) NG457A NG182	Satellite Communications (25)
4200-4400 AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION 5.440 US261		Aviation (87)
4400-4500 FIXED MOBILE 5.440A			4400-4940 FIXED MOBILE US113 US245 US342	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A				4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy 5.149 5.339 5.443				4800-4940 US113 US342	
			4940-4990 5.339 US342 US385 G122	4940-4990 FIXED MOBILE except aeronautical mobile 5.339 US342 US385	Public Safety Land Mobile (90Y)
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149			4990-5000 RADIO ASTRONOMY US74 Space research (passive) US246		

5000-5010 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space)	5000-5010 AERONAUTICAL MOBILE (R) US115 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (Earth-to-space) US211		Aviation (87)
5010-5030 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B	5010-5030 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.443B US115 US211		
5030-5091 AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIONAVIGATION 5.444	5030-5091 AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIONAVIGATION US260 US211 US444		
5091-5150 FIXED-SATELLITE (Earth-to-space) 5.444A AERONAUTICAL MOBILE 5.444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION 5.444	5091-5150 AERONAUTICAL MOBILE US111 US444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION US260 US211 US344 US444 US444A		Satellite Communications (25) Aviation (87)
5150-5250 FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446 5.446C 5.447 5.447B 5.447C	5150-5250 AERONAUTICAL RADIONAVIGATION US260 US211 US307 US344	5150-5250 FIXED-SATELLITE (Earth-to-space) 5.447A US344 AERONAUTICAL RADIONAVIGATION US260 5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)
5250-5255 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.447E 5.448 5.448A	5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.447D 5.448A	5250-5255 Earth exploration-satellite (active) Radiolocation Space research	RF Devices (15) Private Land Mobile (90)
5255-5350 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.447E 5.448 5.448A	5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.448A	5255-5350 Earth exploration-satellite (active) Radiolocation Space research (active) 5.448A	
5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C	5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION G56 AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) US390 G130	5350-5460 AERONAUTICAL RADIONAVIGATION 5.449 Earth exploration-satellite (active) 5.448B Radiolocation Space research (active) US390	Aviation (87) Private Land Mobile (90)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
5460-5470 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448B			5460-5470 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION 5.449 US65 SPACE RESEARCH (active) 5.448B US49 G130	5460-5470 RADIONAVIGATION 5.449 US65 Earth exploration-satellite (active) Radiolocation Space research (active) 5.448B US49	Maritime (80) Aviation (87) Private Land Mobile (90)
5470-5570 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) 5.448B 5.450 5.451			5470-5570 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 MARITIME RADIONAVIGATION US65 SPACE RESEARCH (active) 5.448B US50 G131	5470-5570 RADIOLOCATION MARITIME RADIONAVIGATION US65 Earth exploration-satellite (active) Space research (active) US50	RF Devices (15) Maritime (80) Private Land Mobile (90)
5570-5650 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.450 5.451 5.452			5570-5600 RADIOLOCATION G56 MARITIME RADIONAVIGATION US65 US50 G131	5570-5600 RADIOLOCATION MARITIME RADIONAVIGATION US65 US50	
			5600-5650 METEOROLOGICAL AIDS RADIOLOCATION G56 MARITIME RADIONAVIGATION US65 5.452 US50 G131	5600-5650 METEOROLOGICAL AIDS RADIOLOCATION MARITIME RADIONAVIGATION US65 5.452 US50	
5650-5725 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282 5.451 5.453 5.454 5.455			5650-5925 RADIOLOCATION G2	5650-5830 Amateur 5.150 5.282	RF Devices (15) ISM Equipment (18) Amateur Radio (97)
5725-5830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455	5725-5830 RADIOLOCATION Amateur 5.150 5.453 5.455				
5830-5850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455	5830-5850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455			5830-5850 Amateur Amateur-satellite (space-to-Earth) 5.150	

5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	5.150 US245	5850-5925 FIXED-SATELLITE (Earth-to-space) US245 MOBILE NG160 Amateur 5.150	RF Devices (15) ISM Equipment (18) Private Land Mobile (90) Personal Radio (95) Amateur Radio (97)
5925-6700 FIXED 5.457 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.149 5.440 5.458			5925-6425 5.458 US342	5925-6425 FIXED FIXED-SATELLITE (Earth-to-space) NG457A 5.458 US342	RF Devices (15) Satellite Communications (25) Fixed Microwave (101)
			6425-6525 5.440 5.458	6425-6525 FIXED-SATELLITE (Earth-to-space) MOBILE 5.440 5.458	RF Devices (15) Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
			6525-6700 5.458 US342	6525-6700 FIXED FIXED-SATELLITE (Earth-to-space) 5.458 US342	RF Devices (15) Satellite Communications (25) Fixed Microwave (101)
6700-7075 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B			6700-7125 5.458	6700-6875 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 5.458 5.458A 5.458B	
				6875-7025 FIXED NG118 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE NG171 5.458 5.458A 5.458B	RF Devices (15) Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78)
				7025-7075 FIXED NG118 FIXED-SATELLITE (Earth-to-space) NG172 MOBILE NG171 5.458 5.458A 5.458B	RF Devices (15) TV Broadcast Auxiliary (74F) Cable TV Relay (78)
7075-7145 FIXED MOBILE 5.458 5.459				7075-7125 FIXED NG118 MOBILE NG171 5.458	
			7125-7145 FIXED 5.458 G116	7125-7145 5.458	RF Devices (15)

Table of Frequency Allocations			7145-8650 MHz (SHF)		Page 45
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
7145-7190 FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459			7145-7190 FIXED SPACE RESEARCH (deep space)(Earth-to-space) US262 5.458 G116	7145-7235	RF Devices (15)
7190-7235 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459			7190-7235 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED SPACE RESEARCH (Earth-to-space) 5.460 5.458 G134	5.458 US262	
7235-7250 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE 5.458			7235-7250 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED 5.458	7235-7250 5.458	
7250-7300 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461			7250-7300 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Fixed G117	7250-8025	
7300-7375 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461			7300-7375 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G117		
7375-7450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB			7375-7450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB Mobile-satellite except maritime mobile-satellite (space-to-Earth) G117		
7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A			7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB Mobile-satellite except maritime mobile-satellite (space-to-Earth) G104 G117		

7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB Mobile-satellite except maritime mobile-satellite (space-to-Earth) G117		
7750-7900 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	7750-7900 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B		
7900-8025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	7900-8025 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Fixed G117		
8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space)(no airborne transmissions) US258 G117	8025-8400	
8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space)(no airborne transmissions) US258 G104 G117		
8215-8400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	8215-8400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space)(no airborne transmissions) US258 G117	US258	
8400-8500 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465 5.466	8400-8450 FIXED SPACE RESEARCH (deep space)(space-to-Earth)	8400-8450 Space research (deep space) (space-to-Earth)	
	8450-8500 FIXED SPACE RESEARCH (space-to-Earth)	8450-8500 SPACE RESEARCH (space-to-Earth)	
8500-8550 RADIOLOCATION 5.468 5.469	8500-8550 RADIOLOCATION G59	8500-8550 Radiolocation	Private Land Mobile (90)
8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469 5.469A	8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active)	8550-8650 Earth exploration-satellite (active) Radiolocation Space research (active)	

Table of Frequency Allocations			8.65-11.7 GHz (SHF)		Page 47
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
8.65-8.75 RADIOLOCATION 5.468 5.469			8.65-9 RADIOLOCATION G59	8.65-9 Radiolocation	Aviation (87) Private Land Mobile (90)
8.75-8.85 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471					
8.85-9 RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473			US53	US53	
9-9.2 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION 5.471 5.473A			9-9.2 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION G2 5.473A G19	9-9.2 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation	
9.2-9.3 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473 5.474 5.474D			9.2-9.3 MARITIME RADIONAVIGATION 5.472 Radiolocation US110 G59 5.474	9.2-9.3 MARITIME RADIONAVIGATION 5.472 Radiolocation US110 5.474	Maritime (80) Private Land Mobile (90)
9.3-9.5 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION 5.475 SPACE RESEARCH (active) 5.427 5.474 5.475A 5.475B 5.476A			9.3-9.5 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION US475 SPACE RESEARCH (active) Meteorological aids 5.427 5.474 5.475A 5.475B US67 US71 US476A	9.3-9.5 RADIONAVIGATION US475 Meteorological aids Earth exploration-satellite (active) Radiolocation Space research (active) 5.427 5.474 US67 US71 US476A	Maritime (80) Aviation (87) Private Land Mobile (90)
9.5-9.8 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A			9.5-9.8 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)	9.5-9.9 Earth exploration-satellite (active) Radiolocation Space research (active)	Private Land Mobile (90)
9.8-9.9 RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.477 5.478 5.478A 5.478B			9.8-9.9 RADIOLOCATION Earth exploration-satellite (active) Space research (active)		
9.9-10 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.474D 5.477 5.478 5.479			9.9-10 RADIOLOCATION 5.479	9.9-10 Radiolocation 5.479	

10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479	10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Amateur 5.474D 5.479 5.480	10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479	10-10.5 RADIOLOCATION US108 G32 5.479 US128	10-10.45 Amateur Radiolocation US108 5.479 US128 NG50	Private Land Mobile (90) Amateur Radio (97)
10.4-10.45 FIXED MOBILE RADIOLOCATION Amateur	10.4-10.45 RADIOLOCATION Amateur 5.480	10.4-10.45 FIXED MOBILE RADIOLOCATION Amateur			
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481				10.45-10.5 Amateur Amateur-satellite Radiolocation US108 US128 NG50	
10.5-10.55 FIXED MOBILE Radiolocation	10.5-10.55 FIXED MOBILE RADIOLOCATION		10.5-10.55 RADIOLOCATION US59		Private Land Mobile (90)
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation			10.55-10.6	10.55-10.6 FIXED	Fixed Microwave (101)
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US130 US131 US482	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED US482 SPACE RESEARCH (passive) US130 US131	
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US131 US246		
10.7-10.95 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-10.95 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile		10.7-11.7 US131 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US131 US211 NG52 NG527A	Satellite Communications (25) Fixed Microwave (101)
10.95-11.2 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.95-11.2 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile				

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
11.2-11.45 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 (Earth-to-space) 5.484 MOBILE except aeronautical mobile	11.2-11.45 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile		(See previous page)		
11.45-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space) 5.484 MOBILE except aeronautical mobile	11.45-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile				
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 Mobile except aeronautical mobile 5.485	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	11.7-12.2	11.7-12.2 FIXED-SATELLITE (space-to-Earth) 5.485 5.488 NG143 NG527A	Satellite Communications (25)
	12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 5.485 5.489	5.487 5.487A			
	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487A 5.488 5.490	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.484B MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	12.2-12.75	12.2-12.7 FIXED BROADCASTING-SATELLITE 5.487A 5.488 5.490	Satellite Communications (25) Fixed Microwave (101)
12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space) 5.494 5.495 5.496	12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	12.5-12.75 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493		12.7-12.75 FIXED NG118 FIXED-SATELLITE (Earth-to-space) MOBILE	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
12.75-13.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)			12.75-13.25 US251	12.75-13.25 FIXED NG118 FIXED-SATELLITE (Earth-to-space) 5.441 NG52 NG57 MOBILE US251 NG53	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499			13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A	13.25-13.4 AERONAUTICAL RADIONAVIGATION 5.497 Earth exploration-satellite (active) Space research (active)	Aviation (87)

13.4-13.65 EARTH EXPLORATION-SATELLITE (active) FIXED-SATELLITE (space-to-Earth) 5.499A 5.499B RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.499E 5.500 5.501 5.501B	13.4-13.65 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B		13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH 5.499C 5.499D 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.501B	13.4-13.75 Earth exploration-satellite (active) Radiolocation Space research Standard frequency and time signal-satellite (Earth-to-space)	Private Land Mobile (90)
13.65-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B					
13.75-14 FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503			13.75-14 RADIOLOCATION G59 Standard frequency and time signal-satellite (Earth-to-space) Space research US337 US356 US357	13.75-14 FIXED-SATELLITE (Earth-to-space) US337 Standard frequency and time signal-satellite (Earth-to-space) Space research Radiolocation US356 US357	Satellite Communications (25) Private Land Mobile (90)
14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research 5.504A 5.505			14-14.2 Space research US133	14-14.2 FIXED-SATELLITE (Earth-to-space) NG527A Mobile-satellite (Earth-to-space) Space research US133	Satellite Communications (25)
14.25-14.3 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research 5.504A 5.505 5.508			14.2-14.4	14.2-14.47 FIXED-SATELLITE (Earth-to-space) NG527A Mobile-satellite (Earth-to-space)	
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A			
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A			14.4-14.47 Fixed Mobile		

Table of Frequency Allocations			14.47-18.6 GHz (SHF)		Page 51
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
14.47-14.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A			14.47-14.5 Fixed Mobile US113 US133 US342	14.47-14.5 FIXED-SATELLITE (Earth-to-space) NG527A Mobile-satellite (Earth-to-space) US113 US133 US342	Satellite Communications (25)
14.5-14.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G			14.5-14.7145 FIXED Mobile Space research 5.509G	14.5-14.8	
14.75-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research 5.509G		14.75-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G	14.7145-14.8 MOBILE Fixed Space research 5.509G		
14.8-15.35 FIXED MOBILE Space research 5.339			14.8-15.1365 MOBILE SPACE RESEARCH Fixed US310	14.8-15.1365 US310	
			15.1365-15.35 FIXED SPACE RESEARCH Mobile 5.339 US211	15.1365-15.35 5.339 US211	
15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511			15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
15.4-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION			15.4-15.43 RADIOLOCATION 5.511E 5.511F US511E AERONAUTICAL RADIONAVIGATION US260 US211	15.4-15.43 AERONAUTICAL RADIONAVIGATION US260 US211 US511E	Aviation (87)
15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C			15.43-15.63 RADIOLOCATION 5.511E 5.511F US511E AERONAUTICAL RADIONAVIGATION US260 5.511C US211 US359	15.43-15.63 FIXED-SATELLITE (Earth-to-space) AERONAUTICAL RADIONAVIGATION US260 5.511C US211 US359 US511E	Satellite Communications (25) Aviation (87)

15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION			15.63-15.7 RADIOLOCATION 5.511E 5.511F US511E AERONAUTICAL RADIONAVIGATION US260 US211	15.63-15.7 AERONAUTICAL RADIONAVIGATION US260 US211 US511E	Aviation (87)
15.7-16.6 RADIOLOCATION 5.512 5.513			15.7-16.6 RADIOLOCATION G59	15.7-17.2 Radiolocation	Private Land Mobile (90)
16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512 5.513			16.6-17.1 RADIOLOCATION G59 Space research (deep space) (Earth-to-space)		
17.1-17.2 RADIOLOCATION 5.512 5.513			17.1-17.2 RADIOLOCATION G59		
17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.512 5.513 5.513A			17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active)	17.2-17.3 Earth exploration-satellite (active) Radiolocation Space research (active)	
17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation 5.514	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.514 5.515	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation 5.514	17.3-17.7 Radiolocation US259 G59 US402 G117	17.3-17.7 FIXED-SATELLITE (Earth-to-space) US271 BROADCASTING-SATELLITE US402 NG163 US259	Satellite Communications (25)
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 US334 G117	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-space) US271 US334	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE 5.519		17.8-18.3 FIXED-SATELLITE (space-to-Earth) US334 G117 US519	17.8-18.3 FIXED Fixed-satellite (space-to-Earth) US334 US519 NG527A	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE 5.519 5.521			18.3-18.6 FIXED-SATELLITE (space-to-Earth) US334 G117	18.3-18.6 FIXED-SATELLITE (space-to-Earth) NG527A	Satellite Communications (25)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE			US139	US139 US334	

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 US334 G117 SPACE RESEARCH (passive) US139 US254	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 NG527A SPACE RESEARCH (passive) US139 US254 US334	Satellite Communications (25)
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) US334 G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 NG527A US139 US334	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE				19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) NG166 US334 NG527A	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A Mobile-satellite (space-to-Earth) 5.524		19.7-20.2 FIXED-SATELLITE (space-to-Earth) NG527A MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528			US139	5.525 5.526 5.527 5.528 5.529 US334	
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) G117	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US532		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.530D	21.4-22 FIXED MOBILE 5.530A	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.530D 5.531	21.4-22 FIXED MOBILE		

22-22.21 FIXED MOBILE except aeronautical mobile 5.149			22-22.21 FIXED MOBILE except aeronautical mobile US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) US342 US532		
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE US211		
22.55-23.15 FIXED INTER-SATELLITE 5.338A MOBILE SPACE RESEARCH (Earth-to-space) 5.532A 5.149			22.55-23.15 FIXED INTER-SATELLITE US145 US278 MOBILE SPACE RESEARCH (Earth-to-space) 5.532A US342		Satellite Communications (25) Fixed Microwave (101)
23.15-23.55 FIXED INTER-SATELLITE 5.338A MOBILE			23.15-23.55 FIXED INTER-SATELLITE US145 US278 MOBILE		
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
24-24.05 AMATEUR AMATEUR-SATELLITE 5.150			24-24.05 5.150 US211	24-24.05 AMATEUR AMATEUR-SATELLITE 5.150 US211	ISM Equipment (18) Amateur Radio (97)
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150			24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active) 5.150	24.05-24.25 Amateur Earth exploration-satellite (active) Radiolocation 5.150	RF Devices (15) ISM Equipment (18) Private Land Mobile (90) Amateur Radio (97)
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 FIXED MOBILE RADIONAVIGATION	24.25-24.45	24.25-24.45 FIXED MOBILE	RF Devices (15) Upper Microwave Flexible Use (30)

Table of Frequency Allocations		24.45-31.8 GHz (SHF/EHF)			Page 55
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
24.45-24.65 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 5.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION 5.533	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 5.533		RF Devices (15) Satellite Communications (25)
24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE 5.533	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B	24.75-25.25 FIXED-SATELLITE (Earth-to-space) 5.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE	24.75-25.25	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) NG65 MOBILE	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30)
25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.25-25.5 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	RF Devices (15)
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A			25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	25.5-27 SPACE RESEARCH (space-to-Earth) Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE		27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 Inter-satellite 5.536	
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540			27.5-30	27.5-28.35 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30) Fixed Microwave (101)
				28.35-29.1 FIXED-SATELLITE (Earth-to-space) NG165 NG527A	RF Devices (15) Satellite Communications (25)

28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540				NG62	
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540				29.1-29.25 FIXED FIXED-SATELLITE (Earth-to-space) NG166 MOBILE	Satellite Communications (25) Fixed Microwave (101)
				29.25-29.5 FIXED-SATELLITE (Earth-to-space) NG527A NG535A NG62	Satellite Communications (25)
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542		29.5-30 FIXED-SATELLITE (Earth-to-space) NG527A MOBILE-SATELLITE (Earth-to-space) 5.525 5.526 5.527 5.529 5.543	
29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542					
30-31 FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.542			30-31 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) G117	30-31 Standard frequency and time signal-satellite (space-to-Earth)	
31-31.3 FIXED 5.338A 5.543A MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 5.149			31-31.3 Standard frequency and time signal-satellite (space-to-Earth) US211 US342	31-31.3 FIXED NG60 MOBILE Standard frequency and time signal-satellite (space-to-Earth) US211 US342	Fixed Microwave (101)
31.3-31.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			31.3-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.546	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149			

Table of Frequency Allocations			31.8-42 GHz (EHF)			Page 57
International Table			United States Table			FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table		
31.8-32 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B 5.548			31.8-32.3 RADIONAVIGATION US69 SPACE RESEARCH (deep space) (space-to-Earth) US262 5.548 US211	31.8-32.3 SPACE RESEARCH (deep space) (space-to-Earth) US262 5.548 US211		
32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548						
32.3-33 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D 5.548			32.3-33 INTER-SATELLITE US278 RADIONAVIGATION US69 5.548			Aviation (87)
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547 5.547E			33-33.4 RADIONAVIGATION US69 US360 G117			
33.4-34.2 RADIOLOCATION 5.549			33.4-34.2 RADIOLOCATION US360 G117	33.4-34.2 Radiolocation US360		Private Land Mobile (90)
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549			34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) US262 US360 G34 G117	34.2-34.7 Radiolocation Space research (deep space) (Earth-to-space) US262 US360		
34.7-35.2 RADIOLOCATION Space research 5.550 5.549			34.7-35.5 RADIOLOCATION US360 G117	34.7-35.5 Radiolocation US360		
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549						
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A			35.5-36 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) US360 G117	35.5-36 Earth exploration-satellite (active) Radiolocation Space research (active) US360		
36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A			36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US342 US550A			

37-37.5 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.547			37-38 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth)	37-37.5 FIXED MOBILE except aeronautical mobile US151	Upper Microwave Flexible Use (30)
37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547			US151	37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) NG63 MOBILE except aeronautical mobile US151	Satellite Communications (25) Upper Microwave Flexible Use (30)
38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547			38-38.6 FIXED MOBILE 38.6-39.5	38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) NG63 MOBILE NG175	
39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547			39.5-40 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US382 G117	39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) NG63 MOBILE NG175 US382	
40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)			40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) G117	40-40.5 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) 5.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547	40.5-41 FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) US211 G117	40.5-41 FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Fixed Mobile Mobile-satellite (space-to-Earth) US211	
41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551F 5.551H 5.551I			41-42.5 US211	41-42 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE US211	

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)			(See previous page)	42-42.5 FIXED MOBILE US211	
42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.547			42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile RADIO ASTRONOMY US342	42.5-43.5 RADIO ASTRONOMY US342	
43.5-47 MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			43.5-45.5 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) G117	43.5-45.5	
			45.5-46.9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554		
			46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554	46.9-47 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554	
47-47.2 AMATEUR AMATEUR-SATELLITE			47-48.2	47-47.2 AMATEUR AMATEUR-SATELLITE	Amateur Radio (97)
47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A				47.2-48.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 NG65 MOBILE	Satellite Communications (25) Upper Microwave Flexible Use (30)
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A MOBILE	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE				
47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A					

48.2-48.54 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.516B 5.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US156 US297 MOBILE US264		Satellite Communications (25)
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5.340 5.555				
49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	5.149 5.340 5.555	5.555 US342		
50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340		50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-satellite (Earth-to-space)		50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space) NG65	Satellite Communications (25)
51.4-52.6 FIXED 5.338A MOBILE 5.547 5.556		51.4-52.6 FIXED US157 MOBILE		
52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556		52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B		54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)		Satellite Communications (25)
55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557		55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED US379 INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US353 US532		

Table of Frequency Allocations			56.9-81 GHz (EHF)		Page 61
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5.558 SPACE RESEARCH (passive) US532	56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 SPACE RESEARCH (passive) US532	
57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US532		RF Devices (15) Satellite Communications (25)
58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556			58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US353 US354		RF Devices (15)
59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)			59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive) US353	59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive) US353	
59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138			59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138 US353	59.3-64 FIXED MOBILE 5.558 RADIOLOCATION 5.559 5.138 US353	RF Devices (15) ISM Equipment (18)
64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556			64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile	64-65 FIXED MOBILE except aeronautical mobile	RF Devices (15)
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547			65-66 EARTH EXPLORATION-SATELLITE FIXED MOBILE except aeronautical mobile SPACE RESEARCH	65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH	RF Devices (15) Satellite Communications (25)

66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US389		Fixed Microwave (101)
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Space research (space-to-Earth) US389	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) US389	RF Devices (15) Fixed Microwave (101)
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	76-81 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth)	76-77 RADIO ASTRONOMY RADIOLOCATION Amateur Space research (space-to-Earth) US342	RF Devices (15) Personal Radio (95) Amateur Radio (97)
77.5-78 AMATEUR AMATEUR-SATELLITE RADIOLOCATION 5.559B Radio astronomy Space research (space-to-Earth) 5.149		77-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth)	
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560			
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	5.560 US342	5.560 US342	

Table of Frequency Allocations			81-123 GHz (EHF)		Page 63
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
81-84 FIXED 5.338A FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A			81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US161 US342 US389		RF Devices (15) Fixed Microwave (101)
84-86 FIXED 5.338A FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149			84-86 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY US161 US342 US389		
86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
92-94 FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US161 US342		RF Devices (15) Fixed Microwave (101)
94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A			94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	94-94.1 RADIOLOCATION Radio astronomy 5.562A	RF Devices (15)
94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US161 US342		RF Devices (15) Fixed Microwave (101)
95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554			95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554 US342		

100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
102-105 FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	102-105 FIXED MOBILE RADIO ASTRONOMY 5.341 US342		
105-109.5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	105-109.5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.341 US342		
109.5-111.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	109.5-111.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
111.8-114.25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	111.8-114.25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.341 US342		
114.25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	114.25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
116-119.98 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341	116-122.25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341 US211		ISM Equipment (18)
119.98-122.25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341			
122.25-123 FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	122.25-123 FIXED INTER-SATELLITE MOBILE 5.558 5.138	122.25-123 FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	ISM Equipment (18) Amateur Radio (97)

Table of Frequency Allocations			123-191.8 GHz (EHF)		Page 65
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.562D 5.149 5.554			123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.554 US211 US342		
130-134 EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A			130-134 EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.562A US342		
134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy			134-136 Radio astronomy	134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy	Amateur Radio (97)
136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149			136-141 RADIO ASTRONOMY RADIOLOCATION US342	136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite US342	
141-148.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			141-148.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342		
148.5-151.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			148.5-151.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
151.5-155.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			151.5-155.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342		

155.5-158.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.562F 5.562G	155.5-158.5 FIXED MOBILE RADIO ASTRONOMY US342	
158.5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	158.5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US211	
164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246	
167-174.5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149 5.562D	167-174.5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 US211 US342	
174.5-174.8 FIXED INTER-SATELLITE MOBILE 5.558	174.5-174.8 FIXED INTER-SATELLITE MOBILE 5.558	
174.8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	174.8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) US246	
185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
190-191.8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	190-191.8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246	Page 66

Table of Frequency Allocations			191.8-3000 GHz (EHF)		Page 67
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
191.8-200 FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554			191.8-200 FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.341 5.554 US211 US342		
200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A			200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 5.563A US246		
209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341			209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.341 US342		
217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341			217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.341 US342		
226-231.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			226-231.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) US246		
231.5-232 FIXED MOBILE Radiolocation			231.5-232 FIXED MOBILE Radiolocation		
232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation			232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation		
235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B			235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B		

238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE		
240-241 FIXED MOBILE RADIOLOCATION	240-241 FIXED MOBILE RADIOLOCATION		
241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	241-248 RADIO ASTRONOMY RADIOLOCATION 5.138 US342	241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 US342	ISM Equipment (18) Amateur Radio (97)
248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149	248-250 Radio astronomy US342	248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy US342	Amateur Radio (97)
250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.563A US246		
252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554 US211 US342		
265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.563A US342		
275-3000 (Not allocated) 5.565	275-3000 (Not allocated) US565		Amateur Radio (97)

INTERNATIONAL FOOTNOTES

5.53 Administrations authorizing the use of frequencies below 8.3 kHz shall ensure that no harmful interference is caused to services to which the bands above 8.3 kHz are allocated. (WRC–12)

5.54 Administrations conducting scientific research using frequencies below 8.3

kHz are urged to advise other administrations that may be concerned in order that such research may be afforded all practicable protection from harmful interference. (WRC–12)

5.54A Use of the 8.3–11.3 kHz frequency band by stations in the meteorological aids service is limited to passive use only. In the band 9–11.3 kHz, meteorological aids stations shall not claim protection from stations of the radionavigation service submitted for notification to the Bureau prior to 1 January 2013. For sharing between stations of the meteorological aids service and stations in the radionavigation service submitted for notification after this date, the most recent version of Recommendation ITU–R RS.1881 should be applied. (WRC–12)

5.54B *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Kuwait, Lebanon, Morocco, Qatar, the Syrian Arab Republic, Sudan and Tunisia, the frequency band 8.3–9 kHz is also allocated to the radionavigation, fixed and mobile services on a primary basis. (WRC–15)

5.54C *Additional allocation:* In China, the frequency band 8.3–9 kHz is also allocated to the maritime radionavigation and maritime mobile services on a primary basis. (WRC–12)

5.55 *Additional allocation:* In Armenia, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequency band 14–17 kHz is also allocated to the radionavigation service on a primary basis. (WRC–15)

5.56 The stations of services to which the bands 14–19.95 kHz and 20.05–70 kHz and in Region 1 also the bands 72–84 kHz and 86–90 kHz are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC–12)

5.57 The use of the bands 14–19.95 kHz, 20.05–70 kHz and 70–90 kHz (72–84 kHz and 86–90 kHz in Region 1) by the maritime mobile service is limited to coast radiotelegraph stations (A1A and F1B only). Exceptionally, the use of class J2B or J7B emissions is authorized subject to the necessary bandwidth not exceeding that normally used for class A1A or F1B emissions in the band concerned.

5.58 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the band 67–70 kHz is also allocated to the radionavigation service on a primary basis.

5.59 *Different category of service:* in Bangladesh and Pakistan, the allocation of the bands 70–72 kHz and 84–86 kHz to the fixed and maritime mobile services is on a primary basis (*see* No. 5.33).

5.60 In the bands 70–90 kHz (70–86 kHz in Region 1) and 110–130 kHz (112–130 kHz in Region 1), pulsed radionavigation systems may be used on condition that they do not cause harmful interference to other services to which these bands are allocated.

5.61 In Region 2, the establishment and operation of stations in the maritime radionavigation service in the bands 70–90 kHz and 110–130 kHz shall be subject to agreement obtained under No. 9.21 with administrations whose services, operating in accordance with the Table, may be affected. However, stations of the fixed, maritime mobile and radiolocation services shall not cause harmful interference to stations in the maritime radionavigation service established under such agreements.

5.62 Administrations which operate stations in the radionavigation service in the band 90–110 kHz are urged to coordinate technical and operating characteristics in such a way as to avoid harmful interference to the services provided by these stations.

5.64 Only classes A1A or F1B, A2C, A3C, F1C or F3C emissions are authorized for stations of the fixed service in the bands allocated to this service between 90 kHz and 160 kHz (148.5 kHz in Region 1) and for stations of the maritime mobile service in the bands allocated to this service between 110 kHz and 160 kHz (148.5 kHz in Region 1). Exceptionally, class J2B or J7B emissions are also authorized in the bands between 110 kHz and 160 kHz (148.5 kHz in Region 1) for stations of the maritime mobile service.

5.65 *Different category of service:* in Bangladesh, the allocation of the bands 112–117.6 kHz and 126–129 kHz to the fixed and maritime mobile services is on a primary basis (*see* No. 5.33).

5.66 *Different category of service:* in Germany, the allocation of the band 115–117.6 kHz to the fixed and maritime mobile services is on a primary basis (*see* No. 5.33) and to the radionavigation service on a secondary basis (*see* No. 5.32).

5.67 *Additional allocation:* in Mongolia, Kyrgyzstan and Turkmenistan, the band 130–148.5 kHz is also allocated to the radionavigation service on a secondary basis. Within and between these countries this service shall have an equal right to operate. (WRC–07)

5.67A Stations in the amateur service using frequencies in the band 135.7–137.8 kHz shall not exceed a maximum radiated power of 1 W (e.i.r.p.) and shall not cause harmful interference to stations of the radionavigation service operating in countries listed in No. 5.67. (WRC–07)

5.67B The use of the band 135.7–137.8 kHz in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Lebanon, Syrian Arab Republic, Sudan, South Sudan and Tunisia is limited to the

fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the band 135.7–137.8 kHz, and this should be taken into account by the countries authorizing such use. (WRC–12)

5.68 *Alternative allocation:* In Congo (Rep. of the), the Dem. Rep. of the Congo and South Africa, the frequency band 160–200 kHz is allocated to the fixed service on a primary basis. (WRC–15)

5.69 *Additional allocation:* in Somalia, the band 200–255 kHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.70 *Alternative allocation:* In Angola, Botswana, Burundi, the Central African Rep., Congo (Rep. of the), Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, the Dem. Rep. of the Congo, South Africa, Swaziland, Tanzania, Chad, Zambia and Zimbabwe, the band 200–283.5 kHz is allocated to the aeronautical radionavigation service on a primary basis. (WRC–12)

5.71 *Alternative allocation:* in Tunisia, the band 255–283.5 kHz is allocated to the broadcasting service on a primary basis.

5.73 The band 285–325 kHz (283.5–325 kHz in Region 1) in the maritime radionavigation service may be used to transmit supplementary navigational information using narrow-band techniques, on condition that no harmful interference is caused to radiobeacon stations operating in the radionavigation service.

5.74 *Additional Allocation:* in Region 1, the frequency band 285.3–285.7 kHz is also allocated to the maritime radionavigation service (other than radiobeacons) on a primary basis.

5.75 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Romania, the allocation of the band 315–325 kHz to the maritime radionavigation service is on a primary basis under the condition that in the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned. (WRC–07)

5.76 The frequency 410 kHz is designated for radio direction-finding in the maritime radionavigation service. The other radionavigation services to which the band 405–415 kHz is allocated shall not cause harmful interference to radio direction-finding in the band 406.5–413.5 kHz.

5.77 *Different category of service:* In Australia, China, the French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the allocation of the frequency band 415–495 kHz to the aeronautical radionavigation service is on a primary basis. In Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Latvia, Uzbekistan and Kyrgyzstan, the allocation of the frequency band 435–495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in all the aforementioned countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the frequency band 435–495 kHz do not cause interference to reception by coast stations of transmissions from ship stations on frequencies designated for ship stations on a worldwide basis. (WRC–12)

5.78 *Different category of service:* in Cuba, the United States of America and Mexico, the allocation of the band 415–435 kHz to the aeronautical radionavigation service is on a primary basis.

5.79 The use of the bands 415–495 kHz and 505–526.5 kHz (505–510 kHz in Region 2) by the maritime mobile service is limited to radiotelegraphy.

5.79A When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4209.5 kHz, administrations are strongly recommended to coordinate the operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution 339 (Rev.WRC–07)). (WRC–07)

5.80 In Region 2, the use of the band 435–495 kHz by the aeronautical radionavigation service is limited to non-directional beacons not employing voice transmission.

5.80A The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service using frequencies in the band 472–479 kHz shall not exceed 1 W. Administrations may increase this limit of e.i.r.p. to 5 W in portions of their territory which are at a distance of over 800 km from the borders of Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia, Ukraine and Yemen. In this frequency band, stations in the amateur service shall not cause harmful interference to, or claim protection from, stations of the aeronautical radionavigation service. (WRC–12)

5.80B The use of the frequency band 472–479 kHz in Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia and Yemen is limited to the maritime mobile

and aeronautical radionavigation services. The amateur service shall not be used in the above-mentioned countries in this frequency band, and this should be taken into account by the countries authorizing such use. (WRC–12)

5.82 In the maritime mobile service, the frequency 490 kHz is to be used exclusively for the transmission by coast stations of navigational and meteorological warnings and urgent information to ships, by means of narrow-band direct-printing telegraphy. The conditions for use of the frequency 490 kHz are prescribed in Articles 31 and 52. In using the frequency band 415–495 kHz for the aeronautical radionavigation service, administrations are requested to ensure that no harmful interference is caused to the frequency 490 kHz. In using the frequency band 472–479 kHz for the amateur service, administrations shall ensure that no harmful interference is caused to the frequency 490 kHz. (WRC–12)

5.84 The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in Articles 31 and 52. (WRC–07)

5.86 In Region 2, in the band 525–535 kHz the carrier power of broadcasting stations shall not exceed 1 kW during the day and 250 W at night.

5.87 *Additional allocation:* In Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Niger and Swaziland, the band 526.5–535 kHz is also allocated to the mobile service on a secondary basis. (WRC–12)

5.87A *Additional allocation:* in Uzbekistan, the band 526.5–1606.5 kHz is also allocated to the radionavigation service on a primary basis. Such use is subject to agreement obtained under No. 9.21 with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime.

5.88 *Additional allocation:* in China, the band 526.5–535 kHz is also allocated to the aeronautical radionavigation service on a secondary basis.

5.89 In Region 2, the use of the band 1605–1705 kHz by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

The examination of frequency assignments to stations of the fixed and mobile services in the band 1625–1705 kHz shall take account of the allotments appearing in the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

5.90 In the band 1605–1705 kHz, in cases where a broadcasting station of Region 2 is concerned, the service area of the maritime mobile stations in Region 1 shall be limited to that provided by ground-wave propagation.

5.91 *Additional allocation:* in the Philippines and Sri Lanka, the band 1606.5–1705 kHz is also allocated to the broadcasting service on a secondary basis.

5.92 Some countries of Region 1 use radiodetermination systems in the bands 1606.5–1625 kHz, 1635–1800 kHz, 1850–2160 kHz, 2194–2300 kHz, 2502–2850 kHz and 3500–3800 kHz, subject to agreement obtained under No. 9.21. The radiated mean power of these stations shall not exceed 50 W.

5.93 *Additional allocation:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Tajikistan, Chad, Turkmenistan and Ukraine, the frequency bands 1625–1635 kHz, 1800–1810 kHz and 2160–2170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. 9.21. (WRC–15)

5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Croatia, Denmark, Estonia, the Russian Federation, Finland, Georgia, Hungary, Ireland, Iceland, Israel, Kazakhstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the frequency bands 1715–1800 kHz and 1850–2000 kHz. However, when allocating the frequency bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W. (WRC–15)

5.97 In Region 3, the Loran system operates either on 1850 kHz or 1950 kHz, the bands occupied being 1825–1875 kHz and 1925–1975 kHz respectively. Other services to which the band 1800–2000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1850 kHz or 1950 kHz.

5.98 *Alternative allocation:* In Armenia, Azerbaijan, Belarus, Belgium, Cameroon, Congo (Rep. of the), Denmark, Egypt, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Tunisia, Turkmenistan and Turkey, the frequency band 1810–1830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–15)

5.99 *Additional allocation:* In Saudi Arabia, Austria, Iraq, Libya, Uzbekistan, Slovakia, Romania, Slovenia, Chad, and Togo, the band 1810–1830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.100 In Region 1, the authorization to use the band 1810–1830 kHz by the amateur service in countries situated totally or partially north of 40° N shall be given only after consultation with the countries mentioned in Nos. 5.98 and 5.99 to define the necessary steps to be taken to prevent harmful interference between amateur stations and stations of other services operating in accordance with Nos. 5.98 and 5.99.

5.102 *Alternative allocation:* In Bolivia, Chile, Paraguay and Peru, the frequency band 1850–2000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis. (WRC–15)

5.103 In Region 1, in making assignments to stations in the fixed and mobile services in the bands 1850–2045 kHz, 2194–2498 kHz, 2502–2625 kHz and 2650–2850 kHz, administrations should bear in mind the special requirements of the maritime mobile service.

5.104 In Region 1, the use of the band 2025–2045 kHz by the meteorological aids service is limited to oceanographic buoy stations.

5.105 In Region 2, except in Greenland, coast stations and ship stations using radiotelephony in the band 2065–2107 kHz shall be limited to class J3E emissions and to a peak envelope power not exceeding 1 kW. Preferably, the following carrier frequencies should be used: 2065.0 kHz, 2079.0 kHz, 2082.5 kHz, 2086.0 kHz, 2093.0 kHz, 2096.5 kHz, 2100.0 kHz and 2103.5 kHz. In Argentina and Uruguay, the carrier frequencies 2068.5 kHz and 2075.5 kHz are also used for this purpose, while the frequencies within the band 2072–2075.5 kHz are used as provided in No. 52.165.

5.106 In Regions 2 and 3, provided no harmful interference is caused to the maritime mobile service, the frequencies between 2065 kHz and 2107 kHz may be used by stations of the fixed service communicating only within national borders and whose mean power does not exceed 50 W. In notifying the frequencies, the attention of the Bureau should be drawn to these provisions.

5.107 *Additional allocation:* In Saudi Arabia, Eritrea, Ethiopia, Iraq, Libya, Somalia and Swaziland, the band 2160–2170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W. (WRC–12)

5.108 The carrier frequency 2182 kHz is an international distress and calling frequency for radiotelephony. The conditions for the use of the band 2173.5–2190.5 kHz are prescribed in Articles 31 and 52. (WRC–07)

5.109 The frequencies 2187.5 kHz, 4207.5 kHz, 6312 kHz, 8414.5 kHz, 12577 kHz and 16804.5 kHz are international distress frequencies for digital selective calling. The conditions for the use of these frequencies are prescribed in Article 31.

5.110 The frequencies 2174.5 kHz, 4177.5 kHz, 6268 kHz, 8376.5 kHz, 12520 kHz and 16695 kHz are international distress frequencies for narrow-band direct-printing telegraphy. The conditions for the use of these frequencies are prescribed in Article 31.

5.111 The carrier frequencies 2182 kHz, 3023 kHz, 5680 kHz, 8364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article 31.

The same applies to the frequencies 10003 kHz, 14993 kHz and 19993 kHz, but in each of these cases emissions must be confined in a band of ±3 kHz about the frequency. (WRC–07)

5.112 *Alternative allocation:* In Denmark and Sri Lanka, the band 2194–2300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.113 For the conditions for the use of the bands 2300–2495 kHz (2498 kHz in Region 1), 3200–3400 kHz, 4750–4995 kHz and 5005–5060 kHz by the broadcasting service, *see* Nos. 5.16 to 5.20, 5.21 and 23.3 to 23.10.

5.114 *Alternative allocation:* In Denmark and Iraq, the band 2502–2625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.115 The carrier (reference) frequencies 3023 kHz and 5680 kHz may also be used, in accordance with Article 31, by stations of the maritime mobile service engaged in coordinated search and rescue operations. (WRC–07)

5.116 Administrations are urged to authorize the use of the band 3155–3195 kHz to provide a common worldwide channel for low power wireless hearing aids. Additional channels for these devices may be assigned by administrations in the bands between 3155 kHz and 3400 kHz to suit local needs.

It should be noted that frequencies in the range 3000 kHz to 4000 kHz are suitable for hearing aid devices which are designed to operate over short distances within the induction field.

5.117 *Alternative allocation:* In Côte d'Ivoire, Denmark, Egypt, Liberia, Sri Lanka and Togo, the band 3155–3200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.118 *Additional allocation:* in the United States, Mexico, Peru and Uruguay, the band 3230–3400 kHz is also allocated to the radiolocation service on a secondary basis.

5.119 *Additional allocation:* In Peru, the frequency band 3500–3750 kHz is also allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.122 *Alternative allocation:* In Bolivia, Chile, Ecuador, Paraguay and Peru, the frequency band 3750–4000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–15)

5.123 *Additional allocation:* in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the band 3900–3950 kHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. 9.21.

5.125 *Additional allocation:* in Greenland, the band 3950–4000 kHz is also allocated to the broadcasting service on a primary basis. The power of the broadcasting stations operating in this band shall not exceed that necessary for a national service and shall in no case exceed 5 kW.

5.126 In Region 3, the stations of those services to which the band 3995–4005 kHz is allocated may transmit standard frequency and time signals.

5.127 The use of the band 4000–4063 kHz by the maritime mobile service is limited to ship stations using radiotelephony (*see* No. 52.220 and Appendix 17).

5.128 Frequencies in the bands 4063–4123 kHz and 4130–4438 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W, on condition that harmful interference is not caused to the maritime mobile service. In addition, in Afghanistan, Argentina, Armenia, Azerbaijan, Belarus, Botswana, Burkina Faso, the Central African Rep., China, the Russian Federation, Georgia, India, Kazakhstan, Mali, Niger, Pakistan, Kyrgyzstan, Tajikistan, Chad, Turkmenistan and Ukraine, in the bands 4063–4123 kHz, 4130–4133 kHz and 4408–4438 kHz, stations in the fixed service, with a mean power not exceeding 1 kW, can be operated on condition that they are situated at least 600 km from the coast and that harmful interference is not caused to the maritime mobile service. (WRC–12)

5.130 The conditions for the use of the carrier frequencies 4125 kHz and 6215 kHz are prescribed in Articles 31 and 52. (WRC–07)

5.131 The frequency 4209.5 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing techniques.

5.132 The frequencies 4210 kHz, 6314 kHz, 8416.5 kHz, 12579 kHz, 16806.5 kHz, 19680.5 kHz, 22376 kHz and 26100.5 kHz are the international frequencies for the transmission of maritime safety information (MSI) (*see* Appendix 17).

5.132A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev. WRC–12). (WRC–12)

5.132B *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 4438–4488 kHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. (WRC–15)

5.133 *Different category of service:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Niger, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 5130–5250 kHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33). (WRC–12)

5.133A *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency bands 5250–5275 kHz and 26200–26350 kHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–15)

5.133B Stations in the amateur service using the frequency band 5351.5–5366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.). However, in Region 2 in Mexico, stations in the amateur service using the frequency band 5351.5–5366.5 kHz shall not exceed a maximum radiated power of 20 W (e.i.r.p.). In the following Region 2 countries: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Ecuador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, as well as the overseas territories of the Netherlands in Region 2, stations in the amateur service using the frequency band 5351.5–5366.5 kHz shall not exceed a maximum radiated power of 25 W (e.i.r.p.). (WRC–15)

5.134 The use of the bands 5900–5950 kHz, 7300–7350 kHz, 9400–9500 kHz, 11600–11650 kHz, 12050–12100 kHz, 13570–13600 kHz, 13800–13870 kHz, 15600–15800 kHz, 17480–17550 kHz and 18900–19020 kHz by the broadcasting service is subject to the application of the procedure of Article 12. Administrations are encouraged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev.WRC–15). (FCC)

5.136 *Additional allocation:* frequencies in the band 5900–5950 kHz may be used by stations in the following services, communicating only within the boundary of the country in which they are located: fixed service (in all three Regions), land mobile service (in Region 1), mobile except aeronautical mobile (R) service (in Regions 2 and 3), on condition that harmful interference is

not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–07)

5.137 On condition that harmful interference is not caused to the maritime mobile service, the bands 6200–6213.5 kHz and 6220.5–6525 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W. At the time of notification of these frequencies, the attention of the Bureau will be drawn to the above conditions.

5.138 The following bands:

6765–6795 kHz (centre frequency 6780 kHz),
433.05–434.79 MHz (centre frequency 433.92 MHz) in Region 1 except in the countries mentioned in No. 5.280,
61–61.5 GHz (centre frequency 61.25 GHz),
122–123 GHz (centre frequency 122.5 GHz), and
244–246 GHz (centre frequency 245 GHz)

are designated for industrial, scientific and medical (ISM) applications. The use of these frequency bands for ISM applications shall be subject to special authorization by the administration concerned, in agreement with other administrations whose radiocommunication services might be affected. In applying this provision, administrations shall have due regard to the latest relevant ITU–R Recommendations.

5.140 *Additional allocation:* In Angola, Iraq, Somalia and Togo, the frequency band 7000–7050 kHz is also allocated to the fixed service on a primary basis. (WRC–15)

5.141 *Alternative allocation:* In Egypt, Eritrea, Ethiopia, Guinea, Libya, Madagascar and Niger, the band 7000–7050 kHz is allocated to the fixed service on a primary basis. (WRC–12)

5.141A *Additional allocation:* in Uzbekistan and Kyrgyzstan, the bands 7000–7100 kHz and 7100–7200 kHz are also allocated to the fixed and land mobile services on a secondary basis.

5.141B *Additional allocation:* In Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Guinea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, Libya, Mali, Morocco, Mauritania, Niger, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, South Sudan, Tunisia, Viet Nam and Yemen, the frequency band 7100–7200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC–15)

5.142 The use of the band 7200–7300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. (WRC–12)

5.143 *Additional allocation:* frequencies in the band 7300–7350 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–07)

5.143A In Region 3, frequencies in the band 7350–7450 kHz may be used by stations in the fixed service on a primary basis and land mobile service on a secondary basis, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–12)

5.143B In Region 1, frequencies in the band 7350–7450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located on condition that harmful interference is not caused to the broadcasting service. The total radiated power of each station shall not exceed 24 dBW. (WRC–12)

5.143C *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), Jordan, Kuwait, Libya, Morocco, Mauritania, Niger, Oman, Qatar, the Syrian Arab Republic, Sudan, South Sudan, Tunisia and Yemen, the bands 7350–7400 kHz and 7400–7450 kHz are also allocated to the fixed service on a primary basis. (WRC–12)

5.143D In Region 2, frequencies in the band 7350–7400 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–12)

5.144 In Region 3, the stations of those services to which the band 7995–8005 kHz is allocated may transmit standard frequency and time signals.

5.145 The conditions for the use of the carrier frequencies 8291 kHz, 12290 kHz and 16420

kHz are prescribed in Articles 31 and 52. (WRC–07)

5.145A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed service. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev. WRC–12). (WRC–12)

5.145B *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency bands 9305–9355 kHz and 16100–16200 kHz are allocated to the fixed service on a primary basis. (WRC–15)

5.146 *Additional allocation:* frequencies in the bands 9400–9500 kHz, 11600–11650 kHz, 12050–12100 kHz, 15600–15800 kHz, 17480–17550 kHz and 18900–19020 kHz may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–07)

5.147 On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 9775–9900 kHz, 11650–11700 kHz and 11975–12050 kHz may be used by stations in the fixed service communicating only within the boundary of the country in which they are located, each station using a total radiated power not exceeding 24 dBW.

5.149 In making assignments to stations of other services to which the bands:

13360–13410 kHz,
25550–25670 kHz,
37.5–38.25 MHz,
73–74.6 MHz in Regions 1 and 3,
150.05–153 MHz in Region 1,
322–328.6 MHz,
406.1–410 MHz,
608–614 MHz in Regions 1 and 3,
1330–1400 MHz,
1610.6–1613.8 MHz,
1660–1670 MHz,
1718.8–1722.2 MHz,
2655–2690 MHz,
3260–3267 MHz,
3332–3339 MHz,
3345.8–3352.5 MHz,
4825–4835 MHz,
4950–4990 MHz,
4990–5000 MHz,
6650–6675.2 MHz,
10.6–10.68 GHz,
14.47–14.5 GHz,
22.01–22.21 GHz,
22.21–22.5 GHz,
22.81–22.86 GHz,
23.07–23.12 GHz,
31.2–31.3 GHz,
31.5–31.8 GHz in Regions 1 and 3,
36.43–36.5 GHz,
42.5–43.5 GHz,
48.94–49.04 GHz,
76–86 GHz,
92–94 GHz,
94.1–100 GHz,
102–109.5 GHz,
111.8–114.25 GHz,
128.33–128.59 GHz,
129.23–129.49 GHz,
130–134 GHz,
136–148.5 GHz,
151.5–158.5 GHz,
168.59–168.93 GHz,
171.11–171.45 GHz,
172.31–172.65 GHz,
173.52–173.85 GHz,
195.75–196.15 GHz,
209–226 GHz,
241–250 GHz,
252–275 GHz

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (*see* Nos. 4.5 and 4.6 and Article 29). (WRC–07)

5.149A *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 13450–13550 kHz is allocated to the fixed service on a primary basis and to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC–15)

5.150 The following bands:

13553–13567 kHz (centre frequency 13560 kHz),
26957–27283 kHz (centre frequency 27120 kHz),
40.66–40.70 MHz (centre frequency 40.68 MHz),
902–928 MHz in Region 2 (centre frequency 915 MHz),
2400–2500 MHz (centre frequency 2450 MHz),
5725–5875 MHz (centre frequency 5800 MHz), and
24–24.25 GHz (centre frequency 24.125 GHz)

are also designated for industrial, scientific and medical (ISM) applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications. ISM equipment operating in these bands is subject to the provisions of No. 15.13.

5.151 *Additional allocation:* frequencies in the bands 13570–13600 kHz and 13800–13870 kHz may be used by stations in the fixed service and in the mobile except aeronautical mobile (R) service, communicating only within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies in these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC–07)

5.152 *Additional allocation:* in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14250–14350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW.

5.153 In Region 3, the stations of those services to which the band 15995–16005 kHz is allocated may transmit standard frequency and time signals.

5.154 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 18068–18168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW.

5.155 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the band 21850–21870 kHz is also allocated to the aeronautical mobile (R) service on a primary basis. (WRC–07)

5.155A In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the use of the band 21850–21870 kHz by the fixed service is limited to provision of services related to aircraft flight safety. (WRC–07)

5.155B The band 21870–21924 kHz is used by the fixed service for provision of services related to aircraft flight safety.

5.156 *Additional allocation:* in Nigeria, the band 22720–23200 kHz is also allocated to the meteorological aids service (radiosondes) on a primary basis.

5.156A The use of the band 23200–23350 kHz by the fixed service is limited to provision of services related to aircraft flight safety.

5.157 The use of the band 23350–24000 kHz by the maritime mobile service is limited to inter-ship radiotelegraphy.

5.158 *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 24450–24600 kHz is allocated to the fixed and land mobile services on a primary basis. (WRC–15)

5.159 *Alternative allocation:* In Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 39–39.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.160 *Additional allocation:* In Botswana, Burundi, Dem. Rep. of the Congo and Rwanda, the band 41–44 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC–12)

5.161 *Additional allocation:* in Iran (Islamic Republic of) and Japan, the band 41–44 MHz is also allocated to the radiolocation service on a secondary basis.

5.161A *Additional allocation:* In Korea (Rep. of) and the United States, the frequency bands 41.015–41.665 MHz and 43.35–44 MHz are also allocated to the radiolocation service on a primary basis. Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev. WRC–12). (WRC–12)

5.161B *Alternative allocation:* In Albania, Germany, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Cyprus, Vatican, Croatia, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Rep. of Macedonia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Montenegro, Norway, Uzbekistan, Netherlands, Portugal, Kyrgyzstan, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Slovenia, Sweden, Switzerland, Turkey and Ukraine, the frequency band 42–42.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.162 *Additional allocation:* In Australia, the band 44–47 MHz is also allocated to the broadcasting service on a primary basis. (WRC–12)

5.162A *Additional allocation:* In Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, the Russian Federation, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, the Czech Rep., the United Kingdom, Serbia, Slovenia, Sweden and Switzerland the band 46–68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (WRC–97). (WRC–12)

5.163 *Additional allocation:* In Armenia, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 47–48.5 MHz and 56.5–58 MHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC–12)

5.164 *Additional allocation:* In Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Croatia, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, Jordan, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Slovakia, Czech Rep., Romania, the United Kingdom, Serbia, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the frequency band 47–68 MHz, in South Africa the frequency band 47–50 MHz, and in Latvia the frequency band 48.5–56.5 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each frequency band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned

broadcasting stations of countries other than those mentioned in connection with the frequency band. (WRC–15)

5.165 *Additional allocation:* In Angola, Cameroon, Congo (Rep. of the), Madagascar, Mozambique, Niger, Somalia, Sudan, South Sudan, Tanzania and Chad, the band 47–68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.167 *Alternative allocation:* In Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan and Singapore, the frequency band 50–54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC–15)

5.167A *Additional allocation:* In Indonesia and Thailand, the frequency band 50–54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC–15)

5.168 *Additional allocation:* in Australia, China and the Dem. People's Rep. of Korea, the band 50–54 MHz is also allocated to the broadcasting service on a primary basis.

5.169 *Alternative allocation:* In Botswana, Lesotho, Malawi, Namibia, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 50–54 MHz is allocated to the amateur service on a primary basis. In Senegal, the band 50–51 MHz is allocated to the amateur service on a primary basis. (WRC–12)

5.170 *Additional allocation:* In New Zealand, the frequency band 51–54 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.171 *Additional allocation:* In Botswana, Lesotho, Malawi, Mali, Namibia, Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 54–68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.172 *Different category of service:* In the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 54–68 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC–15)

5.173 *Different category of service:* In the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 68–72 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC–15)

5.175 *Alternative allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 68–73 MHz and 76–87.5 MHz are allocated to the broadcasting service on a primary basis. In Latvia and Lithuania, the bands 68–73 MHz and 76–87.5 MHz are allocated to the broadcasting and mobile, except aeronautical mobile, services on a primary basis. The services to which these bands are allocated in other countries and the broadcasting service in the countries listed above are subject to agreements with the neighbouring countries concerned. (WRC–07)

5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68–74 MHz is also allocated to the broadcasting service on a primary basis. (WRC–07)

5.177 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 73–74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. 9.21. (WRC–07)

5.178 *Additional allocation:* In Colombia, Cuba, El Salvador, Guatemala, Guyana, Honduras and Nicaragua, the band 73–74.6 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC–12)

5.179 *Additional allocation:* In Armenia, Azerbaijan, Belarus, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Mongolia, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 74.6–74.8 MHz and 75.2–75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only. (WRC–12)

5.180 The frequency 75 MHz is assigned to marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guardband to stations of other services which, because of their power or geographical position, might cause harmful interference or otherwise place a constraint on marker beacons.

Every effort should be made to improve further the characteristics of airborne receivers and to limit the power of transmitting stations close to the limits 74.8 MHz and 75.2 MHz.

5.181 *Additional allocation:* in Egypt, Israel and the Syrian Arab Republic, the band 74.8–75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. 9.21.

5.182 *Additional allocation:* in Western Samoa, the band 75.4–87 MHz is also allocated to the broadcasting service on a primary basis.

5.183 *Additional allocation:* in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76–87

MHz is also allocated to the broadcasting service on a primary basis.

5.185 *Different category of service:* In the United States, the French overseas departments and communities in Region 2, Guyana and Paraguay, the allocation of the frequency band 76–88 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC–15)

5.187 *Alternative allocation:* in Albania, the band 81–87.5 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions contained in the Final Acts of the Special Regional Conference (Geneva, 1960).

5.188 *Additional allocation:* in Australia, the band 85–87 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service in Australia is subject to special agreements between the administrations concerned.

5.190 *Additional allocation:* in Monaco, the band 87.5–88 MHz is also allocated to the land mobile service on a primary basis, subject to agreement obtained under No. 9.21.

5.192 *Additional allocation:* in China and Korea (Rep. of), the band 100–108 MHz is also allocated to the fixed and mobile services on a primary basis.

5.194 *Additional allocation:* in Azerbaijan, Kyrgyzstan, Somalia and Turkmenistan, the band 104–108 MHz is also allocated to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC–07)

5.197 *Additional allocation:* In the Syrian Arab Republic, the band 108–111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under No. 9.21. (WRC–12)

5.197A *Additional allocation:* The band 108–117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 413 (Rev.WRC–12). The use of the band 108–112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. (FCC)

5.200 In the band 117.975–137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article 31 for distress and safety purposes with stations of the aeronautical mobile service. (WRC–07)

5.201 *Additional allocation:* In Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Moldova, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 132–136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC–15)

5.202 *Additional allocation:* In Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 136–137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC–15)

5.204 *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Serbia, Singapore, Thailand and Yemen, the band 137–138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (*see* No. 5.33). (WRC–07)

5.205 *Different category of service:* in Israel and Jordan, the allocation of the band 137–138 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33).

5.206 *Different category of service:* in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, the Russian Federation, Finland, France, Georgia, Greece, Kazakhstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Syrian Arab Republic, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 137–138 MHz to the aeronautical mobile (OR) service is on a primary basis (*see* No. 5.33).

5.207 *Additional allocation:* in Australia, the band 137–144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.

5.208 The use of the band 137–138 MHz by the mobile-satellite service is subject to coordination under No. 9.11A.

5.208A In making assignments to space stations in the mobile-satellite service in the bands 137–138 MHz, 387–390 MHz and 400.15–401 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the bands 150.05–153 MHz, 322–328.6 MHz, 406.1–410 MHz and 608–614 MHz from harmful interference from unwanted emissions. The threshold levels of interference detrimental to the radio astronomy service are shown in the relevant ITU–R Recommendation. (WRC–07)

5.208B In the frequency bands:

137–138 MHz,
387–390 MHz,
400.15–401 MHz,
1452–1492 MHz,
1525–1610 MHz,
1613.8–1626.5 MHz,
2655–2690 MHz,
21.4–22 GHz,

Resolution 739 (Rev.WRC–15) applies. (WRC–15)

5.209 The use of the bands 137–138 MHz, 148–150.05 MHz, 399.9–400.05 MHz, 400.15–401 MHz, 454–456 MHz and 459–460 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems.

5.210 *Additional allocation:* in Italy, the Czech Rep. and the United Kingdom, the bands 138–143.6 MHz and 143.65–144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis. (WRC–07)

5.211 *Additional allocation:* In Germany, Saudi Arabia, Austria, Bahrain, Belgium, Denmark, the United Arab Emirates, Spain, Finland, Greece, Guinea, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Liechtenstein, Luxembourg, Mali, Malta, Montenegro, Norway, the Netherlands, Qatar, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sweden, Switzerland, Tanzania, Tunisia and Turkey, the frequency band 138–144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC–15)

5.212 *Alternative allocation:* In Angola, Botswana, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Lesotho, Liberia, Libya, Malawi, Mozambique, Namibia, Niger, Oman, Uganda, Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Swaziland, Chad, Togo, Zambia and Zimbabwe, the band 138–144 MHz is allocated to the fixed and mobile services on a primary basis. (WRC–12)

5.213 *Additional allocation:* in China, the band 138–144 MHz is also allocated to the radiolocation service on a primary basis.

5.214 *Additional allocation:* In Eritrea, Ethiopia, Kenya, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia, Somalia, Sudan, South Sudan and Tanzania, the band 138–144 MHz is also allocated to the fixed service on a primary basis. (WRC–12)

5.216 *Additional allocation:* in China, the band 144–146 MHz is also allocated to the aeronautical mobile (OR) service on a secondary basis.

5.217 *Alternative allocation:* in Afghanistan, Bangladesh, Cuba, Guyana and India, the band 146–148 MHz is allocated to the fixed and mobile services on a primary basis.

5.218 *Additional allocation:* the band 148–149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. 9.21. The bandwidth of any individual transmission shall not exceed ±25 kHz.

5.219 The use of the band 148–149.9 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the band 148–149.9 MHz.

5.220 The use of the frequency bands 149.9–150.05 MHz and 399.9–400.05 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. (WRC–15)

5.221 Stations of the mobile-satellite service in the frequency band 148–149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Djibouti, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the Russian Federation, Finland, France, Gabon, Georgia, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey,

Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC–15)

5.225 *Additional allocation:* in Australia and India, the band 150.05–153 MHz is also allocated to the radio astronomy service on a primary basis.

5.225A *Additional allocation:* In Algeria, Armenia, Azerbaijan, Belarus, China, the Russian Federation, France, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and Viet Nam, the frequency band 154–156 MHz is also allocated to the radiolocation service on a primary basis. The usage of the frequency band 154–156 MHz by the radiolocation service shall be limited to space-object detection systems operating from terrestrial locations. The operation of stations in the radiolocation service in the frequency band 154–156 MHz shall be subject to agreement obtained under No. 9.21. For the identification of potentially affected administrations in Region 1, the instantaneous field-strength value of 12 dB(μV/m) for 10% of the time produced at 10 m above ground level in the 25 kHz reference frequency band at the border of the territory of any other administration shall be used. For the identification of potentially affected administrations in Region 3, the interference-to-noise ratio (I/N) value of −6 dB (N = −161 dBW/4 kHz), or −10 dB for applications with greater protection requirements, such as public protection and disaster relief (PPDR (N = −161 dBW/4 kHz)), for 1% of the time produced at 60 m above ground level at the border of the territory of any other administration shall be used. In the frequency bands 156.7625–156.8375 MHz, 156.5125–156.5375 MHz, 161.9625–161.9875 MHz, 162.0125–162.0375 MHz, out-of-band e.i.r.p. of space surveillance radars shall not exceed −16 dBW. Frequency assignments to the radiolocation service under this allocation in Ukraine shall not be used without the agreement of Moldova. (WRC–12)

5.226 The frequency 156.525 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service using digital selective calling (DSC). The conditions for the use of this frequency and the band 156.4875–156.5625 MHz are contained in Articles 31 and 52, and in Appendix 18.

The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. The conditions for the use of this frequency and the band 156.7625–156.8375 MHz are contained in Article 31 and Appendix 18.

In the bands 156–156.4875 MHz, 156.5625–156.7625 MHz, 156.8375–157.45 MHz, 160.6–160.975 MHz and 161.475–162.05 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by the administration (*see* Articles 31 and 52, and Appendix 18).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radiocommunication service.

However, the frequencies 156.8 MHz and 156.525 MHz and the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreement between interested and affected administrations and taking into account current frequency usage and existing agreements. (WRC–07)

5.227 *Additional allocation:* the bands 156.4875–156.5125 MHz and 156.5375–156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis. The use of these bands by the fixed and land mobile services shall not cause harmful interference to nor claim protection from the maritime mobile VHF radiocommunication service. (WRC–07)

5.228 The use of the frequency bands 156.7625–156.7875 MHz and 156.8125–156.8375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system (AIS) emissions of long-range AIS broadcast messages (Message 27, see the most recent version of Recommendation ITU–R M.1371). With the exception of AIS emissions, emissions in these frequency bands by systems operating in the maritime mobile service for communications shall not exceed 1 W. (WRC–12)

5.228A The frequency bands 161.9625–161.9875 MHz and 162.0125–162.0375 MHz may be used by aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC–12)

5.228AA The use of the frequency bands 161.9375–161.9625 MHz and 161.9875–162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix 18. (WRC–15)

5.228B The use of the frequency bands 161.9625–161.9875 MHz and 162.0125–162.0375 MHz by the fixed and land mobile services shall not cause harmful interference to, or claim protection from, the maritime mobile service. (WRC–12)

5.228C The use of the frequency bands 161.9625–161.9875 MHz and 162.0125–162.0375 MHz by the maritime mobile service and the mobile-satellite (Earth-to-space) service is limited to the automatic identification system (AIS). The use of these frequency bands by the aeronautical mobile (OR) service is limited to AIS emissions from search and rescue aircraft operations. The AIS operations in these frequency bands shall not constrain the development and use of the

fixed and mobile services operating in the adjacent frequency bands. (WRC–12)

5.228D The frequency bands 161.9625–161.9875 MHz (AIS 1) and 162.0125–162.0375 MHz (AIS 2) may continue to be used by the fixed and mobile services on a primary basis until 1 January 2025, at which time this allocation shall no longer be valid. Administrations are encouraged to make all practicable efforts to discontinue the use of these bands by the fixed and mobile services prior to the transition date. During this transition period, the maritime mobile service in these frequency bands has priority over the fixed, land mobile and aeronautical mobile services. (WRC–12)

5.228E The use of the automatic identification system in the frequency bands 161.9625–161.9875 MHz and 162.0125–162.0375 MHz by the aeronautical mobile (OR) service is limited to aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC–12)

5.228F The use of the frequency bands 161.9625–161.9875 MHz and 162.0125–162.0375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system emissions from stations operating in the maritime mobile service. (WRC–12)

5.229 *Alternative allocation:* in Morocco, the band 162–174 MHz is allocated to the broadcasting service on a primary basis. The use of this band shall be subject to agreement with administrations having services, operating or planned, in accordance with the Table which are likely to be affected. Stations in existence on 1 January 1981, with their technical characteristics as of that date, are not affected by such agreement.

5.230 *Additional allocation:* in China, the band 163–167 MHz is also allocated to the space operation service (space-to-Earth) on a primary basis, subject to agreement obtained under No. 9.21.

5.231 *Additional allocation:* In Afghanistan and China, the band 167–174 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service into this band shall be subject to agreement with the neighbouring countries in Region 3 whose services are likely to be affected. (WRC–12)

5.233 *Additional allocation:* in China, the band 174–184 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis, subject to agreement obtained under No. 9.21. These services shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations.

5.235 *Additional allocation:* in Germany, Austria, Belgium, Denmark, Spain, Finland, France, Israel, Italy, Liechtenstein, Malta, Monaco, Norway, the Netherlands, the United Kingdom, Sweden and Switzerland, the band 174–223 MHz is also allocated to the land mobile service on a primary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, broadcasting stations, existing or planned, in countries other than those listed in this footnote.

5.237 *Additional allocation:* In Congo (Rep. of the), Egypt, Eritrea, Ethiopia, Gambia, Guinea, Libya, Mali, Sierra Leone, Somalia and Chad, the band 174–223 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC–12)

5.238 *Additional allocation:* in Bangladesh, India, Pakistan and the Philippines, the band 200–216 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.240 *Additional allocation:* in China and India, the band 216–223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.241 In Region 2, no new stations in the radiolocation service may be authorized in the band 216–225 MHz. Stations authorized prior to 1 January 1990 may continue to operate on a secondary basis.

5.242 *Additional allocation:* in Canada, the band 216–220 MHz is also allocated to the land mobile service on a primary basis.

5.243 *Additional allocation:* in Somalia, the band 216–225 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to not causing harmful interference to existing or planned broadcasting services in other countries.

5.245 *Additional allocation:* in Japan, the band 222–223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.246 *Alternative allocation:* in Spain, France, Israel and Monaco, the band 223–230 MHz is allocated to the broadcasting and land mobile services on a primary basis (*see* No. 5.33) on the basis that, in the preparation of frequency plans, the broadcasting service shall have prior choice of frequencies; and allocated to the fixed and mobile, except land mobile, services on a secondary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations in Morocco and Algeria.

5.247 *Additional allocation:* in Saudi Arabia, Bahrain, the United Arab Emirates, Jordan, Oman, Qatar and Syrian Arab Republic, the band 223–235 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.250 *Additional allocation:* in China, the band 225–235 MHz is also allocated to the radio astronomy service on a secondary basis.

5.251 *Additional allocation:* in Nigeria, the band 230–235 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to agreement obtained under No. 9.21.

5.252 *Alternative allocation:* in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the bands 230–238 MHz and 246–254 MHz are allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. 9.21.

5.254 The bands 235–322 MHz and 335.4–399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under No. 9.21, on condition that stations in this service do not cause harmful interference to those of other services operating or planned to be operated in accordance with the Table of Frequency Allocations except for the additional allocation made in footnote No. 5.256A.

5.255 The bands 312–315 MHz (Earth-to-space) and 387–390 MHz (space-to-Earth) in the mobile-satellite service may also be used by non-geostationary-satellite systems. Such use is subject to coordination under No. 9.11A.

5.256 The frequency 243 MHz is the frequency in this band for use by survival craft stations and equipment used for survival purposes. (WRC–07)

5.256A *Additional allocation:* In China, the Russian Federation and Kazakhstan, the frequency band 258–261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, or claim protection from, or constrain the use and development of, the mobile service systems and mobile-satellite service systems operating in the frequency band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC–15)

5.257 The band 267–272 MHz may be used by administrations for space telemetry in their countries on a primary basis, subject to agreement obtained under No. 9.21.

5.258 The use of the band 328.6–335.4 MHz by the aeronautical radionavigation service is limited to Instrument Landing Systems (glide path).

5.259 *Additional allocation:* In Egypt and the Syrian Arab Republic, the band 328.6–335.4 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. 9.21. (WRC–12)

5.261 Emissions shall be confined in a band of ±25 kHz about the standard frequency 400.1 MHz.

5.262 *Additional allocation:* In Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Botswana, Colombia, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Singapore, Somalia, Tajikistan, Chad, Turkmenistan and Ukraine, the band 400.05–401 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC–12)

5.263 The band 400.15–401 MHz is also allocated to the space research service in the space-to-space direction for communications with manned space vehicles. In this application, the space research service will not be regarded as a safety service.

5.264 The use of the band 400.15–401 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. The power flux-density limit indicated in Annex 1 of Appendix 5 shall apply until such time as a competent world radiocommunication conference revises it.

5.265 In the frequency band 403–410 MHz, Resolution 205 (Rev.WRC–15) applies. (WRC–15)

5.266 The use of the band 406–406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (*see* also Article 31). (WRC–07)

5.267 Any emission capable of causing harmful interference to the authorized uses of the band 406–406.1 MHz is prohibited.

5.268 Use of the frequency band 410–420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from transmitting stations of the space research service (space-to-space) in the frequency band 410–420 MHz shall not exceed -153 dB(W/m^2) for $0° \leq \delta \leq 5°$, $-153 + 0.077\ (\delta - 5)$ dB(W/m^2) for $5° \leq \delta \leq 70°$ and -148 dB(W/m^2) for $70° \leq \delta \leq 90°$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. In this frequency band, stations of the space research service (space-to-space) shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. No. 4.10 does not apply. (WRC–15)

5.269 *Different category of service:* in Australia, the United States, India, Japan and the United Kingdom, the allocation of the

bands 420–430 MHz and 440–450 MHz to the radiolocation service is on a primary basis (*see* No. 5.33).

5.270 *Additional allocation:* in Australia, the United States, Jamaica and the Philippines, the bands 420–430 MHz and 440–450 MHz are also allocated to the amateur service on a secondary basis.

5.271 *Additional allocation:* in Belarus, China, India, Kyrgyzstan and Turkmenistan, the band 420–460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis. (WRC–07)

5.274 *Alternative allocation:* In Denmark, Norway, Sweden and Chad, the bands 430–432 MHz and 438–440 MHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.275 *Additional allocation:* In Croatia, Estonia, Finland, Libya, The Former Yugoslav Republic of Macedonia, Montenegro and Serbia, the frequency bands 430–432 MHz and 438–440 MHz are also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–15)

5.276 *Additional allocation:* In Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Djibouti, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Jordan, Kenya, Kuwait, Libya, Malaysia, Niger, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Switzerland, Thailand, Togo, Turkey and Yemen, the frequency band 430–440 MHz is also allocated to the fixed service on a primary basis and the frequency bands 430–435 MHz and 438–440 MHz are also allocated, except in Ecuador, to the mobile, except aeronautical mobile, service on a primary basis. (WRC–15)

5.277 *Additional allocation:* In Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Mongolia, Uzbekistan, Poland, the Dem. Rep. of the Congo, Kyrgyzstan, Slovakia, Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430–440 MHz is also allocated to the fixed service on a primary basis. (WRC–12)

5.278 *Different category of service:* in Argentina, Colombia, Costa Rica, Cuba, Guyana, Honduras, Panama and Venezuela, the allocation of the band 430–440 MHz to the amateur service is on a primary basis (*see* No. 5.33).

5.279 *Additional allocation:* in Mexico, the bands 430–435 MHz and 438–440 MHz are also allocated on a primary basis to the land mobile service, subject to agreement obtained under No. 9.21.

5.279A The use of the frequency band 432–438 MHz by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU–R RS.1260–1. Additionally, the Earth exploration-satellite service (active) in the frequency band 432–438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China. The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. 5.29 and 5.30. (WRC–15)

5.280 In Germany, Austria, Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Montenegro, Portugal, Serbia, Slovenia and Switzerland, the band 433.05–434.79 MHz (centre frequency 433.92 MHz) is designated for industrial, scientific and medical (ISM) applications. Radiocommunication services of these countries operating within this band must accept harmful interference which may be caused by these applications. ISM equipment operating in this band is subject to the provisions of No. 15.13. (WRC–07)

5.281 *Additional allocation:* in the French overseas departments and communities in Region 2 and India, the band 433.75–434.25 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis. In France and in Brazil, the band is allocated to the same service on a secondary basis.

5.282 In the bands 435–438 MHz, 1260–1270 MHz, 2400–2450 MHz, 3400–3410 MHz (in Regions 2 and 3 only) and 5650–5670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (*see* No. 5.43). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. 25.11. The use of the bands 1260–1270 MHz and 5650–5670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

5.283 *Additional allocation:* in Austria, the band 438–440 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.284 *Additional allocation:* in Canada, the band 440–450 MHz is also allocated to the amateur service on a secondary basis.

5.285 *Different category of service:* in Canada, the allocation of the band 440–450 MHz to the radiolocation service is on a primary basis (*see* No. 5.33).

5.286 The band 449.75–450.25 MHz may be used for the space operation service (Earth-to-space) and the space research service (Earth-to-space), subject to agreement obtained under No. 9.21.

5.286A The use of the bands 454–456 MHz and 459–460 MHz by the mobile-satellite service is subject to coordination under No. 9.11A.

5.286AA The frequency band 450–470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). See Resolution 224 (Rev.WRC–15). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.286B The use of the band 454–455 MHz in the countries listed in No. 5.286D, 455–456 MHz and 459–460 MHz in Region 2, and 454–456 MHz and 459–460 MHz in the countries listed in No. 5.286E, by stations in the mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations.

5.286C The use of the band 454–455 MHz in the countries listed in No. 5.286D, 455–456 MHz and 459–460 MHz in Region 2, and 454–456 MHz and 459–460 MHz in the countries listed in No. 5.286E, by stations in the mobile-satellite service, shall not constrain the development and use of the fixed and mobile services operating in accordance with the Table of Frequency Allocations.

5.286D *Additional allocation:* in Canada, the United States and Panama, the band 454–455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis. (WRC–07)

5.286E *Additional allocation:* in Cape Verde, Nepal and Nigeria, the bands 454–456 MHz and 459–460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC–07)

5.287 Use of the frequency bands 457.5125–457.5875 MHz and 467.5125–467.5875 MHz by the maritime mobile service is limited to on-board communication stations. The characteristics of the equipment and the channelling arrangement shall be in accordance with Recommendation ITU–R M.1174–3. The use of these frequency bands in territorial waters is subject to the national regulations of the administration concerned. (WRC–15)

5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU–R M.1174–3. (WRC–15)

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460–470 MHz and 1690–1710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table.

5.290 *Different category of service:* In Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 460–470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC–12)

5.291 *Additional allocation:* in China, the band 470–485 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis subject to agreement obtained under No. 9.21 and subject to not causing harmful interference to existing and planned broadcasting stations.

5.291A *Additional allocation:* In Germany, Austria, Denmark, Estonia, Liechtenstein, the Czech Rep., Serbia and Switzerland, the frequency band 470–494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (WRC–97). (WRC–15)

5.292 *Different category of service:* In Argentina, Uruguay and Venezuela, the allocation of the frequency band 470–512 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC–15)

5.293 *Different category of service:* In Canada, Chile, Cuba, the United States, Guyana, Jamaica and Panama, the allocation of the frequency bands 470–512 MHz and 614–806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In the Bahamas, Barbados, Canada, Chile, Cuba, the United States, Guyana, Jamaica, Mexico and Panama, the allocation of the frequency bands 470–512 MHz and 614–698 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In Argentina and Ecuador, the allocation of the frequency band 470–512 MHz to the fixed and mobile services is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC–15)

5.294 *Additional allocation:* In Saudi Arabia, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, Libya, the Syrian Arab Republic, Chad and Yemen, the frequency band 470–582 MHz is also allocated to the fixed service on a secondary basis. (WRC–15)

5.295 In the Bahamas, Barbados, Canada, the United States and Mexico, the frequency band 470–608 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT)—see Resolution 224 (Rev.WRC–15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of

neighbouring countries. Nos. 5.43 and 5.43A apply. In Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC–15)

5.296 *Additional allocation:* In Albania, Germany, Angola, Saudi Arabia, Austria, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Burundi, Cameroon, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Djibouti, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Gabon, Georgia, Ghana, Hungary, Iraq, Ireland, Iceland, Israel, Italy, Jordan, Kenya, Kuwait, Lesotho, Latvia, The Former Yugoslav Republic of Macedonia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Malawi, Mali, Malta, Morocco, Mauritius, Mauritania, Moldova, Monaco, Mozambique, Namibia, Niger, Nigeria, Norway, Oman, Uganda, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, the Czech Republic, the United Kingdom, Rwanda, San Marino, Serbia, Sudan, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Togo, Tunisia, Turkey, Ukraine, Zambia and Zimbabwe, the frequency band 470–694 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting and programme-making. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC–15)

5.296A In Micronesia, the Solomon Islands, Tuvalu and Vanuatu, the frequency band 470–698 MHz, or portions thereof, and in Bangladesh, Maldives and New Zealand, the frequency band 610–698 MHz, or portions thereof, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT)—see Resolution 224 (Rev.WRC–15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The mobile allocation in this frequency band shall not be used for IMT systems unless subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. (WRC–15)

5.297 *Additional allocation:* In Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana and Jamaica, the frequency band 512–608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. 9.21. In the Bahamas, Barbados and Mexico, the frequency band 512–608 MHz is also allocated to the mobile service on a primary basis, subject to agreement obtained under No. 9.21. (WRC–15)

5.298 *Additional allocation:* in India, the band 549.75–550.25 MHz is also allocated to the space operation service (space-to-Earth) on a secondary basis.

5.300 *Additional allocation:* In Saudi Arabia, Cameroon, Egypt, United Arab Emirates, Israel, Jordan, Libya, Oman, Qatar, the Syrian Arab Republic and Sudan, the frequency band 582–790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC–15)

5.304 *Additional allocation:* in the African Broadcasting Area (*see* Nos. 5.10 to 5.13), the band 606–614 MHz is also allocated to the radio astronomy service on a primary basis.

5.305 *Additional allocation:* in China, the band 606–614 MHz is also allocated to the radio astronomy service on a primary basis.

5.306 *Additional allocation:* in Region 1, except in the African Broadcasting Area (*see* Nos. 5.10 to 5.13), and in Region 3, the band 608–614 MHz is also allocated to the radio astronomy service on a secondary basis.

5.307 *Additional allocation:* in India, the band 608–614 MHz is also allocated to the radio astronomy service on a primary basis.

5.308 *Additional allocation:* In Belize and Colombia, the frequency band 614–698 MHz is also allocated to the mobile service on a primary basis. Stations of the mobile service within the frequency band are subject to agreement obtained under No. 9.21. (WRC–15)

5.308A In the Bahamas, Barbados, Belize, Canada, Colombia, the United States and Mexico, the frequency band 614–698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT)—see Resolution 224 (Rev.WRC–15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to or claim protection from the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. In Belize and Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC–15)

5.309 *Different category of service:* In El Salvador, the allocation of the frequency band 614–806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC–15)

5.311A For the frequency band 620–790 MHz, see also Resolution 549 (WRC–07). (WRC–07)

5.312 *Additional allocation:* In Armenia, Azerbaijan, Belarus, the Russian Federation,

Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 645–862 MHz, in Bulgaria the frequency bands 646–686 MHz, 726–758 MHz, 766–814 MHz and 822–862 MHz, and in Poland the frequency band 860–862 MHz until 31 December 2017, are also allocated to the aeronautical radionavigation service on a primary basis. (WRC–15)

5.312A In Region 1, the use of the frequency band 694–790 MHz by the mobile, except aeronautical mobile, service is subject to the provisions of Resolution 760 (WRC–15). See also Resolution 224 (Rev.WRC–15). (WRC–15)

5.313A The frequency band, or portions of the frequency band 698–790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, the Philippines, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this frequency band will not start until 2015. (WRC–15)

5.316B In Region 1, the allocation to the mobile, except aeronautical mobile, service in the frequency band 790–862 MHz is subject to agreement obtained under No. 9.21 with respect to the aeronautical radionavigation service in countries mentioned in No. 5.312. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolutions 224 (Rev.WRC–15) and 749 (Rev.WRC–15) shall apply, as appropriate. (WRC–15)

5.317 *Additional allocation:* In Region 2 (except Brazil, the United States and Mexico), the frequency band 806–890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21. The use of this service is intended for operation within national boundaries. (WRC–15)

5.317A The parts of the frequency band 698–960 MHz in Region 2 and the frequency bands 694–790 MHz in Region 1 and 790–960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT)—see Resolutions 224 (Rev.WRC–15), 760 (WRC–15) and 749 (Rev.WRC–15), where applicable. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC – 15)

5.318 *Additional allocation:* in Canada, the United States and Mexico, the bands 849–851 MHz and 894–896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849–851 MHz is limited to transmissions from aeronautical stations and the use of the band 894–896 MHz is limited to transmissions from aircraft stations.

5.319 *Additional allocation:* in Belarus, the Russian Federation and Ukraine, the bands 806–840 MHz (Earth-to-space) and 856–890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.

5.320 *Additional allocation:* in Region 3, the bands 806–890 MHz and 942–960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. 9.21. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.

5.322 In Region 1, in the band 862–960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. 5.10 to 5.13) excluding Algeria, Burundi, Egypt, Spain, Lesotho, Libya, Morocco, Malawi, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. 9.21. (WRC–12)

5.323 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 862–960 MHz, in Bulgaria the bands 862–890.2 MHz and 900–935.2 MHz, in Poland the band 862–876 MHz until 31 December 2017, and in Romania the bands 862–880 MHz and 915–925 MHz, are also allocated to the aeronautical radionavigation service on a primary basis. Such use is subject to agreement obtained under No. 9.21 with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC–12)

5.325 *Different category of service:* in the United States, the allocation of the band 890–942 MHz to the radiolocation service is on a primary basis (*see* No. 5.33), subject to agreement obtained under No. 9.21.

5.325A *Different category of service:* In Argentina, Brazil, Costa Rica, Cuba, Dominican

Republic, El Salvador, Ecuador, the French overseas departments and communities in Region 2, Guatemala, Mexico, Paraguay, Uruguay and Venezuela, the frequency band 902–928 MHz is allocated to the land mobile service on a primary basis. In Colombia, the frequency band 902–905 MHz is allocated to the land mobile service on a primary basis. (WRC–15)

5.326 *Different category of service:* in Chile, the band 903–905 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. 9.21.

5.327 *Different category of service:* in Australia, the allocation of the band 915–928 MHz to the radiolocation service is on a primary basis (*see* No. 5.33).

5.327A The use of the frequency band 960–1164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 417 (Rev.WRC–15). (WRC–15)

5.328 The use of the band 960–1215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

5.328A Stations in the radionavigation-satellite service in the band 1164–1215 MHz shall operate in accordance with the provisions of Resolution 609 (Rev.WRC–07) and shall not claim protection from stations in the aeronautical radionavigation service in the band 960–1215 MHz. No. 5.43A does not apply. The provisions of No. 21.18 shall apply. (WRC–07)

5.328AA The frequency band 1087.7–1092.3 MHz is also allocated to the aeronautical mobile-satellite (R) service (Earth-to-space) on a primary basis, limited to the space station reception of Automatic Dependent Surveillance-Broadcast (ADS–B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution 425 (WRC–15) shall apply. (WRC–15)

5.328B The use of the bands 1164–1300 MHz, 1559–1610 MHz and 5010–5030 MHz by systems and networks in the radionavigation-satellite service for which complete coordination or notification information, as appropriate, is received by the Radiocommunication Bureau after 1 January 2005 is subject to the application of the provisions of Nos. 9.12, 9.12A and 9.13. Resolution 610 (WRC–03) shall also apply; however, in the case of radionavigation-satellite service (space-to-space) networks and systems, Resolution 610 (WRC–03) shall only apply to transmitting space stations. In accordance with No. 5.329A, for systems and networks in the radionavigation-satellite service (space-to-space) in the bands 1215–1300 MHz and 1559–1610 MHz, the provisions of Nos. 9.7, 9.12, 9.12A and 9.13 shall only apply with respect to other systems and networks in the radionavigation-satellite service (space-to-space). (WRC–07)

5.329 Use of the radionavigation-satellite service in the band 1215–1300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215–1300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. 5.43 shall not apply in respect of the radiolocation service. Resolution 608 (Rev.WRC–15) shall apply. (FCC)

5.329A Use of systems in the radionavigation-satellite service (space-to-space) operating in the bands 1215–1300 MHz and 1559–1610 MHz is not intended to provide safety service applications, and shall not impose any additional constraints on radionavigation-satellite service (space-to-Earth) systems or on other services operating in accordance with the Table of Frequency Allocations. (WRC–07)

5.330 *Additional allocation:* in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the band 1215–1300 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC–12)

5.331 *Additional allocation:* in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, Pakistan, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, South Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela and Viet Nam, the band

1215–1300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the band 1240–1300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service. (WRC–12)

5.332 In the band 1215–1260 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, the radionavigation-satellite service and other services allocated on a primary basis.

5.334 *Additional allocation:* in Canada and the United States, the band 1350–1370 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.335 In Canada and the United States in the band 1240–1300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause interference to, claim protection from, or otherwise impose constraints on operation or development of the aeronautical radionavigation service.

5.335A In the band 1260–1300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service and other services allocated by footnotes on a primary basis.

5.337 The use of the bands 1300–1350 MHz, 2700–2900 MHz and 9000–9200 MHz by the aeronautical radionavigation service is restricted to ground-based radars and to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

5.337A The use of the band 1300–1350 MHz by earth stations in the radionavigation-satellite service and by stations in the radiolocation service shall not cause harmful interference to, nor constrain the operation and development of, the aeronautical-radionavigation service.

5.338 In Kyrgyzstan, Slovakia and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1350–1400 MHz. (WRC–12)

5.338A In the frequency bands 1350–1400 MHz, 1427–1452 MHz, 22.55–23.55 GHz, 30–31.3 GHz, 49.7–50.2 GHz, 50.4–50.9 GHz, 51.4–52.6 GHz, 81–86 GHz and 92–94 GHz, Resolution 750 (Rev.WRC–15) applies. (WRC–15)

5.339 The bands 1370–1400 MHz, 2640–2655 MHz, 4950–4990 MHz and 15.20–15.35 GHz are also allocated to the space research (passive) and Earth exploration-satellite (passive) services on a secondary basis.

5.340 All emissions are prohibited in the following bands:

1400–1427 MHz,
2690–2700 MHz, except those provided for by No. 5.422,
10.68–10.7 GHz, except those provided for by No. 5.483,
15.35–15.4 GHz, except those provided for by No. 5.511,
23.6–24 GHz,
31.3–31.5 GHz,
31.5–31.8 GHz, in Region 2,
48.94–49.04 GHz, from airborne stations
50.2–50.4 GHz,[2]
52.6–54.25 GHz,
86–92 GHz,
100–102 GHz,
109.5–111.8 GHz,
114.25–116 GHz,
148.5–151.5 GHz,
164–167 GHz,
182–185 GHz,
190–191.8 GHz,
200–209 GHz,
226–231.5 GHz,
250–252 GHz.

5.341 In the bands 1400–1727 MHz, 101–120 GHz and 197–220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

5.341A In Region 1, the frequency bands 1427–1452 MHz and 1492–1518 MHz are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15). This identification does not preclude the use of these frequency bands by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. (WRC–15)

5.341B In Region 2, the frequency band 1427–1518 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15). This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.341C The frequency bands 1427–1452 MHz and 1492–1518 MHz are identified for use by

[2] 5.340.1 The allocation to the Earth exploration-satellite service (passive) and the space research service (passive) in the band 50.2–50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary allocated services in those bands.

administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15). The use of these frequency bands by the above administrations for the implementation of IMT in the frequency bands 1429–1452 MHz and 1492–1518 MHz is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of these frequency bands by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.342 *Additional allocation:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Uzbekistan, Kyrgyzstan and Ukraine, the frequency band 1429–1535 MHz is also allocated to the aeronautical mobile service on a primary basis, exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the frequency band 1452–1492 MHz is subject to agreement between the administrations concerned. (WRC–15)

5.343 In Region 2, the use of the band 1435–1535 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

5.344 *Alternative allocation:* in the United States, the band 1452–1525 MHz is allocated to the fixed and mobile services on a primary basis (*see* also No. 5.343).

5.345 Use of the band 1452–1492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC–15). (FCC)

5.346 In Algeria, Angola, Saudi Arabia, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Kenya, Kuwait, Lesotho, Lebanon, Liberia, Madagascar, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Palestine, Qatar, Dem. Rep. of the Congo, Rwanda, Senegal, Seychelles, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Tunisia, Zambia, and Zimbabwe, the frequency band 1452–1492 MHz is identified for use by administrations listed above wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15). This identification does not preclude the use of this frequency band by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. See also Resolution 761 (WRC–15). (WRC–15)

NOTE: The use by Palestine of the allocation to the mobile service in the frequency band 1452–1492 MHz identified for IMT is noted, pursuant to Resolution 99 (Rev. Busan, 2014) and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.346A The frequency band 1452–1492 MHz is identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15) and Resolution 761 (WRC–15). The use of this frequency band by the above administrations for the implementation of IMT is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.348 The use of the band 1518–1525 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. In the band 1518–1525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. 5.43A does not apply.

5.348A In the band 1518–1525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. 9.11A for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be -150 dB(W/m^2) in any 4 kHz band for all angles of arrival, instead of those given in Table 5–2 of Appendix 5. In the band 1518–1525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. 5.43A does not apply.

5.348B In the band 1518–1525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. 5.343 and 5.344) and in the countries listed in No. 5.342. No. 5.43A does not apply.

5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Cameroon, Egypt, France, Iran (Islamic Republic of), Iraq, Israel, Kazakhstan, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Morocco, Qatar, Syrian Arab Republic, Kyrgyzstan, Turkmenistan and Yemen, the allocation of the band 1525–1530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (*see* No. 5.33). (WRC–07)

5.350 *Additional allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 1525–1530 MHz is also allocated to the aeronautical mobile service on a primary basis.

5.351 The bands 1525–1544 MHz, 1545–1559 MHz, 1626.5–1645.5 MHz and 1646.5–1660.5 MHz shall not be used for feeder links of any service. In exceptional circumstances, however, an earth station at a specified fixed point in any of the mobile-satellite services may be authorized by an administration to communicate via space stations using these bands.

5.351A For the use of the bands 1518–1544 MHz, 1545–1559 MHz, 1610–1645.5 MHz, 1646.5–1660.5 MHz, 1668–1675 MHz, 1980–2010 MHz, 2170–2200 MHz, 2483.5–2520 MHz and 2670–2690 MHz by the mobile-satellite service, see Resolutions 212 (Rev.WRC–15) and 225 (Rev.WRC–12). (FCC)

5.352A In the frequency band 1525–1530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in Algeria, Saudi Arabia, Egypt, France and French overseas communities of Region 3, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Viet Nam and Yemen notified prior to 1 April 1998. (WRC–15)

5.353A In applying the procedures of Section II of Article 9 to the mobile-satellite service in the bands 1530–1544 MHz and 1626.5–1645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution 222 (Rev. WRC–12) shall apply.) (FCC)

5.354 The use of the bands 1525–1559 MHz and 1626.5–1660.5 MHz by the mobile-satellite services is subject to coordination under No. 9.11A.

5.355 *Additional allocation:* in Bahrain, Bangladesh, Congo (Rep. of the), Djibouti, Egypt, Eritrea, Iraq, Israel, Kuwait, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the bands 1540–1559 MHz, 1610–1645.5 MHz and 1646.5–1660 MHz are also allocated to the fixed service on a secondary basis. (WRC–12)

5.356 The use of the band 1544–1545 MHz by the mobile-satellite service (space-to-Earth) is limited to distress and safety communications (*see* Article 31).

5.357 Transmissions in the band 1545–1555 MHz from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links.

5.357A In applying the procedures of Section II of Article 9 to the mobile-satellite service in the frequency bands 1545–1555 MHz and 1646.5–1656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article 44. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44 shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution 222 (Rev. WRC–12) shall apply.) (WRC–12)

5.359 *Additional allocation:* In Germany, Saudi Arabia, Armenia, Azerbaijan, Belarus, Benin, Cameroon, the Russian Federation, France, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kuwait, Lithuania, Mauritania, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Tunisia, Turkmenistan and Ukraine, the frequency bands 1550–1559 MHz, 1610–1645.5 MHz and 1646.5–1660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these frequency bands. (WRC–15)

5.362A In the United States, in the bands 1555–1559 MHz and 1656.5–1660.5 MHz, the aeronautical mobile-satellite (R) service shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

5.364 The use of the band 1610–1626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to coordination under No. 9.11A. A mobile earth

station operating in either of the services in this band shall not produce a peak e.i.r.p. density in excess of −15 dB(W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. 5.366 (to which No. 4.10 applies), unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, the mean e.i.r.p. density of a mobile earth station shall not exceed −3 dB(W/4 kHz). Stations of the mobile-satellite service shall not claim protection from stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 5.366 and stations in the fixed service operating in accordance with the provisions of No. 5.359. Administrations responsible for the coordination of mobile-satellite networks shall make all practicable efforts to ensure protection of stations operating in accordance with the provisions of No. 5.366.

5.365 The use of the band 1613.8–1626.5 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. 9.11A.

5.366 The band 1610–1626.5 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. Such satellite use is subject to agreement obtained under No. 9.21.

5.367 *Additional allocation:* The frequency band 1610–1626.5 MHz is also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. 9.21. (WRC–12)

5.368 With respect to the radiodetermination-satellite and mobile-satellite services the provisions of No. 4.10 do not apply in the band 1610–1626.5 MHz, with the exception of the aeronautical radionavigation-satellite service.

5.369 *Different category of service:* in Angola, Australia, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, South Sudan, Togo and Zambia, the allocation of the band 1610–1626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21 from countries not listed in this provision. (WRC–12)

5.370 *Different category of service:* in Venezuela, the allocation to the radiodetermination-satellite service in the band 1610–1626.5 MHz (Earth-to-space) is on a secondary basis.

5.371 *Additional allocation:* in Region 1, the band 1610–1626.5 MHz (Earth-to-space) is also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under No. 9.21. (WRC–12)

5.372 Harmful interference shall not be caused to stations of the radio astronomy service using the band 1610.6–1613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. 29.13 applies).

5.374 Mobile earth stations in the mobile-satellite service operating in the bands 1631.5–1634.5 MHz and 1656.5–1660 MHz shall not cause harmful interference to stations in the fixed service operating in the countries listed in No. 5.359.

5.375 The use of the band 1645.5–1646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress and safety communications (*see* Article 31).

5.376 Transmissions in the band 1646.5–1656.5 MHz from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

5.376A Mobile earth stations operating in the band 1660–1660.5 MHz shall not cause harmful interference to stations in the radio astronomy service.

5.379 *Additional allocation:* in Bangladesh, India, Indonesia, Nigeria and Pakistan, the band 1660.5–1668.4 MHz is also allocated to the meteorological aids service on a secondary basis.

5.379A Administrations are urged to give all practicable protection in the band 1660.5–1668.4 MHz for future research in radio astronomy, particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1664.4–1668.4 MHz as soon as practicable.

5.379B The use of the band 1668–1675 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. In the band 1668–1668.4 MHz, Resolution 904 (WRC–07) shall apply. (WRC–07)

5.379C In order to protect the radio astronomy service in the band 1668–1670 MHz, the aggregate power flux-density values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed −181 dB(W/m^2) in 10 MHz and −194 dB(W/m^2) in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2000s.

5.379D For sharing of the band 1668.4–1675 MHz between the mobile-satellite service and the fixed and mobile services, Resolution 744 (Rev.WRC–07) shall apply. (WRC–07)

5.379E In the band 1668.4–1675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1668.4–1675 MHz, administrations are urged not to implement new systems in

the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable.

5.380A In the band 1670–1675 MHz, stations in the mobile-satellite service shall not cause harmful interference to, nor constrain the development of, existing earth stations in the meteorological-satellite service notified before 1 January 2004. Any new assignment to these earth stations in this band shall also be protected from harmful interference from stations in the mobile-satellite service. (WRC–07)

5.381 *Additional allocation:* in Afghanistan, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1690–1700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.382 *Different category of service:* In Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Turkmenistan, Ukraine and Yemen, the allocation of the frequency band 1690–1700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33), and in the Dem. People's Rep. of Korea, the allocation of the frequency band 1690–1700 MHz to the fixed service is on a primary basis (see No. 5.33) and to the mobile, except aeronautical mobile, service on a secondary basis. (WRC–15)

5.384 *Additional allocation:* in India, Indonesia and Japan, the band 1700–1710 MHz is also allocated to the space research service (space-to-Earth) on a primary basis.

5.384A The frequency bands, 1710–1885 MHz, 2300–2400 MHz and 2500–2690 MHz, or portions thereof, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC–15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.385 *Additional allocation:* the band 1718.8–1722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations.

5.386 *Additional allocation:* The frequency band 1750–1850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2 (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. 9.21, having particular regard to troposcatter systems. (WRC–15)

5.387 *Additional allocation:* in Belarus, Georgia, Kazakhstan, Kyrgyzstan, Romania, Tajikistan and Turkmenistan, the band 1770–1790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. 9.21. (WRC–12)

5.388 The frequency bands 1885–2025 MHz and 2110–2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution 212 (Rev.WRC–15) (see also Resolution 223 (Rev.WRC–15)). (WRC–15)

5.388A In Regions 1 and 3, the bands 1885–1980 MHz, 2010–2025 MHz and 2110–2170 MHz and, in Region 2, the bands 1885–1980 MHz and 2110–2160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications (IMT), in accordance with Resolution 221 (Rev. WRC–07). Their use by IMT applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC–12)

5.388B In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Libya, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, South Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT base station in neighbouring countries, in the bands referred to in No. 5.388A, shall not exceed a co-channel power flux-density of -127 dB(W/(m^2 · MHz)) at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. (WRC–12)

5.389A The use of the bands 1980–2010 MHz and 2170–2200 MHz by the mobile-satellite service is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (Rev. WRC–12). (FCC)

5.389B The use of the band 1980–1990 MHz by the mobile-satellite service shall not cause harmful interference to or constrain the development of the fixed and mobile services in Argentina, Brazil, Canada, Chile,

Ecuador, the United States, Honduras, Jamaica, Mexico, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

5.389C The use of the bands 2010–2025 MHz and 2160–2170 MHz in Region 2 by the mobile-satellite service is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (Rev. WRC–12). (FCC)

5.389E The use of the bands 2010–2025 MHz and 2160–2170 MHz by the mobile-satellite service in Region 2 shall not cause harmful interference to or constrain the development of the fixed and mobile services in Regions 1 and 3.

5.389F In Algeria, Benin, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the bands 1980–2010 MHz and 2170–2200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services.

5.391 In making assignments to the mobile service in the frequency bands 2025–2110 MHz and 2200–2290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU–R SA.1154–0, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC–15)

5.392 Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2025–2110 MHz and 2200–2290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space-to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites.

5.393 *Additional allocation:* In Canada, the United States and India, the frequency band 2310–2360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC–15), with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC–15)

5.394 In the United States, the use of the band 2300–2390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the band 2360–2400 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. (WRC–07)

5.395 In France and Turkey, the use of the band 2310–2360 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

5.396 Space stations of the broadcasting-satellite service in the band 2310–2360 MHz operating in accordance with No. 5.393 that may affect the services to which this band is allocated in other countries shall be coordinated and notified in accordance with Resolution 33 (Rev.WRC–15). Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use. (FCC)

5.398 In respect of the radiodetermination-satellite service in the band 2483.5–2500 MHz, the provisions of No. 4.10 do not apply.

5.398A *Different category of service:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Ukraine, the band 2483.5–2500 MHz is allocated on a primary basis to the radiolocation service. The radiolocation stations in these countries shall not cause harmful interference to, or claim protection from, stations of the fixed, mobile and mobile-satellite services operating in accordance with the Radio Regulations in the frequency band 2483.5–2500 MHz. (WRC–12)

5.399 Except for cases referred to in No. 5.401, stations of the radiodetermination-satellite service operating in the frequency band 2483.5–2500 MHz for which notification information is received by the Bureau after 17 February 2012, and the service area of which includes Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Ukraine, shall not cause harmful interference to, and shall not claim protection from stations of the radiolocation service operating in these countries in accordance with No. 5.398A. (WRC–12)

5.401 In Angola, Australia, Bangladesh, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Lebanon, Liberia, Libya, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, Dem. Rep. of the Congo, Sudan, Swaziland, Togo and Zambia, the frequency band 2483.5–2500 MHz was already allocated on a primary basis to the radiodetermination-satellite service before WRC–12, subject to agreement obtained under No. 9.21 from countries not listed in this provision. Systems in the radiodetermination-satellite service for which complete coordination information has been received by the Radiocommunication Bureau before 18 February 2012 will retain their regulatory status, as of the date of receipt of the coordination request information. (WRC–15)

5.402 The use of the band 2483.5–2500 MHz by the mobile-satellite and the radiodetermination-satellite services is subject to the coordination under No. 9.11A. Administrations are urged to take all practicable

steps to prevent harmful interference to the radio astronomy service from emissions in the 2483.5–2500 MHz band, especially those caused by second-harmonic radiation that would fall into the 4990–5000 MHz band allocated to the radio astronomy service worldwide.

5.403 Subject to agreement obtained under No. 9.21, the band 2520–2535 MHz may also be used for the mobile-satellite (space-to-Earth), except aeronautical mobile-satellite, service for operation limited to within national boundaries. The provisions of No. 9.11A apply. (WRC–07)

5.404 *Additional allocation:* in India and Iran (Islamic Republic of), the band 2500–2516.5 MHz may also be used for the radiodetermination-satellite service (space-to-Earth) for operation limited to within national boundaries, subject to agreement obtained under No. 9.21.

5.407 In the band 2500–2520 MHz, the power flux-density at the surface of the Earth from space stations operating in the mobile-satellite (space-to-Earth) service shall not exceed -152 dB (W/(m^2 · 4 kHz)) in Argentina, unless otherwise agreed by the administrations concerned.

5.410 The band 2500–2690 MHz may be used for tropospheric scatter systems in Region 1, subject to agreement obtained under No. 9.21. No. 9.21 does not apply to tropospheric scatter links situated entirely outside Region 1. Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in this band. When planning new tropospheric scatter radiorelay links in this band, all possible measures shall be taken to avoid directing the antennas of these links towards the geostationary-satellite orbit. (WRC–12)

5.412 *Alternative allocation:* in Kyrgyzstan and Turkmenistan, the band 2500–2690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–12)

5.413 In the design of systems in the broadcasting-satellite service in the bands between 2500 MHz and 2690 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2690–2700 MHz.

5.414 The allocation of the frequency band 2500–2520 MHz to the mobile-satellite service (space-to-Earth) is subject to coordination under No. 9.11A. (WRC–07)

5.414A In Japan and India, the use of the bands 2500–2520 MHz and 2520–2535 MHz, under No. 5.403, by a satellite network in the mobile-satellite service (space-to-Earth) is limited to operation within national boundaries and subject to the application of No. 9.11A. The following pfd values shall be used as a threshold for coordination under No. 9.11A, for all conditions and for all methods of modulation, in an area of 1000 km around the territory of the administration notifying the mobile-satellite service network:

-136 dB(W/(m^2 · MHz)) for $0° \leq \theta \leq 5°$

$-136 + 0.55\ (\theta - 5)$ dB(W/(m^2 · MHz)) for $5° < \theta \leq 25°$

-125 dB(W/(m^2 · MHz)) for $25° < \theta \leq 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. Outside this area Table 21–4 of Article 21 shall apply. Furthermore, the coordination thresholds in Table 5–2 of Annex 1 to Appendix 5 of the Radio Regulations (Edition of 2004), in conjunction with the applicable provisions of Articles 9 and 11 associated with No. 9.11A, shall apply to systems for which complete notification information has been received by the Radicommunication Bureau by 14 November 2007 and that have been brought into use by that date. (WRC–07)

5.415 The use of the bands 2500–2690 MHz in Region 2 and 2500–2535 MHz and 2655–2690 MHz in Region 3 by the fixed-satellite service is limited to national and regional systems, subject to agreement obtained under No. 9.21, giving particular attention to the broadcasting-satellite service in Region 1. (WRC–07)

5.415A *Additional allocation:* in India and Japan, subject to agreement obtained under No. 9.21, the band 2515–2535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries.

5.416 The use of the band 2520–2670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. 9.21. The provisions of No. 9.19 shall be applied by administrations in this band in their bilateral and multilateral negotiations. (WRC–07)

5.418 *Additional allocation:* In India, the frequency band 2535–2655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC–15). The provisions of No. 5.416 and Table 21–4 of Article 21, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC–15). Geostationary broadcasting-satellite service (sound) systems for which complete Appendix 4 coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the frequency band 2630–2655 MHz, and for which complete Appendix 4 coordination information has been received

after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

—130 dB(W/(m² · MHz)) for $0° \leq \theta \leq 5°$

—130 + 0.4 $(\theta - 5)$ dB(W/(m² · MHz)) for $5° < \theta \leq 25°$

—122 dB(W/(m² · MHz)) for $25° < \theta \leq 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of −122 dB(W/(m² · MHz)) shall be used as a threshold for coordination under No. 9.11 in an area of 1500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416 for systems for which complete Appendix 4 coordination information has been received after 1 June 2005. (WRC–15)

5.418A In certain Region 3 countries listed in No. 5.418, use of the band 2630–2655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 2 June 2000, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 3 June 2000.

5.418B Use of the band 2630–2655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418, for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12.

5.418C Use of the band 2630–2655 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418 and No. 22.2 does not apply.

5.419 When introducing systems of the mobile-satellite service in the band 2670–2690 MHz, administrations shall take all necessary steps to protect the satellite systems operating in this band prior to 3 March 1992. The coordination of mobile-satellite systems in the band shall be in accordance with No. 9.11A. (WRC–07)

5.420 The band 2655–2670 MHz may also be used for the mobile-satellite (Earth-to-space), except aeronautical mobile-satellite, service for operation limited to within national boundaries, subject to agreement obtained under No. 9.21. The coordination under No. 9.11A applies. (WRC–07)

5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Mongolia, Montenegro, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and Yemen, the band 2690–2700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC–12)

5.423 In the band 2700–2900 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service.

5.424 *Additional allocation:* in Canada, the band 2850–2900 MHz is also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars.

5.424A In the band 2900–3100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service.

5.425 In the band 2900–3100 MHz, the use of the shipborne interrogator-transponder (SIT) system shall be confined to the sub-band 2930–2950 MHz.

5.426 The use of the band 2900–3100 MHz by the aeronautical radionavigation service is limited to ground-based radars.

5.427 In the bands 2900–3100 MHz and 9300–9500 MHz, the response from radar transponders shall not be capable of being confused with the response from radar beacons (racons) and shall not cause interference to ship or aeronautical radars in the radionavigation service, having regard, however, to No. 4.9.

5.428 *Additional allocation:* In Azerbaijan, Kyrgyzstan and Turkmenistan, the frequency band 3100–3300 MHz is also allocated to the radionavigation service on a primary basis. (WRC–15)

5.429 *Additional allocation:* In Saudi Arabia, Bahrain, Bangladesh, Benin, Brunei Darussalam, Cambodia, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte

d'Ivoire, Egypt, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Sudan and Yemen, the frequency band 3300–3400 MHz is also allocated to the fixed and mobile services on a primary basis. The countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service. (WRC–15)

5.429A *Additional allocation:* In Angola, Benin, Botswana, Burkina Faso, Burundi, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3300–3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3300–3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC–15)

5.429B In the following countries of Region 1 south of 30° parallel north: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Egypt, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Namibia, Niger, Nigeria, Uganda, the Dem. Rep. of the Congo, Rwanda, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3300–3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). The use of this frequency band shall be in accordance with Resolution 223 (Rev.WRC–15). The use of the frequency band 3300–3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.429C *Different category of service:* In Argentina, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay and Uruguay, the frequency band 3300–3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. In Argentina, Brazil, Guatemala, Mexico and Paraguay, the frequency band 3300–3400 MHz is also allocated to the fixed service on a primary basis. Stations in the fixed and mobile services operating in the frequency band 3300–3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC–15)

5.429D In the following countries in Region 2: Argentina, Colombia, Costa Rica, Ecuador, Mexico and Uruguay, the use of the frequency band 3300–3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC–15). This use in Argentina and Uruguay is subject to the application of No. 9.21. The use of the frequency band 3300–3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.429E *Additional allocation:* In Papua New Guinea, the frequency band 3300–3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3300–3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC–15)

5.429F In the following countries in Region 3: Cambodia, India, Lao P.D.R., Pakistan, the Philippines and Viet Nam, the use of the frequency band 3300–3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC–15). The use of the frequency band 3300–3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service. Before an administration brings into use a base or mobile station of an IMT system in this frequency band, it shall seek agreement under No. 9.21 with neighbouring countries to protect the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC–15)

5.430 *Additional allocation:* In Azerbaijan, Kyrgyzstan and Turkmenistan, the frequency band 3300–3400 MHz is also allocated to the radionavigation service on a primary basis. (WRC–15)

5.430A The allocation of the frequency band 3400–3600 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. 9.21. This frequency band is identified for International

Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The provisions of Nos. 9.17 and 9.18 shall also apply in the coordination phase. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/($m^2 \cdot 4$ kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) and with the assistance of the Bureau if so requested. In case of disagreement, calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3400–3600 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010. (WRC–15)

5.431 *Additional allocation:* In Germany and Israel, the frequency band 3400–3475 MHz is also allocated to the amateur service on a secondary basis. (WRC–15)

5.431A In Region 2, the allocation of the frequency band 3400–3500 MHz to the mobile, except aeronautical mobile, service on a primary basis is subject to agreement obtained under No. 9.21. (WRC–15)

5.431B In Region 2, the frequency band 3400–3600 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a base or mobile station of an IMT system, it shall seek agreement under No. 9.21 with other administrations and ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/($m^2 \cdot 4$ kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service, including IMT systems, in the frequency band 3400–3600 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). (WRC–15)

5.432 *Different category of service:* in Korea (Rep. of), Japan and Pakistan, the allocation of the band 3400–3500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33).

5.432A In Korea (Rep. of), Japan and Pakistan, the band 3400–3500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3400–3500 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). (WRC–07)

5.432B *Different category of service:* In Australia, Bangladesh, China, French overseas communities of Region 3, India, Iran (Islamic Republic of), New Zealand, the Philippines and Singapore, the frequency band 3400–3500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. 9.21 with other administrations

and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −also apply. Be· 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3400–3500 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). (WRC–15)

5.433 In Regions 2 and 3, in the band 3400–3600 MHz the radiolocation service is allocated on a primary basis. However, all administrations operating radiolocation systems in this band are urged to cease operations by 1985. Thereafter, administrations shall take all practicable steps to protect the fixed-satellite service and coordination requirements shall not be imposed on the fixed-satellite service.

5.433A In Australia, Bangladesh, China, French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, New Zealand, Pakistan and the Philippines, the frequency band 3500–3600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3500–3600 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). (WRC–15)

5.434 In Canada, Colombia, Costa Rica and the United States, the frequency band 3600–3700 MHz, or portions thereof, is identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a base or mobile station of an IMT system, it shall seek agreement under No. 9.21 with other administrations and ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service, including IMT systems, in the frequency band 3600–3700 MHz shall not claim more protection from space stations than that provided in Table 21–4 of the Radio Regulations (Edition of 2004). (WRC–15)

5.435 In Japan, in the band 3620–3700 MHz, the radiolocation service is excluded.

5.436 Use of the frequency band 4200–4400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards. Such

use shall be in accordance with Resolution 424 (WRC–15). (WRC–15)

5.437 Passive sensing in the Earth exploration-satellite and space research services may be authorized in the frequency band 4200–4400 MHz on a secondary basis. (WRC–15)

5.438 Use of the frequency band 4200–4400 MHz by the aeronautical radionavigation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. (WRC–15)

5.439 *Additional allocation:* In Iran (Islamic Republic of), the band 4200–4400 MHz is also allocated to the fixed service on a secondary basis. (WRC–12)

5.440 The standard frequency and time signal-satellite service may be authorized to use the frequency 4202 MHz for space-to-Earth transmissions and the frequency 6427 MHz for Earth-to-space transmissions. Such transmissions shall be confined within the limits of ±2 MHz of these frequencies, subject to agreement obtained under No. 9.21.

5.440A In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), and in Australia, the band 4400–4940 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. 1.83). Such use shall be in accordance with Resolution 416 (WRC–07) and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this band by other mobile service applications or by other services to which this band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC–07)

5.441 The use of the bands 4500–4800 MHz (space-to-Earth), 6725–7025 MHz (Earth-to-space) by the fixed-satellite service shall be in accordance with the provisions of Appendix 30B. The use of the bands 10.7–10.95 GHz (space-to-Earth), 11.2–11.45 GHz (space-to-Earth) and 12.75–13.25 GHz (Earth-to-space) by geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix 30B. The use of the bands 10.7–10.95 GHz (space-to-Earth), 11.2–11.45 GHz (space-to-Earth) and 12.75–13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

5.441A In Uruguay, the frequency band 4800–4900 MHz, or portions thereof, is identified for the implementation of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained with neighbouring countries, and IMT stations shall not claim protection from stations of other applications of the mobile service. Such use shall be in accordance with Resolution 223 (Rev.WRC–15). (WRC–15)

5.441B In Cambodia, Lao P.D.R. and Viet Nam, the frequency band 4800–4990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained under No. 9.21 with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density produced by this station does not exceed -155 dB(W/($m^2 \cdot 1$ MHz)) produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. This criterion is subject to review at WRC–19. See Resolution 223 (Rev.WRC–15). This identification shall be effective after WRC–19. (WRC–15)

5.442 In the frequency bands 4825–4835 MHz and 4950–4990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), and in Australia, the frequency band 4825–4835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution 416 (WRC–07) and shall not cause harmful interference to the fixed service. (WRC–15)

5.443 *Different category of service:* in Argentina, Australia and Canada, the allocation of

the bands 4825–4835 MHz and 4950–4990 MHz to the radio astronomy service is on a primary basis (see No. 5.33).

5.443AA In the frequency bands 5000–5030 MHz and 5091–5150 MHz, the aeronautical mobile-satellite (R) service is subject to agreement obtained under No. 9.21. The use of these bands by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC–12)

5.443B In order not to cause harmful interference to the microwave landing system operating above 5030 MHz, the aggregate power flux-density produced at the Earth's surface in the frequency band 5030–5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the frequency band 5010–5030 MHz shall not exceed −124.5 dB(W/m^2) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the frequency band 4990–5000 MHz, radionavigation-satellite service systems operating in the frequency band 5010–5030 MHz shall comply with the limits in the frequency band 4990–5000 MHz defined in Resolution 741 (Rev.WRC–15). (WRC–15)

5.443C The use of the frequency band 5030–5091 MHz by the aeronautical mobile (R) service is limited to internationally standardized aeronautical systems. Unwanted emissions from the aeronautical mobile (R) service in the frequency band 5030–5091 MHz shall be limited to protect RNSS system downlinks in the adjacent 5010–5030 MHz band. Until such time that an appropriate value is established in a relevant ITU–R Recommendation, the e.i.r.p. density limit of −75 dBW/MHz in the frequency band 5010–5030 MHz for any AM(R)S station unwanted emission should be used. (WRC–12)

5.443D In the frequency band 5030–5091 MHz, the aeronautical mobile-satellite (R) service is subject to coordination under No. 9.11A. The use of this frequency band by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC–12)

5.444 The frequency band 5030–5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5030–5091 MHz, the requirements of this system shall have priority over other uses of this frequency band. For the use of the frequency band 5091–5150 MHz, No. 5.444A and Resolution 114 (Rev.WRC–15) apply. (WRC–15)

5.444A The use of the allocation to the fixed-satellite service (Earth-to-space) in the frequency band 5091–5150 MHz is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A. The use of the frequency band 5091–5150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be subject to application of Resolution 114 (Rev.WRC–15). Moreover, to ensure that the aeronautical radionavigation service is protected from harmful interference, coordination is required for feeder-link earth stations of the non-geostationary satellite systems in the mobile-satellite service which are separated by less than 450 km from the territory of an administration operating ground stations in the aeronautical radionavigation service. (WRC–15)

5.444B The use of the frequency band 5091–5150 MHz by the aeronautical mobile service is limited to:

—systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution 748 (Rev.WRC–15);

—aeronautical telemetry transmissions from aircraft stations (see No. 1.83) in accordance with Resolution 418 (Rev.WRC–15). (WRC–15)

5.446 *Additional allocation:* In the countries listed in No. 5.369, the frequency band 5150–5216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. 9.21. In Region 2 (except in Mexico), the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in No. 5.369 and Bangladesh, the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the frequency bands 1610–1626.5 MHz and/or 2483.5–2500 MHz. The total power flux-density at the Earth's surface shall in no case exceed −159 dB (W/m^2) in any 4 kHz band for all angles of arrival. (WRC–15)

5.446A The use of the bands 5150–5350 MHz and 5470–5725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution 229 (Rev. WRC–12). (WRC–12)

5.446B In the band 5150–5250 MHz, stations in the mobile service shall not claim protection from earth stations in the fixed-satellite service. No. 5.43A does not apply to the mobile service with respect to fixed-satellite service earth stations.

5.446C *Additional allocation:* In Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan, South Sudan and Tunisia) and in Brazil, the band 5150–5250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to

aeronautical telemetry transmissions from aircraft stations (see No. 1.83), in accordance with Resolution 418 (Rev.WRC–15). These stations shall not claim protection from other stations operating in accordance with Article 5. No. 5.43A does not apply. (FCC)

5.447 *Additional allocation:* In Côte d'Ivoire, Egypt, Israel, Lebanon, the Syrian Arab Republic and Tunisia, the band 5150–5250 MHz is also allocated to the mobile service, on a primary basis, subject to agreement obtained under No. 9.21. In this case, the provisions of Resolution 229 (Rev. WRC–12) do not apply. (WRC–12)

5.447A The allocation to the fixed-satellite service (Earth-to-space) in the band 5150–5250 MHz is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A.

5.447B *Additional allocation:* the band 5150–5216 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. This allocation is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to provisions of No. 9.11A. The power flux-density at the Earth's surface produced by space stations of the fixed-satellite service operating in the space-to-Earth direction in the band 5150–5216 MHz shall in no case exceed −164 dB (W/m^2) in any 4 kHz band for all angles of arrival.

5.447C Administrations responsible for fixed-satellite service networks in the band 5150–5250 MHz operated under Nos. 5.447A and 5.447B shall coordinate on an equal basis in accordance with No. 9.11A with administrations responsible for non-geostationary-satellite networks operated under No. 5.446 and brought into use prior to 17 November 1995. Satellite networks operated under No. 5.446 brought into use after 17 November 1995 shall not claim protection from, and shall not cause harmful interference to, stations of the fixed-satellite service operated under Nos. 5.447A and 5.447B.

5.447D The allocation of the band 5250–5255 MHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis.

5.447E *Additional allocation:* The frequency band 5250–5350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this frequency band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU–R F.1613–0. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. 5.43A do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations. (WRC–15)

5.447F In the frequency band 5250–5350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU–R M.1638–0 and ITU–R RS.1632–0. (WRC–15)

5.448 *Additional allocation:* In Azerbaijan, Kyrgyzstan, Romania and Turkmenistan, the band 5250–5350 MHz is also allocated to the radionavigation service on a primary basis. (WRC–12)

5.448A The Earth exploration-satellite (active) and space research (active) services in the frequency band 5250–5350 MHz shall not claim protection from the radiolocation service. No. 5.43A does not apply.

5.448B The Earth exploration-satellite service (active) operating in the band 5350–5570 MHz and space research service (active) operating in the band 5460–5570 MHz shall not cause harmful interference to the aeronautical radionavigation service in the band 5350–5460 MHz, the radionavigation service in the band 5460–5470 MHz and the maritime radionavigation service in the band 5470–5570 MHz.

5.448C The space research service (active) operating in the band 5350–5460 MHz shall not cause harmful interference to nor claim protection from other services to which this band is allocated.

5.448D In the frequency band 5350–5470 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the aeronautical radionavigation service operating in accordance with No. 5.449.

5.449 The use of the band 5350–5470 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.

5.450 *Additional allocation:* In Austria, Azerbaijan, Iran (Islamic Republic of), Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5470–5650 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC–12)

5.450A In the frequency band 5470–5725 MHz, stations in the mobile service shall not claim protection from radiodetermination

services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendation ITU–R M.1638–0. (WRC–15)

5.450B In the frequency band 5470–5650 MHz, stations in the radiolocation service, except ground-based radars used for meteorological purposes in the band 5600–5650 MHz, shall not cause harmful interference to, nor claim protection from, radar systems in the maritime radionavigation service.

5.451 *Additional allocation:* in the United Kingdom, the band 5470–5850 MHz is also allocated to the land mobile service on a secondary basis. The power limits specified in Nos. 21.2, 21.3, 21.4 and 21.5 shall apply in the band 5725–5850 MHz.

5.452 Between 5600 MHz and 5650 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the maritime radionavigation service.

5.453 *Additional allocation:* In Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Madagascar, Malaysia, Niger, Nigeria, Oman, Uganda, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sri Lanka, Swaziland, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the band 5650–5850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of Resolution 229 (Rev. WRC–12) do not apply. (WRC–12)

5.454 *Different category of service:* In Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5670–5725 MHz to the space research service is on a primary basis (see No. 5.33). (WRC–12)

5.455 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5670–5850 MHz is also allocated to the fixed service on a primary basis. (WRC–07)

5.457 In Australia, Burkina Faso, Côte d'Ivoire, Mali and Nigeria, the allocation to the fixed service in the bands 6440–6520 MHz (HAPS-to-ground direction) and 6560–6640 MHz (ground-to-HAPS direction) may also be used by gateway links for high-altitude platform stations (HAPS) within the territory of these countries. Such use is limited to operation in HAPS gateway links and shall not cause harmful interference to, and shall not claim protection from, existing services, and shall be in compliance with Resolution 150 (WRC–12). Existing services shall not be constrained in future development by HAPS gateway links. The use of HAPS gateway links in these bands requires explicit agreement with other administrations whose territories are located within 1000 kilometres from the border of an administration intending to use the HAPS gateway links. (WRC–12)

5.457A In the frequency bands 5925–6425 MHz and 14–14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution 902 (WRC–03). In the frequency band 5925–6425 MHz, earth stations located on board vessels and communicating with space stations of the fixed-satellite service may employ transmit antennas with minimum diameter of 1.2 m and operate without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognized by the coastal State. All other provisions of Resolution 902 (WRC–03) shall apply. (WRC–15)

5.457B In the frequency bands 5925–6425 MHz and 14–14.5 GHz, earth stations located on board vessels may operate with the characteristics and under the conditions contained in Resolution 902 (WRC–03) in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Jordan, Kuwait, Libya, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, in the maritime mobile-satellite service on a secondary basis. Such use shall be in accordance with Resolution 902 (WRC–03). (WRC–15)

5.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), the frequency band 5925–6700 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. 1.83). Such use shall be in accordance with Resolution 416 (WRC–07) and shall not cause harmful interference to, or claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this frequency band by other mobile service applications or by other services to which this frequency band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC–15)

5.458 In the band 6425–7075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7075–7250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6425–7025 MHz and 7075–7250 MHz.

5.458A In making assignments in the band 6700–7075 MHz to space stations of the fixed-

satellite service, administrations are urged to take all practicable steps to protect spectral line observations of the radio astronomy service in the band 6650–6675.2 MHz from harmful interference from unwanted emissions.

5.458B The space-to-Earth allocation to the fixed-satellite service in the band 6700–7075 MHz is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service and is subject to coordination under No. 9.11A. The use of the band 6700–7075 MHz (space-to-Earth) by feeder links for non-geostationary satellite systems in the mobile-satellite service is not subject to No. 22.2.

5.459 *Additional allocation:* In the Russian Federation, the frequency bands 7100–7155 MHz and 7190–7235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. 9.21. In the frequency band 7190–7235 MHz, with respect to the Earth exploration-satellite service (Earth-to-space), No. 9.21 does not apply. (WRC–15)

5.460 No emissions from space research service (Earth-to-space) systems intended for deep space shall be effected in the frequency band 7190–7235 MHz. Geostationary satellites in the space research service operating in the frequency band 7190–7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply. (WRC–15)

5.460A The use of the frequency band 7190–7250 MHz (Earth-to-space) by the Earth exploration-satellite service shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7190–7250 MHz shall not claim protection from existing and future stations in the fixed and mobile services, and No. 5.43A does not apply. No. 9.17 applies. Additionally, to ensure protection of the existing and future deployment of fixed and mobile services, the location of earth stations supporting spacecraft in the Earth exploration-satellite service in non-geostationary orbits or geostationary orbit shall maintain a separation distance of at least 10 km and 50 km, respectively, from the respective border(s) of neighbouring countries, unless a shorter distance is otherwise agreed between the corresponding administrations. (WRC–15)

5.460B Space stations on the geostationary orbit operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7190–7235 MHz shall not claim protection from existing and future stations of the space research service, and No. 5.43A does not apply. (WRC–15)

5.461 *Additional allocation:* the bands 7250–7375 MHz (space-to-Earth) and 7900–8025 MHz (Earth-to-space) are also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21.

5.461A The use of the band 7450–7550 MHz by the meteorological-satellite service (space-to-Earth) is limited to geostationary-satellite systems. Non-geostationary meteorological-satellite systems in this band notified before 30 November 1997 may continue to operate on a primary basis until the end of their lifetime.

5.461AA The use of the frequency band 7375–7750 MHz by the maritime mobile-satellite service is limited to geostationary-satellite networks. (WRC–15)

5.461AB In the frequency band 7375–7750 MHz, earth stations in the maritime mobile-satellite service shall not claim protection from, nor constrain the use and development of, stations in the fixed and mobile, except aeronautical mobile, services. No. 5.43A does not apply. (WRC–15)

5.461B The use of the band 7750–7900 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC–12)

5.462A In Regions 1 and 3 (except for Japan), in the band 8025–8400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following values for angles of arrival (θ), without the consent of the affected administration:

-135 dB(W/m^2) in a 1 MHz band for $0 \le \theta < 5°$

$-135 + 0.5\ (\theta - 5)$ dB(W/m^2) in a 1 MHz band for $5 \le \theta < 25°$

-125 dB(W/m^2) in a 1 MHz band for $25 \le \theta \le 90°$ (WRC–12)

5.463 Aircraft stations are not permitted to transmit in the band 8025–8400 MHz.

5.465 In the space research service, the use of the band 8400–8450 MHz is limited to deep space.

5.466 *Different category of service:* In Singapore and Sri Lanka, the allocation of the band 8400–8500 MHz to the space research service is on a secondary basis (see No. 5.32). (WRC–12)

5.468 *Additional allocation:* In Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Djibouti, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, Swaziland, Chad, Togo, Tunisia and Yemen, the frequency band 8500–8750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.469 *Additional allocation:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Czech Rep., Romania, Tajikistan, Turkmenistan

and Ukraine, the band 8500–8750 MHz is also allocated to the land mobile and radionavigation services on a primary basis. (WRC–12)

5.469A In the band 8550–8650 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, or constrain the use and development of, stations of the radiolocation service.

5.470 The use of the band 8750–8850 MHz by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8800 MHz.

5.471 *Additional allocation:* In Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), Libya, the Netherlands, Qatar and Sudan, the frequency bands 8825–8850 MHz and 9000–9200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC–15)

5.472 In the bands 8850–9000 MHz and 9200–9225 MHz, the maritime radionavigation service is limited to shore-based radars.

5.473 *Additional allocation:* in Armenia, Austria, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the bands 8850–9000 MHz and 9200–9300 MHz are also allocated to the radionavigation service on a primary basis. (WRC–07)

5.473A In the band 9000–9200 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, systems identified in No. 5.337 operating in the aeronautical radionavigation service, or radar systems in the maritime radionavigation service operating in this band on a primary basis in the countries listed in No. 5.471. (WRC–07)

5.474 In the band 9200–9500 MHz, search and rescue transponders (SART) may be used, having due regard to the appropriate ITU–R Recommendation (*see* also Article 31).

5.474A The use of the frequency bands 9200–9300 MHz and 9900–10400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9300–9900 MHz. Such use is subject to agreement to be obtained under No. 9.21 from Algeria, Saudi Arabia, Bahrain, Egypt, Indonesia, Iran (Islamic Republic of), Lebanon and Tunisia. An administration that has not replied under No. 9.52 is considered as not having agreed to the coordination request. In this case, the notifying administration of the satellite system operating in the Earth exploration-satellite service (active) may request the assistance of the Bureau under Sub-Section IID of Article 9. (WRC–15)

5.474B Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU–R RS.2066–0. (WRC–15)

5.474C Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU–R RS.2065–0. (WRC–15)

5.474D Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9200–9300 MHz, the radionavigation and radiolocation services in the frequency band 9900–10000 MHz and the radiolocation service in the frequency band 10.0–10.4 GHz. (WRC–15)

5.475 The use of the band 9300–9500 MHz by the aeronautical radionavigation service is limited to airborne weather radars and ground-based radars. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9300–9320 MHz on condition that harmful interference is not caused to the maritime radionavigation service. (WRC–07)

5.475A The use of the band 9300–9500 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 300 MHz that cannot be fully accommodated within the 9500–9800 MHz band. (WRC–07)

5.475B In the band 9300–9500 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the radionavigation service in conformity with the Radio Regulations. Ground-based radars used for meteorological purposes have priority over other radiolocation uses. (WRC–07)

5.476A In the band 9300–9800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC–07)

5.477 *Different category of service:* In Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Trinidad and Tobago, and Yemen, the allocation of the frequency band 9800–10000 MHz to the fixed service is on a primary basis (see No. 5.33). (WRC–15)

5.478 *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 9800–

10000 MHz is also allocated to the radionavigation service on a primary basis. (WRC–07)

5.478A The use of the band 9800–9900 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 500 MHz that cannot be fully accommodated within the 9300–9800 MHz band. (WRC–07)

5.478B In the band 9800–9900 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from stations of the fixed service to which this band is allocated on a secondary basis. (WRC–07)

5.479 The band 9975–10025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.

5.480 *Additional allocation:* In Argentina, Brazil, Chile, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Paraguay, the Netherlands Antilles, Peru and Uruguay, the frequency band 10–10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Colombia, Costa Rica, Mexico and Venezuela, the frequency band 10–10.45 GHz is also allocated to the fixed service on a primary basis. (WRC–15)

5.481 *Additional allocation:* In Algeria, Germany, Angola, Brazil, China, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Pakistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania and Uruguay, the frequency band 10.45–10.5 GHz is also allocated to the fixed and mobile services on a primary basis. In Costa Rica, the frequency band 10.45–10.5 GHz is also allocated to the fixed service on a primary basis. (WRC–15)

5.482 In the band 10.6–10.68 GHz, the power delivered to the antenna of stations of the fixed and mobile, except aeronautical mobile, services shall not exceed −3 dBW. This limit may be exceeded, subject to agreement obtained under No. 9.21. However, in Algeria, Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Egypt, United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Moldova, Nigeria, Oman, Uzbekistan, Pakistan, Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Singapore, Tajikistan, Tunisia, Turkmenistan and Viet Nam, this restriction on the fixed and mobile, except aeronautical mobile, services is not applicable. (WRC–07)

5.482A For sharing of the band 10.6–10.68 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile, except aeronautical mobile, services, Resolution 751 (WRC–07) applies. (WRC–07)

5.483 *Additional allocation:* In Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Tajikistan, Turkmenistan and Yemen, the band 10.68–10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC–12)

5.484 In Region 1, the use of the band 10.7–11.7 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.

5.484A The use of the bands 10.95–11.2 GHz (space-to-Earth), 11.45–11.7 GHz (space-to-Earth), 11.7–12.2 GHz (space-to-Earth) in Region 2, 12.2–12.75 GHz (space-to-Earth) in Region 3, 12.5–12.75 GHz (space-to-Earth) in Region 1, 13.75–14.5 GHz (Earth-to-space), 17.8–18.6 GHz (space-to-Earth), 19.7–20.2 GHz (space-to-Earth), 27.5–28.6 GHz (Earth-to-space), 29.5–30 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

5.484B Resolution 155 (WRC–15) shall apply. (WRC–15)

5.485 In Region 2, in the band 11.7–12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.

5.486 *Different category of service:* In the United States, the allocation of the frequency band 11.7–12.1 GHz to the fixed service is on a secondary basis (see No. 5.32). (WRC–15)

5.487 In the band 11.7–12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in Appendix 30.

5.487A *Additional allocation:* in Region 1, the band 11.7–12.5 GHz, in Region 2, the band 12.2–12.7 GHz and, in Region 3, the band 11.7–12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

5.488 The use of the band 11.7–12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to application of the provisions of No. 9.14 for coordination with stations of terrestrial services in Regions 1, 2 and 3. For the use of the band 12.2–12.7 GHz by the broadcasting-satellite service in Region 2, *see* Appendix 30.

5.489 *Additional allocation:* in Peru, the band 12.1–12.2 GHz is also allocated to the fixed service on a primary basis.

5.490 In Region 2, in the band 12.2–12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the broadcasting-satellite Plan for Region 2 contained in Appendix 30.

5.492 Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix 30 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate.

5.493 The broadcasting-satellite service in the band 12.5–12.75 GHz in Region 3 is limited to a power flux-density not exceeding −111 dB(W/(m^2 · 27 MHz)) for all conditions and for all methods of modulation at the edge of the service area.

5.494 *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Madagascar, Mali, Morocco, Mongolia, Nigeria, Oman, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 12.5–12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC–15)

5.495 *Additional allocation:* In France, Greece, Monaco, Montenegro, Uganda, Romania and Tunisia, the frequency band 12.5–12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC–15)

5.496 *Additional allocation:* in Austria, Azerbaijan, Kyrgyzstan and Turkmenistan, the band 12.5–12.75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service on a primary basis. However, stations in these services shall not cause harmful interference to fixed-satellite service earth stations of countries in Region 1 other than those listed in this footnote. Coordination of these earth stations is not required with stations of the fixed and mobile services of the countries listed in this footnote. The power flux-density limit at the Earth's surface given in Table 21–4 of Article 21, for the fixed-satellite service shall apply on the territory of the countries listed in this footnote.

5.497 The use of the band 13.25–13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.

5.498A The Earth exploration-satellite (active) and space research (active) services operating in the band 13.25–13.4 GHz shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service.

5.499 *Additional allocation:* In Bangladesh and India, the band 13.25–14 GHz is also allocated to the fixed service on a primary basis. In Pakistan, the band 13.25–13.75 GHz is allocated to the fixed service on a primary basis. (WRC–12)

5.499A The use of the frequency band 13.4–13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement

obtained under No. 9.21 with respect to satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015. (WRC–15)

5.499B Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite service (Earth-to-space) allocated on a secondary basis in the frequency band 13.4–13.65 GHz due to the primary allocation to FSS (space-to-Earth). (WRC–15)

5.499C The allocation of the frequency band 13.4–13.65 GHz to the space research service on a primary basis is limited to:

—Satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015,

—active spaceborne sensors,

—satellite systems operating in the space research service (space-to-Earth) to relay data from space stations in the geostationary-satellite orbit to associated earth stations.

Other uses of the frequency band by the space research service are on a secondary basis. (WRC–15)

5.499D In the frequency band 13.4–13.65 GHz, satellite systems in the space research service (space-to-Earth) and/or the space research service (space-to-space) shall not cause harmful interference to, nor claim protection from, stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. (WRC–15)

5.499E In the frequency band 13.4–13.65 GHz, geostationary-satellite networks in the fixed-satellite service (space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations, and No. 5.43A does not apply. The provisions of No. 22.2 do not apply to the Earth exploration-satellite service (active) with respect to the fixed-satellite service (space-to-Earth) in this frequency band. (WRC–15)

5.500 *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Morocco, Mauritania, Niger, Nigeria, Oman, Qatar, the Syrian Arab Republic, Singapore, Sudan, South Sudan, Chad and Tunisia, the frequency band 13.4–14 GHz is also allocated to the fixed and mobile services on a primary basis. In Pakistan, the frequency band 13.4–13.75 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.501 *Additional allocation:* In Azerbaijan, Hungary, Japan, Kyrgyzstan, Romania and Turkmenistan, the band 13.4–14 GHz is also allocated to the radionavigation service on a primary basis. (WRC–12)

5.501A The allocation of the frequency band 13.65–13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the frequency band by the space research service are on a secondary basis. (WRC–15)

5.501B In the band 13.4–13.75 GHz, the Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service.

5.502 In the band 13.75–14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

— -115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;

— -115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW.

5.503 In the band 13.75–14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has

been received by the Bureau prior to 31 January 1992 cease to operate in this band:

—In the band 13.77–13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:

(i) 4.7*D* + 28 dB (W/40 kHz), where *D* is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;

(ii) 49.2 + 20 log (*D*/4.5) dB(W/40 kHz), where *D* is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;

(iii) 66.2 dB(W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;

(iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;

— the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions.

5.504 The use of the band 14–14.3 GHz by the radionavigation service shall be such as to provide sufficient protection to space stations of the fixed-satellite service.

5.504A In the band 14–14.5 GHz, aircraft earth stations in the secondary aeronautical mobile-satellite service may also communicate with space stations in the fixed-satellite service. The provisions of Nos. 5.29, 5.30 and 5.31 apply.

5.504B Aircraft earth stations operating in the aeronautical mobile-satellite service in the frequency band 14–14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU–R M.1643–0, with respect to any radio astronomy station performing observations in the 14.47–14.5 GHz frequency band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC–15)

5.504C In the frequency band 14–14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU–R M.1643–0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC–15)

5.505 *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Djibouti, Egypt, the United Arab Emirates, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Swaziland, Chad, Viet Nam and Yemen, the frequency band 14–14.3 GHz is also allocated to the fixed service on a primary basis. (WRC–15)

5.506 The band 14–14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service. Such use of feeder links is reserved for countries outside Europe.

5.506A In the band 14–14.5 GHz, ship earth stations with an e.i.r.p. greater than 21 dBW shall operate under the same conditions as earth stations located on board vessels, as provided in Resolution 902 (WRC–03). This footnote shall not apply to ship earth stations for which the complete Appendix 4 information has been received by the Bureau prior to 5 July 2003.

5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14–14.5 GHz without the need for prior agreement from Cyprus and Malta, within the minimum distance given in Resolution 902 (WRC–03) from these countries. (WRC–15)

5.508 *Additional allocation:* In Germany, France, Italy, Libya, The Former Yugoslav Rep. of Macedonia and the United Kingdom, the band 14.25–14.3 GHz is also allocated to the fixed service on a primary basis. (WRC–12)

5.508A In the frequency band 14.25–14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU–R M.1643–0, unless otherwise specifically agreed

by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC–15)

5.509A In the frequency band 14.3–14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU–R M.1643–0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC–15)

5.509B The use of the frequency bands 14.5–14.75 GHz in countries listed in Resolution 163 (WRC–15) and 14.5–14.8 GHz in countries listed in Resolution 164 (WRC–15) by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service is limited to geostationary-satellites. (WRC–15)

5.509C For the use of the frequency bands 14.5–14.75 GHz in countries listed in Resolution 163 (WRC–15) and 14.5–14.8 GHz in countries listed in Resolution 164 (WRC–15) by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service, the fixed-satellite service earth stations shall have a minimum antenna diameter of 6 m and a maximum power spectral density of -44.5 dBW/Hz at the input of the antenna. The earth stations shall be notified at known locations on land. (WRC–15)

5.509D Before an administration brings into use an earth station in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service in the frequency bands 14.5–14.75 GHz (in countries listed in Resolution 163 (WRC–15)) and 14.5–14.8 GHz (in countries listed in Resolution 164 (WRC–15)), it shall ensure that the power flux-density produced by this earth station does not exceed -151.5 dB(W/(m^2 · 4 kHz)) produced at all altitudes from 0 m to 19000 m above sea level at 22 km seaward from all coasts, defined as the low-water mark, as officially recognized by each coastal State. (WRC–15)

5.509E In the frequency bands 14.50–14.75 GHz in countries listed in Resolution 163 (WRC–15) and 14.50–14.8 GHz in countries listed in Resolution 164 (WRC–15), the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. 9.17 does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU–R Recommendations. (WRC–15)

5.509F In the frequency bands 14.50–14.75 GHz in countries listed in Resolution 163 (WRC–15) and 14.50–14.8 GHz in countries listed in Resolution 164 (WRC–15), earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services. (WRC–15)

5.509G The frequency band 14.5–14.8 GHz is also allocated to the space research service on a primary basis. However, such use is limited to the satellite systems operating in the space research service (Earth-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations. Stations in the space research service shall not cause harmful interference to, or claim protection from, stations in the fixed and mobile services and in the fixed-satellite service limited to feeder links for the broadcasting-satellite service and associated space operations functions using the guardbands under Appendix 30A and feeder links for the broadcasting-satellite service in Region 2. Other uses of this frequency band by the space research service are on a secondary basis. (WRC–15)

5.510 Except for use in accordance with Resolution 163 (WRC–15) and Resolution 164 (WRC–15), the use of the frequency band 14.5–14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe. Uses other than feeder links for the broadcasting-satellite service are not authorized in Regions 1 and 2 in the frequency band 14.75–14.8 GHz. (WRC–15)

5.511 *Additional allocation:* In Saudi Arabia, Bahrain, Cameroon, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, Kuwait, Lebanon, Oman, Pakistan, Qatar, the Syrian Arab Republic and Somalia, the band 15.35–15.4 GHz is also allocated to the fixed and mobile services on a secondary basis. (WRC–12)

5.511A Use of the frequency band 15.43–15.63 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. 9.11A. (WRC–15)

5.511C Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU–R S.1340–0. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. 4.10 applies) from harmful interference from

feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU–R S.1340–0. (WRC–15)

5.511E In the frequency band 15.4–15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the aeronautical radionavigation service. (WRC–12)

5.511F In order to protect the radio astronomy service in the frequency band 15.35–15.4 GHz, radiolocation stations operating in the frequency band 15.4–15.7 GHz shall not exceed the power flux-density level of −156 dB(W/m^2) in a 50 MHz bandwidth in the frequency band 15.35–15.4 GHz, at any radio astronomy observatory site for more than 2 per cent of the time. (WRC–12)

5.512 *Additional allocation:* In Algeria, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Montenegro, Nepal, Nicaragua, Niger, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 15.7–17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC–15)

5.513 *Additional allocation:* In Israel, the band 15.7–17.3 GHz is also allocated to the fixed and mobile services on a primary basis. These services shall not claim protection from or cause harmful interference to services operating in accordance with the Table in countries other than those included in No. 5.512.

5.513A Spaceborne active sensors operating in the band 17.2–17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis.

5.514 *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Bangladesh, Cameroon, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kuwait, Libya, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Sudan and South Sudan, the frequency band 17.3–17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. 21.3 and 21.5 shall apply. (WRC–15)

5.515 In the band 17.3–17.8 GHz, sharing between the fixed-satellite service (Earth-to-space) and the broadcasting-satellite service shall also be in accordance with the provisions of § 1 of Annex 4 of Appendix 30A.

5.516 The use of the band 17.3–18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3–17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3–17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2–12.7 GHz, *see* Article 11. The use of the bands 17.3–18.1 GHz (Earth-to-space) in Regions 1 and 3 and 17.8–18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

5.516A In the band 17.3–17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 1 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix 30A, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link.

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service:

17.3–17.7 GHz (space-to-Earth) in Region 1,
18.3–19.3 GHz (space-to-Earth) in Region 2,
19.7–20.2 GHz (space-to-Earth) in all Regions,
39.5–40 GHz (space-to-Earth) in Region 1,
40–40.5 GHz (space-to-Earth) in all Regions,
40.5–42 GHz (space-to-Earth) in Region 2,
47.5–47.9 GHz (space-to-Earth) in Region 1,
48.2–48.54 GHz (space-to-Earth) in Region 1,
49.44–50.2 GHz (space-to-Earth) in Region 1, and
27.5–27.82 GHz (Earth-to-space) in Region 1,
28.35–28.45 GHz (Earth-to-space) in Region 2,
28.45–28.94 GHz (Earth-to-space) in all Regions,
28.94–29.1 GHz (Earth-to-space) in Regions 2 and 3,
29.25–29.46 GHz (Earth-to-space) in Region 2,
29.46–30 GHz (Earth-to-space) in all Regions,
48.2–50.2 GHz (Earth-to-space) in Region 2.

This identification does not preclude the use of these bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in these Radio Regulations among users of the bands. Administrations should take this into account when considering regulatory provisions in relation to these bands. See Resolution 143 (Rev.WRC–07). (FCC)

5.517 In Region 2, use of the fixed-satellite (space-to-Earth) service in the band 17.7–17.8 GHz shall not cause harmful interference to nor claim protection from assignments in the broadcasting-satellite service operating in conformity with the Radio Regulations. (WRC–07)

5.519 *Additional allocation:* The bands 18–18.3 GHz in Region 2 and 18.1–18.4 GHz in Regions 1 and 3 are also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Their use is limited to geostationary satellites. (WRC–07)

5.520 The use of the band 18.1–18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of geostationary-satellite systems in the broadcasting-satellite service.

5.521 *Alternative allocation:* In the United Arab Emirates and Greece, the frequency band 18.1–18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. 5.33). The provisions of No. 5.519 also apply. (WRC–15)

5.522A The emissions of the fixed service and the fixed-satellite service in the band 18.6–18.8 GHz are limited to the values given in Nos. 21.5A and 21.16.2, respectively.

5.522B The use of the band 18.6–18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20000 km.

5.522C In the band 18.6–18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC–2000 are not subject to the limits of No. 21.5A.

5.523A The use of the bands 18.8–19.3 GHz (space-to-Earth) and 28.6–29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. 9.11A and No. 22.2 does not apply. Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. 9.11A with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix 4 notification information is considered as having been received by the Bureau prior to 18 November 1995.

5.523B The use of the band 19.3–19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. 9.11A, and No. 22.2 does not apply.

5.523C No. 22.2 shall continue to apply in the bands 19.3–19.6 GHz and 29.1–29.4 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix 4 coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995.

5.523D The use of the band 19.3–19.7 GHz (space-to-Earth) by geostationary fixed-satellite service systems and by feeder links for non-geostationary-satellite systems in the mobile-satellite service is subject to the application of the provisions of No. 9.11A, but not subject to the provisions of No. 22.2. The use of this band for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. 5.523C and 5.523E, is not subject to the provisions of No. 9.11A and shall continue to be subject to Articles 9 (except No. 9.11A) and 11 procedures, and to the provisions of No. 22.2.

5.523E No. 22.2 shall continue to apply in the bands 19.6–19.7 GHz and 29.4–29.5 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix 4 coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997.

5.524 *Additional allocation:* In Afghanistan, Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Tunisia, the frequency band 19.7–21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux- density of space stations in the fixed-satellite service in the frequency band 19.7–21.2 GHz and of space stations in the mobile-satellite service in the frequency band 19.7–20.2 GHz where the allocation to the mobile-satellite service is on a

primary basis in the latter frequency band. (WRC–15)

5.525 In order to facilitate interregional coordination between networks in the mobile-satellite and fixed-satellite services, carriers in the mobile-satellite service that are most susceptible to interference shall, to the extent practicable, be located in the higher parts of the bands 19.7–20.2 GHz and 29.5–30 GHz.

5.526 In the bands 19.7–20.2 GHz and 29.5–30 GHz in Region 2, and in the bands 20.1–20.2 GHz and 29.9–30 GHz in Regions 1 and 3, networks which are both in the fixed-satellite service and in the mobile-satellite service may include links between earth stations at specified or unspecified points or while in motion, through one or more satellites for point-to-point and point-to-multipoint communications.

5.527 In the bands 19.7–20.2 GHz and 29.5–30 GHz, the provisions of No. 4.10 do not apply with respect to the mobile-satellite service.

5.527A The operation of earth stations in motion communicating with the FSS is subject to Resolution 156 (WRC–15). (WRC–15)

5.528 The allocation to the mobile-satellite service is intended for use by networks which use narrow spot-beam antennas and other advanced technology at the space stations. Administrations operating systems in the mobile-satellite service in the band 19.7–20.1 GHz in Region 2 and in the band 20.1–20.2 GHz shall take all practicable steps to ensure the continued availability of these bands for administrations operating fixed and mobile systems in accordance with the provisions of No. 5.524.

5.529 The use of the bands 19.7–20.1 GHz and 29.5–29.9 GHz by the mobile-satellite service in Region 2 is limited to satellite networks which are both in the fixed-satellite service and in the mobile-satellite service as described in No. 5.526.

5.530A Unless otherwise agreed between the administrations concerned, any station in the fixed or mobile services of an administration shall not produce a power flux-density in excess of -120.4 dB(W/(m^2 · MHz)) at 3 m above the ground of any point of the territory of any other administration in Regions 1 and 3 for more than 20% of the time. In conducting the calculations, administrations should use the most recent version of Recommendation ITU–R P.452 (see also the most recent version of Recommendation ITU–R BO.1898). (WRC–15)

5.530B In the band 21.4–22 GHz, in order to facilitate the development of the broadcasting-satellite service, administrations in Regions 1 and 3 are encouraged not to deploy stations in the mobile service and are encouraged to limit the deployment of stations in the fixed service to point-to-point links. (WRC–12)

5.530D See Resolution 555 (Rev.WRC–15). (FCC)

5.531 *Additional allocation:* in Japan, the band 21.4–22 GHz is also allocated to the broadcasting service on a primary basis.

5.532 The use of the band 22.21–22.5 GHz by the Earth exploration-satellite (passive) and space research (passive) services shall not impose constraints upon the fixed and mobile, except aeronautical mobile, services.

5.532A The location of earth stations in the space research service shall maintain a separation distance of at least 54 km from the respective border(s) of neighbouring countries to protect the existing and future deployment of fixed and mobile services unless a shorter distance is otherwise agreed between the corresponding administrations. Nos. 9.17 and 9.18 do not apply. (WRC–12)

5.532B Use of the band 24.65–25.25 GHz in Region 1 and the band 24.65–24.75 GHz in Region 3 by the fixed-satellite service (Earth-to-space) is limited to earth stations using a minimum antenna diameter of 4.5 m. (WRC–12)

5.533 The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.

5.535 In the band 24.75–25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

5.535A The use of the band 29.1–29.5 GHz (Earth-to-space) by the fixed-satellite service is limited to geostationary-satellite systems and feeder links to non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. 9.11A, but not subject to the provisions of No. 22.2, except as indicated in Nos. 5.523C and 5.523E where such use is not subject to the provisions of No. 9.11A and shall continue to be subject to Articles 9 (except No. 9.11A) and 11 procedures, and to the provisions of No. 22.2.

5.536 Use of the 25.25–27.5 GHz band by the inter-satellite service is limited to space research and Earth exploration-satellite applications, and also transmissions of data originating from industrial and medical activities in space.

5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account the most recent version of Recommendation ITU–R SA.1862. (WRC–12)

5.536B In Saudi Arabia, Austria, Bahrain, Belgium, Brazil, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Estonia, Finland, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Lebanon, Libya, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the frequency band 25.5–27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC–15)

5.536C In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5–27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC–12)

5.537 Space services using non-geostationary satellites operating in the intersatellite service in the band 27–27.5 GHz are exempt from the provisions of No. 22.2.

5.537A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.9–28.2 GHz may also be used by high altitude platform stations (HAPS) within the territory of these countries. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other coprimary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution 145 (Rev. WRC–12). (WRC–12)

5.538 *Additional allocation:* the bands 27.500–27.501 GHz and 29.999–30.000 GHz are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotropically radiated power (e.i.r.p.) of + 10 dBW in the direction of adjacent satellites on the geostationary-satellite orbit. (WRC–07)

5.539 The band 27.5–30 GHz may be used by the fixed-satellite service (Earth-to-space) for the provision of feeder links for the broadcasting-satellite service.

5.540 *Additional allocation:* the band 27.501–29.999 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis for beacon transmissions intended for up-link power control.

5.541 In the band 28.5–30 GHz, the earth exploration-satellite service is limited to the transfer of data between stations and not to the primary collection of information by means of active or passive sensors.

5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1–29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix 4 coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed by a future competent world radiocommunication conference. Administrations submitting Appendix 4 information for coordination before this date are encouraged to utilize these techniques to the extent practicable.

5.542 *Additional allocation:* In Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Oman, Pakistan, Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Somalia, Sudan, South Sudan, Sri Lanka and Chad, the band 29.5–31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in Nos. 21.3 and 21.5 shall apply. (WRC–12)

5.543 The band 29.95–30 GHz may be used for space-to-space links in the Earth exploration-satellite service for telemetry, tracking, and control purposes, on a secondary basis.

5.543A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the frequency band 31–31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS

direction. The use of the frequency band 31–31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. 5.545. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the frequency band 31–31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the frequency band 31.3–31.8 GHz, taking into account the protection criterion as given in the most recent version of Recommendation ITU–R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the frequency band 31.3–31.8 GHz shall be limited to −106 dB(W/MHz) under clear-sky conditions, and may be increased up to −100 dB(W/MHz) under rainy conditions to mitigate fading due to rain, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions. See Resolution 145 (Rev.WRC–12). (WRC–15)

5.544 In the band 31–31.3 GHz the power flux-density limits specified in Article 21, Table 21–4 shall apply to the space research service.

5.545 *Different category of service:* In Armenia, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 31–31.3 GHz to the space research service is on a primary basis (see No. 5.33). (WRC–12)

5.546 *Different category of service:* In Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Lebanon, Moldova, Mongolia, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, the United Kingdom, South Africa, Tajikistan, Turkmenistan and Turkey, the allocation of the band 31.5–31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33). (WRC–12)

5.547 The bands 31.8–33.4 GHz, 37–40 GHz, 40.5–43.5 GHz, 51.4–52.6 GHz, 55.78–59 GHz and 64–66 GHz are available for high-density applications in the fixed service (see Resolution 75 (WRC–12)). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the bands 39.5–40 GHz and 40.5–42 GHz (see No. 5.516B), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate. (FCC)

5.547A Administrations should take practical measures to minimize the potential interference between stations in the fixed service and airborne stations in the radionavigation service in the 31.8–33.4 GHz band, taking into account the operational needs of the airborne radar systems.

5.547B *Alternative allocation:* in the United States, the band 31.8–32 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis.

5.547C *Alternative allocation:* in the United States, the band 32–32.3 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis.

5.547D *Alternative allocation:* in the United States, the band 32.3–33 GHz is allocated to the inter-satellite and radionavigation services on a primary basis.

5.547E *Alternative allocation:* in the United States, the band 33–33.4 GHz is allocated to the radionavigation service on a primary basis.

5.548 In designing systems for the inter-satellite service in the band 32.3–33 GHz, for the radionavigation service in the band 32–33 GHz, and for the space research service (deep space) in the band 31.8–32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (*see* Recommendation 707).

5.549 *Additional allocation:* In Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4–36 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC–12)

5.549A In the band 35.5–36.0 GHz, the mean power flux-density at the Earth's surface, generated by any spaceborne sensor in the Earth exploration-satellite service (active) or space research service (active), for any angle greater than 0.8° from the beam centre shall not exceed −73.3 dB(W/m^2) in this band.

5.550 *Different category of service:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 34.7–35.2 GHz to the space research service is on a primary basis (see No. 5.33). (WRC–12)

5.550A For sharing of the band 36–37 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services, Resolution 752 (WRC–07) shall apply. (WRC–07)

5.551F *Different category of service:* in Japan, the allocation of the band 41.5–42.5 GHz to the mobile service is on a primary basis (*see* No. 5.33).

5.551H The equivalent power flux-density (epfd) produced in the frequency band 42.5–43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the frequency band 42–42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

− 230 dB(W/m²) in 1 GHz and − 246 dB(W/m²) in any 500 kHz of the frequency band 42.5–43.5 GHz at the site of any radio astronomy station registered as a single-dish telescope; and

− 209 dB(W/m²) in any 500 kHz of the frequency band 42.5–43.5 GHz at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU–R S.1586–1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU–R RA.1631–0 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θmin of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

—was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

—was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC–03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC–15)

5.551I The power flux-density in the band 42.5–43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service operating in the 42–42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

− 137 dB(W/m²) in 1 GHz and − 153 dB(W/m²) in any 500 kHz of the 42.5–43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

− 116 dB(W/m²) in any 500 kHz of the 42.5–43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

—Was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

—Was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC–03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed.

5.552 The allocation of the spectrum for the fixed-satellite service in the bands 42.5–43.5 GHz and 47.2–50.2 GHz for Earth-to-space transmission is greater than that in the band 37.5–39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites. Administrations are urged to take all practicable steps to reserve the band 47.2–49.2 GHz for feeder links for the broadcasting-satellite service operating in the band 40.5–42.5 GHz.

5.552A The allocation to the fixed service in the bands 47.2–47.5 GHz and 47.9–48.2 GHz is designated for use by high altitude platform stations. The use of the bands 47.2–47.5 GHz and 47.9–48.2 GHz is subject to the provisions of Resolution 122 (Rev.WRC–07). (WRC–07)

5.553 In the bands 43.5–47 GHz and 66–71 GHz, stations in the land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (*see* No. 5.43).

5.554 In the bands 43.5–47 GHz, 66–71 GHz, 95–100 GHz, 123–130 GHz, 191.8–200 GHz and 252–265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service.

5.554A The use of the bands 47.5–47.9 GHz, 48.2–48.54 GHz and 49.44–50.2 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary satellites.

5.555 *Additional allocation:* the band 48.94–49.04 GHz is also allocated to the radio astronomy service on a primary basis.

5.555B The power flux-density in the band 48.94–49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2–48.54 GHz and 49.44–50.2 GHz shall not exceed − 151.8 dB(W/m²) in any 500 kHz band at the site of any radio astronomy station.

5.556 In the bands 51.4–54.25 GHz, 58.2–59 GHz and 64–65 GHz, radio astronomy observations may be carried out under national arrangements.

5.556A Use of the bands 54.25–56.9 GHz, 57–58.2 GHz and 59–59.3 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density at all altitudes from 0 km to 1000 km above the Earth's surface produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed −147 dB(W/(m^2 · 100 MHz)) for all angles of arrival.

5.556B *Additional allocation:* in Japan, the band 54.25–55.78 GHz is also allocated to the mobile service on a primary basis for low-density use.

5.557 *Additional allocation:* in Japan, the band 55.78–58.2 GHz is also allocated to the radiolocation service on a primary basis.

5.557A In the band 55.78–56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to −26 dB(W/MHz).

5.558 In the bands 55.78–58.2 GHz, 59–64 GHz, 66–71 GHz, 122.25–123 GHz, 130–134 GHz, 167–174.8 GHz and 191.8–200 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (*see* No. 5.43).

5.558A Use of the band 56.9–57 GHz by inter-satellite systems is limited to links between satellites in geostationary-satellite orbit and to transmissions from non-geostationary satellites in high-Earth orbit to those in low-Earth orbit. For links between satellites in the geostationary-satellite orbit, the single entry power flux-density at all altitudes from 0 km to 1000 km above the Earth's surface, for all conditions and for all methods of modulation, shall not exceed −147 dB(W/(m^2 · 100 MHz)) for all angles of arrival.

5.559 In the band 59–64 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (*see* No. 5.43).

5.559B The use of the frequency band 77.5–78 GHz by the radiolocation service shall be limited to short-range radar for ground-based applications, including automotive radars. The technical characteristics of these radars are provided in the most recent version of Recommendation ITU–R M.2057. The provisions of No. 4.10 do not apply. (WRC–15)

5.560 In the band 78–79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

5.561 In the band 74–76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service.

5.561A The 81–81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis.

5.561B In Japan, use of the band 84–86 GHz, by the fixed-satellite service (Earth-to-space) is limited to feeder links in the broadcasting-satellite service using the geostationary-satellite orbit.

5.562 The use of the band 94–94.1 GHz by the Earth exploration-satellite (active) and space research (active) services is limited to spaceborne cloud radars.

5.562A In the bands 94–94.1 GHz and 130–134 GHz, transmissions from space stations of the Earth exploration-satellite service (active) that are directed into the main beam of a radio astronomy antenna have the potential to damage some radio astronomy receivers. Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible.

5.562B In the bands 105–109.5 GHz, 111.8–114.25 GHz, 155.5–158.5 GHz and 217–226 GHz, the use of this allocation is limited to space-based radio astronomy only.

5.562C Use of the band 116–122.25 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 km to 1000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed −148 dB(W/(m^2 · MHz)) for all angles of arrival.

5.562D *Additional allocation:* In Korea (Rep. of), the frequency bands 128–130 GHz, 171–171.6 GHz, 172.2–172.8 GHz and 173.3–174 GHz are also allocated to the radio astronomy service on a primary basis. Radio astronomy stations in Korea (Rep. of) operating in the frequency bands referred to in this footnote shall not claim protection from, or constrain the use and development of, services in other countries operating in accordance with the Radio Regulations. (WRC–15)

5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5–134 GHz.

5.562F In the band 155.5–158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018.

5.562G The date of entry into force of the allocation to the fixed and mobile services in the band 155.5–158.5 GHz shall be 1 January 2018.

5.562H Use of the bands 174.8–182 GHz and 185–190 GHz by the inter-satellite service is

limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 to 1000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed -144 dB(W/(m^2 · MHz)) for all angles of arrival.

5.563A In the bands 200–209 GHz, 235–238 GHz, 250–252 GHz and 265–275 GHz, ground-based passive atmospheric sensing is carried out to monitor atmospheric constituents.

5.563B The band 237.9–238 GHz is also allocated to the Earth exploration-satellite service (active) and the space research service (active) for spaceborne cloud radars only.

5.565 The following frequency bands in the range 275–1000 GHz are identified for use by administrations for passive service applications:

—Radio astronomy service: 275–323 GHz, 327–371 GHz, 388–424 GHz, 426–442 GHz, 453–510 GHz, 623–711 GHz, 795–909 GHz and 926–945 GHz;

—Earth exploration-satellite service (passive) and space research service (passive): 275–286 GHz, 296–306 GHz, 313–356 GHz, 361–365 GHz, 369–392 GHz, 397–399 GHz, 409–411 GHz, 416–434 GHz, 439–467 GHz, 477–502 GHz, 523–527 GHz, 538–581 GHz, 611–630 GHz, 634–654 GHz, 657–692 GHz, 713–718 GHz, 729–733 GHz, 750–754 GHz, 771–776 GHz, 823–846 GHz, 850–854 GHz, 857–862 GHz, 866–882 GHz, 905–928 GHz, 951–956 GHz, 968–973 GHz and 985–990 GHz.

The use of the range 275–1000 GHz by the passive services does not preclude use of this range by active services. Administrations wishing to make frequencies in the 275–1000 GHz range available for active service applications are urged to take all practicable steps to protect these passive services from harmful interference until the date when the Table of Frequency Allocations is established in the above-mentioned 275–1000 GHz frequency range.

All frequencies in the range 1000–3000 GHz may be used by both active and passive services. (WRC–12)

UNITED STATES (US) FOOTNOTES

(These footnotes, each consisting of the letters ''US'' followed by one or more digits, denote stipulations applicable to both Federal and non-Federal operations and thus appear in both the Federal Table and the non-Federal Table.)

US1 The bands 2501–2502 kHz, 5003–5005 kHz, 10003–10005 kHz, 15005–15010 kHz, 19990–19995 kHz, 20005–20010 kHz, and 25005–25010 kHz are also allocated to the space research service on a secondary basis for Federal use. In the event of interference to the reception of the standard frequency and time broadcasts, these space research transmissions are subject to immediate temporary or permanent shutdown.

US2 In the band 9–490 kHz, electric utilities operate Power Line Carrier (PLC) systems on power transmission lines for communications important to the reliability and security of electric service to the public. These PLC systems operate under the provisions of 47 CFR part 15, or Chapter 8 of the *NTIA Manual*, on an unprotected and non-interference basis with respect to authorized radio users. Notification of intent to place new or revised radio frequency assignments or PLC frequency uses in the band 9–490 kHz is to be made in accordance with the Rules and Regulations of the FCC and NTIA, and users are urged to minimize potential interference to the extent practicable. This footnote does not provide any allocation status to PLC radio frequency uses.

US8 The use of the frequencies 170.475, 171.425, 171.575, and 172.275 MHz east of the Mississippi River, and 170.425, 170.575, 171.475, 172.225 and 172.375 MHz west of the Mississippi River may be authorized to fixed, land and mobile stations operated by non-Federal forest firefighting agencies. In addition, land stations and mobile stations operated by non-Federal conservation agencies, for mobile relay operation only, may be authorized to use the frequency 172.275 MHz east of the Mississippi River and the frequency 171.475 MHz west of the Mississippi River. The use of any of the foregoing nine frequencies shall be on the condition that no harmful interference will be caused to Government stations.

US11 On the condition that harmful interference is not caused to present or future Federal stations in the band 162–174 MHz, the frequencies 166.25 MHz and 170.15 MHz may be authorized to non-Federal stations, as follows:

(a) Eligibles in the Public Safety Radio Pool may be authorized to operate in the fixed and land mobile services for locations within 150 miles (241.4 kilometers) of New York City; and

(b) Remote pickup broadcast stations may be authorized to operate in the land mobile service for locations within the conterminous United States, excluding locations within 150 miles of New York City and the Tennessee Valley Authority Area (TVA Area). The TVA Area is bounded on the west by the Mississippi River, on the north by the parallel of latitude 37°30′ N, and on the east and south by that arc of the circle with center at Springfield, IL, and radius equal to the airline distance between Springfield, IL, and Montgomery, AL, subtended between the foregoing west and north boundaries.

US13 The following center frequencies, each with a channel bandwidth not greater than 12.5 kHz, are available for assignment to non-Federal fixed stations for the specific

purpose of transmitting hydrological and meteorological data in cooperation with Federal agencies, subject to the condition that harmful interference will not be caused to Federal stations:

HYDRO CHANNELS (MHZ)

169.425	170.2625	171.100	406.1250
169.4375	170.275	171.1125	406.1750
169.450	170.2875	171.125	412.6625
169.4625	170.300	171.825	412.6750
169.475	170.3125	171.8375	412.6875
169.4875	170.325	171.850	412.7125
169.500	171.025	171.8625	412.7250
169.5125	171.0375	171.875	412.7375
169.525	171.050	171.8875	412.7625
170.225	171.0625	171.900	412.7750
170.2375	171.075	171.9125	415.1250
170.250	171.0875	171.925	415.1750

New assignments on the frequencies 406.125 MHz and 406.175 MHz are to be primarily for paired operations with the frequencies 415.125 MHz and 415.175 MHz, respectively.

US14 When 500 kHz is being used for distress purposes, ship and coast stations using morse telegraph may use 512 kHz for calling.

US18 In the bands 9–14 kHz, 90–110 kHz, 190–415 kHz, 510–535 kHz, and 2700–2900 MHz, navigation aids in the U.S. and its insular areas are normally operated by the Federal Government. However, authorizations may be made by the FCC for non-Federal operations in these bands subject to the conclusion of appropriate arrangements between the FCC and the Federal agencies concerned and upon special showing of need for service which the Federal Government is not yet prepared to render.

US22 The following provisions shall apply to non-Federal use of 68 carrier frequencies in the range 2–8 MHz, which are not coordinated with NTIA:

(a) The frequencies authorized pursuant to 47 CFR 90.264 (Disaster Communications) and 47 CFR 90.266 (Long Distance Communications) are listed in columns 1–2 and columns 3–5, respectively. All stations are restricted to emission designator 2K80J3E, upper sideband transmissions, a maximum transmitter output power of 1 kW PEP, and to the class of station(s) listed in the column heading (*i.e.*, fixed (FX) for all frequencies; base and mobile (FB and ML) for the frequencies in column 1 and 3; itinerant FX for the frequencies in columns 4–5).

(b) *Use, Geographic, and Time Restrictions.* Letter(s) to the right of a frequency indicate that the frequency is available only for the following purpose(s):

—A or I: *A*lternate channel or *I*nterstate coordination.

—C, E, M, or W: For stations located in the *C*onterminous U.S., *E*ast of 108° West Longitude (WL), West of the *M*ississippi River, or *W*est of 90° WL.

—D or N: From two hours after local sunrise until two hours before local sunset (*i.e.*, *D*ay only operations) or from two hours prior to local sunset until two hours after local sunrise (*i.e.*, *N*ight only operations).

PREFERRED CARRIER FREQUENCIES (KHZ)

Disaster communications		Long distance communications		
FX, FB, ML	FX	FX, FB, ML	FX (including itinerant)	
2326 ... I	5135 ... A	2289	5046.6 ... E	7480.1
2411	5140 ... A, I	2292	5052.6 ... E	7483.1
2414	5192 ... I	2395	5055.6 ... E	7486.1 ... E
2419	5195 ... I	2398	5061.6 ... W	7549.1 ... D
2422	7477 ... A	3170	5067.6	7552.1
2439	7480 ... A	4538.6 ... N	5074.6 ... E	7555.1 ... W
2463	7802 ... D	4548.6 ... N	5099.1	7558.1 ... W
2466	7805 ... I	4575	5102.1	7559.1 ... W
2471	7932	4610.5	5313.6	7562.1 ... W
2474	7935 ... C, D	4613.5		7697.1
2487		4634.5	6800.1 ... N	
2511		4637.5	6803.1	
2535		4647	6806.1 ... W	
2569			6855.1 ... N, M	
2587			6858.1 ... N	
2801			6861.1 ... W	
2804 ... A			6885.1 ... N	

PREFERRED CARRIER FREQUENCIES (KHZ)—Continued

2812			6888.1 ... N	

NOTE: To determine the assigned frequency, add 1.4 kHz to the carrier frequency. Other emission designators may be authorized within the 2.8 kHz maximum necessary bandwidth pursuant to 47 CFR 90.264 and 90.266.

US23 In the band 5330.5–5406.4 kHz (60 m band), the assigned frequencies 5332, 5348, 5358.5, 5373, and 5405 kHz are allocated to the amateur service on a secondary basis. Amateur service use of the 60 m band frequencies is restricted to a maximum effective radiated power of 100 W PEP and to the following emission types and designators: phone (2K80J3E), data (2K80J2D), RTTY (60H0J2B), and CW (150HA1A). Amateur operators using the data and RTTY emissions must exercise care to limit the length of transmissions so as to avoid causing harmful interference to Federal stations.

US25 The use of frequencies in the band 25.85–26.175 MHz may be authorized in any area to non-Federal remote pickup broadcast base and mobile stations on the condition that harmful interference is not caused to stations of the broadcasting service in the band 25.85–26.1 MHz and to stations of the maritime mobile service in the band 26.1–26.175 MHz. Frequencies within the band 26.1–26.175 MHz may also be assigned for use by low power auxiliary stations.

US26 The bands 117.975–121.4125 MHz, 123.5875–128.8125 MHz and 132.0125–136.0 MHz are for air traffic control communications.

US28 The band 121.5875–121.9375 MHz is for use by aeronautical utility land and mobile stations, and for air traffic control communications.

US30 The band 121.9375–123.0875 MHz is available to FAA aircraft for communications pursuant to flight inspection functions in accordance with the Federal Aviation Act of 1958.

US31 The frequencies 122.700, 122.725, 122.750, 122.800, 122.950, 122.975, 123.000, 123.050 and 123.075 MHz may be assigned to aeronautical advisory stations. In addition, at landing areas having a part-time or no airdrome control tower or FAA flight service station, these frequencies may be assigned on a secondary non-interference basis to aeronautical utility mobile stations, and may be used by FAA ground vehicles for safety related communications during inspections conducted at such landing areas.

The frequencies 122.850, 122.900 and 122.925 MHz may be assigned to aeronautical multicom stations. In addition, 122.850 MHz may be assigned on a secondary noninterference basis to aeronautical utility mobile stations. In case of 122.925 MHz, US213 applies.

Air carrier aircraft stations may use 122.000 and 122.050 MHz for communication with aeronautical stations of the Federal Aviation Administration and 122.700, 122.800, 122.900 and 123.000 MHz for communications with aeronautical stations pertaining to safety of flight with and in the vicinity of landing areas not served by a control tower.

Frequencies in the band 121.9375–122.6875 MHz may be used by aeronautical stations of the Federal Aviation Administration for communication with aircraft stations.

US32 Except for the frequencies 123.3 and 123.5 MHz, which are not authorized for Federal use, the band 123.1125–123.5875 MHz is available for FAA communications incident to flight test and inspection activities pertinent to aircraft and facility certification on a secondary basis.

US33 The band 123.1125–123.5875 MHz is for use by flight test and aviation instructional stations. The frequency 121.950 MHz is available for aviation instructional stations.

US36 In Hawaii, the bands 120.647–120.653 MHz and 127.047–127.053 MHz are also allocated to the aeronautical mobile service on a primary basis for non-Federal aircraft air-to-air communications on 120.65 MHz (Maui) and 127.05 MHz (Hawaii and Kauai) as specified in 47 CFR 87.187.

US41 In the band 2450–2500 MHz, the Federal radiolocation service is permitted on condition that harmful interference is not caused to non-Federal services.

US44 In the band 2900–3100 MHz, the non-Federal radiolocation service may be authorized on the condition that no harmful interference is caused to Federal services.

US49 In the band 5460–5470 MHz, the non-Federal radiolocation service may be authorized on the condition that it does not cause harmful interference to the aeronautical or maritime radionavigation services or to the Federal radiolocation service.

US50 In the band 5470–5650 MHz, the radiolocation service may be authorized for non-Federal use on the condition that harmful interference is not caused to the maritime radionavigation service or to the Federal radiolocation service.

US52 In the VHF maritime mobile band (156–162 MHz), the following provisions shall apply:

(a) Except as provided for below, the use of the bands 161.9625–161.9875 MHz (AIS 1 with center frequency 161.975 MHz) and 162.0125–162.0375 MHz (AIS 2 with center frequency

162.025 MHz) by the maritime mobile and mobile-satellite (Earth-to-space) services is restricted to Automatic Identification Systems (AIS). The use of these bands by the aeronautical mobile (OR) service is restricted to AIS emissions from search and rescue aircraft operations. Frequencies in the AIS 1 band may continue to be used by non-Federal base, fixed, and land mobile stations until March 2, 2024.

(b) Except as provided for below, the use of the bands 156.7625–156.7875 MHz (AIS 3 with center frequency 156.775 MHz) and 156.8125–156.8375 MHz (AIS 4 with center frequency 156.825 MHz) by the mobile-satellite service (Earth-to-space) is restricted to the reception of long-range AIS broadcast messages from ships (Message 27; see most recent version of Recommendation ITU–R M.1371). The frequencies 156.775 MHz and 156.825 MHz may continue to be used by non-Federal ship and coast stations for navigation-related port operations or ship movement until August 26, 2019.

(c) The frequency 156.3 MHz may also be used by aircraft stations for the purpose of search and rescue operations and other safety-related communication.

(d) Federal stations in the maritime mobile service may also be authorized as follows: (1) Vessel traffic services under the control of the U.S. Coast Guard on a simplex basis by coast and ship stations on the frequencies 156.25, 156.55, 156.6 and 156.7 MHz; (2) Inter-ship use of the frequency 156.3 MHz on a simplex basis; (3) Navigational bridge-to-bridge and navigational communications on a simplex basis by coast and ship stations on the frequencies 156.375 and 156.65 MHz; (4) Port operations use on a simplex basis by coast and ship stations on the frequencies 156.6 and 156.7 MHz; (5) Environmental communications on the frequency 156.75 MHz in accordance with the national plan; and (6) Duplex port operations use of the frequencies 157 MHz for ship stations and 161.6 MHz for coast stations.

US53 In view of the fact that the band 13.25–13.4 GHz is allocated to doppler navigation aids, Federal and non-Federal airborne doppler radars in the aeronautical radionavigation service are permitted in the band 8750–8850 MHz only on the condition that they must accept any interference that may be experienced from stations in the radiolocation service in the band 8500–10000 MHz.

US55 In the bands 162.0375–173.2 MHz and 406.1–420 MHz, the FCC may authorize public safety applicants to use the 40 Federal Interoperability Channels that are designated for joint federal/non-federal operations for law enforcement, public safety, emergency response and disaster response in section 4.3.16 of the NTIA Manual, subject to the condition that that these non-Federal mobile (including portable) interoperability communications shall conform to the national plans specified therein, and in particular, shall not cause harmful interference to Federal stations. The procedure for authorizing such use is set forth in 47 CFR 90.25.

US59 The band 10.5–10.55 GHz is restricted to systems using type NON (AO) emission with a power not to exceed 40 watts into the antenna.

US64 (a) In the band 401–406 MHz, the mobile, except aeronautical mobile, service is allocated on a secondary basis and is limited to, with the exception of military tactical mobile stations, Medical Device Radiocommunication Service (MedRadio) operations. MedRadio stations are authorized by rule on the condition that harmful interference is not caused to stations in the meteorological aids, meteorological-satellite, and Earth exploration-satellite services, and that MedRadio stations accept interference from stations in the meteorological aids, meteorological-satellite, and Earth exploration-satellite services.

(b) The bands 413–419 MHz, 426–432 MHz, 438–444 MHz, and 451–457 MHz are also allocated on a secondary basis to the mobile, except aeronautical mobile, service. The use of this allocation is limited to MedRadio operations. MedRadio stations are authorized by rule and operate in accordance with 47 CFR part 95.

US65 The use of the band 5460–5650 MHz by the maritime radionavigation service is limited to shipborne radars.

US67 The use of the band 9300–9500 MHz by the meteorological aids service is limited to ground-based radars. Radiolocation installations will be coordinated with the meteorological aids service and, insofar as practicable, will be adjusted to meet the requirements of the meteorological aids service.

US69 In the band 31.8–33.4 GHz, ground-based radionavigation aids are not permitted except where they operate in cooperation with airborne or shipborne radionavigation devices.

US70 The meteorological aids service allocation in the band 400.15–406.0 MHz does not preclude the operation therein of associated ground transmitters.

US71 In the band 9300–9320 MHz, low-powered maritime radionavigation stations shall be protected from harmful interference caused by the operation of land-based equipment.

US73 The frequencies 150.775, 150.79, 152.0075, and 163.25 MHz, and the bands 462.94–463.19675 and 467.94–468.19675 MHz shall be authorized for the purpose of delivering or rendering medical services to individuals (medical radiocommunication systems), and shall be authorized on a primary basis for Federal and non-Federal use. The frequency 152.0075 MHz may also be used for the purpose of conducting public safety radio communications

that include, but are not limited to, the delivering or rendering of medical services to individuals.

(a) The use of the frequencies 150.775 and 150.79 MHz is restricted to mobile stations operating with a maximum e.r.p. of 100 watts. Airborne operations are prohibited.

(b) The use of the frequencies 152.0075 and 163.25 MHz is restricted to base stations that are authorized only for one-way paging communications to mobile receivers. Transmissions for the purpose of activating or controlling remote objects on these frequencies shall not be authorized.

(c) Non-Federal licensees in the Public Safety Radio Pool holding a valid authorization on May 27, 2005, to operate on the frequencies 150.7825 and 150.7975 MHz may, upon proper renewal application, continue to be authorized for such operation; provided that harmful interference is not caused to present or future Federal stations in the band 150.05–150.8 MHz and, should harmful interference result, that the interfering non-Federal operation shall immediately terminate.

US74 In the bands 25.55–25.67, 73–74.6, 406.1–410, 608–614, 1400–1427, 1660.5–1670, 2690–2700, and 4990–5000 MHz, and in the bands 10.68–10.7, 15.35–15.4, 23.6–24.0, 31.3–31.5, 86–92, 100–102, 109.5–111.8, 114.25–116, 148.5–151.5, 164–167, 200–209, and 250–252 GHz, the radio astronomy service shall be protected from unwanted emissions only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates. Radio astronomy observations in these bands are performed at the locations listed in US385.

US79 In the bands 1390–1400 MHz and 1427–1432 MHz, the following provisions shall apply:

(a) Airborne and space-to-Earth operations are prohibited.

(b) Federal operations (except for devices authorized by the FCC for the Wireless Medical Telemetry Service) are on a non-interference basis to non-Federal operations and shall not constrain implementation of non-Federal operations.

US80 Federal stations may use the frequency 122.9 MHz subject to the following conditions: (a) All operations by Federal stations shall be restricted to the purpose for which the frequency is authorized to non-Federal stations, and shall be in accordance with the appropriate provisions of the Commission's Rules and Regulations, Part 87, Aviation Services; (b) Use of the frequency is required for coordination of activities with Commission licensees operating on this frequency; and (c) Federal stations will not be authorized for operation at fixed locations.

US81 The band 38–38.25 MHz is used by both Federal and non-Federal radio astronomy observatories. No new fixed or mobile assignments are to be made and Federal stations in the band 38–38.25 MHz will be moved to other bands on a case-by-case basis, as required, to protect radio astronomy observations from harmful interference. As an exception, however, low powered military transportable and mobile stations used for tactical and training purposes will continue to use the band. To the extent practicable, the latter operations will be adjusted to relieve such interference as may be caused to radio astronomy observations. In the event of harmful interference from such local operations, radio astronomy observatories may contact local military commands directly, with a view to effecting relief. A list of military commands, areas of coordination, and points of contact for purposes of relieving interference may be obtained upon request from the Office of Engineering and Technology, FCC, Washington, DC 20554.

US82 In the bands 4146–4152 kHz, 6224–6233 kHz, 8294–8300 kHz, 12353–12368 kHz, 16528–16549 kHz, 18825–18846 kHz, 22159–22180 kHz, and 25100–25121 kHz, the assignable frequencies may be authorized on a shared non-priority basis to Federal and non-Federal ship and coast stations (SSB telephony, with peak envelope power not to exceed 1 kW).

US83 In the 1432–1435 MHz band, Federal stations in the fixed and mobile services may operate indefinitely on a primary basis at the 22 sites listed in the table below. The first 21 sites are in the United States and the last site is in Guam (GU). All other Federal stations in the fixed and mobile services shall operate in the band 1432–1435 MHz on a primary basis until re-accommodated in accordance with the National Defense Authorization Act of 1999.

State	Site	North	West	Radius
AK	Fort Greely	63°47′	145°52′	80
AL	Redstone Arsenal	34°35′	086°35′	80
AZ	Fort Huachuca	31°33′	110°18′	80
AZ	Yuma Proving Ground	32°29′	114°20′	160
CA	China Lake/Edwards AFB	35°29′	117°16′	100
CA	Lemoore	36°20′	119°57′	120
FL	Eglin AFB/Ft Rucker, AL	30°28′	086°31′	140
FL	NAS Cecil Field	30°13′	081°52′	160
MD	Patuxent River	38°17′	076°24′	70
ME	Naval Space Operations Center	44°24′	068°01′	80
MI	Alpene Range	44°23′	083°20′	80
MS	Camp Shelby	31°20′	089°18′	80

State	Site	North	West	Radius
NC	MCAS Cherry Point	34°54′	076°53′	100
NM	White Sands Missile Range/Holloman AFB	32°11′	106°20′	160
NV	NAS Fallon	39°30′	118°46′	100
NV	Nevada Test and Training Range (NTTR)	37°29′	114°14′	130
SC	Beaufort MCAS	32°26′	080°40′	160
SC	Savannah River	33°15′	081°39′	3
UT	Utah Test and Training Range/Dugway Proving Ground, Hill AFB.	40°57′	113°05′	160
VA	NAS Oceana	36°49′	076°01′	100
WA	NAS Whidbey Island	48°21′	122°39′	70
GU	NCTAMS	13°35′	144°51′	80

Note: The coordinates (North latitude and West longitude) are listed under the headings North and West. The Guam entry under the West heading is actually 144°51′ East longitude. The operating radii in kilometers are listed under the heading Radius.

US84 In the bands 941.5–944 MHz and 1435–1525 MHz, low power auxiliary stations may be authorized on a secondary basis, subject to the terms and conditions set forth in 47 CFR part 74, subpart H.

US85 Differential-Global-Positioning-System (DGPS) Stations, limited to ground-based transmitters, may be authorized on a primary basis in the band 1559–1610 MHz for the specific purpose of transmitting DGPS information intended for aircraft navigation.

US87 The band 449.75–450.25 MHz may be used by Federal and non-Federal stations for space telecommand (Earth-to-space) at specific locations, subject to such conditions as may be applied on a case-by-case basis. Operators shall take all practical steps to keep the carrier frequency close to 450 MHz.

US88 In the bands 1675–1695 MHz and 1695–1710 MHz, the following provisions shall apply:

(a) Non-Federal use of the band 1695–1710 MHz by the fixed and mobile except aeronautical mobile services is restricted to stations in the Advanced Wireless Service (AWS). Base stations that enable AWS mobile and portable stations to operate in the band 1695–1710 MHz must be successfully coordinated prior to operation as follows: (i) All base stations within the 27 protection zones listed in paragraph (b) that enable mobiles to operate at a maximum e.i.r.p. of 20 dBm, and (ii) nationwide for base stations that enable mobiles to operate with a maximum e.i.r.p. greater than 20 dBm, up to a maximum e.i.r.p. of 30 dBm, unless otherwise specified by Commission rule, order, or notice.

(b) Forty-seven Federal earth stations located within the protection zones listed below operate on a co-equal, primary basis with AWS operations. All other Federal earth stations operate on a secondary basis.

(1) Protection zones for Federal earth stations receiving in the band 1695–1710 MHz:

State	Location	Latitude	Longitude	Radius (km)
AK	Barrow	71°19′22″	156°36′41″	35
AK	Elmendorf AFB	61°14′08″	149°55′31″	98
AK	Fairbanks	64°58′22″	147°30′02″	20
AZ	Yuma	32°39′24″	114°36′22″	95
CA	Monterey	36°35′34″	121°51′20″	76
CA	Twenty-Nine Palms	34°17′46″	116°09′44″	80
FL	Miami	25°44′05″	080°09′45″	51
HI	Hickam AFB	21°19′18″	157°57′30″	28
MD	Suitland	38°51′07″	076°56′12″	98
MS	Stennis Space Center	30°21′23″	089°36′41″	57
SD	Sioux Falls	43°44′09″	096°37′33″	42
VA	Wallops Island	37°56′45″	075°27′45″	30
GU	Andersen AFB	13°34′52″	144°55′28″	42

(2) Protection zones for Federal earth stations receiving in the band 1675–1695 MHz:

State	Location	Latitude	Longitude	Radius (km)
CA	Sacramento	38°35′50″	121°32′34″	55
CO	Boulder	39°59′26″	105°15′51″	02
ID	Boise	43°35′42″	116°13′49″	39
IL	Rock Island	41°31′04″	090°33′46″	19
MO	Kansas City	39°16′40″	094°39′44″	40

State	Location	Latitude	Longitude	Radius (km)
MO	St. Louis	38°35′26″	090°12′25″	34
MS	Columbus Lake	33°32′04″	088°30′06″	03
MS	Vicksburg	32°20′47″	090°50′10″	16
NE	Omaha	41°20′56″	095°57′34″	30
OH	Cincinnati	39°06′10″	084°30′35″	32
OK	Norman	35°10′52″	097°26′21″	03
TN	Knoxville	35°57′58″	083°55′13″	50
WV	Fairmont	39°26′02″	080°11′33″	04
PR	Guaynabo	18°25′26″	066°06′50″	48

NOTE: The coordinates are specified in the conventional manner (North latitude, West longitude), except that the Guam (GU) entry is specified in terms of East longitude.

US90 In the band 2025–2110 MHz, the power flux-density at the Earth's surface produced by emissions from a space station in the space operation, Earth exploration-satellite, or space research service that is transmitting in the space-to-space direction, for all conditions and all methods of modulation, shall not exceed the following values in any 4 kHz sub-band:

(a) -154 dBW/m^2 for angles of arrival above the horizontal plane (δ) of 0° to 5°,

(b) $-154 + 0.5(\delta - 5)$ dBW/m^2 for δ of 5° to 25°, and

(c) -144 dBW/m^2 for δ of 25° to 90°.

US91 In the band 1755–1780 MHz, the following provisions shall apply:

(a) Non-Federal use of the band 1755–1780 MHz by the fixed and mobile services is restricted to stations in the Advanced Wireless Service (AWS). Base stations that enable AWS mobile and portable stations to operate in the band 1755–1780 MHz must be successfully coordinated on a nationwide basis prior to operation, unless otherwise specified by Commission rule, order, or notice.

(b) In the band 1755–1780 MHz, the Federal systems listed below operate on a co-equal, primary basis with AWS stations. All other Federal stations in the fixed and mobile services identified in an approved Transition Plan will operate on a primary basis until reaccommodated in accordance with 47 CFR part 301.

(1) Joint Tactical Radio Systems (JTRS) may operate indefinitely at the following locations:

State	Training area	Latitude	Longitude
AZ	Yuma Proving Ground	33°12′14″	114°13′47″
CA	Fort Irwin	35°23′19″	116°37′43″
LA	Fort Polk	31°08′38″	093°06′52″
NC	Fort Bragg (including Camp MacKall)	35°09′04″	078°59′13″
NM	White Sands Missile Range	32°52′50″	106°23′10″
TX	Fort Hood	31°13′50″	097°45′23″

(2) Air combat training system (ACTS) stations may operate on two frequencies within two geographic zones that are defined by the following coordinates:

Geographic zone	Latitude	Longitude
Polygon 1	41°52′00″	117°49′00″
	42°00′00″	115°05′00″
	43°31′13″	115°47′18″
Polygon 2	47°29′00″	111°22′00″
	48°13′00″	110°00′00″
	47°30′00″	107°00′00″
	44°11′00″	103°06′00″

NOTE: ACTS transmitters may cause interference to AWS base stations between separation distances of 285 km (minimum) and 415 km (maximum).

(3) In the sub-band 1761–1780 MHz, Federal earth stations in the space operation service (Earth-to-space) may transmit at the following 25 sites and non-Federal base stations must accept harmful interference caused by the operation of these earth stations:

State	Site	Latitude	Longitude
AK	Fairbanks	64°58′20″	147°30′59″
CA	Camp Parks	37°43′51″	121°52′50″
CA	Huntington Beach	33°44′50″	118°02′04″
CA	Laguna Peak	34°06′31″	119°03′53″
CA	Monterey	36°35′42″	121°52′28″
CA	Sacramento	38°39′59″	121°23′33″

State	Site	Latitude	Longitude
CA	Vandenberg AFB	34°49′23″	120°30′07″
CO	Buckley	39°42′55″	104°46′29″
CO	Schriever AFB	38°48′22″	104°31′41″
FL	Cape Canaveral AFS	28°29′09″	080°34′33″
FL	Cape GA, CCAFB	28°29′03″	080°34′21″
FL	JIATF–S Key West	24°32′36″	081°48′17″
HI	Kaena Point, Oahu	21°33′43″	158°14′31″
MD	Annapolis	38°59′27″	076°29′25″
MD	Blossom Point	38°25′53″	077°05′06″
MD	Patuxent River NAS	38°16′28″	076°24′45″
ME	Prospect Harbor	44°24′16″	068°00′46″
NC	Ft Bragg	35°09′04″	078°59′13″
NH	New Boston AFS	42°56′46″	071°37′44″
NM	Kirtland AFB	34°59′06″	106°30′28″
TX	Ft Hood	31°08′57″	097°46′12″
VA	Fort Belvoir	38°44′04″	077°09′12″
WA	Joint Base Lewis-McChord	47°06′11″	122°33′11″
GU	Andersen AFB	13°36′54″	144°51′22″
GU	NAVSOC Det. Charlie	13°34′58″	144°50′32″

NOTE: The coordinates are specified in the conventional manner (North latitude, West longitude), except that the Guam (GU) entries are specified in terms of East longitude. Use at Cape Canaveral AFS is restricted to launch support only. If required, successfully coordinated with all affected AWS licensees, and authorized by NTIA, reasonable modifications of these grandfathered Federal systems beyond their current authorizations or the addition of new earth station locations may be permitted. The details of the coordination must be filed with NTIA and FCC.

(c) In the band 1755–1780 MHz, the military services may conduct Electronic Warfare (EW) operations on Federal ranges and within associated airspace on a non-interference basis with respect to non-Federal AWS operations and shall not constrain implementation of non-Federal AWS operations. This use is restricted to Research, Development, Test and Evaluation (RDT&E), training, and Large Force Exercise (LFE) operations.

US92 In the band 2025–2110 MHz, Federal use of the co-primary fixed and mobile services is restricted to the military services and the following provisions apply:

(a) Federal use shall not cause harmful interference to, nor constrain the deployment and use of the band by, the Television Broadcast Auxiliary Service, the Cable Television Relay Service, or the Local Television Transmission Service. To facilitate compatible operations, coordination is required in accordance with a Memorandum of Understanding between Federal and non-Federal fixed and mobile operations. Non-Federal licensees shall make all reasonable efforts to accommodate military mobile and fixed operations; however, the use of the band 2025–2110 MHz by the non-Federal fixed and mobile services has priority over military fixed and mobile operations.

(b) Military stations should, to the extent practicable, employ frequency agile technologies and techniques, including the capability to tune to other frequencies and the use of a modular retrofit capability, to facilitate sharing of this band with incumbent Federal and non-Federal operations.

US93 In the conterminous United States, the frequency 108.0 MHz may be authorized for use by VOR test facilities, the operation of which is not essential for the safety of life or property, subject to the condition that no interference is caused to the reception of FM broadcasting stations operating in the band 88–108 MHz. In the event that such interference does occur, the licensee or other agency authorized to operate the facility shall discontinue operation on 108 MHz and shall not resume operation until the interference has been eliminated or the complaint otherwise satisfied. VOR test facilities operating on 108 MHz will not be protected against interference caused by FM broadcasting stations operating in the band 88–108 MHz nor shall the authorization of a VOR test facility on 108 MHz preclude the Commission from authorizing additional FM broadcasting stations.

US97 The following provisions shall apply in the band 2305–2320 MHz:

(a) In the sub-band 2305–2310 MHz, space-to-Earth operations are prohibited.

(b) Within 145 km of Goldstone, CA (35°25′33″ N, 116°53′23″ W), Wireless Communications Service (WCS) licensees operating base stations in the band 2305–2320 MHz shall, prior to operation of those base stations, achieve a mutually satisfactory coordination agreement with the National Aeronautics and Space Administration (NASA).

NOTE: NASA operates a deep space facility in Goldstone in the band 2290–2300 MHz.

US99 In the band 1668.4–1670 MHz, the meteorological aids service (radiosonde) will avoid operations to the maximum extent practicable. Whenever it is necessary to operate radiosondes in the band 1668.4–1670 MHz within the United States, notification of the operations shall be sent as far in advance as possible to the National Science Foundation, Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: *esm@nsf.gov*.

US100 The following provisions shall apply to the bands 2310–2320 MHz and 2345–2360 MHz:

(a) The bands 2310–2320 and 2345–2360 MHz are available for Federal aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles, or major components thereof, on a secondary basis to the Wireless Communications Service (WCS). The frequencies 2312.5 MHz and 2352.5 MHz are shared on a co-equal basis by Federal stations for telemetering and associated telecommand operations of expendable and reusable launch vehicles, irrespective of whether such operations involve flight testing. Other Federal mobile telemetering uses may be provided in the bands 2310–2320 and 2345–2360 MHz on a non-interference basis to all other uses authorized pursuant to this footnote.

(b) The band 2345–2360 MHz is available for non-Federal aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles, or major components thereof, on a secondary basis to the WCS until January 1, 2020. The use of this allocation is restricted to non-Federal licensees in the Aeronautical and Fixed Radio Service holding a valid authorization on April 23, 2015.

US101 The band 2360–2400 MHz is also allocated on a secondary basis to the mobile, except aeronautical mobile, service. The use of this allocation is limited to MedRadio operations. MedRadio stations are authorized by rule and operate in accordance with 47 CFR part 95.

US102 In Alaska only, the frequency 122.1 MHz may also be used for air carrier air traffic control purposes at locations where other frequencies are not available to air carrier aircraft stations for air traffic control.

US104 In the band 90–110 kHz, the LORAN radionavigation system has priority in the United States and its insular areas. Radiolocation land stations making use of LORAN type equipment may be authorized to both Federal and non-Federal licensees on a secondary basis for offshore radiolocation activities only at specific locations and subject to such technical and operational conditions (e.g., power, emission, pulse rate and phase code, hours of operation), including on-the-air testing, as may be required on a case-by-case basis to ensure protection of the LORAN radionavigation system from harmful interference and to ensure mutual compatibility among radiolocation operators. Such authorizations to stations in the radiolocation service are further subject to showing of need for service which is not currently provided and which the Federal Government is not yet prepared to render by way of the radionavigation service.

US105 In the band 3550–3650 MHz, non-Federal stations in the radiolocation service that were licensed or applied for prior to July 23, 2015 may continue to operate on a secondary basis until the end of the equipment's useful lifetime.

US107 In the band 3600–3650 MHz, the following provisions shall apply to earth stations in the fixed-satellite service (space-to-Earth):

(a) Earth stations authorized prior to, or granted as a result of an application filed prior to July 23, 2015, and constructed within 12 months of initial authorization may continue to operate on a primary basis. Applications for modifications to such earth station facilities filed after July 23, 2015 shall not be accepted, except for repair or replacement of equipment; changes in polarization, antenna orientation, or ownership; and increases in antenna size for interference mitigation purposes.

(b) The assignment of frequencies to new earth stations after July 23, 2015 shall be authorized on a secondary basis.

US108 In the bands 3300–3500 MHz and 10–10.5 GHz, survey operations, using transmitters with a peak power not to exceed five watts into the antenna, may be authorized for Federal and non-Federal use on a secondary basis to other Federal radiolocation operations.

US109 The band 3650–3700 MHz is also allocated to the Federal radiolocation service on a primary basis at the following sites: St. Inigoes, MD (38°10′ N, 76°23′ W); Pascagoula, MS (30°22′ N, 88 29′ W); and Pensacola, FL (30°21′28″ N, 87°16′26″ W). The FCC shall coordinate all non-Federal operations authorized under 47 CFR part 90 within 80 km of these sites with NTIA on a case-by-case basis. For stations in the Citizens Broadband Radio Service these sites shall be protected consistent with the procedures set forth in 47 CFR 96.15(b) and 96.67.

US110 In the band 9200–9300 MHz, the use of the radiolocation service by non-Federal licensees may be authorized on the condition that harmful interference is not caused to the maritime radionavigation service or to the Federal radiolocation service.

US111 In the band 5091–5150 MHz, aeronautical mobile telemetry operations for flight testing are conducted at the following locations. Flight testing at additional locations may be authorized on a case-by-case basis.

Location	Test sites	Lat. (N)	Long. (W)
Gulf Area Ranges Complex (GARC).	Eglin AFB, Tyndall AFB, FL; Gulfport ANG Range, MS; Ft. Rucker, Redstone, NASA Marshall Space Flight Center, AL.	30° 28′	86° 31′
Utah Ranges Complex (URC) ...	Dugway PG; Utah Test & Training Range (Hill AFB), UT	40° 57′	113° 05′
Western Ranges Complex (WRC).	Pacific Missile Range; Vandenberg AFB, China Lake NAWS, Pt. Mugu NAWS, Edwards AFB, Thermal, Nellis AFB, Ft. Irwin, NASA Dryden Flight Research Center, Victorville, CA.	35° 29′	117° 16′
Southwest Ranges Complex (SRC).	Ft. Huachuca, Tucson, Phoenix, Mesa, Yuma, AZ	31° 33′	110° 18′
Mid-Atlantic Ranges Complex (MARC).	Patuxent River, Aberdeen PG, NASA Langley Research Center, NASA Wallops Flight Facility, MD.	38° 17′	76° 24′
New Mexico Ranges Complex (NMRC).	White Sands Missile Range, Holloman AFB, Albuquerque, Roswell, NM; Amarillo, TX.	32° 11′	106° 20′
Colorado Ranges Complex (CoRC).	Alamosa, Leadville, CO	37° 26′	105° 52′
Texas Ranges Complex (TRC) ..	Dallas/Ft. Worth, Greenville, Waco, Johnson Space Flight Center/Ellington Field, TX.	32° 53′	97° 02′
Cape Ranges Complex (CRC) ..	Cape Canaveral, Palm Beach-Dade, FL	28° 33′	80° 34′
Northwest Range Complex (NWRC).	Seattle, Everett, Spokane, Moses Lake, WA; Klamath Falls, Eugene, OR.	47° 32′	122° 18′
St. Louis	St Louis, MO	38° 45′	90° 22′
Wichita	Wichita, KS	37° 40′	97° 26′
Marietta	Marietta, GA	33° 54′	84° 31′
Glasgow	Glasgow, MT	48° 25′	106° 32′
Wilmington/Ridley	Wilmington, DE/Ridley, PA	39° 49′	75° 26′
San Francisco Bay Area (SFBA)	NASA Ames Research Center, CA	37° 25′	122° 03′
Charleston	Charleston, SC	32° 52′	80° 02′

US112 The frequency 123.1 MHz is for search and rescue communications. This frequency may be assigned for air traffic control communications at special aeronautical events on the condition that no harmful interference is caused to search and rescue communications during any period of search and rescue operations in the locale involved.

US113 Radio astronomy observations of the formaldehyde line frequencies 4825–4835 MHz and 14.47–14.5 GHz may be made at certain radio astronomy observatories as indicated below:

BANDS TO BE OBSERVED

4 GHz	14 GHz	Observatory
X	.....	National Astronomy and Ionosphere Center (NAIC), Arecibo, PR
X	X	National Radio Astronomy Observatory (NRAO), Green Bank, WV
X	X	NRAO, Socorro, NM
X	.....	Allen Telescope Array (ATA), Hat Creek, CA
X	X	Owens Valley Radio Observatory (OVRO), Big Pine, CA
X	X	NRAO's ten Very Long Baseline Array (VLBA) stations (see US131)
X	X	University of Michigan Radio Astronomy Observatory, Stinchfield Woods, MI
X	.....	Pisgah Astronomical Research Institute, Rosman, NC

Every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed or mobile services in these bands. Should such assignments result in harmful interference to these observations, the situation will be remedied to the extent practicable.

US115 In the bands 5000–5010 MHz and 5010–5030 MHz, the following provisions shall apply:

(a) In the band 5000–5010 MHz, systems in the aeronautical mobile (R) service (AM(R)S) are limited to surface applications at airports that operate in accordance with international aeronautical standards (*i.e.*, AeroMACS).

(b) The band 5010–5030 MHz is also allocated on a primary basis to the AM(R)S, limited to surface applications at airports that operate in accordance with international aeronautical standards. In making assignments for this band, attempts shall first be made to satisfy the AM(R)S requirements in the bands 5000–5010 MHz and 5091–5150 MHz. AM(R)S systems used in the band 5010–5030 MHz shall be designed and implemented to be capable of operational modification if receiving harmful interference from the radionavigation-satellite service. Finally, notwithstanding Radio Regulation No. 4.10, stations in the AM(R)S operating in this band shall be designed and implemented to be capable of operational modification to reduce throughput and/or preclude the use of specific frequencies in order to ensure protection of radionavigation-satellite service systems operating in this band.

(c) Aeronautical fixed communications that are an integral part of the AeroMACS system in the bands 5000–5010 MHz and 5010–5030 MHz are also authorized on a primary basis.

US116 In the bands 890–902 MHz and 935–941 MHz, no new assignments are to be made

to Federal radio stations after July 10, 1970, except on a case-by-case basis to experimental stations. Federal assignments existing prior to July 10, 1970, shall be on a secondary basis to stations in the non-Federal land mobile service and shall be subject to adjustment or removal from the bands 890–902 MHz, 928–932 MHz, and 935–941 MHz at the request of the FCC.

US117 In the band 406.1–410 MHz, the following provisions shall apply:

(a) Stations in the fixed and mobile services are limited to a transmitter output power of 125 watts, and new authorizations for stations, other than mobile stations, are subject to prior coordination by the applicant in the following areas:

(1) Within Puerto Rico and the U.S. Virgin Islands, contact Spectrum Manager, Arecibo Observatory, HC3 Box 53995, Arecibo, PR 00612. Phone: 787–878–2612, Fax: 787–878–1861, Email: *prcz@naic.edu*.

(2) Within 350 km of the Very Large Array (34°04′44″ N, 107°37′06″ W), contact Spectrum Manager, National Radio Astronomy Observatory, P.O. Box O, 1003 Lopezville Road, Socorro, NM 87801. Phone: 505–835–7000, Fax: 505–835–7027, Email: *nrao-rfi@nrao.edu*.

(3) Within 10 km of the Table Mountain Observatory (40°08′02″ N, 105°14′40″ W) and for operations only within the sub-band 407–409 MHz, contact Radio Frequency Manager, Department of Commerce, 325 Broadway, Boulder, CO 80305. Phone: 303–497–4619, Fax: 303–497–6982, Email: *frequencymanager@its.bldrdoc.gov*.

(b) Non-Federal use is limited to the radio astronomy service and as provided by footnote US13.

US128 In the band 10–10.5 GHz, pulsed emissions are prohibited, except for weather radars on board meteorological satellites in the sub-band 10–10.025 GHz. The amateur service, the amateur-satellite service, and the non-Federal radiolocation service, which shall not cause harmful interference to the Federal radiolocation service, are the only non-Federal services permitted in this band. The non-Federal radiolocation service is limited to survey operations as specified in footnote US108.

US130 The band 10.6–10.68 GHz is also allocated on a primary basis to the radio astronomy service. However, the radio astronomy service shall not receive protection from stations in the fixed service which are licensed to operate in the one hundred most populous urbanized areas as defined by the 1990 U.S. Census. For the list of observatories operating in this band, see footnote US131.

US131 In the band 10.7–11.7 GHz, non-geostationary satellite orbit licensees in the fixed-satellite service (space-to-Earth), prior to commencing operations, shall coordinate with the following radio astronomy observatories to achieve a mutually acceptable agreement regarding the protection of the radio telescope facilities operating in the band 10.6–10.7 GHz:

Observatory	North latitude	West longitude	Elevation (in meters)
Arecibo Observatory, PR	18°20′37″	66°45′11″	497
Green Bank Telescope (GBT), WV	38°25′59″	79°50′23″	807
Very Large Array (VLA), Socorro, NM	34°04′44″	107°37′06″	2,115
Very Long Baseline Array (VLBA) Stations:			
Brewster, WA	48°07′52″	119°41′00″	250
Fort Davis, TX	30°38′06″	103°56′41″	1,606
Hancock, NH	42°56′01″	71°59′12″	296
Kitt Peak, AZ	31°57′23″	111°36′45″	1,902
Los Alamos, NM	35°46′30″	106°14′44″	1,962
Mauna Kea, HI	19°48′05″	155°27′20″	3,763
North Liberty, IA	41°46′17″	91°34′27″	222
Owens Valley, CA	37°13′54″	118°16′37″	1,196
Pie Town, NM	34°18′04″	108°07′09″	2,365
St. Croix, VI	17°45′24″	64°35′01″	16

US132A In the bands 26.2–26.42 MHz, 41.015–41.665 MHz, and 43.35–44 MHz, applications of radiolocation service are limited to oceanographic radars operating in accordance with ITU Resolution 612 (Rev. WRC–12). Oceanographic radars shall not cause harmful interference to, or claim protection from, non-Federal stations in the land mobile service in the bands 26.2–26.42 MHz and 43.69–44 MHz, Federal stations in the fixed or mobile services in the band 41.015–41.665 MHz, and non-Federal stations in the fixed or land mobile services in the band 43.35–43.69 MHz.

US133 In the bands 14–14.2 GHz and 14.47–14.5 GHz, the following provisions shall apply to the operations of Earth Stations Aboard Aircraft (ESAA):

(a) In the band 14–14.2 GHz, ESAA licensees proposing to operate within radio line-of-sight of the coordinates specified in 47 CFR 25.228(j)(1) are subject to prior coordination with NTIA in order to minimize harmful interference to the ground terminals of NASA's Tracking and Data Relay Satellite System (TDRSS).

(b) In the band 14.47–14.5 GHz, operations within radio line-of-sight of the radio astronomy stations specified in 47 CFR 25.228(j)(3) are subject to coordination with the National Science Foundation in accordance with the requirements set forth in that rule section.

US136 The following provisions shall apply in eight HF bands that are allocated to the broadcasting service (HFBC) on a primary basis in all Regions.

(a) In Alaska, the assigned frequency band 7368.48–7371.32 kHz is allocated exclusively to the fixed service (FS) on a primary basis for non-Federal use in accordance with 47 CFR 80.387.

(b) On the condition that harmful interference is not caused to the broadcasting service (NIB operations), Federal and non-Federal stations that communicate wholly within the United States and its insular areas may operate as specified herein. All such stations must take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU *Radio Regulations* and are limited to the minimum power needed for reliable communications.

(1) *Federal stations*. Frequencies in the 13 HF bands/sub-bands listed in the table below (HF NIB Bands) may be authorized to Federal stations in the FS. In the bands 5.9–5.95, 7.3–7.4, 13.57–13.6, and 13.80–13.87 MHz (6, 7, 13.6, and 13.8 MHz bands), frequencies may also be authorized to Federal stations in the mobile except aeronautical mobile route (R) service (MS except AM(R)S). Federal use of the bands 9.775–9.9, 11.65–11.7, and 11.975–12.05 MHz is restricted to stations in the FS that were authorized as of June 12, 2003, and each grandfathered station is restricted to a total radiated power of 24 dBW. In all other HF NIB Bands (*), new Federal stations may be authorized.

(2) *Non-Federal stations*. Non-Federal use of the HF NIB Bands is restricted to stations in the FS, land mobile service (LMS), and maritime mobile service (MMS) that were licensed prior to March 25, 2007, except that, in the sub-band 7.35–7.4 MHz, use is restricted to stations that were licensed prior to March 29, 2009.

NIB OPERATIONS IN EIGHT HFBC BANDS (MHZ)

HF NIB band	Federal (* new stations permitted)	Non-Federal	HFBC band
5.90–5.95	*FS and MS except AM(R)S	MMS	5.90–6.20
7.30–7.40	*FS and MS except AM(R)S	FS, LMS and MMS.	7.30–7.40
9.40–9.50	*9 MHz: FS	FS and LMS	9.40–9.90
9.775–9.90	FS (Grandfathered, restricted to 24 dBW).		
11.60–11.65	*11 MHz: FS	FS	11.60–12.10
11.65–11.70	FS (Grandfathered, restricted to 24 dBW).		
11.975–12.05	FS (Grandfathered, restricted to 24 dBW).		
12.05–12.10	*12 MHz: FS	FS.	
13.57–13.60	*FS and MS except AM(R)S	MMS	13.57–13.87
13.80–13.87	*FS and MS except AM(R)S	MMS.	
15.60–15.80	*15 MHz: FS	FS	15.10–15.80
17.48–17.55	*17 MHz: FS		17.48–17.90
18.90–19.02	*19 MHz: FS	MMS	18.90–19.02

NOTE: Non-Federal stations may continue to operate in nine HF NIB Bands as follows: (i) In the 6, 7, 13.6, 13.8, and 19 MHz bands, stations in the MMS; (ii) In the 7 and 9 MHz bands, stations in the FS and LMS; and (iii) In the 11, 12, and 15 MHz band, stations in the FS.

US139 Fixed stations authorized in the band 18.3–19.3 GHz under the provisions of 47 CFR 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r) may continue operations consistent with the provisions of those sections.

US142 In the bands 7.2–7.3 and 7.4–7.45 MHz, the following provisions shall apply:

(a) In the U.S. Pacific insular areas located in Region 3 (*see* 47 CFR 2.105(a), note 3), the bands 7.2–7.3 and 7.4–7.45 MHz are alternatively allocated to the broadcasting service on a primary basis. Use of this allocation is restricted to international broadcast stations that transmit to geographical zones and areas of reception in Region 1 or Region 3.

(b) The use of the band 7.2–7.3 MHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3.

US145 The following unwanted emissions power limits for non-geostationary satellites operating in the inter-satellite service that transmit in the band 22.55–23.55 GHz shall apply in any 200 MHz of the passive band 23.6–24 GHz, based on the date that complete advance publication information is received by the ITU's Radiocommunication Bureau:

(a) For information received before January 1, 2020: −36 dBW/200 MHz.

(b) For information received on or after January 1, 2020: −46 dBW/200 MHz.

US151 In the band 37–38 GHz, stations in the fixed and mobile services shall not cause

harmful interference to Federal earth stations in the space research service (space-to-Earth) at the following sites: Goldstone, CA; Socorro, NM; and White Sands, NM. Applications for non-Federal use of this band shall be coordinated with NTIA in accordance with 47 CFR 30.205.

US156 In the bands 49.7–50.2 GHz and 50.4–50.9 GHz, for earth stations in the fixed-satellite service (Earth-to-space), the unwanted emissions power in the band 50.2–50.4 GHz shall not exceed −20 dBW/200 MHz (measured at the input of the antenna), except that the maximum unwanted emissions power may be increased to −10 dBW/200 MHz for earth stations having an antenna gain greater than or equal to 57 dBi. These limits apply under clear-sky conditions. During fading conditions, the limits may be exceeded by earth stations when using uplink power control.

US157 In the band 51.4–52.6 GHz, for stations in the fixed service, the unwanted emissions power in the band 52.6–54.25 GHz shall not exceed −33 dBW/100 MHz (measured at the input of antenna).

US161 In the bands 81–86 GHz, 92–94 GHz, and 94.1–95 GHz and within the coordination distances indicated below, assignments to allocated services shall be coordinated with the following radio astronomy observatories. New observatories shall not receive protection from fixed stations that are licensed to operate in the one hundred most populous urbanized areas as defined by the U.S. Census Bureau for the year 2000.

(a) Within 25 km of the National Radio Astronomy Observatory's (NRAO's) Very Long Baseline Array (VLBA) Stations:

State	VLBA station	Lat. (N)	Long. (W)
AZ	Kitt Peak	31° 57′ 23″	111° 36′ 45″
CA	Owens Valley	37° 13′ 54″	118° 16′ 37″
HI	Mauna Kea	19° 48′ 05″	155° 27′ 20″
IA	North Liberty	41° 46′ 17″	091° 34′ 27″
NH	Hancock	42° 56′ 01″	071° 59′ 12″
NM	Los Alamos	35° 46′ 30″	106° 14′ 44″
NM	Pie Town	34° 18′ 04″	108° 07′ 09″
TX	Fort Davis	30° 38′ 06″	103° 56′ 41″
VI	Saint Croix	17° 45′ 24″	064° 35′ 01″
WA	Brewster	48° 07′ 52″	119° 41′ 00″

(b) Within 150 km of the following observatories:

State	Telescope and site	Lat. (N)	Long. (W)
AZ	Heinrich Hertz Submillimeter Observatory, Mt. Graham	32° 42′ 06″	109° 53′ 28″
AZ	University of Arizona 12-m Telescope, Kitt Peak	31° 57′ 12″	111° 36′ 53″
CA	Caltech Telescope, Owens Valley	37° 13′ 54″	118° 17′ 36″
CA	Combined Array for Research in Millimeter-wave Astronomy (CARMA)	37° 16′ 43″	118° 08′ 32″
HI	James Clerk Maxwell Telescope, Mauna Kea	19° 49′ 33″	155° 28′ 47″
MA	Haystack Observatory, Westford	42° 37′ 24″	071° 29′ 18″
NM	NRAO's Very Large Array, Socorro	34° 04′ 44″	107° 37′ 06″
WV	NRAO's Robert C. Byrd Telescope, Green Bank	38° 25′ 59″	079° 50′ 23″

Note: Satisfactory completion of the coordination procedure utilizing the automated mechanism, see 47 CFR 101.1523, will be deemed to establish sufficient separation from radio astronomy observatories, regardless of whether the distances set forth above are met.

US208 Planning and use of the band 1559–1626.5 MHz necessitate the development of technical and/or operational sharing criteria to ensure the maximum degree of electromagnetic compatibility with existing and planned systems within the band.

US209 The use of frequencies 460.6625, 460.6875, 460.7125, 460.7375, 460.7625, 460.7875, 460.8125, 460.8375, 460.8625, 465.6625, 465.6875, 465.7125, 465.7375, 465.7625, 465.7875, 465.8125, 465.8375, and 465.8625 MHz may be authorized, with 100 mW or less output power, to Federal and non-Federal radio stations for one-way, non-voice bio-medical telemetry operations in hospitals, or medical or convalescent centers.

US210 In the bands 40.66–40.7 MHz and 216–220 MHz, frequencies may be authorized to Federal and non-Federal stations on a secondary basis for the tracking of, and telemetering of scientific data from, ocean buoys and wildlife. Operation in these bands is subject to the technical standards specified in Section 8.2.42 of the NTIA Manual for Federal use, or 47 CFR 90.248 for non-Federal use. After January 1, 2002, no new assignments shall be authorized in the band 216–217 MHz.

US211 In the bands 1670–1690, 5000–5250 MHz and 10.7–11.7, 15.1365–15.35, 15.4–15.7, 22.5–22.55, 24–24.05, 31.0–31.3, 31.8–32.0, 40.5–42.5, 116–122.25, 123–130, 158.5–164, 167–168, 191.8–200, and 252–265 GHz, applicants for airborne or space station assignments are urged to take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference; however, US74 applies.

US212 In, or within 92.6 km (50 nautical miles) of, the State of Alaska, the carrier frequency 5167.5 kHz (assigned frequency 5168.9 kHz) is designated for emergency communications. This frequency may also be used in the Alaska-Private Fixed Service for calling and listening, but only for establishing communications before switching to another frequency. The maximum power is limited to 150 watts peak envelope power (PEP).

US213 The frequency 122.925 MHz is for use only for communications with or between aircraft when coordinating natural resources programs of Federal or State natural resources, agencies, including forestry management and fire suppression, fish and game management and protection and environmental monitoring and protection.

US214 The frequency 157.1 MHz is the primary frequency for liaison communications between ship stations and stations of the United States Coast Guard.

US218 The band 902–928 MHz is available for Location and Monitoring Service (LMS) systems subject to not causing harmful interference to the operation of all Federal stations authorized in this band. These systems must tolerate interference from the operation of industrial, scientific, and medical (ISM) equipment and the operation of Federal stations authorized in this band.

US220 The frequencies 36.25 and 41.71 MHz may be authorized to Federal stations and non-Federal stations in the petroleum radio service, for oil spill containment and cleanup operations. The use of these frequencies for oil spill containment or cleanup operations is limited to the inland and coastal waterway regions.

US221 Use of the mobile service in the bands 525–535 kHz and 1605–1615 kHz is limited to distribution of public service information from Travelers Information stations operating on 530 kHz and 1610 kHz.

US222 In the band 2025–2035 MHz, geostationary operational environmental satellite (GOES) earth stations in the space research and Earth exploration-satellite services may be authorized on a coequal basis for Earth-to-space transmissions for tracking, telemetry, and telecommand at Honolulu, HI (21°21′12″ N, 157°52′36″ W); Seattle, WA (47°34′15″ N, 122°33′10″ W); and Wallops Island, VA (37°56′44″ N, 75°27′42″ W).

US224 Federal systems utilizing spread spectrum techniques for terrestrial communication, navigation and identification may be authorized to operate in the band 960–1215 MHz on the condition that harmful interference will not be caused to the aeronautical radionavigation service. These systems will be handled on a case-by-case basis. Such systems shall be subject to a review at the national level for operational requirements and electromagnetic compatibility prior to development, procurement or modification.

US225 In addition to its present Federal use, the band 510–525 kHz is available to Federal and non-Federal aeronautical radionavigation stations inland of the Territorial Base Line as coordinated with the military services. In addition, the frequency 510 kHz is available for non-Federal ship-helicopter operations when beyond 100 nautical miles from shore and required for aeronautical radionavigation.

US227 The bands 156.4875–156.5125 MHz and 156.5375–156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis for non-Federal use in VHF Public Coast Station Areas 10–42. The use of these bands by the fixed and land mobile services shall not cause harmful interference to, nor claim protection from, the maritime mobile VHF radiocommunication service.

US230 The bands 422.1875–425.4875 MHz and 427.1875–429.9875 MHz are allocated to the land mobile service on a primary basis for non-Federal use within 80.5 kilometers (50 miles) of Cleveland, OH (41°29′51.2″ N, 81°41′49.5″ W) and Detroit, MI (42°19′48.1″ N, 83°02′56.7″ W). The bands 423.8125–425.4875 MHz and 428.8125–429.9875 MHz are allocated to the land mobile service on a primary basis for non-Federal use within 80.5 kilometers of Buffalo, NY (42°52′52.2″ N, 78°52′20.1″ W).

US231 When an assignment cannot be obtained in the bands between 200 kHz and 525 kHz, which are allocated to aeronautical radionavigation, assignments may be made to aeronautical radiobeacons in the maritime mobile bands at 435–472 kHz and 479–490 kHz, on a secondary basis, subject to the coordination and agreement of those agencies having assignments within the maritime mobile bands which may be affected. Assignments to Federal aeronautical radionavigation radiobeacons in the bands 435–472 kHz and 479–490 kHz shall not be a bar to any required changes to the maritime mobile service and shall be limited to non-voice emissions.

US239 Aeronautical radionavigation stations (radiobeacons) may be authorized, primarily for off-shore use, in the band 525–535 kHz on a non-interference basis to travelers information stations.

US240 The bands 1715–1725 and 1740–1750 kHz are allocated on a primary basis and the bands 1705–1715 kHz and 1725–1740 kHz on a secondary basis to the aeronautical radionavigation service (radiobeacons).

US241 The following provision shall apply to Federal operations in the band 216–220.035 MHz:

(a) Use of the fixed and land mobile services in the band 216–220 MHz and of the aeronautical mobile service in the sub-band 217–220 MHz is restricted to telemetry and associated telecommand operations. New stations in the fixed and land mobile services shall not be authorized in the sub-band 216–217 MHz.

(b) The sub-band 216.965–216.995 MHz is also allocated to the Federal radiolocation service on a primary basis and the use of this allocation is restricted to the Air Force Space Surveillance System (AFSSS) radar system. AFSSS stations transmit on the frequency 216.98 MHz and other operations may be affected within: 1) 250 km of Lake Kickapoo (Archer City), TX (33°2′48″ N, 98°45′46″ W); and 2) 150 km of Gila River (Phoenix), AZ (33°6′32″ N, 112°1′45″ W) and Jordan Lake (Wetumpka), AL (32°39′33″ N, 86°15′52″ W). AFSSS reception shall be protected from harmful interference within 50 km of: (1) Elephant Butte, NM (33°26′35″ N, 106°59′50″ W); (2) Fort Stewart, GA (31°58′36″ N, 81°30′34″ W); (3) Hawkinsville, GA (32°17′20″ N, 83°32′10″ W); (4) Red River, AR (33°19′48″ N, 93°33′1″ W); (5) San Diego, CA (32°34′42″ N, 116°58′11″ W); and (6) Silver Lake, MS (33°8′42″ N, 91°1′16″ W).

(c) The sub-band 219.965–220.035 MHz is also allocated to the Federal radiolocation service on a secondary basis and the use of this allocation is restricted to air-search radars onboard Coast Guard vessels.

US242 Use of the fixed and land mobile services in the band 220–222 MHz shall be in accordance with the following plan:

(a) Frequencies are assigned in pairs, with base station transmit frequencies taken from the sub-band 220–221 MHz and with corresponding mobile and control station transmit frequencies being 1 MHz higher and taken from the sub-band 221–222 MHz.

(b) In the non-Federal exclusive sub-bands, temporary fixed geophysical telemetry operations are also permitted on a secondary basis.

(c) The use of Channels 161–170 is restricted to public safety/mutual aid communications.

(d) The use of Channels 181–185 is restricted to emergency medical communications.

220 MHz PLAN

Use	Base transmit	Mobile transmit	Channel Nos.
Non-Federal exclusive	220.00–220.55	221.00–221.55	001–110
Federal exclusive	220.55–220.60	221.55–221.60	111–120
Non-Federal exclusive	220.60–220.80	221.60–221.80	121–160
Shared	220.80–220.85	221.80–221.85	161–170
Non-Federal exclusive	220.85–220.90	221.85–221.90	171–180
Shared	220.90–220.925	221.90–221.925	181–185
Non-Federal exclusive	220.925–221	221.925–222	186–200

US244 The band 136–137 MHz is allocated to the non-Federal aeronautical mobile (R) service on a primary basis, and is subject to pertinent international treaties and agreements. The frequencies 136, 136.025, 136.05, 136.075, 136.1, 136.125, 136.15, 136.175, 136.2, 136.225, 136.25, 136.275, 136.3, 136.325, 136.35, 136.375, 136.4, 136.425, 136.45, and 136.475 MHz are available on a shared basis to the Federal Aviation Administration for air traffic control purposes, such as automatic weather observation stations (AWOS), automatic terminal information services (ATIS), flight information services-broadcast (FIS-B), and airport control tower communications.

US245 In the bands 3600–3650 MHz (space-to-Earth), 4500–4800 MHz (space-to-Earth), and 5850–5925 MHz (Earth-to-space), the use of the non-Federal fixed-satellite service is limited to international inter-continental systems and is subject to case-by-case electromagnetic compatibility analysis. The FCC's policy for these bands is codified at 47 CFR 2.108.

US246 No station shall be authorized to transmit in the following bands: 73–74.6 MHz, 608–614 MHz, except for medical telemetry equipment[1] and white space devices,[2] 1400–1427 MHz, 1660.5–1668.4 MHz, 2690–2700 MHz, 4990–5000 MHz, 10.68–10.7 GHz, 15.35–15.4 GHz, 23.6–24 GHz, 31.3–31.8 GHz, 50.2–50.4 GHz, 52.6–54.25 GHz, 86–92 GHz, 100–102 GHz, 109.5–111.8 GHz, 114.25–116 GHz, 148.5–151.5 GHz, 164–167 GHz, 182–185 GHz, 190–191.8 GHz, 200–209 GHz, 226–231.5 GHz, 250–252 GHz.

US247 The band 10100–10150 kHz is allocated to the fixed service on a primary basis outside the United States and its insular areas. Transmissions from stations in the

[1] Medical telemetry equipment shall not cause harmful interference to radio astronomy operations in the band 608–614 MHz and shall be coordinated under the requirements found in 47 CFR 95.1119.

[2] White space devices shall not cause harmful interference to radio astronomy operations in the band 608–614 MHz and shall not operate within the areas described in 47 CFR 15.712(h).

amateur service shall not cause harmful interference to this fixed service use and stations in the amateur service shall make all necessary adjustments (including termination of transmission) if harmful interference is caused.

US251 The band 12.75–13.25 GHz is also allocated to the space research (deep space) (space-to-Earth) service for reception only at Goldstone, CA (35°20′ N, 116°53′ W).

US252 The band 2110–2120 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a primary basis at Goldstone, CA (35°20′ N, 116°53′ W).

US254 In the band 18.6–18.8 GHz the fixed and mobile services shall be limited to a maximum equivalent isotropically radiated power of + 35 dBW and the power delivered to the antenna shall not exceed −3 dBW.

US255 In addition to any other applicable limits, the power flux-density across the 200 MHz band 18.6–18.8 GHz produced at the surface of the Earth by emissions from a space station under assumed free-space propagation conditions shall not exceed −95 dB(W/m^2) for all angles of arrival. This limit may be exceeded by up to 3 dB for no more than 5% of the time.

US258 In the bands 8025–8400 MHz and 25.5–27 GHz, the Earth exploration-satellite service (space-to-Earth) is allocated on a primary basis for non-Federal use. Authorizations are subject to a case-by-case electromagnetic compatibility analysis.

US259 In the band 17.3–17.7 GHz, Federal stations in the radiolocation service shall operate with an e.i.r.p. of less than 51 dBW.

US260 Aeronautical mobile communications which are an integral part of aeronautical radionavigation systems may be satisfied in the bands 1559–1626.5 MHz, 5000–5250 MHz and 15.4–15.7 GHz.

US261 The use of the band 4200–4400 MHz by the aeronautical radionavigation service is reserved exclusively for airborne radio altimeters. Experimental stations will not be authorized to develop equipment for operational use in this band other than equipment related to altimeter stations. However, passive sensing in the earth-exploration satellite and space research services may be authorized in this band on a secondary basis (no protection is provided from the radio altimeters).

US262 The band 7145–7190 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a secondary basis for non-Federal use. Federal and non-Federal use of the bands 7145–7190 MHz and 34.2–34.7 GHz by the space research service (deep space) (Earth-to-space) and of the band 31.8–32.3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, CA (35°20′ N, 116°53′ W).

US264 In the band 48.94–49.04 GHz, airborne stations shall not be authorized.

US266 Non-Federal licensees in the Public Safety Radio Pool holding a valid authorization on June 30, 1958, to operate in the frequency band 156.27–157.45 MHz or on the frequencies 161.85 MHz or 161.91 MHz may, upon proper application, continue to be authorized for such operation, including expansion of existing systems, until such time as harmful interference is caused to the operation of any authorized station other than those licensed in the Public Safety Radio Pool.

US267 In the band 902–928 MHz, amateur stations shall transmit only in the sub-bands 902–902.4, 902.6–904.3, 904.7–925.3, 925.7–927.3, and 927.7–928 MHz within the States of Colorado and Wyoming, bounded by the area of latitudes 39° N and 42° N and longitudes 103° W and 108° W.

US268 The bands 890–902 MHz and 928–942 MHz are also allocated to the radiolocation service for Federal ship stations (off-shore ocean areas) on the condition that harmful interference is not caused to non-Federal land mobile stations. The provisions of footnote US116 apply.

US269 In the band 420–450 MHz, the following provisions shall apply to the non-Federal radiolocation service:

(a) Pulse-ranging radiolocation systems may be authorized for use along the shoreline of the conterminous United States and Alaska.

(b) In the sub-band 420–435 MHz, spread spectrum radiolocation systems may be authorized within the conterminous United States and Alaska.

(c) All stations operating in accordance with this provision shall be secondary to stations operating in accordance with the Table of Frequency Allocations.

(d) Authorizations shall be granted on a case-by-case basis; however, operations proposed to be located within the areas listed in paragraph (a) of US270 should not expect to be accommodated.

US270 In the band 420–450 MHz, the following provisions shall apply to the amateur service:

(a) The peak envelope power of an amateur station shall not exceed 50 watts in the following areas, unless expressly authorized by the FCC after mutual agreement, on a case-by-case basis, between the Regional Director of the applicable field office and the military area frequency coordinator at the applicable military base. For areas (5) through (7), the appropriate military coordinator is located at Peterson AFB, CO.

(1) Arizona, Florida and New Mexico.

(2) Within those portions of California and Nevada that are south of latitude 37°0′ N.

(3) Within that portion of Texas that is west of longitude 104° W.

(4) Within 322 km of Eglin AFB, FL (30°30′ N, 86°30′ W); Patrick AFB, FL (28°21′ N, 80°43′ W); and the Pacific Missile Test Center, Point Mugu, CA (34°09′ N, 119°11′ W).

(5) Within 240 km of Beale AFB, CA (39°08′ N, 121°26′ W).

(6) Within 200 km of Goodfellow AFB, TX (31°25′ N, 100°24′ W) and Warner Robins AFB, GA (32°38′ N, 83°35′ W).

(7) Within 160 km of Clear AFS, AK (64°17′ N, 149°10′ W); Concrete, ND (48°43′ N, 97°54′ W); and Otis AFB, MA (41°45′ N, 70°32′ W).

(b) In the sub-band 420–430 MHz, the amateur service is not allocated north of Line A (def. §2.1).

US271 The use of the band 17.3–17.8 GHz by the fixed-satellite service (earth-to-space) is limited to feeder links for broadcasting-satellite service.

US273 In the bands 74.6–74.8 MHz and 75.2–75.4 MHz, stations in the fixed and mobile services are limited to a maximum power of 1 watt from the transmitter into the antenna transmission line.

US275 The band 902–928 MHz is allocated on a secondary basis to the amateur service subject to not causing harmful interference to the operations of Federal stations authorized in this band or to Location and Monitoring Service (LMS) systems. Stations in the amateur service must tolerate any interference from the operations of industrial, scientific, and medical (ISM) devices, LMS systems, and the operations of Federal stations authorized in this band. Further, the amateur service is prohibited in those portions of Texas and New Mexico bounded on the south by latitude 31°41′ North, on the east by longitude 104°11′ West, and on the north by latitude 34°30′ North, and on the west by longitude 107°30′West; in addition, outside this area but within 150 miles of these boundaries of White Sands Missile Range the service is restricted to a maximum transmitter peak envelope power output of 50 watts.

US276 Except as otherwise provided for herein, use of the band 2360–2395 MHz by the mobile service is limited to aeronautical telemetering and associated telecommand operations for flight testing of aircraft, missiles or major components thereof. The following three frequencies are shared on a coequal basis by Federal and non-Federal stations for telemetering and associated telecommand operations of expendable and reusable launch vehicles, whether or not such operations involve flight testing: 2364.5 MHz, 2370.5 MHz, and 2382.5 MHz. All other mobile telemetering uses shall not cause harmful interference to, or claim protection from interference from, the above uses.

US278 In the bands 22.55–23.55 GHz and 32.3–33 GHz, non-geostationary inter-satellite links may operate on a secondary basis to geostationary inter-satellite links.

US279 The frequency 2182 kHz may be authorized to fixed stations associated with the maritime mobile service for the sole purpose of transmitting distress calls and distress traffic, and urgency and safety signals and messages.

US281 In the band 25070–25210 kHz, non-Federal stations in the Industrial/Business Pool shall not cause harmful interference to, and must accept interference from, stations in the maritime mobile service operating in accordance with the Table of Frequency Allocations.

US282 In the band 4650–4700 kHz, frequencies may be authorized for non-Federal communication with helicopters in support of off-shore drilling operations on the condition that harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations.

US283 In the bands 2850–3025 kHz, 3400–3500 kHz, 4650–4700 kHz, 5450–5680 kHz, 6525–6685 kHz, 10005–10100 kHz, 11275–11400 kHz, 13260–13360 kHz, and 17900–17970 kHz, frequencies may be authorized for non-Federal flight test purposes on the condition that harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations.

US285 Under exceptional circumstances, the carrier frequencies 2635 kHz, 2638 kHz, and 2738 kHz may be authorized to coast stations.

US287 In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU–R M.1174–2.

US288 In the territorial waters of the United States, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The characteristics of the equipment used shall conform to those specified in Recommendation ITU–R M.1174–2.

US289 In the bands 460–470 MHz and 1690–1695 MHz, the following provisions shall apply:

(a) In the band 460–470 MHz, space stations in the Earth exploration-satellite service (EESS) may be authorized for space-to-Earth transmissions on a secondary basis with respect to the fixed and mobile services. When operating in the meteorological-satellite

service, such stations shall be protected from harmful interference from other EESS applications. The power flux density produced at the Earth's surface by any space station in this band shall not exceed −152 dBW/m²/4 kHz.

(b) In the band 1690–1695 MHz, EESS applications, other than the meteorological-satellite service, may also be used for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table of Frequency Allocations.

US296 In the bands designated for ship wide-band telegraphy, facsimile and special transmission systems, the following assignable frequencies are available to non-Federal stations on a shared basis with Federal stations: 2070.5 kHz, 2072.5 kHz, 2074.5 kHz, 2076.5 kHz, 4154 kHz, 4170 kHz, 6235 kHz, 6259 kHz, 8302 kHz, 8338 kHz, 12370 kHz, 12418 kHz, 16551 kHz, 16615 kHz, 18848 kHz, 18868 kHz, 22182 kHz, 22238 kHz, 25123 kHz, and 25159 kHz.

US297 The bands 47.2–49.2 GHz and 81–82.5 GHz are also available for feeder links for the broadcasting-satellite service.

US298 The assigned frequencies 27.555, 27.615, 27.635, 27.655, 27.765, and 27.860 MHz are available for use by forest product licensees on a secondary basis to Federal operations including experimental stations. Non-Federal operations on these frequencies will not exceed 150 watts output power and are limited to the states of Washington, Oregon, Maine, North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas (eastern portion).

US299 In Alaska, the band 1615–1705 kHz is also allocated to the maritime mobile and Alaska fixed services on a secondary basis to Region 2 broadcast operations.

US300 The frequencies 169.445, 169.505, 169.545, 169.575, 169.605, 169.995, 170.025, 170.055, 170.245, 170.305, 171.045, 171.075, 171.105, 171.845, 171.875, and 171.905 MHz are available for wireless microphone operations on a secondary basis to Federal and non-Federal operations. On center frequencies 169.575 MHz, 170.025 MHz, 171.075 MHz, and 171.875 MHz, the emission bandwidth shall not exceed 200 kHz. On the other center frequencies, the emission bandwidth shall not exceed 54 kHz.

US301 Except as provided in NG30, broadcast auxiliary stations licensed as of November 21, 1984, to operate in the band 942–944 MHz may continue to operate on a co-equal primary basis to other stations and services operating in the band in accordance with the Table of Frequency Allocations.

US303 In the band 2285–2290 MHz, non-Federal space stations in the space research, space operations and Earth exploration-satellite services may be authorized to transmit to the Tracking and Data Relay Satellite System subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal stations. The power flux-density at the Earth's surface from such non-Federal stations shall not exceed −144 to −154 dBW/m2/4 kHz, depending on angle of arrival, in accordance with ITU Radio Regulation 21.16.

US307 The band 5150–5216 MHz is also allocated to the fixed-satellite service (space-to-Earth) for feeder links in conjunction with the radiodetermination-satellite service operating in the bands 1610–1626.5 MHz and 2483.5–2500 MHz. The total power flux-density at the Earth's surface shall in no case exceed −159 dBW/m² per 4 kHz for all angles of arrival.

US308 In the bands 1549.5–1558.5 MHz and 1651–1660 MHz, those requirements of the aeronautical mobile-satellite (R) service that cannot be accommodated in the bands 1545–1549.5 MHz, 1558.5–1559 MHz, 1646.5–1651 MHz, and 1660–1660.5 MHz shall have priority access with real-time preemptive capability for communications in the mobile-satellite service. Systems not interoperable with the aeronautical mobile-satellite (R) service shall operate on a secondary basis. Account shall be taken of the priority of safety-related communications in the mobile-satellite service.

US309 In the bands 1545–1559 MHz, transmissions from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links. In the band 1646.5–1660.5 MHz, transmissions from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

US310 In the band 14.896–15.121 GHz, non-Federal space stations in the space research service may be authorized on a secondary basis to transmit to Tracking and Data Relay Satellites subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal stations. The power flux-density (pfd) produced by such non-Federal stations at the Earth's surface in any 1 MHz band for all conditions and methods of modulation shall not exceed:

-124 dB(W/m² for $0° < \theta \leq 5°$

$-124 + (\theta - 5)/2$ dB(W/m²) for $5° < \theta \leq 25°$

-114 dB(W/m²) for $25° < \theta \leq 90°$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizontal). These limits relate to the pfd and angles of arrival which would be obtained under free-space propagation conditions.

US312 The frequency 173.075 MHz may also be authorized on a primary basis to non-

Federal stations in the Public Safety Radio Pool, limited to police licensees, for stolen vehicle recovery systems (SVRS). As of May 27, 2005, new SVRS licenses shall be issued for an authorized bandwidth not to exceed 12.5 kHz. Stations that operate as part of a stolen vehicle recovery system that was authorized and in operation prior to May 27, 2005 may operate with an authorized bandwidth not to exceed 20 kHz until May 27, 2019. After that date, all SVRS shall operate with an authorized bandwidth not to exceed 12.5 kHz.

US315 In the bands 1530–1544 MHz and 1626.5–1645.5 MHz, maritime mobile-satellite distress and safety communications, e.g., GMDSS, shall have priority access with real-time preemptive capability in the mobile-satellite service. Communications of mobile-satellite system stations not participating in the GMDSS shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the mobile-satellite service.

US316 The band 2900–3000 MHz is also allocated to the meteorological aids service on a primary basis for Federal use. Operations in this service are limited to Next Generation Weather Radar (NEXRAD) systems where accommodation in the band 2700–2900 MHz is not technically practical and are subject to coordination with existing authorized stations.

US319 In the bands 137–138 MHz, 148–149.9 MHz, 149.9–150.05 MHz, 399.9–400.05 MHz, 400.15–401 MHz, 1610–1626.5 MHz, and 2483.5–2500 MHz, Federal stations in the mobile-satellite service shall be limited to earth stations operating with non-Federal space stations.

US320 The use of the bands 137–138 MHz, 148–150.05 MHz, 399.9–400.05 MHz, and 400.15–401 MHz by the mobile-satellite service is limited to non-voice, non-geostationary satellite systems and may include satellite links between land earth stations at fixed locations.

US323 In the band 148–149.9 MHz, no individual mobile earth station shall transmit on the same frequency being actively used by fixed and mobile stations and shall transmit no more than 1% of the time during any 15 minute period; except, individual mobile earth stations in this band that do not avoid frequencies actively being used by the fixed and mobile services shall not exceed a power density of −16 dBW/4 kHz and shall transmit no more than 0.25% of the time during any 15 minute period. Any single transmission from any individual mobile earth station operating in this band shall not exceed 450 ms in duration and consecutive transmissions from a single mobile earth station on the same frequency shall be separated by at least 15 seconds. Land earth stations in this band shall be subject to electromagnetic compatibility analysis and coordination with terrestrial fixed and mobile stations.

US324 In the band 400.15–401 MHz, Federal and non-Federal satellite systems shall be subject to electromagnetic compatibility analysis and coordination.

US325 In the band 148–149.9 MHz fixed and mobile stations shall not claim protection from land earth stations in the mobile-satellite service that have been previously coordinated; Federal fixed and mobile stations exceeding 27 dBW EIRP, or an emission bandwidth greater than 38 kHz, will be coordinated with existing mobile-satellite service space stations.

US327 The band 2310–2360 MHz is allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528.

US334 In the bands between 17.7 GHz and 20.2 GHz, the following provisions shall apply:

(a) In the bands between 17.8 GHz and 20.2 GHz, Federal space stations in both geostationary (GSO) and non-geostationary satellite orbits (NGSO) and associated earth stations in the fixed-satellite service (FSS) (space-to-Earth) may be authorized on a primary basis. For a Federal GSO FSS network to operate on a primary basis, the space station shall be located outside the arc, measured from east to west, 70–120° West longitude. Coordination between Federal FSS systems and non-Federal space and terrestrial systems operating in accordance with the United States Table of Frequency Allocations is required.

(b) In the bands between 17.8 GHz and 20.2 GHz, Federal earth stations operating with Federal space stations shall be authorized on a primary basis only in the following areas: Denver, Colorado; Washington, DC; San Miguel, California; and Guam. Prior to the commencement of non-Federal terrestrial operations in these areas, the FCC shall coordinate with NTIA all applications for new stations and modifications to existing stations as specified in 47 CFR 1.924(f), 74.32, and 78.19(f). In the band 17.7–17.8 GHz, the FCC shall also coordinate with NTIA all applications for new stations and modifications to existing stations that support the operations of Multichannel Video Programming Distributors (MVPD) in these areas, as specified in the aforementioned regulations.

(c) In the bands between 17.8 GHz and 19.7 GHz, the power flux-density (pfd) at the surface of the Earth produced by emissions from a Federal GSO space station or from a Federal space station in a NGSO constellation of 50 or fewer satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) -115 dB(W/m^2) for angles of arrival above the horizontal plane (δ) between 0° and 5°,

(2) $-115 + 0.5(\delta - 5)$ dB(W/m^2) for δ between 5° and 25°, and

(3) -105 dB(W/m^2) for δ between 25° and 90°.

(d) In the bands between 17.8 GHz and 19.3 GHz, the pfd at the surface of the Earth produced by emissions from a Federal space station in an NGSO constellation of 51 or more satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) $-115 - X$ dB(W/m^2) for δ between 0° and 5°,

(2) $-115 - X + ((10 + X)/20)(\delta - 5)$ dB(W/m^2) for δ between 5° and 25°, and

(3) -105 dB(W/m^2) for δ between 25° and 90°; where X is defined as a function of the number of satellites, n, in an NGSO constellation as follows:

For $n \leq 288$, $X = (5/119)(n - 50)$ dB; and

For $n > 288$, $X = (1/69)(n + 402)$ dB.

US337 In the band 13.75–13.8 GHz, the FCC shall coordinate earth stations in the fixed-satellite service with NTIA on a case-by-case basis in order to minimize harmful interference to the Tracking and Data Relay Satellite System's forward space-to-space link (TDRSS forward link-to-LEO).

US338A In the band 1435–1452 MHz, operators of aeronautical telemetry stations are encouraged to take all reasonable steps to ensure that the unwanted emissions power does not exceed -28 dBW/27 MHz in the band 1400–1427 MHz. Operators of aeronautical telemetry stations that do not meet this limit shall first attempt to operate in the band 1452–1525 MHz prior to operating in the band 1435–1452 MHz.

US340 The band 2–30 MHz is available on a non-interference basis to Federal and non-Federal maritime and aeronautical stations for the purposes of measuring the quality of reception on radio channels. See 47 CFR 87.149 for the list of protected frequencies and bands within this frequency range. Actual communications shall be limited to those frequencies specifically allocated to the maritime mobile and aeronautical mobile services.

US342 In making assignments to stations of other services to which the bands:

13360–13410 kHz	6650–6675.2 MHz*
25550–25670 kHz	14.47–14.5 GHz*
37.5–38.25 MHz	22.01–22.21 GHz*
322–328.6 MHz*	22.21–22.5 GHz
1330–1400 MHz*	22.81–22.86 GHz*
1610.6–1613.8 MHz*	23.07–23.12 Gz*
1660–1660.5 MHz*	31.2–31.3 GHz
1668.4–1670 MHz*	36.43–36.5 GHz*
3260–3267 MHz*	42.5–43.5 GHz
3332–3339 MHz*	42.77–42.87 GHz*
3345.8–3352.5 MHz*	43.07–43.17 GHz*
4825–4835 MHz*	43.37–43.47 GHz*
4950–4990 MHz	48.94–49.04 GHz*
76–86 GHz	151.5–158.5 GHz
92–94 GHz	168.59–168.93 GHz*
94.1–100 GHz	171.11–171.45 GHz*
102–109.5 GHz	172.31–172.65 GHz*
111.8–114.25 GHz	173.52–173.85 GHz*
128.33–128.59 GHz*	195.75–196.15 GHz*
129.23–129.49 GHz*	209–226 GHz
130–134 GHz	241–250 GHz
136–148.5 GHz	252–275 GHz

are allocated (*indicates radio astronomy use for spectral line observations), all practicable steps shall be taken to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see ITU *Radio Regulations* at Nos. 4.5 and 4.6 and Article 29).

US343 In the mobile service, the frequencies between 1435 and 1525 MHz will be assigned for aeronautical telemetry and associated telecommand operations for flight testing of manned or unmanned aircraft and missiles, or their major components. Permissible usage includes telemetry associated with launching and reentry into the Earth's atmosphere as well as any incidental orbiting prior to reentry of manned objects undergoing flight tests. The following frequencies are shared on a co-equal basis with flight telemetering mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz.

US344 In the band 5091–5250 MHz, the FCC shall coordinate earth stations in the fixed-satellite service (Earth-to-space) with NTIA (see Recommendation ITU–R S.1342). In order to better protect the operation of the international standard system (microwave landing system) in the band 5000–5091 MHz, non-Federal tracking and telecommand operations should be conducted in the band 5150–5250 MHz.

US346 Except as provided for below and by US222, Federal use of the band 2025–2110 MHz by the space operation service (Earth-to-space), Earth exploration-satellite service (Earth-to-space), and space research service (Earth-to-space) shall not constrain the deployment of the Television Broadcast Auxiliary Service, the Cable Television Relay Service, or the Local Television Transmission Service. To facilitate compatible operations between non-Federal terrestrial receiving stations at fixed sites and Federal earth station transmitters, coordination is required. To facilitate compatible operations between non-Federal terrestrial transmitting stations and Federal spacecraft receivers, the terrestrial transmitters in the band 2025–2110 MHz shall not be high-density systems (see Recommendations ITU–R SA.1154 and ITU–R F.1247). Military satellite control stations at the following sites shall operate on a co-equal, primary basis with non-Federal operations:

Facility	Coordinates
Naval Satellite Control Network, Prospect Harbor, ME	44°24′16″ N, 068°00′46″ W
New Hampshire Tracking Station, New Boston AFS, NH	42°56′52″ N, 071°37′36″ W
Eastern Vehicle Check-out Facility & GPS Ground Antenna & Monitoring Station, Cape Canaveral, FL.	28°29′09″ N, 080°34′33″ W
Buckley AFB, CO	39°42′55″ N, 104°46′36″ W
Colorado Tracking Station, Schriever AFB, CO	38°48′21″ N, 104°31′43″ W
Kirtland AFB, NM	34°59′46″ N, 106°30′28″ W
Camp Parks Communications Annex, Pleasanton, CA	37°43′51″ N, 121°52′50″ W
Naval Satellite Control Network, Laguna Peak, CA	34°06′31″ N, 119°03′53″ W
Vandenberg Tracking Station, Vandenberg AFB, CA	34°49′21″ N, 120°30′07″ W
Hawaii Tracking Station, Kaena Pt, Oahu, HI	21°33′44″ N, 158°14′31″ W
Guam Tracking Stations, Anderson AFB, and Naval CTS, Guam	13°36′54″ N, 144°51′18″ E

US347 In the band 2025–2110 MHz, non-Federal Earth-to-space and space-to-space transmissions may be authorized in the space research and Earth exploration-satellite services subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to Federal and non-Federal stations operating in accordance with the Table of Frequency Allocations.

US349 The band 3650–3700 MHz is also allocated to the Federal radiolocation service on a non-interference basis for use by ship stations located at least 44 nautical miles in off-shore ocean areas on the condition that harmful interference is not caused to non-Federal operations.

US350 In the band 1427–1432 MHz, Federal use of the land mobile service and non-Federal use of the fixed and land mobile services is limited to telemetry and telecommand operations as described further:

(a) *Medical operations*. The use of the band 1427–1432 MHz for medical telemetry and telecommand operations (medical operations) shall be authorized for both Federal and non-Federal stations.

(1) Medical operations shall be authorized in the band 1427–1429.5 MHz in the United States and its insular areas, except in the following locations: Austin/Georgetown, Texas; Detroit and Battle Creek, Michigan; Pittsburgh, Pennsylvania; Richmond/Norfolk, Virginia; Spokane, Washington; and Washington, DC metropolitan area (collectively, the ''carved-out'' locations). *See* Section 47 CFR 90.259(b)(4) for a detailed description of these areas.

(2) In the carved-out locations, medical operations shall be authorized in the band 1429–1431.5 MHz.

(3) Medical operations may operate on frequencies in the band 1427–1432 MHz other than those described in paragraphs (a)(1) and (2) only if the operations were registered with a designated frequency coordinator prior to April 14, 2010.

(b) *Non-medical operations*. The use of the band 1427–1432 MHz for non-medical telemetry and telecommand operations (non-medical operations) shall be limited to non-Federal stations.

(1) Non-medical operations shall be authorized on a secondary basis to the Wireless Medical Telemetry Service (WMTS) in the band 1427–1429.5 MHz and on a primary basis in the band 1429.5–1432 MHz in the United States and its insular areas, except in the carved-out locations.

(2) In the carved-out locations, non-medical operations shall be authorized on a secondary basis in the band 1429–1431.5 MHz and on a primary basis in the bands 1427–1429 MHz and 1431.5–1432 MHz.

US353 In the bands 56.24–56.29 GHz, 58.422–58.472 GHz, 59.139–59.189 GHz, 59.566–59.616 GHz, 60.281–60.331 GHz, 60.41–60.46 GHz, and 62.461–62.511 GHz, space-based radio astronomy observations may be made on an unprotected basis.

US354 In the band 58.422–58.472 GHz, airborne stations and space stations in the space-to-Earth direction shall not be authorized.

US356 In the band 13.75–14 GHz, an earth station in the fixed-satellite service shall have a minimum antenna diameter of 4.5 m and the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation service shall not exceed 59 dBW. Receiving space stations in the fixed-satellite service shall not claim protection from radiolocation transmitting stations operating in accordance with the United States Table of Frequency Allocations. ITU Radio Regulation No. 5.43A does not apply.

US357 In the band 13.75–14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the ITU Radiocommunication Bureau (Bureau) prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has

been received by the Bureau prior to 31 January 1992 cease to operate in this band:

a. The e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed 71 dBW in any 6 MHz band from 13.77 to 13.78 GHz;

b. The e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in any 6 MHz band from 13.77 to 13.78 GHz.

Automatic power control may be used to increase the e.i.r.p. density in any 6 MHz band in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. of 71 dBW or 51 dBW, as appropriate, in any 6 MHz band in clear-sky conditions.

US359 In the band 15.43–15.63 GHz, use of the fixed-satellite service (Earth-to-space) is limited to non-Federal feeder links of non-geostationary systems in the mobile-satellite service. The FCC shall coordinate Earth stations in this band with NTIA (see Annex 3 of Recommendation ITU–R S.1340).

US360 The band 33–36 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for Federal use. Coordination between Federal fixed-satellite service systems and non-Federal systems operating in accordance with the United States Table of Frequency Allocations is required.

US362 The band 1670–1675 MHz is allocated to the meteorological-satellite service (space-to-Earth) on a primary basis for Federal use. Earth station use of this allocation is limited to Wallops Island, VA (37°56′44″ N, 75°27′37″ W), Fairbanks, AK (64°58′22″ N, 147°30′04″ W), and Greenbelt, MD (39°00′02″ N, 76°50′29″ W). Applicants for non-Federal stations within 100 kilometers of the Wallops Island or Fairbanks coordinates and within 65 kilometers of the Greenbelt coordinates shall notify NOAA in accordance with the procedures specified in 47 CFR 1.924.

US364 Consistent with US18, stations may be authorized on a primary basis in the band 285–325 kHz for the specific purpose of transmitting differential global positioning system information.

US378 In the band 1710–1755 MHz, the following provisions apply:

(a) Federal fixed and tactical radio relay stations may operate indefinitely on a primary basis within 80 km of Cherry Point, NC (34°58′ N, 76°56′ W) and Yuma, AZ (32°32′ N, 113°58′ W).

(b) Federal fixed and tactical radio relay stations shall operate on a secondary basis to primary non-Federal operations at the 14 sites listed below:

State	Location	Coordinates
	80 km radius of operation centered on:	
CA	China Lake	35°41′ N, 117°41′ W.
CA	Pacific Missile Test Range/Point Mugu	34°07′ N, 119°30′ W.
FL	Eglin AFB	30°29′ N, 086°31′ W.
MD	Patuxent River	38°17′ N, 076°25′ W.
NM	White Sands Missile Range	33°00′ N, 106°30′ W.
NV	Nellis AFB	36°14′ N, 115°02′ W.
UT	Hill AFB	41°07′ N, 111°58′ W.
	50 km radius of operation centered on:	
AL	Fort Rucker	31°13′ N, 085°49′ W.
CA	Fort Irwin	35°16′ N, 116°41′ W.
GA	Fort Benning	32°22′ N, 084°56′ W.
GA	Fort Stewart	31°52′ N, 081°37′ W.
KY	Fort Campbell	36°41′ N, 087°28′ W.
NC	Fort Bragg	35°09′ N, 079°01′ W.
WA	Fort Lewis	47°05′ N, 122°36′ W.

(c) In the sub-band 1710–1720 MHz, precision guided munitions shall operate on a primary basis until inventory is exhausted or until December 31, 2008, whichever is earlier.

(d) All other Federal stations in the fixed and mobile services shall operate on a primary basis until reaccommodated in accordance with the Commercial Spectrum Enhancement Act.

US379 In the band 55.78–56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to −28.5 dB(W/MHz).

US380 In the bands 1525–1544 MHz, 1545–1559 MHz, 1610–1645.5 MHz, 1646.5–1660.5 MHz, and 2483.5–2500 MHz, a non-Federal licensee in the mobile-satellite service (MSS) may also operate an ancillary terrestrial component in conjunction with its MSS network, subject

to the Commission's rules for ancillary terrestrial component and subject to all applicable conditions and provisions of its MSS authorization.

US382 In the band 39.5–40 GHz, Federal earth stations in the mobile-satellite service (space-to-Earth) shall not claim protection from non-Federal stations in the fixed and mobile services. ITU Radio Regulation No. 5.43A does not apply.

US384 In the band 401–403 MHz, the non-Federal Earth exploration-satellite (Earth-to-space) and meteorological-satellite (Earth-to-space) services are limited to earth stations transmitting to Federal space stations.

US385 Radio astronomy observations may be made in the bands 1350–1400 MHz, 1718.8–1722.2 MHz, and 4950–4990 MHz on an unprotected basis, and in the band 2655–2690 MHz on a secondary basis, at the following radio astronomy observatories:

Allen Telescope Array, Hat Creek, CA	Rectangle between latitudes 40°00′ N and 42°00′ N and between longitudes 120°15′ W and 122°15′ W.	
NASA Goldstone Deep Space Communications Complex, Goldstone, CA.	80 kilometers (50 mile) radius centered on 35°20′ N, 116°53′ W.	
National Astronomy and Ionosphere Center, Arecibo, PR.	Rectangle between latitudes 17°30′ N and 19°00′ N and between longitudes 65°10′ W and 68°00′ W.	
National Radio Astronomy Observatory, Socorro, NM.	Rectangle between latitudes 32°30′ N and 35°30′ N and between longitudes 106°00′ W and 109°00′ W.	
National Radio Astronomy Observatory, Green Bank, WV.	Rectangle between latitudes 37°30′ N and 39°15′ N and between longitudes 78°30′ W and 80°30′ W.	
National Radio Astronomy Observatory, Very Long Baseline Array Stations.	80 kilometer radius centered on:	
	North latitude	West longitude
Brewster, WA	48°08′	119°41′
Fort Davis, TX	30°38′	103°57′
Hancock, NH	42°56′	71°59′
Kitt Peak, AZ	31°57′	111°37′
Los Alamos, NM	35°47′	106°15′
Mauna Kea, HI	19°48′	155°27′
North Liberty, IA	41°46′	91°34′
Owens Valley, CA	37°14′	118°17′
Pie Town, NM	34°18′	108°07′
Saint Croix, VI	17°45′	64°35′
Owens Valley Radio Observatory, Big Pine, CA	Two contiguous rectangles, one between latitudes 36°00′ N and 37°00′ N and between longitudes 117°40′ W and 118°30′ W and the second between latitudes 37°00′ N and 38°00′ N and between longitudes 118°00′ W and 118°50′ W.	

(a) In the bands 1350–1400 MHz and 4950–4990 MHz, every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed and mobile services that could interfere with radio astronomy observations within the geographic areas given above. In addition, every practicable effort

will be made to avoid assignment of frequencies in these bands to stations in the aeronautical mobile service which operate outside of those geographic areas, but which may cause harmful interference to the listed observatories. Should such assignments result in harmful interference to these observatories, the situation will be remedied to the extent practicable.

(b) In the band 2655–2690 MHz, for radio astronomy observations performed at the locations listed above, licensees are urged to coordinate their systems through the National Science Foundation, Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: *esm@nsf.gov*.

US390 Federal stations in the space research service (active) operating in the band 5350–5460 MHz shall not cause harmful interference to, nor claim protection from, Federal and non-Federal stations in the aeronautical radionavigation service nor Federal stations in the radiolocation service.

US391 In the band 2495–2500 MHz, the mobile-satellite service (space-to-Earth) shall not receive protection from non-Federal stations in the fixed and mobile except aeronautical mobile services operating in that band.

US397 In the band 432–438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis for Federal use. Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of the United States except for the purpose of short duration pre-operational testing. Operations under this allocation shall not cause harmful interference to, nor claim protection from, any other services allocated in the band 432–438 MHz in the United States, including secondary services and the amateur-satellite service.

US402 In the band 17.3–17.7 GHz, existing Federal satellites and associated earth stations in the fixed-satellite service (Earth-to-space) are authorized to operate on a primary basis in the frequency bands and areas listed below. Receiving earth stations in the broadcasting-satellite service within the bands and areas listed below shall not claim protection from Federal earth stations in the fixed-satellite service.

(a) 17.600–17.700 GHz for stations within a 120 km radius of 38°49′ N latitude and 76°52′ W longitude.

(b) 17.375–17.475 GHz for stations within a 160 km radius of 39°42′ N latitude and 104°45′ W longitude.

US433 In the band 3550–3650 MHz, the following provisions shall apply to Federal use of the aeronautical radionavigation (ground-based) and radiolocation services and to non-Federal use of the fixed and mobile except aeronautical mobile services:

(a) Non-Federal stations in the fixed and mobile except aeronautical mobile services are restricted to stations in the Citizens Broadband Radio Service and shall not cause harmful interference to, or claim protection from, Federal stations in the aeronautical radionavigation (ground-based) and radiolocation services at the locations listed at: *ntia.doc.gov/category/3550-3650-mhz*. New and modified federal stations shall be allowed at current or new locations, subject only to approval through the National Telecommunications and Information Administration frequency assignment process with new locations added to the list at: *ntia.doc.gov/category/3550-3650-mhz*. Coordination of the Federal stations with Citizens Broadband Radio Service licensees or users is not necessary. Federal operations, other than airborne radiolocation systems, shall be protected consistent with the procedures set forth in 47 CFR 96.15 and 96.67.

(b) Non-federal fixed and mobile stations shall not claim protection from federal airborne radar systems.

(c) Federal airborne radar systems shall not claim protection from non-Federal stations in the fixed and mobile except aeronautical mobile services operating in the band.

US444 The frequency band 5030–5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5030–5091 MHz, the requirements of this system shall have priority over other uses of this band. For the use of the frequency band 5091–5150 MHz, US444A and Resolution 114 (Rev.WRC–12) of the ITU *Radio Regulations* apply.

US444A The band 5091–5150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis for non-Federal use. This allocation is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A of the ITU *Radio Regulations*. In the band 5091–5150 MHz, the following conditions also apply:

(a) Prior to January 1, 2018, the use of the band 5091–5150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC–12);

(b) After January 1, 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems; and

(c) After January 1, 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

US444B In the band 5091–5150 MHz, the following provisions shall apply to the aeronautical mobile service:

(a) Use is restricted to:

(1) Systems operating in the aeronautical mobile (R) service (AM(R)S) in accordance with international aeronautical standards, limited to surface applications at airports,

and in accordance with Resolution 748 (Rev. WRC–12) (*i.e.*, AeroMACS); and

(2) Aeronautical telemetry transmissions from aircraft stations (AMT) in accordance with Resolution 418 (Rev. WRC–12).

(b) Consistent with Radio Regulation No. 4.10, airport surface wireless systems operating in the AM(R)S have priority over AMT systems in the band.

(c) Operators of AM(R)S and AMT systems at the following airports are urged to cooperate with each other in the exchange of information about planned deployments of their respective systems so that the prospects for compatible sharing of the band are enhanced:

(1) Boeing Field/King County Intl Airport, Seattle, WA;

(2) Lambert-St. Louis Intl Airport, St. Louis, MO;

(3) Charleston AFB/Intl Airport, Charleston, SC;

(4) Wichita Dwight D. Eisenhower National Airport, Wichita, KS;

(5) Roswell Intl Air Center Airport, Roswell, NM; and

(6) William P. Gwinn Airport, Jupiter, FL. Other airports may be addressed on a case-by-case basis.

(d) Aeronautical fixed communications that are an integral part of the AeroMACS system authorized in paragraph (a)(1) are also authorized on a primary basis.

US475 The use of the band 9300–9500 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9300–9320 MHz on the condition that harmful interference is not caused to the maritime radionavigation service.

US476A In the band 9300–9500 MHz, Federal stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and Federal radiolocation services.

US482 In the band 10.6–10.68 GHz, the following provisions and urgings apply:

(a) Non-Federal use of the fixed service shall be restricted to point-to-point stations, with each station supplying not more than −3 dBW of transmitter power to the antenna, producing not more than 40 dBW of EIRP, and radiating at an antenna main beam elevation angle of 20° or less. Licensees holding a valid authorization on August 6, 2015 to operate in this band may continue to operate as authorized, subject to proper license renewal.

(b) In order to minimize interference to the Earth exploration-satellite service (passive) receiving in this band, licensees of stations in the fixed service are urged to:

(1) Limit the maximum transmitter power supplied to the antenna to −15 dBW; and

(2) Employ automatic transmitter power control (ATPC).

The maximum transmitter power supplied to the antenna of stations using ATPC may be increased by a value corresponding to the ATPC range, up to a maximum of −3 dBW.

US511E The use of the band 15.4–15.7 GHz by the radiolocation service is limited to Federal systems requiring a necessary bandwidth greater than 1600 MHz that cannot be accommodated within the band 15.7–17.3 GHz except as described below. In the band 15.4–15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the aeronautical radionavigation service. Radar systems operating in the radiolocation service shall not be developed solely for operation in the band 15.4–15.7 GHz. Radar systems requiring use of the band 15.4–15.7 GHz for testing, training, and exercises may be accommodated on a case-by-case basis.

US519 The band 18–18.3 GHz is also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Its use is limited to geostationary satellites and shall be in accordance with the provisions of Article 21, Table 21–4 of the ITU *Radio Regulations*.

US532 In the bands 21.2–21.4 GHz, 22.21–22.5 GHz, and 56.26–58.2 GHz, the space research and Earth exploration-satellite services shall not receive protection from the fixed and mobile services operating in accordance with the Table of Frequency Allocations.

US550A In the band 36–37 GHz, the following provisions shall apply:

(a) For stations in the mobile service, the transmitter power supplied to the antenna shall not exceed −10 dBW, except that the maximum transmitter power may be increased to −3 dBW for stations used for public safety and disaster management.

(b) For stations in the fixed service, the elevation angle of the antenna main beam shall not exceed 20° and the transmitter power supplied to the antenna shall not exceed:

(1) −5 dBW for hub stations of point-to-multipoint systems; or

(2) −10 dBW for all other stations, except that the maximum transmitter power of stations using automatic transmitter power control (ATPC) may be increased by a value corresponding to the ATPC range, up to a maximum of −7 dBW.

US565 The following frequency bands in the range 275–1000 GHz are identified for passive service applications:

—Radio astronomy service: 275–323 GHz, 327–371 GHz, 388–424 GHz, 426–442 GHz, 453–510 GHz, 623–711 GHz, 795–909 GHz and 926–945 GHz;

—Earth exploration-satellite service (passive) and space research service (passive): 275–286 GHz, 296–306 GHz, 313–356 GHz, 361–

365 GHz, 369–392 GHz, 397–399 GHz, 409–411 GHz, 416–434 GHz, 439–467 GHz, 477–502 GHz, 523–527 GHz, 538–581 GHz, 611–630 GHz, 634–654 GHz, 657–692 GHz, 713–718 GHz, 729–733 GHz, 750–754 GHz, 771–776 GHz, 823–846 GHz, 850–854 GHz, 857–862 GHz, 866–882 GHz, 905–928 GHz, 951–956 GHz, 968–973 GHz and 985–990 GHz.

The use of the range 275–1000 GHz by the passive services does not preclude use of this range by active services. This provision does not establish priority of use in the United States Table of Frequency Allocations, and does not preclude or constrain any active service use or future allocation of frequency bands in the 275–3000 GHz range.

NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

(These footnotes, each consisting of the letters ''NG'' followed by one or more digits, denote stipulations applicable only to non-Federal operations and thus appear solely in the non-Federal Table.)

NG1 The band 535–1705 kHz is also allocated to the mobile service on a secondary basis for the distribution of public service information from Travelers Information Stations operating in accordance with the provisions of 47 CFR 90.242 on 10 kilohertz spaced channels from 540 kHz to 1700 kHz.

NG2 Facsimile broadcasting stations may be authorized in the band 88–108 MHz.

NG3 Control stations in the domestic public mobile radio service may be authorized frequencies in the band 72–73 and 75.4–76 MHz on the condition that harmful interference will not be caused to operational fixed stations.

NG4 The use of the frequencies in the band 152.84–153.38 MHz may be authorized, in any area, to remote pickup broadcast base and mobile stations on the condition that harmful interference will not be caused to stations operating in accordance with the Table of Frequency Allocations.

NG5 In the band 535–1705 kHz, AM broadcast licensees and permittees may use their AM carrier on a secondary basis to transmit signals intended for both broadcast and non-broadcast purposes. In the band 88–108 MHz, FM broadcast licensees and permittees are permitted to use subcarriers on a secondary basis to transmit signals intended for both broadcast and non-broadcast purposes. In the bands 54–72, 76–88, 174–216, 470–608, and 614–698 MHz, TV broadcast licensees and permittees are permitted to use subcarriers on a secondary basis for both broadcast and non-broadcast purposes. Use of the band 614–698 MHz is subject to the provisions specified in NG33.

NG6 Stations in the public safety radio services authorized as of June 30, 1958, to use frequencies in the band 159.51–161.79 MHz in areas other than Puerto Rico and the Virgin Islands may continue such operation, including expansion of existing systems, on the condition that harmful interference will not be caused to stations in the services to which these bands are allocated. In Puerto Rico and the Virgin Islands this authority is limited to frequencies in the band 160.05–161.37 MHz. No new public radio service system will be authorized to operate on these frequencies.

NG7 In the bands 2000–2065, 2107–2170, and 2194–2495 kHz, fixed stations associated with the maritime mobile service may be authorized, for purposes of communication with coast stations, to use frequencies assignable to ship stations in these bands on the condition that harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations. *See* 47 CFR 80.371(a) for the list of available carrier frequencies.

NG8 In the band 472–479 kHz, non-Federal stations in the maritime mobile service that were licensed or applied for prior to July 14, 2017 may continue to operate on a primary basis, subject to periodic license renewals.

NG14 TV broadcast stations authorized to operate in the bands 54–72, 76–88, 174–216, 470–608, and 614–698 MHz may use a portion of the television vertical blanking interval for the transmission of telecommunications signals, on the condition that harmful interference will not be caused to the reception of primary services, and that such telecommunications services must accept any interference caused by primary services operating in these bands. Use of the band 614–698 MHz is subject to the provisions specified in NG33.

NG16 In the bands 72–73 MHz and 75.4–76 MHz, frequencies may be authorized for mobile operations in the Industrial/Business Radio Pool, subject to not causing interference to the reception of broadcast television signals on channels 4 and 5.

NG17 Stations in the land transportation radio services authorized as of May 15, 1958 to operate on the frequency 161.61 MHz may, upon proper application, continue to be authorized for such operation, including expansion of existing systems, on the condition that harmful interference will not be caused to the operation of any authorized station in the maritime mobile service. No new land transportation radio service system will be authorized to operate on 161.61 MHz.

NG22 The frequencies 156.050 and 156.175 MHz may be assigned to stations in the maritime mobile service for commercial and port operations in the New Orleans Vessel Traffic Service (VTS) area and the frequency 156.250 MHz may be assigned to stations in the maritime mobile service for port operations in the New Orleans and Houston VTS areas.

NG28 In Puerto Rico and the United States Virgin Islands, the band 160.86–161.4 MHz is available for assignment to remote pickup broadcast stations on a shared basis

with stations in the Industrial/Business Pool.

NG30 In Puerto Rico, the band 942–944 MHz is alternatively allocated to the fixed service (aural broadcast auxiliary stations).

NG32 Frequencies in the bands 454.6625–454.9875 MHz and 459.6625–459.9875 MHz may be assigned to domestic public land and mobile stations to provide a two-way air-ground public radiotelephone service.

NG33 In the band 614–698 MHz, the following provisions shall apply:

(a) Until July 13, 2020, stations in the broadcasting service and other authorized uses may operate as follows:

(1) Full power and Class A television (TV) stations, *i.e.*, broadcast TV stations, may operate on a co-equal, primary basis with stations in the fixed and mobile services until such stations terminate operations on their pre-auction television channels in accordance with § 73.3700(b)(4).

(2) Low power TV (LPTV) and TV translator stations may operate on a secondary basis to stations in the fixed and mobile services and to broadcast TV stations, and fixed TV broadcast auxiliary stations may operate on a secondary basis to LPTV and TV translator stations, unless such stations are required to terminate their operations earlier in accordance with § 73.3700(g)(4) or § 74.602(h)(5)–(6).

(3) Low power auxiliary stations (LPAS), including wireless assist video devices (WAVDs), may operate on a secondary basis to all other authorized stations in accordance with § 74.802(f) and § 74.870(i).

(4) Unlicensed wireless microphones and white space devices (WSDs) may operate on a non-interference basis, unless such devices are required to terminate operations earlier in accordance with § 15.236(c)(2) or § 15.707(a)(1)–(2), (5), respectively.

(b) After July 13, 2020, only the following types of radiofrequency devices that are authorized in paragraph (a) may continue to operate:

(1) LPTV and TV translator stations may operate on a secondary basis to stations in the fixed and mobile services in the sub-bands 617–652 MHz and 663–698 MHz until required to terminate their operations in accordance with § 73.3700(g)(4).

(2) LPAS may operate in the sub-band 653–657 MHz and unlicensed wireless microphones may operate in the sub-bands 614–616 MHz and 657–663 MHz.

(3) WSDs may operate in: (i) The sub-bands 617–652 MHz and 663–698 MHz, except in those areas where their use is prohibited in accordance with §§ 15.707(a)(5) and 15.713(b)(2)(iv), and (ii) the sub-band 657–663 MHz, in accordance with § 15.707(a)(4).

NG34 The bands 758–775 MHz and 788–805 MHz are available for assignment to the public safety services, as described in 47 CFR part 90.

NG35 Frequencies in the bands 928–929 MHz, 932–932.5 MHz, 941–941.5 MHz, and 952–960 MHz may be assigned for multiple address systems and associated mobile operations on a primary basis.

NG41 In the band 2120–2180 MHz, the following provisions shall apply to grandfathered stations in the fixed service:

(a) In the sub-band 2160–2162 MHz, authorizations in the Broadband Radio Service (BRS) applied for after January 16, 1992 shall be granted on a secondary basis to Advanced Wireless Services (AWS). In the band 2150–2162 MHz, all other BRS stations shall operate on a primary basis until December 9, 2021, and may continue to operate on a secondary basis thereafter, unless said facility is relocated in accordance with 47 CFR 27.1250 through 27.1255.

(b) In the sub-band 2160–2180 MHz, fixed stations authorized pursuant to 47 CFR part 101 may continue to operate on a secondary basis to AWS.

NG50 In the band 10–10.5 GHz, non-Federal stations in the radiolocation service shall not cause harmful interference to the amateur service; and in the sub-band 10.45–10.5 GHz, these stations shall not cause harmful interference to the amateur-satellite service.

NG51 In Puerto Rico and the United States Virgin Islands, the use of band 150.8–151.49 MHz by the fixed and land mobile services is limited to stations in the Industrial/Business Pool.

NG52 Except as provided for by NG527A, use of the bands 10.7–11.7 GHz (space-to-Earth) and 12.75–13.25 GHz (Earth-to-space) by geostationary satellites in the fixed-satellite service shall be limited to international systems, *i.e.*, other than domestic systems.

NG53 In the band 13.15–13.25 GHz, the following provisions shall apply:

(a) The sub-band 13.15–13.2 GHz is reserved for television pickup (TVPU) and cable television relay service (CARS) pickup stations inside a 50 km radius of the 100 television markets delineated in 47 CFR 76.51; and outside these areas, TVPU stations, CARS stations and non-geostationary satellite orbit fixed-satellite service (NGSO FSS) gateway earth stations shall operate on a co-primary basis.

(b) The sub-band 13.2–13.2125 GHz is reserved for TVPU stations on a primary basis and for CARS pickup stations on a secondary basis inside a 50 km radius of the 100 television markets delineated in 47 CFR 76.51; and outside these areas, TVPU stations and NGSO FSS gateway earth stations shall operate on a co-primary basis and CARS stations shall operate on a secondary basis.

(c) In the band 13.15–13.25 GHz, fixed television auxiliary stations licensed pursuant to applications accepted for filing before September 1, 1979, may continue operation, subject to periodic license renewals.

(d) In the sub-band 13.15–13.2125 GHz, NGSO FSS gateway uplink transmissions shall be limited to a maximum e.i.r.p. of 3.2 dBW towards 0° on the radio horizon.

NOTE: The above provisions shall not apply to geostationary satellite orbit (GSO) FSS operations in the band 12.75–13.25 GHz.

NG56 In the bands 72–73 and 75.4–76 MHz, the use of mobile radio remote control of models is on a secondary basis to all other fixed and mobile operations. Such operations are subject to the condition that interference will not be caused to common carrier domestic public stations, to remote control of industrial equipment operating in the band 72–76 MHz, or to the reception of television signals on channels 4 (66–72 MHz) or 5 (76–82 MHz). Television interference shall be considered to occur whenever reception of regularly used television signals is impaired or destroyed, regardless of the strength of the television signal or the distance to the television station.

NG57 The use of the band 12.75–13.25 GHz by non-geostationary-satellite systems in the fixed-satellite service is limited to communications with individually licensed earth stations.

NG59 The frequencies 37.60 and 37.85 MHz may be authorized only for use by base, mobile, and operational fixed stations participating in an interconnected or coordinated power service utility system.

NG60 In the band 31–31.3 GHz, for stations in the fixed service authorized after August 6, 2018, the unwanted emissions power in any 100 MHz of the 31.3–31.5 GHz Earth exploration-satellite service (passive) band shall be limited to −38 dBW (−38 dBW/100 MHz), as measured at the input to the antenna.

NG62 In the bands 28.5–29.1 GHz and 29.25–29.5 GHz, stations in the fixed-satellite service shall not cause harmful interference to, or claim protection from, stations in the fixed service operating under the following call signs: KEB35, KGB72, KGC79, KIL20, KME49, KQG58, KQH74, KSA96, KSE73, KVH83, KYJ33, KZS88, WAX78, WLT380, WMK817, WML443, WMP367, and WSL69.

NG63 In the band 37.5–40 GHz, earth station operations in the fixed-satellite service (space-to-Earth) shall not claim protection from stations in the fixed and mobile services, except where individually licensed earth stations are authorized pursuant to 47 CFR 25.136.

NG65 In the bands 24.75–25.25 GHz, 47.2–48.2 GHz, and 50.4–51.4 GHz, stations in the fixed and mobile services may not claim protection from individually licensed earth stations authorized pursuant to 47 CFR 25.136. However, nothing in this footnote shall limit the right of Upper Microwave Flexible Use Service licensees to operate in conformance with the technical rules contained in 47 CFR part 30. The Commission reserves the right to monitor developments and to undertake further action concerning interference between Upper Microwave Flexible Use Service and Fixed-Satellite Service, including aggregate interference to satellite receivers, if appropriate.

NG66 The band 470–512 MHz (TV channels 14–20) is allocated to the broadcasting service on an exclusive basis throughout the United States and its insular areas, except as described below:

(a) In the urbanized areas listed in the table below, the indicated frequency bands are allocated to the land mobile service on an exclusive basis for assignment to eligibles in the Public Mobile Services, the Public Safety Radio Pool, and the Industrial/Business Radio Pool, except that:

(1) Licensees in the land mobile service that are regulated as Commercial Mobile Radio Service (CMRS) providers may also use their assigned spectrum to provide fixed service on a primary basis.

(2) The use of the band 482–488 MHz (TV channel 16) is limited to eligibles in the Public Safety Radio Pool in or near (i) the Los Angeles urbanized area; and (ii) New York City; Nassau, Suffolk, and Westchester Counties in New York State; and Bergen County, NJ.

Urbanized area	Bands (MHz)	TV channels
Boston, MA	470–476, 482–488	14, 16
Chicago, IL-Northwestern IN	470–476, 476–482	14, 15
Cleveland, OH	470–476, 476–482	14, 15
Dallas-Fort Worth, TX	482–488	16
Detroit, MI	476–482, 482–488	15, 16
Houston, TX	488–494	17
Los Angeles, CA	470–476, 482–488, 506–512	14, 16, 20
Miami, FL	470–476	14
New York, NY-Northeastern NJ	470–476, 476–482, 482–488	14, 15, 16
Philadelphia, PA-NJ	500–506, 506–512	19, 20
Pittsburgh, PA	470–476, 494–500	14, 18
San Francisco-Oakland, CA	482–488, 488–494	16, 17
Washington, DC-MD-VA	488–494, 494–500	17, 18

(b) In the Gulf of Mexico offshore from the Louisiana-Texas coast, the band 476–494 MHz (TV channels 15–17) is allocated to the fixed and mobile services on a primary basis for assignment to eligibles in the Public Mobile and Private Land Mobile Radio Services.

(c) In Hawaii, the band 488–494 MHz (TV channel 17) is allocated exclusively to the fixed service for use by common carrier control and repeater stations for point-to-point inter-island communications only.

(d) The use of these allocations is further subject to the conditions set forth in 47 CFR parts 22 and 90.

NG70 In Puerto Rico and the Virgin Islands only, the bands 159.240–159.435 and 160.410–160.620 MHz are also available for assignment to base stations and mobile stations in the special industrial radio service.

NG92 The band 1900–2000 kHz is also allocated on a primary basis to the maritime mobile service in Regions 2 and 3 and to the radiolocation service in Region 2, and on a secondary basis to the radiolocation service in Region 3. The use of these allocations is restricted to radio buoy operations on the open sea and the Great Lakes. Stations in the amateur, maritime mobile, and radiolocation services in Region 2 shall be protected from harmful interference only to the extent that the offending station does not operate in compliance with the technical rules applicable to the service in which it operates.

NG111 The band 157.4375–157.4625 MHz may be used for one way paging operations in the special emergency radio service.

NG112 The frequencies 25.04, 25.08, 150.980, 154.585, 158.445, 159.480, 454.000 and 459.000 MHz may be authorized to stations in the Industrial/Business Pool for use primarily in oil spill containment and cleanup operations and secondarily in regular land mobile communication.

NG115 In the bands 54–72 MHz, 76–88 MHz, 174–216 MHz, 470–608 MHz, and 614–698 MHz, wireless microphones and wireless assist video devices may be authorized on a non-interference basis, subject to the terms and conditions set forth in 47 CFR part 74, subpart H.

NG118 In the bands 2025–2110 MHz, 6875–7125 MHz, and 12.7–13.25 GHz, television translator relay stations may be authorized to use frequencies on a secondary basis to other stations in the Television Broadcast Auxiliary Service that are operating in accordance with the Table of Frequency Allocations.

NG124 In the bands 30.85–34, 37–38, 39–40, 42–47.41, 150.995–156.25, 158.715–159.465, 453.0125–453.9875, 458.0125–458.9875, 460.0125–465.6375, and 467.9375–467.9875 MHz, police licensees are authorized to operate low-power transmitters on a secondary basis in accordance with the provisions of 47 CFR 2.803 and 90.20(e)(5).

NG141 In Alaska, the frequencies 42.4 MHz and 44.1 MHz are authorized on a primary basis for meteor burst communications by fixed stations in the Rural Radio Service operating under the provisions of 47 CFR part 22. In Alaska, the frequencies 44.2 MHz and 45.9 MHz are authorized on a primary basis for meteor burst communications by fixed private radio stations operating under the provisions of 47 CFR part 90. The private radio station frequencies may be used by Common Carrier stations on a secondary, noninterference basis and the Common Carrier frequencies may be used by private radio stations for meteor burst communications on a secondary, noninterference basis. Users shall cooperate to the extent practical to minimize potential interference. Stations utilizing meteor burst communications shall not cause harmful interference to stations of other radio services operating in accordance with the Table of Frequency Allocations.

NG143 In the band 11.7–12.2 GHz, protection from harmful interference shall be afforded to transmissions from space stations not in conformance with ITU Radio Regulation No. 5.488 only if the operations of such space stations impose no unacceptable constraints on operations or orbit locations of space stations in conformance with No. 5.488.

NG147 In the band 2483.5–2500 MHz, non-Federal stations in the fixed and mobile services that are licensed under 47 CFR parts 74, 90, or 101, which were licensed as of July 25, 1985, and those whose initial applications were filed on or before July 25, 1985, may continue to operate on a primary basis with the mobile-satellite and radiodetermination-satellite services, and in the sub-band 2495–2500 MHz, these grandfathered stations may also continue to operate on a primary basis with stations in the fixed and mobile except aeronautical mobile services that are licensed under 47 CFR part 27.

NG148 The frequencies 154.585 MHz, 159.480 MHz, 160.725 MHz, 160.785 MHz, 454.000 MHz and 459.000 MHz may be authorized to maritime mobile stations for offshore radiolocation and associated telecommand operations.

NG149 The bands 54–72, 76–88, 174–216, 470–608, and 614–698 MHz are also allocated to the fixed service to permit subscription television operations in accordance with 47 CFR part 73. Use of the band 614–698 MHz is subject to the provisions specified in NG33.

NG152 The use of the band 219–220 MHz by the amateur service is limited to stations participating, as forwarding stations, in point-to-point fixed digital message forwarding systems, including intercity packet backbone networks.

NG155 The bands 159.500–159.675 MHz and 161.375–161.550 MHz are allocated to the maritime service as described in 47 CFR part 80. Additionally, the frequencies 159.550, 159.575

and 159.600 MHz are available for low-power intership communications.

NG159 In the band 698–806 MHz, stations authorized under 47 CFR part 74, subparts F and G may continue to operate indefinitely on a secondary basis to all other stations operating in that band.

NG160 In the band 5850–5925 MHz, the use of the non-Federal mobile service is limited to Dedicated Short Range Communications operating in the Intelligent Transportation System radio service.

NG163 The use of the band 17.3–17.7 GHz by the broadcasting-satellite service is limited to geostationary satellites.

NG164 The use of the band 18.6–18.8 GHz by the fixed-satellite service is limited to geostationary-satellite networks.

NG165 In the bands 18.8–19.3 GHz and 28.6–29.1 GHz, geostationary-satellite networks in the fixed-satellite service shall not cause harmful interference to, or claim protection from, non-geostationary-satellite systems in the fixed-satellite service.

NG166 The use of the bands 19.4–19.6 GHz and 29.1–29.25 GHz by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service.

NG169 After December 1, 2000, operations on a primary basis by the fixed-satellite service (space-to-Earth) in the band 3650–3700 MHz shall be limited to grandfathered earth stations. All other fixed-satellite service earth station operations in the band 3650–3700 MHz shall be on a secondary basis. Grandfathered earth stations are those authorized prior to December 1, 2000, or granted as a result of an application filed prior to December 1, 2000, and constructed within 12 months of initial authorization. License applications for primary operations for new earth stations, major amendments to pending earth station applications, or applications for major modifications to earth station facilities filed on or after December 18, 1998, and prior to December 1, 2000, shall not be accepted unless the proposed facilities are within 16.1 kilometers (10 miles) of an authorized primary earth station operating in the band 3650–3700 MHz. License applications for primary operations by new earth stations, major amendments to pending earth station applications, and applications for major modifications to earth station facilities, filed after December 1, 2000, shall not be accepted, except for changes in polarization, antenna orientation or ownership of a grandfathered earth station.

NG171 In the band 6875–7125 MHz, the following two channels should be used for airborne TV pickup stations, wherever possible: 7075–7100 MHz and 7100–7125 MHz.

NG172 In the band 7025–7075 MHz, the fixed-satellite service (space-to-Earth) is allocated on a primary basis, but the use of this allocation shall be limited to two grandfathered satellite systems. Associated earth stations located within 300 meters of the following locations shall be grandfathered: (a) In the band 7025–7075 MHz, Brewster, WA (48°08′46.7″ N., 119°42′8.0″ W.); and (b) In the sub-band 7025–7055 MHz, Clifton, TX (31°47′58.5″ N., 97°36′46.7″ W.) and Finca Pascual, PR (17°58′41.8″ N., 67°8′12.6″ W.).

NG173 In the band 216–220 MHz, secondary telemetry operations are permitted subject to the requirements of 47 CFR 90.259. After January 1, 2002, no new assignments shall be authorized in the sub-band 216–217 MHz.

NG175 In the band 38.6–40 GHz, television pickup stations that were authorized on or before April 16, 2003, may continue to operate on a secondary basis to stations operating in accordance with the Table of Frequency Allocations.

NG182 In the band 3700–4200 MHz, the following provisions shall apply:

(a) Except as provided in paragraph (c)(1) of this footnote, any currently authorized space stations serving the contiguous United States may continue to operate on a primary basis, but no applications for new space station authorizations or new petitions for market access shall be accepted for filing after June 21, 2018, other than applications by existing operators in the band seeking to make more efficient use of the band 4000–4200 MHz. Applications for extension, cancellation, replacement, or modification of existing space station authorizations in the band will continue to be accepted and processed normally.

(b) In areas outside the contiguous United States, the band 3700–4000 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis.

(c) In the contiguous United States, *i.e.*, the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline (*see* § 27.6(m) of this chapter), the following provisions apply:

(1) Incumbent use of the fixed-satellite service (space-to-Earth) in the band 3700–4000 MHz is subject to the provisions of §§ 25.138, 25.147, 25.203(n) and part 27, subpart O, of this chapter;

(2) Fixed service licensees authorized as of April 19, 2018, pursuant to part 101 of this chapter, must self-relocate their point-to-point links out of the band 3700–4200 MHz by December 5, 2023;

(3) In the band 3980–4000 MHz, no new fixed or mobile operations will be permitted until specified by Commission rule, order, or notice.

NG185 In the band 3650–3700 MHz, the use of the non-Federal fixed-satellite service (space-to-Earth) is limited to international inter-continental systems.

NG338A In the bands 1390–1395 MHz and 1427–1435 MHz, licensees are encouraged to

take all reasonable steps to ensure that unwanted emissions power does not exceed the following levels in the band 1400–1427 MHz:

(a) For stations of point-to-point systems in the fixed service: −45 dBW/27 MHz.

(b) For stations in the mobile service (except for devices authorized by the FCC for the Wireless Medical Telemetry Service): −60 dBW/27 MHz.

NG457A Earth stations on vessels (ESVs), as regulated under 47 CFR part 25, are an application of the fixed-satellite service and the following provisions shall apply:

(a) In the band 3700–4200 MHz, ESVs may be authorized to receive FSS signals from geostationary satellites. ESVs in motion are subject to the condition that these earth stations may not claim protection from transmissions of non-Federal stations in the fixed and mobile except aeronautical mobile services. While docked, ESVs receiving in the band 4000–4200 MHz may be coordinated for up to 180 days, renewable. NG182 applies to incumbent licensees that provide service to ESVs in the band 3700–4000 MHz.

(b) In the band 5925–6425 MHz, ESVs may be authorized to transmit to geostationary satellites on a primary basis.

NG527A Earth Stations in Motion (ESIMs), as regulated under 47 CFR part 25, are an application of the fixed-satellite service (FSS) and the following provisions shall apply:

(a) In the bands 10.7–11.7 GHz, 19.3–19.4 GHz, and 19.6–19.7 GHz (space-to-Earth), ESIMs may be authorized for the reception of FSS emissions from geostationary and non-geostationary satellites, subject to the conditions that these earth stations may not claim protection from transmissions of non-Federal stations in the fixed service and that non-geostationary-satellite systems not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

(b) In the bands 11.7–12.2 GHz (space-to-Earth), 14.0–14.5 GHz (Earth-to-space), 18.3–18.8 GHz (space-to-Earth), 19.7–20.2 GHz (space-to-Earth), 28.35–28.6 GHz (Earth-to-space), and 29.25–30.0 GHz (Earth-to-space), ESIMs may be authorized to communicate with geostationary satellites on a primary basis.

(c) In the bands 11.7–12.2 GHz (space-to-Earth), 14.0–14.5 GHz (Earth-to-space), 18.3–18.6 GHz (space-to-Earth), 19.7–20.2 GHz (space-to-Earth), 28.4–28.6 GHz (Earth-to-space), and 29.5–30.0 GHz (Earth-to-space), ESIMs may be authorized to communicate with non-geostationary satellites, subject to the condition that non-geostationary-satellite systems may not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

(d) In the band 17.8–18.3 GHz (space-to-Earth), ESIMs may be authorized for the reception of FSS emissions from geostationary and non-geostationary satellites on a secondary basis, subject to the condition that non-geostationary-satellite systems not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

(e) In the bands 18.8–19.3 GHz and 28.6–29.1 GHz, ESIMs may be authorized to communicate with geostationary and non-geostationary satellites, subject to the condition that geostationary-satellite networks may not cause unacceptable interference to, or claim protection from, non-geostationary satellite systems in the fixed-satellite service.

NG535A The use of the band 29.25–29.5 GHz by the fixed-satellite service is limited to geostationary-satellite networks and to feeder links for non-geostationary-satellite systems in the mobile-satellite service.

FEDERAL GOVERNMENT (G) FOOTNOTES

(These footnotes, each consisting of the letter ''G'' followed by one or more digits, denote stipulations applicable only to Federal operations and thus appear solely in the Federal Table.)

G2 In the bands 216.965–216.995 MHz, 420–450 MHz (except as provided for in G129), 890–902 MHz, 928–942 MHz, 1300–1390 MHz, 2310–2390 MHz, 2417–2450 MHz, 2700–2900 MHz, 3300–3500 MHz (except as provided for in US108), 5650–5925 MHz, and 9000–9200 MHz, use of the Federal radiolocation service is restricted to the military services.

G5 In the bands 162.0125–173.2, 173.4–174, 406.1–410 and 410–420 MHz, use by the military services is limited by the provisions specified in the channeling plans shown in Sections 4.3.7 and 4.3.9 of the NTIA Manual.

G6 Military tactical fixed and mobile operations may be conducted nationally on a secondary basis: (a) To the meteorological aids service in the band 403–406 MHz; and (b) To the radio astronomy service in the band 406.1–410 MHz. Such fixed and mobile operations are subject to local coordination to ensure that harmful interference will not be caused to the services to which the bands are allocated.

G8 Low power Federal radio control operations are permitted in the band 420–450 MHz.

G11 Federal fixed and mobile radio services, including low power radio control operations, are permitted in the band 902–928 MHz on a secondary basis.

G15 Use of the band 2700–2900 MHz by the military fixed and shipborne air defense radiolocation installations will be fully coordinated with the meteorological aids and aeronautical radionavigation services. The military air defense installations will be moved from the band 2700–2900 MHz at the earliest practicable date. Until such time as military air defense installations can be accommodated satisfactorily elsewhere in the

spectrum, such operations will, insofar as practicable, be adjusted to meet the requirements of the aeronautical radionavigation service.

G19 Use of the band 9000–9200 MHz by military fixed and shipborne air defense radiolocation installations will be fully coordinated with the aeronautical radionavigation service, recognizing fully the safety aspects of the latter. Military air defense installations will be accommodated ultimately outside this band. Until such time as military defense installations can be accommodated satisfactorily elsewhere in the spectrum such operations will, insofar as practicable, be adjusted to meet the requirements of the aeronautical radionavigation services.

G27 In the bands 225–328.6 MHz, 335.4–399.9 MHz, and 1350–1390 MHz, the fixed and mobile services are limited to the military systems.

G30 In the bands 138–144 MHz, 148–149.9 MHz, and 150.05–150.8 MHz, the fixed and mobile services are limited primarily to operations by the military services.

G32 Except for weather radars on meteorological satellites in the band 9975–10025 MHz and for Federal survey operations (see footnote US108), Federal radiolocation in the band 10–10.5 GHz is limited to the military services.

G34 In the band 34.4–34.5 GHz, weather radars on board meteorological satellites for cloud detection are authorized to operate on the basis of equality with military radiolocation devices. All other non-military radiolocation in the band 33.4–36.0 GHz shall be secondary to the military services.

G42 The space operation service (Earth-to-space) is limited to the band 1761–1842 MHz, and is limited to space command, control, range and range rate systems.

G56 Federal radiolocation in the bands 1215–1300, 2900–3100, 5350–5650 and 9300–9500 MHz is primarily for the military services; however, limited secondary use is permitted by other Federal agencies in support of experimentation and research programs. In addition, limited secondary use is permitted for survey operations in the band 2900–3100 MHz.

G59 In the bands 902–928 MHz, 3100–3300 MHz, 3500–3650 MHz, 5250–5350 MHz, 8500–9000 MHz, 9200–9300 MHz, 13.4–14.0 GHz, 15.7–17.7 GHz and 24.05–24.25 GHz, all Federal non-military radiolocation shall be secondary to military radiolocation, except in the sub-band 15.7–16.2 GHz airport surface detection equipment (ASDE) is permitted on a co-equal basis subject to coordination with the military departments.

G100 The bands 235–322 MHz and 335.4–399.9 MHz are also allocated on a primary basis to the mobile-satellite service, limited to military operations.

G104 In the bands 7450–7550 and 8175–8215 MHz, it is agreed that although the military space radio communication systems, which include earth stations near the proposed meteorological-satellite installations will precede the meteorological-satellite installations, engineering adjustments to either the military or the meteorological-satellite systems or both will be made as mutually required to assure compatible operations of the systems concerned.

G109 All assignments in the band 157.0375–157.1875 MHz are subject to adjustment to other frequencies in this band as long term U.S. maritime VHF planning develops, particularly that planning incident to support of the National VHF-FM Radiotelephone Safety and Distress System (See Doc. 15624/1–1.9.111/1.9.125).

G110 Federal ground-based stations in the aeronautical radionavigation service may be authorized between 3500–3650 MHz when accommodation in the band 2700–2900 MHz is not technically and/or economically feasible.

G114 The band 1369.05–1390 MHz is also allocated to the fixed-satellite service (space-to-Earth) and to the mobile-satellite service (space-to-Earth) on a primary basis for the relay of nuclear burst data.

G115 In the band 13360–13410 kHz, the fixed service is allocated on a primary basis outside the conterminous United States. Within the conterminous United States, assignments in the fixed service are permitted, and will be protected for national defense purposes or, if they are to be used only in an emergency jeopardizing life, public safety, or important property under conditions calling for immediate communication where other means of communication do not exist.

G116 The band 7125–7155 MHz is also allocated for earth-to-space transmissions in the Space Operations Service at a limited number of sites (not to exceed two), subject to established coordination procedures.

G117 In the bands 7.25–7.75 GHz, 7.9–8.4 GHz, 17.375–17.475 GHz, 17.6–21.2 GHz, 30–31 GHz, 33–36 GHz, 39.5–41 GHz, 43.5–45.5 GHz, and 50.4–51.4 GHz, the Federal fixed-satellite and mobile-satellite services are limited to military systems.

G120 Development of airborne primary radars in the band 2360–2390 MHz with peak transmitter power in excess of 250 watts for use in the United States is not permitted.

G122 In the bands 2300–2310 MHz, 2395–2400 MHz, 2400–2417 MHz, and 4940–4990 MHz, Federal operations may be authorized on a non-interference basis to authorized non-Federal operations, and shall not constrain the implementation of any non-Federal operations.

G127 Federal Travelers Information Stations (TIS) on 1610 kHz have coprimary status with AM Broadcast assignments. Federal TIS authorized as of August 4, 1994, preclude subsequent assignment for conflicting allotments.

G128 Use of the band 56.9–57 GHz by inter-satellite systems is limited to transmissions between satellites in geostationary orbit, to

transmissions between satellites in geostationary satellite orbit and those in high-Earth orbit, to transmissions from satellites in geostationary satellite orbit to those in low-Earth orbit, and to transmissions from non-geostationary satellites in high-Earth orbit to those in low-Earth orbit. For links between satellites in the geostationary satellite orbit, the single entry power flux-density at all altitudes from 0 km to 1000 km above the Earth's surface, for all conditions and for all methods of modulation, shall not exceed −147 dB (W/m^2/100 MHz) for all angles of arrival.

G129 Federal wind profilers are authorized to operate on a primary basis in the radiolocation service in the frequency band 448–450 MHz with an authorized bandwidth of no more than 2 MHz centered on 449 MHz, subject to the following conditions: (1) wind profiler locations must be pre-coordinated with the military services to protect fixed military radars; and (2) wind profiler operations shall not cause harmful interference to, nor claim protection from, military mobile radiolocation stations that are engaged in critical national defense operations.

G130 Federal stations in the radiolocation service operating in the band 5350–5470 MHz, shall not cause harmful interference to, nor claim protection from, Federal stations in the aeronautical radionavigation service operating in accordance with ITU Radio Regulation No. 5.449.

G131 Federal stations in the radiolocation service operating in the band 5470–5650 MHz, with the exception of ground-based radars used for meteorological purposes operating in the band 5600–5650 MHz, shall not cause harmful interference to, nor claim protection from, Federal stations in the maritime radionavigation service.

G132 Use of the radionavigation-satellite service in the band 1215–1240 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under ITU Radio Regulation No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215–1240 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. ITU Radio Regulation No. 5.43 shall not apply in respect of the radiolocation service. ITU Resolution 608 (Rev.WRC–15) shall apply.

G134 In the band 7190–7235 MHz, Federal earth stations operating in the meteorological-satellite service (Earth-to-space) may be authorized subject to the following conditions:

(a) Earth stations are limited to those communicating with the Department of Commerce Geostationary Operational Environmental Satellites (GOES).

(b) There shall not be more than five earth stations authorized at one time.

(c) The GOES satellite receiver shall not claim protection from existing and future stations in the fixed service (ITU Radio Regulation No. 5.43A does not apply).

[49 FR 2373, Jan. 19, 1984]

EDITORIAL NOTES: 1. For FEDERAL REGISTER citations affecting § 2.106, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.govinfo.gov*.

2. At 85 FR 38633, June 26, 2020, section 2.106, the ''Table of Frequency Allocations'', was amended; however, the amendment could not be incorporated due to formatting inconsistencies.

§ 2.107 Radio astronomy station notification.

(a) Pursuant to No. 11.12 of Article 11 to the Radio Regulations, operators of radio astronomy stations desiring international recognition of their use of specific radio astronomy frequencies for reception, should file the following information with the Commission for inclusion in the Master International Frequency Register:

(1) The characteristics of radio astronomy stations specified in Annex 2 of Appendix 4 to the Radio Regulations.

(2) The name, mailing address, and email of the operator.

(b) The permanent discontinuance of observations, or any change to the information above, should also be filed with the Commission.

(c) Observations being conducted on frequencies or frequency bands not allocated to the radio astronomy service should be reported as in paragraph (a) of this section for information purposes. Information in this category will not be submitted for entry in the Master International Frequency Register and protection from interference will not be afforded such operations by stations in other services.

[49 FR 2373, Jan. 19, 1984, as amended at 85 FR 38739, June 26, 2020]

§ 2.108 Policy regarding the use of the fixed-satellite allocations in the 3.6–3.7, 4.5–4.8, and 5.85–5.925 GHz bands.

The use of the fixed-satellite allocations in the United States in the above bands will be governed by footnote US245. Use of the fixed-satellite service allocations in these bands is for the

international fixed-satellite service, that is, for international inter-continental communications. Case-by-case electromagnetic compatibility analysis is required with all users of the bands. It is anticipated that one earth station on each coast can be successfully coordinated. Specific locations of these earth stations depend upon service requirements and case-by-case EMC analyses that demonstrate compatible operations.

Subpart C—Emissions

§ 2.201 Emission, modulation, and transmission characteristics.

The following system of designating emission, modulation, and transmission characteristics shall be employed.

(a) Emissions are designated according to their classification and their necessary bandwidth.

(b) Three symbols are used to describe the basic characteristics of emissions. Emissions are classified and symbolized according to the following characteristics:

(1) First symbol—type of modulation of the main carrier;

(2) Second symbol—nature of signal(s) modulating the main carrier;

(3) Third symbol—type of information to be transmitted.

NOTE TO PARAGRAPH (b): Two additional symbols for the classification of emissions may be added for a more complete description of an emission. *See* Appendix 1, Sub-Section IIB of the ITU *Radio Regulations* for the specifications of these fourth and fifth symbols. Use of these symbols is not required by the Commission.

(c) First Symbol—types of modulation of the main carrier:

(1) Emission of an unmodulated carrier ..... N

(2) Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated):.

—Double-sideband ..... A

—Single-sideband, full carrier .. H

—Single-sideband, reduced or variable level carrier ..... R

—Single-sideband, suppressed carrier ..... J

—Independent sidebands ..... B

—Vestigial sideband C

(3) Emission in which the main carrier is angle-modulated:.

—Frequency modulation ..... F

—Phase modulation ..... G

NOTE: Whenever frequency modulation ''F'' is indicated, Phase modulation ''G'' is also acceptable.

(4) Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence .. D

(5) Emission of pulses:[1].

—Sequence of unmodulated pulses ..... P

—A sequence of pulses:

—Modulated in amplitude .. K

—Modulated in width/duration L

—Modulated in position/phase ..... M

—In which the carrier is angle-modulated during the period of the pulse ..... Q

—Which is a combination of the foregoing or is produced by other means V

(6) Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse ... W

(7) Cases not otherwise covered ... X

[1]Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g. pulse code modulation) should be designated under (2) or (3).

(d) Second Symbol—nature of signal(s) modulating the main carrier:

(1) No modulating signal 0

(2) A single channel containing quantized or digital information without the use of a modulating sub-carrier, excluding time-division muliplex 1

(3) A single channel containing quantized or digital information with the use of a modulating sub-carrier, excluding time-division multiplex 2

(4) A single channel containing analogue information 3

(5) Two or more channels containing quantized or digital information 7

(6) Two or more channels containing analogue information 8

(7) Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information 9
(8) Cases not otherwise covered ... X

(e) Third Symbol—type of information to be transmitted:[2]

(1) No information transmitted ... N
(2) Telegraphy—for aural reception ..... A
(3) Telegraphy—for automatic reception ..... B
(4) Facsimile C
(5) Data transmission, telemetry, telecommand ..... D
(6) Telephony (including sound broadcasting) ..... E
(7) Television (video) ..... F
(8) Combination of the above ..... W
(9) Cases not otherwise covered ... X

(f) Type *B* emission: As an exception to the above principles, damped waves are symbolized in the Commission's rules and regulations as type *B* emission. The use of type B emissions is forbidden.

(g) Whenever the full designation of an emission is necessary, the symbol for that emission, as given above, shall be preceded by the necessary bandwidth of the emission as indicated in § 2.202(b)(1).

[49 FR 48697, Dec. 14, 1984, as amended at 75 FR 63030, Oct. 13, 2010]

§ 2.202 Bandwidths.

(a) *Occupied bandwidth.* The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.

[2] In this context the word ''information'' does not include information of a constant, unvarying nature such as is provided by standard frequency emissions, continuous wave and pulse radars, etc.

(b) *Necessary bandwidth.* For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed, under specified conditions. Emissions useful for the good functioning of the receiving equipment as, for example, the emission corresponding to the carrier of reduced carrier systems, shall be included in the necessary bandwidth.

(1) The necessary bandwidth shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.

(2) Necessary bandwidths:

between 0.001 and 999 Hz shall be expressed in Hz (letter H);
between 1.00 and 999 kHz shall be expressed in kHz (letter K);
between 1.00 and 999 MHz shall be expressed in MHz (letter M);
between 1.00 and 999 GHz shall be expressed in GHz (letter G).

(3) Examples:

0.002 Hz—H002	180.4 kHz—180K
0.1 Hz—H100	180.5 kHz—181K
25.3 Hz—25H3	180.7 kHz—181K
400 Hz—400H	1.25 MHz—1M25
2.4 kHz—2K40	2 MHz—2M00
6 kHz—6K00	10 MHz—10M0
12.5 kHz—12K5	202 MHz—202M
	5.65 GHz—5G65

(c) The necessary bandwidth may be determined by one of the following methods:

(1) Use of the formulas included in the table, in paragraph (g) of this section, which also gives examples of necessary bandwidths and designation of corresponding emissions;

(2) For frequency modulated radio systems which have a substantially linear relationship between the value of input voltage to the modulator and the resulting frequency deviation of the carrier and which carry either single sideband suppressed carrier frequency division multiplex speech channels or television, computation in accordance with provisions of paragraph (f) of this section and formulas and methods indicated in the table, in paragraph (g) of this section;

(3) Computation in accordance with Recommendations of the International

Radio Consultative Committee (C.C.I.R.);

(4) Measurement in cases not covered by paragraph (c) (1), (2), or (3) of this section.

(d) The value so determined should be used when the full designation of an emission is required. However, the necessary bandwidth so determined is not the only characteristic of an emission to be considered in evaluating the interference that may be caused by that emission.

(e) In the formulation of the table in paragraph (g) of this section, the following terms are employed:

B_n = Necessary bandwidth in hertz
B = Modulation rate in bauds
N = Maximum possible number of black plus white elements to be transmitted per second, in facsimile
M = Maximum modulation frequency in hertz
C = Sub-carrier frequency in hertz
D = Peak frequency deviation, *i.e.*, half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change in phase in radians divided by 2
t = Pulse duration in seconds at half-amplitude
t_r = Pulse rise time in seconds between 10% and 90% of maximum amplitude
K = An overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion.
N_c = Number of baseband telephone channels in radio systems employing multichannel multiplexing
P = Continuity pilot sub-carrier frequency (Hz) (continuous signal utilized to verify performance of frequency-division multiplex systems).

(f) Determination of values of D and B_n for systems specified in paragraph (c)(2) of this section:

(1) Determination of D in systems for multichannel telephony:

(i) The rms value of the per-channel deviation for the system shall be specified. (In the case of systems employing preemphasis or phase modulation, this value of per-channel deviation shall be specified at the characteristic baseband frequency.)

(ii) The value of D is then calculated by multiplying the rms value of the per-channel deviation by the appropriate factors, as follows:

Number of message circuits	Multiplying factors	Limits of X (P_{avg} (dBmO))
More than 3, but less than 12	4.47 × [a factor specified by the equipment manufacturer or station licensee, subject to Commission approval].	
At least 12, but less than 60	$\frac{3.76 \text{ antilog } (X + 2 \log_{10} N_c)}{20}$	X: −2 to + 2.6.
At least 60, but less than 240	$\frac{3.76 \text{ antilog } (X + 4 \log_{10} N_c)}{20}$	X: −5.6 to −1.0.
240 or more	$\frac{3.76 \text{ antilog } (X + 10 \log_{10} N_c)}{20}$	X: −19.6 to −15.0.

Where X represents the average power in a message circuit in dBmO; N_c is the number of circuits in the multiplexed message load; 3.76 corresponds to a peak load factor of 11.5 dB.

(2) The necessary bandwidth (B_n) normally is considered to be numerically equal to:

(i) $2M + 2DK$, for systems having no continuity pilot subcarrier or having a continuity pilot subcarrier whose frequency is not the highest modulating the main carrier;

(ii) $2P + 2DK$, for systems having a continuity pilot subcarrier whose frequency exceeds that of any other signal modulating the main carrier, unless the conditions set forth in paragraph (f)(3) of this section are met.

(3) As an exception to paragraph (f)(2)(ii) of this section, the necessary bandwidth (B_n) for such systems is numerically equal to $2P$ or $2M + 2DK$, whichever is greater, provided the following conditions are met:

(i) The modulation index of the main carrier due to the continuity pilot subcarrier does not exceed 0.25, and

(ii) In a radio system of multichannel telephony, the rms frequency deviation of the main carrier due to the continuity pilot subcarrier does not exceed 70 percent of the rms value of the per-

channel deviation, or, in a radio system for television, the rms deviation of the main carrier due to the pilot does not exceed 3.55 percent of the peak deviation of the main carrier.

(g) Table of necessary bandwidths:

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
I. NO MODULATING SIGNAL			
Continuous wave emission.			N0N (zero)
II. AMPLITUDE MODULATION			
1. Signal With Quantized or Digital Information			
Continuous wave telegraphy.	B_n = BK, K = 5 for fading circuits, K = 3 for non-fading circuits	25 words per minute; B = 20, K = 5, Bandwidth: 100 Hz	100HA1A
Telegraphy by on-off keying of a tone modulated carrier.	B_n = BK + 2M, K = 5 for fading circuits, K = 3 for non-fading circuits	25 words per minute; B = 20, M = 1000, K = 5, Bandwidth: 2100 Hz = 2.1 kHz	2K10A2A
Selective calling signal, single-sideband full carrier.	B_n = M	Maximum code frequency is: 2110 Hz, M = 2110, Bandwidth: 2110 Hz = 2.11 kHz	2K11H2B
Direct-printing telegraphy using a frequency shifted modulating sub-carrier single-sideband suppressed carrier.	B_n = 2M + 2DK, M = B ÷ 2	B = 50, D = 35 Hz (70 Hz shift), K = 1.2, Bandwidth: 134 Hz	134HJ2B
Telegraphy, single sideband reduced carrier.	B_n = central frequency + M + DK, M = B ÷ 2	15 channels; highest central frequency is: 2805 Hz, B = 100, D = 42.5 Hz (85 Hz shift), K = 0.7 Bandwidth: 2.885 Hz = 2.885 kHz	2K89R7B
2. Telephony (Commercial Quality)			
Telephony double-sideband.	B_n = 2M	M = 3000, Bandwidth = 6000 Hz = 6 kHz	6K00A3E
Telephony, single-sideband, full carrier.	B_n = 2M	M = 3000, Bandwidth: 3000 Hz = 3 kHz	3K00H3E
Telephony, single-sideband suppressed carrier.	B_n = M − lowest modulation frequency	M = 3000, lowest modulation frequency is 3000 Hz, 2700 Hz Bandwidth: 2700Hz = 2.7 kHz	2K70J3E
Telephony with separate frequency modulated signal to control the level of demodulated speech signal, single-sideband, reduced carrier.	B_n = M	Maximum control frequency is 2990 Hz, M = 2990, Bandwidth: 2990 Hz = 2.99 kHz	2K99R3E
Telephony with privacy, single-sideband, suppressed carrier (two or more channels).	B_n = N_c M − lowest modulation frequency in the lowest channel	N_c = 2, M = 3000 lowest modulation frequency is 250 Hz, Bandwidth: 5750 Hz = 5.75 kHz	5K75J8E
Telephony, independent sideband (two or more channels).	B_n = sum of M for each sideband	2 channels, M = 3000, Bandwidth: 6000 Hz = 6 kHz	6K00B8E
3. Sound Broadcasting			
Sound broadcasting, double-sideband.	B_n = 2M, M may vary between 4000 and 10000 depending on the quality desired	Speech and music, M = 4000, Bandwidth: 8000 Hz= 8 kHz	8K00A3E
Sound broadcasting, single-sideband reduced carrier (single channel).	B_n = M, M may vary between 4000 and 10000 depending on the quality desired	Speech and music, M = 4000, Bandwidth: 4000 Hz= 4 kHz	4K00R3E
Sound broadcasting, single-sideband, suppressed carrier.	B_n = M − lowest modulation frequency	Speech and music, M = 4500, lowest modulation frequency = 50 Hz, Bandwidth: 4450 Hz = 4.45 kHz	4K45J3E

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
4. Television			
Television, vision and sound.	Refer to CCIR documents for the bandwidths of the commonly used television systems	Number of lines = 525; Nominal video bandwidth: 4.2 MHz, Sound carrier relative to video carrier = 4.5 MHz	5M75C3F
		Total vision bandwidth: 5.75 MHz; FM aural bandwidth including guardbands: 250,000 Hz	250KF3E
		Total bandwidth: 6 MHz	6M25C3F
5. Facsimile			
Analogue facsimile by sub-carrier frequency modulation of a single-sideband emission with reduced carrier.	$B_n = C - N \div 2 + DK$, K = 1.1 (typically)	N = 1100, corresponding to an index of cooperation of 352 and a cycler rotation speed of 60 rpm. Index of cooperation is the product of the drum diameter and number of lines per unit length C = 1900, D = 400 Hz, Bandwidth = 2.890 Hz = 2.89 kHz	2K89R3C
Analogue facsimile; frequency modulation of an audio frequency sub-carrier which modulates the main carrier, single-sideband suppressed carrier.	$B_n = 2M + 2DK$, $M = N/_2$, K = 1.1 (typically)	N = 1100, D = 400 Hz, Bandwidth: 1980 Hz = 1.98 kHz	1K98J3C
6. Composite Emissions			
Double-sideband, television relay.	$B_n = 2C + 2M + 2D$	Video limited to 5 MHz, audio on 6.5 MHz frequency modulated subcarrier deviation = 50 kHz: $C = 6.5 \times 10^6$ $D = 50 \times 10^3$ Hz, M = 15,000, Bandwidth: 13.13×10^6 Hz = 13.13 MHz	13M2A8W
Double-sideband radio relay system.	$B_n = 2M$	10 voice channels occupying baseband between 1 kHz and 164 kHz; M = 164,000 bandwith = 328,000 Hz = 328 kHz	328KA8E
Double-sideband emission of VOR with voice (VOR = VHF omnidirectional radio range).	$B_n = 2C_{max} + 2M + 2DK$, K = 1 (typically)	The main carrier is modulated by: —a 30 Hz sub-carrier—a carrier resulting from a 9960 Hz tone frequency modulated by a 30 Hz tone—a telephone channel—a 1020 Hz keyed tone for continual Morse identification. C_{max} = 9960, M = 30, D = 480 Hz, Bandwidth: 20,940 Hz = 20.94 kHz	20K9A9W
Independent sidebands; several telegraph channels together with several telephone channels.	B_n = sum of M for each sideband	Normally composite systems are operated in accordance with standardized channel arrangements, (e.g. CCIR Rec. 348–2) 3 telephone channels and 15 telegraphy channels require the bandwidth 12,000 Hz = 12 kHz	12K0B9W
III-A. FREQUENCY MODULATION			
1. Signal With Quantized or Digital Information			
Telegraphy without error-correction (single channel).	$B_n = 2M + 2DK$, $M = B \div 2$, K = 1.2 (typically)	B = 100, D = 85 Hz (170 Hz shift), Bandwidth: 304 Hz	304HF1B
Four-frequency duplex telegraphy.	$B_n 2M + 2DK$, B = Modulation rate in bands of the faster channel. If the channels are synchronized: $M = B \div 2$, otherwise M = 2B, K = 1.1 (typically)	Spacing between adjacent frequencies = 400 Hz; Synchronized channels; B = 100, M = 50, D = 600 Hz, Bandwidth: 1420 Hz = 1.42 kHz	1K42F7B
2. Telephony (Commercial Quality)			
Commercial telephony ...	$B_n = 2M + 2DK$, K = 1 (typically, but under conditions a higher value may be necessary	For an average case of commercial telephony, M = 3,000, Bandwidth: 16,000 Hz = 16 kHz	16K0F3E

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
3. Sound Broadcasting			
Sound broadcasting	$B_n = 2M + 2DK$, K = 1 (typically)	Monaural, D = 75,000 Hz, M = 15,000, Bandwidth: 18,000 Hz = 180 kHz	180KF3E
4. Facsimile			
Facsimile by direct frequency modulation of the carrier; black and white.	$B_n = 2M + 2DK$, $M = N \div 2$, K = 1.1 (typically)	N = 1100 elements/sec; D = 400 Hz, Bandwidth: 1980 Hz = 1.98 kHZ	1K98F1C
Analogue facsimile	$B_n = 2M + 2DK$, $M = N \div 2$, K = 1.1 (typically)	N = 1100 elements/sec; D = 400 Hz, Bandwidth: 1980 Hz = 1.98 kHz	1K98F3C
5. Composite Emissions (See Table III-B)			
Radio-relay system, frequency division multiplex.	$B_n = 2P + 2DK$, K = 1	Microwave radio relay system specifications: 60 telephone channels occupying baseband between 60 and 300 kHz; rms per-channel deviation 200 kHz; pilot at 331 kHz produces 200 kHz rms deviation of main carrier. Computation of B_n:D = $(200 \times 10^3 3 \times 3.76 \times 1.19)$, Hz = 0.895×10^6, P = 0.331×10^6 Hz; Bandwidth: 2.452×10^6 Hz	2M45F8E
Radio-relay system frequency division multiple.	$B_n = 2M + 2DK$, K = 1	Microwave radio relay relay systems specifications: 1200 telephone channels occupying baseband between 60 and 5564 kHz; rms per channel deviation 200 kHz; continunity pilot at 6199 kHz produces 140 kHz rms deviation of main carrier. Computation of B_n:D = $(20^0 \times 10^3 \times 3.76 \times 3.63)$ = 2.73×10^6; M = 5.64×10^6 Hz; P = 6.2×10^6 Hz; (2M + 2DK<2P; Bandwidth 16.59×10^6 Hz	16M6F8E
Radio-relay system, frequency division multiplex.	$B_n = 2P$	Microwave radio relay system specifications: Multiplex 600 telephone channels occupying baseband between 60 and 2540 kHz; continuity pilot at 8500 kHz produces 140 kHz rms deviation of main carrier. Computation of Bn:D = $(200 \times 10^3 \times 3.76 \times 2.565)$ = 1.93×10^6 Hz; M = 2.54×10^6 Hz; 2DK)≤2P Bandwidth: 17×10^6 Hz	17M0F8E
Unmodulated pulse emission.	$B_n = 2K \div t$, K depends upon the ratio of pulse rise time. Its value usually falls between 1 and 10 and in many cases it does not need to exceed 6	Primary Radar Range resolution: 150 m, K = 1.5 (triangular pulse where $t \simeq t_r$, only components down to 27 dB from the strongest are considered) Then t = 2 × range resolution ÷ velocity of light = $2 \times 150 \div 3 \times 10^8 = 1 \times 10^{-6}$ seconds, Bandwidth: 3×10^6 Hz = 3 MHz	3M00P0N
6. Composite Emissions			
Radio-relay system	$B_n = 2K \div t$, K = 1.6	Pulse position modulated by 36 voice channel baseband; pulse width at half amplitude = 0.4 us, Bandwidth: 8×10^6 Hz = 8 MHz (Bandwidth independent of the number of voice channels)	8M00M7E
Radio-relay system	$B_n = 2K/t$ K = 1.6	Pulse position modulated by 36 voice channel baseband: pulse width at half amplitude 0.4 μS; $B_n = 8 \times 10^6$ Hz = 8 MHz (Bandwidth independent of the number of voice channels)	8M00M7E
Composite transmission digital modulation using DSB-AM (Microwave radio relay system).	$B_n = 2RK/\log_2 S$	Digital modulation used to send 5 megabits per second by use of amplitude modulation of the main carrier with 4 signaling states R = 5×10^6 bits per second; K = 1; S = 4; B_n = 5 MHz	5M00K7

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
Binary Frequency Shift Keying.	(0.03 <2D/R <1.0); $B_n = 3.86D + 0.27R$ (1.0 <2D/R <2) $B_n = 2.4D + 1.0R$	Digital modulation used to send 1 megabit per second by frequency shift keying with 2 signaling states and 0.75 MHz peak deviation of the carrier $R = 1 \times 10^6$ bps; $D = 0.75 \times 10^6$ Hz; $B_n = 2.8$ MHz	2M80F1D
Multilevel Frequency Shift Keying.	$B_n = (R/\log_2 S) + 2DK$	Digital modulation to send 10 megabits per second by use of frequency shift keying with four signaling states and 2 MHz peak deviation of the main carrier $R = 10 \times 10^6$ bps; D = 2 MHz; K = 1; S = 4; $B_n = 9$ MHz	9M00F7D
Phase Shift Keying	$B_n = 2RK/\log_2 S$	Digital modulation used to send 10 megabits per second by use of phase shift keying with 4 signaling states $R = 10 \times 10^6$ bps; K = 1; S = 4; $B_n = 10$ MHz	10M0G7D
Quadrature Amplitude Modulation (QAM).	$B_n = 2R/\log_2 S$	64 QAM used to send 135 Mbps has the same necessary bandwidth as 64–PSK used to send 135 Mbps; $R = 135 \times 10^6$ bps; S = 64; $B_n = 45$ MHz	45M0W
Minimum Shift Keying ...	2-ary: $B_n = R(1.18)$ 4-ary: $B_n = R(2.34)$	Digital modulation used to send 2 megabits per second using 2-ary minimum shift keying $R = 2.36 \times 10^6$ bps; $B_n = 2.36$ MHz	2M36G1D

[28 FR 12465, Nov. 22, 1963, as amended at 37 FR 8883, May 2, 1972; 37 FR 9996, May 18, 1972; 48 FR 16492, Apr. 18, 1983; 49 FR 48698, Dec. 14, 1984; 68 FR 68543, Dec. 9, 2003]

Subpart D—Call Signs and Other Forms of Identifying Radio Transmissions

AUTHORITY: Secs. 4, 5, 303, 48 Stat., as amended, 1066, 1068, 1082; 47 U.S.C. 154, 155, 303.

§ 2.301 Station identification requirement.

Each station using radio frequencies shall identify its transmissions according to the procedures prescribed by the rules governing the class of station to which it belongs with a view to the elimination of harmful interference and the general enforcement of applicable radio treaties, conventions, regulations, arrangements, and agreements in force, and the enforcement of the Communications Act of 1934, as amended, and the Commission's rules.

[34 FR 5104, Mar. 12, 1969]

§ 2.302 Call signs.

The table which follows indicates the composition and blocks of international call signs available for assignment when such call signs are required by the rules pertaining to particular classes of stations. When stations operating in two or more classes are authorized to the same licensee for the same location, the Commission may elect to assign a separate call sign to each station in a different class. (In addition to the U.S. call sign allocations listed below, call sign blocks AAA through AEZ and ALA through ALZ have been assigned to the Department of the Army; call sign block AFA through AKZ has been assigned to the Department of the Air Force; and call sign block NAA through NZZ has been assigned jointly to the Department of the Navy and the U.S. Coast. Guard.

Class of station	Composition of call sign	Call sign blocks
Coast (Class I) except for coast telephone in Alaska.	3 letters	KAA through KZZ. WAA through WZZ.
Coast (Classes II and III) and maritime radiodetermination.	3 letters, 3 digits	KAA200 through KZZ999. WAA200 through WZZ999.
Coast telephone in Alaska	3 letters, 2 digits.	

Class of station	Composition of call sign	Call sign blocks
	3 letters, 3 digits (for stations assigned frequencies above 30 MHz).	KAA20 through KZZ99. WAA20 through WZZ99. WZZ200 through WZZ999.
Fixed	3 letters, 2 digits	KAA20 through KZZ99.
	3 letters, 3 digits (for stations assigned frequencies above 30 MHz).	WAA20 through WZZ99. WAA200 through WZZ999.
Marine receiver test	3 letters, 3 digits (plus general geographic location when required).	KAA200 through KZZ999. WAA200 through WZZ999.
Ship telegraph	4 letters [1]	KAAA through KZZZ. WAAA through WZZZ.
Ship telephone	2 letters, 4 digits, or 3 letters, 4 digits [1]	WA2000 through WZ9999, through WZZ9999.
Ship telegraph plus telephone	4 letters	KAAA through KZZZ. WAAA through WZZZ.
Ship radar	Same as ship telephone and/or telegraph call sign, or, if ship has no telephone or telegraph: 2 letters, 4 digits, or 3 letters, 4 digits.	WA2000 through WZ9999, through WZZ9999.
Ship survival craft	Call sign of the parent ship followed by 2 digits.	KAAA20 through KZZZ99. WAAA20 through WZZZ99.
Cable-repair ship marker buoy	Call sign of the parent ship followed by the letters ''BT'' and the identifying number of the buoy.	
Marine utility	2 letters, 4 digits	KA2000 through KZ9999.
Shipyard mobile	2 letters, 4 digits	KA2000 through KZ9999.
Aircraft telegraph	5 letters	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft telegraph and telephone	5 letters [2]	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft telephone	5 letters [2] (whenever a call sign is assigned).	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft survival craft	Whenever a call sign [2] is assigned, call sign of the parent aircraft followed by a single digit other than 0 or 1.	
Aeronautical	3 letters, 1 digit [2]	KAA2 through KZZ9. WAA2 through WZZ9.
Land mobile (base)	3 letters, 3 digits	KAA200 through KZZ999. WAA200 through WZZ999
Land mobile (mobile telegraph)	4 letters, 1 digit	KAAA2 through KZZZ9. WAAA2 through WZZZ9.
Land mobile (mobile telephone)	2 letters, 4 digits	KA2000 through KZ9999. WA2000 through WZ9999
Broadcasting (standard)	4 letters [3] (plus location of station)	KAAA through KZZZ. WAAA through WZZZ.
Broadcasting (FM)	4 letters (plus location of station)	KAAA through KZZZ. WAAA through WZZZ.
Broadcasting with suffix ''FM''	6 letters [3] (plus location of station)	KAAA-FM through KZZZ—FM. WAAA-FM through WZZZ-FM.
Broadcasting (television)	4 letters (plus location of station)	KAAA through KZZZ. WAAA through WZZZ.
Broadcasting with suffix ''TV''	6 letters [3] (plus location of station)	KAAA-TV through KZZZ-TV. WAAA-TV through WZZ-TV.
Television broadcast translator	1 letter—output channel number—2 letters.	K02AA through K83ZZ. W02AA through W83ZZ.
Disaster station, except U.S. Government	4 letters, 1 digit	KAAA2 through KZZZ9. WAAA2 through WZZZ9.
Experimental (letter ''X'' follows the digit)	2 letters, 1 digit, 3 letters	KA2XAA through KZ9XZZ. WA2XAA through WZ9XZZ.
Amateur (letter ''X'' may not follow digit)	1 letter, 1 digit, 1 letter [4]	K1A through K0Z. N1A through N0Z. W1A through W0Z.
Amateur	1 letter, 1 digit, 2 letters [4]	K1AA through K0ZZ. N1AA through N0ZZ. W1AA through W0ZZ.
Do	1 letter, 1 digit, 3 letters [4]	K1AAA through K0ZZZ. N1AAA through N0ZZZ. W1AAA through W0ZZZ.
Do	2 letters, 1 digit, 1 letter [4]	AA1A through AI0Z. KA1A through KZ0Z. NA1A through NZ0Z. WA1A through WZ0Z.

Class of station	Composition of call sign	Call sign blocks
Do	2 letters, 1 digit, 2 letters[4]	AA1AA through AL0ZZ. KA1AA through KZ0ZZ. NA1AA through NZ0ZZ. WA1AA through WZ0ZZ.
Amateur (letter "X" may not follow digit)	2 letters, 1 digit, 3 letters[4]	AA1AAA through AL0ZZZ. KA1AAA through KZ0ZZZ. NA1AAA through NZ0ZZZ. WA1AAA through WZ0ZZZ.
Standard frequency		WWV, WWVB through WWVI, WWVL, WWVS.
Personal radio	3 letters, 4 digits, or 4 letters, 4 digits.	KAA0001 through KZZ9999, WAA0001 through WPZ9999, KAAA0001 through KZZZ9999.
Personal radio, temporary permit	3 letters, 5 digits	KAA00000 through KZZ99999.
Personal radio in trust territories.	1 letter, 4 digits	K0001 through K9999.
Business radio temporary permit	2 letters, 7 digits	WT plus local telephone number.
Part 90 temporary permit	2 letters, 7 digits	WT plus local telephone number.
Part 90 conditional permit	2 letters, 7 digits	WT plus local telephone number.
General Mobile Radio Service, temporary permit.	2 letters, 7 digits	WT plus business or residence telephone number.

NOTE: The symbol 0 indicates the digit zero.

[1] Ships with transmitter-equipped survival craft shall be assigned four letter call signs.

[2] See § 2.303.

[3] A 3 letter call sign now authorized for and in continuous use by a licensee of a standard broadcasting station may continue to be used by that station. The same exception applies also to frequency modulation and television broadcasting stations using 5 letter call signs consisting of 3 letters with the suffix "FM" or "TV".

[4] Plus other identifying data as may be specified.

[34 FR 5104, Mar. 12, 1969, as amended at 54 FR 50239, Dec. 5, 1989]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 2.302, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.govinfo.gov*.

§ 2.303 Other forms of identification of stations.

(a) The following table indicates forms of identification which may be used in lieu of call signs by the specified classes of stations. Such recognized means of identification may be one or more of the following: name of station, location of station, operating agency, official registration mark, flight identification number, selective call number or signal, selective call identification number or signal, characteristic signal, characteristic of emission or other clearly distinguishing form of identification readily recognized internationally. Reference should be made to the appropriate part of the rules for complete information on identification procedures for each service.

Class of station	*Identification, other than assigned call sign*
Aircraft (U.S. registry) telephone	Registration number preceded by the type of the aircraft, or the radiotelephony designator of the aircraft operating agency followed by the flight identification number.
Aircraft (foreign registry) telephone	Foreign registry identification consisting of five characters. This may be preceded by the radiotelephony designator of the aircraft operating agency or it may be preceded by the type of the aircraft.
Aeronautical	Name of the city, area, or airdrome served together with such additional identification as may be required.
Aircraft survival craft	Appropriate reference to parent aircraft, e.g., the air carrier parent aircraft flight number or identification, the aircraft registration number, the name of the aircraft manufacturer, the name of the aircraft owner, or any other pertinent information.
Ship telegraph	When an official call sign is not yet assigned: Complete name of the ship and name of licensee. On 156.65 MHz: Name of ship. Digital selective call.
Ship telegraph	Digital selective call.
Public coast (radiotelephone) and Limited Coast (Radiotelephone).	The approximate geographic location in a format approved by the Commission. Coast station identification number.
Public coast (radiotelegraph)	Coast station identification number.
Fixed	Geographic location. When an approved method of superimposed identification is used, QTT DE (abbreviated name of company or station).

Class of station	*Identification, other than assigned call sign*
Fixed: Rural subscriber service	Assigned telephone number.
Land mobile: Public safety, forestry conservation, highway maintenance, local government, shipyard, land transportation, and aviation services.	Name of station licensee (in abbreviated form if practicable), or location of station, or name of city, area, or facility served. Individual stations may be identified by additional digits following the more general identification.
Land mobile: Industrial service	Mobile unit cochannel with its base station: Unit identifier on file in the base station records. Mobile unit not cochannel with its base station: Unit identifier on file in the base station records and the assigned call sign of either the mobile or base station. Temporary base station: Unit designator in addition to base station identification.
Land mobile: Domestic public and rural radio	Special mobile unit designation assigned by licensee or by assigned telephone number.
Land mobile: Railroad radio service	Name of railroad, train number, caboose number, engine number, or name of fixed wayside station or such other number or name as may be specified for use of railroad employees to identify a specific fixed point or mobile unit. A railroad's abbreviated name or initial letters may be used where such are in general usage. Unit designators may be used in addition to the station identification to identify an individual unit or transmitter of a base station.
Land mobile: Broadcasting (remote pickup)	Identification of associated broadcasting station.
Broadcasting (Emergency Broadcast System)	State and operational area identification.
Broadcasting (aural STL and intercity relay)	Call sign of the broadcasting station with which it is associated.
Broadcasting (television auxiliary)	Call sign of the TV broadcasting station with which it is licensed as an auxiliary, or call sign of the TV broadcasting station whose signals are being relayed, or by network identification.
Broadcasting (television booster).	Retransmission of the call sign of the primary station.
Disaster station	By radiotelephony: Name, location, or other designation of station when same as that of an associated station in some other service. Two or more separate units of a station operated at different locations are separately identified by the addition of a unit name, number, or other designation at the end of its authorized means of identification.

(b) Digital selective calls will be authorized by the Commission and will be formed by groups of numbers (0 through 9), however, the first digit must be other than 0, as follows:

(1) Coast station identification number: 4 digits.

(2) Ship station selective call number: 5 digits.

(3) Predetermined group of ship stations: 5 digits.

(c) Ship stations operating under a temporary operating authority shall identify by a call sign consisting of the letter ''K'' followed by the vessel's Federal or State registration number, or a call sign consisting of the letters ''KUS'' followed by the vessel's documentation number. However, if the vessel has no registration number or documentation number, the call sign shall consist of the name of the vessel and the name of the licensee as they appear on the station application form.

[28 FR 12465, Nov. 22, 1963, as amended at 40 FR 57675, Dec. 11, 1975; 41 FR 44042, Oct. 6, 1976; 42 FR 31008, June 17, 1977; 44 FR 62284, Oct. 30, 1979]

Subpart E—Distress, Disaster, and Emergency Communications

§ 2.401 Distress messages.

Each station licensee shall give absolute priority to radiocommunications or signals relating to ships or aircraft in distress; shall cease all sending on frequencies which will interfere with hearing a radiocommunication or signal of distress and except when engaged in answering or aiding the ship or aircraft in distress, shall refrain from sending any radiocommunications or signals until there is assurance that no interference will be caused with the radiocommunications or signals relating thereto; and shall assist the ship or aircraft in distress, so far as possible, by complying with its instructions.

§ 2.402 Control of distress traffic.

The control of distress traffic is the responsibility of the mobile station in distress or of the mobile station which, by the application of the provisions of § 2.403, has sent the distress call. These stations may, however, delegate the control of the distress traffic to another station.

§ 2.403 Retransmission of distress message.

Any station which becomes aware that a mobile station is in distress may transmit the distress message in the following cases:

(a) When the station in distress is not itself in a position to transmit the message.

(b) In the case of mobile stations, when the master or the person in charge of the ship, aircraft, or other vehicles carrying the station which intervenes believes that further help is necessary.

(c) In the case of other stations, when directed to do so by the station in control of distress traffic or when it has reason to believe that a distress call which it has intercepted has not been received by any station in a position to render aid.

§ 2.404 Resumption of operation after distress.

No station having been notified to cease operation shall resume operation on frequency or frequencies which may cause interference until notified by the station issuing the original notice that the station involved will not interfere with distress traffic as it is then being routed or until the receipt of a general notice that the need for handling distress traffic no longer exists.

§ 2.405 Operation during emergency.

The licensee of any station (except amateur, standard broadcast, FM broadcast, noncommercial educational FM broadcast, or television broadcast) may, during a period of emergency in which normal communication facilities are disrupted as a result of hurricane, flood, earthquake, or similar disaster, utilize such station for emergency communication service in communicating in a manner other than that specified in the instrument of authorization: *Provided:*

(a) That as soon as possible after the beginning of such emergency use, notice be sent to the Public Safety and Homeland Security Bureau of the Commission at Washington, D.C., stating the nature of the emergency and the use to which the station is being put, and

(b) That the emergency use of the station shall be discontinued as soon as substantially normal communication facilities are again available, and

(c) That the Public Safety and Homeland Security Bureau of the Commission at Washington, D.C., shall be notified immediately when such special use of the station is terminated: Provided further,

(d) That in no event shall any station engage in emergency transmission on frequencies other than, or with power in excess of, that specified in the instrument of authorization or as otherwise expressly provided by the Commission, or by law: *And provided further,*

(e) That any such emergency communication undertaken under this section shall terminate upon order of the Commission.

NOTE: Part 73 of this chapter contains provisions governing emergency operation of standard, FM, noncommercial educational FM, and television broadcast stations. Part 97 of this chapter contains such provisions for amateur stations.

[28 FR 13785, Dec. 18, 1963, as amended at 80 FR 53749, Sept. 8, 2015]

§ 2.406 National defense; free service.

Any common carrier subject to the Communications Act may render to any agency of the United States Government free service in connection with the preparation for the national defense. Every such carrier rendering any such free service shall make and file, in duplicate, with the Commission, on or before the 31st day of July and on or before the 31st day of January in each year, reports covering the periods of 6 months ending on the 30th day of June and the 31st day of December, respectively, next prior to said dates. These reports shall show the names of the agencies to which free service was rendered pursuant to this rule, the general character of the communications handled for each agency, and the charges in dollars which would have accrued to the carrier for such service rendered to each agency if charges for all such communications had been collected at the published tariff rates.

§ 2.407 National defense; emergency authorization.

The Federal Communications Commission may authorize the licensee of any radio station during a period of national emergency to operate its facilities upon such frequencies, with such power and points of communication, and in such a manner beyond that specified in the station license as may be requested by the Army, Navy, or Air Force.

Subparts F–G [Reserved]

Subpart H—Prohibition Against Eavesdropping

§ 2.701 Prohibition against use of a radio device for eavesdropping.

(a) No person shall use, either directly or indirectly, a device required to be licensed by section 301 of the Communications Act of 1934, as amended, for the purpose of overhearing or recording the private conversations of others unless such use is authorized by all of the parties engaging in the conversation.

(b) Paragraph (a) of this section shall not apply to operations of any law enforcement officers conducted under lawful authority.

[31 FR 3400, Mar. 4, 1966]

Subpart I—Marketing of Radiofrequency Devices

SOURCE: 35 FR 7898, May 22, 1970, unless otherwise noted.

§ 2.801 Radiofrequency device defined.

As used in this part, a radiofrequency device is any device which in its operation is capable of emitting radiofrequency energy by radiation, conduction, or other means. Radiofrequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in part 18 of this chapter.

(d) Any part or component thereof which in use emits radiofrequency energy by radiation, conduction, or other means.

[35 FR 7898, May 22, 1970, as amended at 54 FR 17711, Apr. 25, 1989]

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Marketing, as used in this section, includes sale or lease, or offering for sale or lease, including advertising for sale or lease, or importation, shipment, or distribution for the purpose of selling or leasing or offering for sale or lease.

(b) *General rule*. No person may market a radio frequency device unless:

(1) For devices subject to authorization under certification, the device has been authorized in accordance with the rules in subpart J of this chapter and is properly identified and labeled as required by § 2.925 and other relevant sections in this chapter; or

(2) For devices subject to authorization under Supplier's Declaration of Conformity in accordance with the rules in subpart J of this part, the device complies with all applicable technical, labeling, identification and administrative requirements; or

(3) For devices that do not require a grant of equipment authorization under subpart J of this chapter but must comply with the specified technical standards prior to use, the device complies with all applicable, technical, labeling, identification and administrative requirements.

(c) *Exceptions*. The following marketing activities are permitted prior to equipment authorization:

(1) Activities conducted under market trials pursuant to subpart H of part 5 of this chapter or in accordance with a Spectrum Horizons experimental radio license issued pursuant to subpart I of part 5.

(2) Limited marketing is permitted, as described in the following text, for devices that could be authorized under the current rules; could be authorized under waivers of such rules that are in effect at the time of marketing; or could be authorized under rules that have been adopted by the Commission but that have not yet become effective.

These devices may not be operated unless permitted by § 2.805.

(i) Conditional sales contracts (including agreements to produce new devices manufactured in accordance with designated specifications) are permitted between manufacturers and wholesalers or retailers provided that delivery is made contingent upon compliance with the applicable equipment authorization and technical requirements.

(ii) A radio frequency device that is in the conceptual, developmental, design or pre-production stage may be offered for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) if the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(iii) (A) A radio frequency device may be advertised or displayed, (e.g., at a trade show or exhibition) if accompanied by a conspicuous notice containing this language:

This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

(B) If the device being displayed is a prototype of a device that has been properly authorized and the prototype, itself, is not authorized due to differences between the prototype and the authorized device, this language may be used instead: Prototype. Not for Sale.

(iv) An evaluation kit as defined in § 2.1 may be sold provided that:

(A) Sales are limited to product developers, software developers, and system integrators;

(B) The following notice is included with the kit:

FCC NOTICE: This kit is designed to allow:

(1) Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and

(2) Software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

(C) The kit is labeled with the following legend: For evaluation only; not FCC approved for resale; and

(D) Any radiofrequency transmitter employed as part of an evaluation kit shall be designed to comply with all applicable FCC technical rules, including frequency use, spurious and out-of-band emission limits, and maximum power or field strength ratings applicable to final products that would employ the components or circuitry to be evaluated.

(d) *Importation.* The provisions of subpart K of this part continue to apply to imported radio frequency devices.

[78 FR 25161, Apr. 29, 2013, as amended at 79 FR 48691, Aug. 18, 2014; 80 FR 52414, Aug. 31, 2015; 82 FR 50825, Nov. 2, 2017; 84 FR 25689, June 4, 2019]

§ 2.805 Operation of radio frequency devices prior to equipment authorization.

(a) *General rule.* A radio frequency device may not be operated prior to equipment authorization unless the conditions set forth in paragraphs (b), (c), (d) or (e), of this section are meet. Radio frequency devices operated under these provisions may not be marketed (as defined in § 2.803(a)) except as provided elsewhere in this chapter. In addition, the provisions of subpart K continue to apply to imported radio frequency devices.

(b) Operation of a radio frequency device prior to equipment authorization is permitted under the authority of an

experimental radio service authorization issued under part 5 of this chapter.

(c) Operation of a radio frequency device prior to equipment authorization is permitted for experimentation or compliance testing of a device that is fully contained within an anechoic chamber or a Faraday cage.

(d) For devices designed to operate solely under parts 15, 18, or 95 of this chapter without a station license, operation of a radio frequency device prior to equipment authorization is permitted under the following conditions, so long as devices are either rendered inoperable or retrieved at the conclusion of such operation:

(1) The radio frequency device shall be operated in compliance with existing Commission rules, waivers of such rules that are in effect at the time of operation, or rules that have been adopted by the Commission but that have not yet become effective; and

(2) The radio frequency device shall be operated for at least one of these purposes:

(i) Demonstrations at a trade show or an exhibition, provided a notice containing the wording specified in § 2.803(c)(2)(iii) is displayed in a conspicuous location on, or immediately adjacent to, the device; or all prospective buyers at the trade show or exhibition are advised in writing that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution; or

(ii) Evaluation of performance and determination of customer acceptability, during developmental, design, or pre-production states. If the device is not operated at the manufacturer's facilities, it must be labeled with the wording specified in § 2.803(c)(2)(iii), and in the case of an evaluation kit, the wording specified in § 2.803(c)(2)(iv)(C).

(e) Operation of a radio frequency device prior to equipment authorization is permitted under either paragraph (e)(1) or (e)(2) of this section so long as devices are either rendered inoperable or retrieved at the conclusion of such operation:

(1) The radio frequency device shall be operated in compliance with existing Commission rules, waivers of such rules that are in effect at the time of operation, or rules that have been adopted by the Commission but that have not yet become effective; and

(i) Under the authority of a service license (only in the bands for which that service licensee holds a license) provided that the licensee grants permission and the licensee continues to remain responsible for complying with all of the operating conditions and requirements associated with its license; or

(ii) Under a grant of special temporary authorization.

(2) The radio frequency device shall be operated at or below the maximum level specified in the table in § 15.209(a) of this chapter for at least one of these purposes:

(i) Demonstrations at a trade show or an exhibition, provided a notice containing the wording specified in § 2.803(c)(2)(iii) is displayed in a conspicuous location on, or immediately adjacent to, the device; or all prospective buyers at the trade show or exhibition are advised in writing that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution; or

(ii) Evaluation of performance and determination of customer acceptability, during developmental, design, or pre-production states. If the device is not operated at the manufacturer's facilities, it must be labeled with the wording specified in § 2.803(c)(2)(iii), and in the case of an evaluation kit, the wording specified in § 2.803(c)(2)(iv)(C).

[78 FR 25162, Apr. 29, 2013, as amended at 79 FR 48691, Aug. 18, 2014]

§ 2.807 Statutory exceptions.

As provided by Section 302(c) of the Communications Act of 1934, as amended, § 2.803 shall not be applicable to:

(a) Carriers transporting radiofrequency devices without trading in them.

(b) Radiofrequency devices manufactured solely for export.

(c) The manufacture, assembly, or installation of radiofrequency devices for its own use by a public utility engaged

in providing electric service: *Provided, however*, That no such device shall be operated if it causes harmful interference to radio communications.

(d) Radiofrequency devices for use by the Government of the United States or any agency thereof: *Provided, however*, That this exception shall not be applicable to any device after it has been disposed of by such Government or agency.

[35 FR 7898, May 22, 1970, as amended at 62 FR 10470, Mar. 7, 1997]

§ 2.811 Transmitters operated under part 73 of this chapter.

Section 2.803(a) through (c) shall not be applicable to a transmitter operated in any of the Radio Broadcast Services regulated under part 73 of this chapter, provided the conditions set out in part 73 of this chapter for the acceptability of such transmitter for use under licensing are met.

[78 FR 25162, Apr. 29, 2013]

§ 2.813 Transmitters operated in the Instructional Television Fixed Service.

Section 2.803 (a) through (d) shall not be applicable to a transmitter operated in the Instructional Television Fixed Service regulated under part 74 of this chapter, provided the conditions in § 74.952 of this chapter for the acceptability of such transmitter for licensing are met.

[62 FR 10470, Mar. 7, 1997]

§ 2.815 External radio frequency power amplifiers.

(a) As used in this part, an external radio frequency power amplifier is any device which, (1) when used in conjunction with a radio transmitter as a signal source is capable of amplification of that signal, and (2) is not an integral part of a radio transmitter as manufactured.

(b) No person shall manufacture, sell or lease, offer for sale or lease (including advertising for sale or lease) or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any external radio frequency power amplifier capable of operation on any frequency or frequencies below 144 MHz unless the amplifier has received a grant of certification in accordance with subpart J of this part and other relevant parts of this chapter. These amplifiers shall comply with the following:

(1) The external radio frequency power amplifier shall not be capable of amplification in the frequency band 26–28 MHz.

(2) The amplifier shall not be capable of easy modification to permit its use as an amplifier in the frequency band 26–28 MHz.

(3) No more than 10 external radio frequency power amplifiers may be constructed for evaluation purposes in preparation for the submission of an application for a grant of certification.

(4) If the external radio frequency power amplifier is intended for operation in the Amateur Radio Service under part 97 of this chapter, the requirements of §§ 97.315 and 97.317 of this chapter shall be met.

[40 FR 1246, Jan. 7, 1975; 40 FR 6474, Feb. 12, 1975, as amended at 43 FR 12687, Mar. 27, 1978; 43 FR 33725, Aug. 1, 1978; 46 FR 18981, Mar. 27, 1981; 62 FR 10470, Mar. 7, 1997; 71 FR 66461, Nov. 15, 2006]

Subpart J—Equipment Authorization Procedures

SOURCE: 39 FR 5919, Feb. 15, 1974, unless otherwise noted.

GENERAL PROVISIONS

§ 2.901 Basis and purpose.

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated. In addition to the technical standards provided, the rules governing the service may require that such equipment be authorized under Supplier's Declaration of Conformity or receive a grant of certification from a Telecommunication Certification Body.

(b) Sections 2.906 through 2.1077 describe the procedure for a Supplier's Declaration of Conformity and the procedures to be followed in obtaining certification and the conditions attendant to such a grant.

[82 FR 50825, Nov. 2, 2017]

§ 2.906 Supplier's Declaration of Conformity.

(a) Supplier's Declaration of Conformity (SDoC) is a procedure where the responsible party, as defined in § 2.909, makes measurements or completes other procedures found acceptable to the Commission to ensure that the equipment complies with the appropriate technical standards. Submittal to the Commission of a sample unit or representative data demonstrating compliance is not required unless specifically requested pursuant to § 2.945.

(b) Supplier's Declaration of Conformity is applicable to all items subsequently marketed by the manufacturer, importer, or the responsible party that are identical, as defined in § 2.908, to the sample tested and found acceptable by the manufacturer.

(c) The responsible party may, if it desires, apply for Certification of a device subject to the Supplier's Declaration of Conformity. In such cases, all rules governing certification will apply to that device.

[82 FR 50825, Nov. 2, 2017]

§ 2.907 Certification.

(a) Certification is an equipment authorization approved by the Commission or issued by a Telecommunication Certification Body (TCB) and authorized under the authority of the Commission, based on representations and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see § 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to § 2.1043.

[39 FR 5919, Feb. 15, 1974, as amended at 39 FR 27802, Aug. 1, 1974; 63 FR 36597, July 7, 1998; 80 FR 33439, June 12, 2015]

§ 2.908 Identical defined.

As used in this subpart, the term *identical* means identical within the variation that can be expected to arise as a result of quantity production techniques.

(Secs. 4, 303, 307, 48 Stat., as amended, 1066, 1082, 1083; 47 U.S.C. 154, 303, 307)

[46 FR 23249, Apr. 24, 1981]

§ 2.909 Responsible party.

(a) In the case of equipment that requires the issuance of a grant of certification, the party to whom that grant of certification is issued is responsible for the compliance of the equipment with the applicable standards. If the radio frequency equipment is modified by any party other than the grantee and that party is not working under the authorization of the grantee pursuant to § 2.929(b), the party performing the modification is responsible for compliance of the product with the applicable administrative and technical provisions in this chapter.

(b) For equipment subject to Supplier's Declaration of Conformity the party responsible for the compliance of the equipment with the applicable standards, who must be located in the United States (see § 2.1077), is set forth as follows:

(1) The manufacturer or, if the equipment is assembled from individual component parts and the resulting system is subject to authorization under Supplier's Declaration of Conformity, the assembler.

(2) If the equipment by itself, or, a system is assembled from individual parts and the resulting system is subject to Supplier's Declaration of Conformity and that equipment or system is imported, the importer.

(3) Retailers or original equipment manufacturers may enter into an agreement with the responsible party designated in paragraph (b)(1) or (b)(2) of this section to assume the responsibilities to ensure compliance of equipment and become the new responsible party.

(4) If the radio frequency equipment is modified by any party not working under the authority of the responsible party, the party performing the modifications, if located within the U.S., or

the importer, if the equipment is imported subsequent to the modifications, becomes the new responsible party.

(c) If the end product or equipment is subject to both certification and Supplier's Declaration of Conformity (*i.e.*, composite system), all the requirements of paragraphs (a) and (b) of this section apply.

(d) If, because of modifications performed subsequent to authorization, a new party becomes responsible for ensuring that a product complies with the technical standards and the new party does not obtain a new equipment authorization, the equipment shall be labeled, following the specifications in § 2.925(d), with the following: ''This product has been modified by [insert name, address and telephone number or internet contact information of the party performing the modifications].''

(e) In the case of transfer of control of equipment, as in the case of sale or merger of the responsible party, the new entity shall bear the responsibility of continued compliance of the equipment.

[82 FR 50825, Nov. 2, 2017]

§ 2.910 Incorporation by reference.

(a) The materials listed in this section are incorporated by reference in this part. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any change in these materials will be published in the FEDERAL REGISTER. All approved material is available for inspection at the Federal Communications Commission, 445 12th St. SW., Reference Information Center, Room CY–A257, Washington, DC 20554, (202) 418–0270 and is available from the sources below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(b) International Electrotechnical Commission (IEC), IEC Central Office, 3, rue de Varembe, CH–1211 Geneva 20, Switzerland, Email: *inmail@iec.ch, www.iec.ch.*

(1) CISPR 16–1–4:2010–04: ''Specification for radio disturbance and immunity measuring apparatus and methods—Part 1–4: Radio disturbance and immunity measuring apparatus—Antennas and test sites for radiated disturbance measurements'', Edition 3.0, 2010–04, IBR approved for §§ 2.948(d) and 2.950(f).

(2) [Reserved]

(c) Institute of Electrical and Electronic Engineers (IEEE), 3916 Ranchero Drive, Ann Arbor, MI 48108, 1–800–699–9277, *http://www.techstreet.com/ieee;* (IEEE publications can also be purchased from the American National Standards Institute (ANSI) through its NSSN operation (*www.nssn.org*), at Customer Service, American National Standards Institute, 25 West 43rd Street, New York, NY 10036, telephone (212) 642–4900.)

(1) ANSI C63.4–2014: ''American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz,'' ANSI approved June 13, 2014, IBR approved for § 2.950(h) and:

(i) Sections 5.4.4 through 5.5, IBR approved for §§ 2.948(d) and 2.950(f);

(ii) [Reserved]

(2) ANSI C63.10–2013, ''American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices,'' ANSI approved June 27, 2013, IBR approved for § 2.950(g).

(3) ANSI C63.26–2015, ''American National Standard of Procedures for Compliance Testing of Transmitters Used in Licensed Radio Services,'' ANSI approved December 11, 2015, IBR approved for § 2.1041(b).

(d) International Organization for Standardization (ISO), 1, ch. De la Voie-Creuse, CP 56, CH–1211, Geneva 20, Switzerland; *www.iso.org* ; Tel.: + 41 22 749 01 11; Fax: + 41 22 733 34 30; email: *central@iso.org.* (ISO publications can also be purchased from the American National Standards Institute (ANSI) through its NSSN operation (*www.nssn.org*), at Customer Service, American National Standards Institute, 25 West 43rd Street, New York, NY 10036, telephone (212) 642–4900.)

(1) ISO/IEC 17011:2004(E), ''Conformity assessment—General requirements for accreditation bodies accrediting conformity assessment bodies,'' First Edition, 2004–09–01, IBR approved for §§ 2.948(e), 2.949(b), 2.950(c) and (d), and 2.960(c).

(2) ISO/IEC 17025:2005(E), ''General requirements for the competence of testing and calibration laboratories,'' Section Edition, 2005–05–15, IBR approved for §§ 2.948(e), 2.949(b), 2.962(c) and (d).

(3) ISO/IEC 17065:2012(E), ''Conformity assessment—Requirements for bodies certifying products, processes and services,'' First Edition, 2012–09–15, IBR approved for §§ 2.950(b), 2.960(b), 2.962(b), (c), (d), (f), and (g).

(4) ISO/IEC Guide 58:1993(E), ''Calibration and testing laboratory accreditation systems—General requirements for operation and recognition'', First Edition 1993, IBR approved for § 2.950(d).

(5) ISO/IEC Guide 61:1996(E), ''General requirements for assessment and accreditation of certification/registration bodies'', First Edition 1996, IBR approved for § 2.950(c).

(6) ISO/IEC Guide 65:1996(E), ''General requirements for bodies operating product certification systems,'' First Edition 1996, IBR approved for § 2.950(b).

[80 FR 33439, June 12, 2015, as amended at 82 FR 50826, Nov. 2, 2017]

Application Procedures for Equipment Authorizations

§ 2.911 Application requirements.

(a) All requests for equipment authorization shall be submitted in writing to a Telecommunication Certification Body (TCB) in a manner prescribed by the TCB.

(b) A TCB shall submit an electronic copy of each equipment authorization application to the Commission pursuant to § 2.962(f)(6) on a form prescribed by the Commission at *https://www.fcc.gov/eas*.

(c) Each application that a TCB submits to the Commission shall be accompanied by all information required by this subpart and by those parts of the rules governing operation of the equipment, the applicant's certifications required by paragraphs (d)(1) and (2) of this section, and by requisite test data, diagrams, photographs, etc., as specified in this subpart and in those sections of rules under which the equipment is to be operated.

(d) The applicant shall provide to the TCB all information that the TCB requests to process the equipment authorization request and to submit the application form prescribed by the Commission and all exhibits required with this form.

(1) The applicant shall provide a written and signed certification to the TCB that all statements it makes in its request for equipment authorization are true and correct to the best of its knowledge and belief.

(2) The applicant shall provide a written and signed certification to the TCB that the applicant complies with the requirements in § 1.2002 of this chapter concerning the Anti-Drug Abuse Act of 1988.

(3) Each request for equipment authorization submitted to a TCB, including amendments thereto, and related statements of fact and authorizations required by the Commission, shall be signed by the applicant if the applicant is an individual; by one of the partners if the applicant is a partnership; by an officer, if the applicant is a corporation; or by a member who is an officer, if the applicant is an unincorporated association: Provided, however, that the application may be signed by the applicant's authorized representative who shall indicate his title, such as plant manager, project engineer, etc.

(4) Information on the Commission's equipment authorization requirements can be obtained from the Internet at *https://www.fcc.gov/eas*.

(e) Technical test data submitted to the TCB and to the Commission shall be signed by the person who performed or supervised the tests. The person signing the test data shall attest to the accuracy of such data. The Commission or TCB may require the person signing the test data to submit a statement showing that they are qualified to make or supervise the required measurements.

(f) Signed, as used in this section, means an original handwritten signature; however, the Office of Engineering and Technology may allow signature by any symbol executed or adopted by the applicant or TCB with the intent that such symbol be a signature, including symbols formed by computer-generated electronic impulses.

[80 FR 33440, June 12, 2015]

§ 2.915 Grant of application.

(a) A Commission recognized TCB will grant an application for certification if it finds from an examination of the application and supporting data, or other matter which it may officially notice, that:

(1) The equipment is capable of complying with pertinent technical standards of the rule part(s) under which it is to be operated; and,

(2) A grant of the application would serve the public interest, convenience and necessity.

(b) Grants will be made in writing showing the effective date of the grant and any special condition(s) attaching to the grant.

(c) Certification shall not attach to any equipment, nor shall any equipment authorization be deemed effective, until the application has been granted.

(d) Grants will be from the date of publication on the Commission Web site and shall show any special condition(s) attaching to the grant. The official copy of the grant shall be maintained on the Commission Web site.

(e) The grant shall identify the approving TCB and the Commission as the issuing authority.

(f) In cases of a dispute the Commission will be the final arbiter.

[39 FR 5919, Feb. 15, 1974, as amended at 48 FR 3621, Jan. 26, 1983; 62 FR 10470, Mar. 7, 1997; 63 FR 36598, July 7, 1998; 80 FR 33440, June 12, 2015]

§ 2.917 Dismissal of application.

(a) An application which is not in accordance with the provisions of this subpart may be dismissed.

(b) Any application, upon written request signed by the applicant or his attorney, may be dismissed prior to a determination granting or denying the authorization requested.

(c) If an applicant is requested to file additional documents or information and fails to submit the requested material within the specified time period, the application may be dismissed.

[39 FR 5919, Feb. 15, 1974, as amended at 62 FR 10470, Mar. 7, 1997; 80 FR 33441, June 12, 2015]

§ 2.919 Denial of application.

If the Commission is unable to make the findings specified in § 2.915(a), it will deny the application. Notification to the applicant will include a statement of the reasons for the denial.

§ 2.921 Hearing on application.

Whenever it is determined that an application for equipment authorization presents substantial factual questions relating to the qualifications of the applicant or the equipment (or the effects of the use thereof), the Commission may designate the application for hearing. A hearing on an application for an equipment authorization shall be conducted in the same manner as a hearing on a radio station application as set out in subpart B of part 1 of this chapter.

§ 2.923 Petition for reconsideration; application for review.

Persons aggrieved by virtue of an equipment authorization action may file with the Commission a petition for reconsideration or an application for review. Rules governing the filing of petitions for reconsideration and applications for review are set forth in §§ 1.106 and 1.115, respectively, of this chapter.

§ 2.924 Marketing of electrically identical equipment having multiple trade names and models or type numbers under the same FCC Identifier.

The grantee of an equipment authorization may market devices having different model/type numbers or trade names without additional authorization, provided that such devices are electrically identical and the equipment bears an FCC Identifier validated by a grant of certification. A device will be considered to be electrically identical if no changes are made to the authorized device, or if the changes

made to the device would be treated as class I permissive changes within the scope of § 2.1043(b)(1). Changes to the model number or trade name by anyone other than the grantee, or under the authorization of the grantee, shall be performed following the procedures in § 2.933.

[80 FR 33441, June 12, 2015]

§ 2.925 Identification of equipment.

(a) Each equipment covered in an application for equipment authorization shall bear a label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in § 2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

(2) Any other statements or labeling requirements imposed by the rules governing the operation of the specific class of equipment, except that such statement(s) of compliance may appear on a separate label at the option of the applicant/grantee.

(3) The information required may be provided electronically pursuant to § 2.935.

(b) Any device subject to more than one equipment authorization procedure may be assigned a single FCC Identifier. However, a single FCC Identifier is required to be assigned to any device consisting of two or more sections assembled in a common enclosure, on a common chassis or circuit board, and with common frequency controlling circuits. Devices to which a single FCC Identifier has been assigned shall be identified pursuant to paragraph (a) of this section.

(1) Separate FCC Identifiers may be assigned to a device consisting of two or more sections assembled in a common enclosure, but constructed on separate sub-units or circuit boards with independent frequency controlling circuits. The FCC Identifier assigned to any transmitter section shall be preceded by the term *TX FCC ID*, the FCC Identifier assigned to any receiver section shall be preceded by the term *RX FCC ID* and the identifier assigned to any remaining section(s) shall be preceded by the term *FCC ID*.

(2) Where terminal equipment subject to part 68 of this chapter, and a radio-frequency device subject to equipment authorization requirements are assembled in a common enclosure, the device shall be labeled in accordance with the Hearing Aid Compatibility-related requirements in part 68 of this chapter and the requirements published by the Administrative Council for Terminal Attachments, and shall also display the FCC Identifier in the format specified in paragraph (a) of this section.

(3) For a transceiver, the receiver portion of which is subject to Supplier's Declaration of Conformity pursuant to § 15.101 of this chapter, and the transmitter portion is subject to certification, the FCC Identifier required for the transmitter portion shall be preceded by the term FCC ID.

(c) [Reserved]

(d) In order to validate the grant of equipment authorization, the nameplate or label shall be permanently affixed to the equipment and shall be readily visible to the purchaser at the time of purchase.

(1) As used here, *permanently affixed* means that the required nameplate data is etched, engraved, stamped, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment enclosure. Alternatively, the required information may be permanently marked on a nameplate of metal, plastic, or other material fastened to the equipment enclosure by welding, riveting, etc., or with a permanent adhesive. Such a nameplate must be able to last the expected lifetime of the equipment in the environment in which the equipment will be operated and must not be readily detachable.

(2) As used here, *readily visible* means that the nameplate or nameplate data must be visible from the outside of the equipment enclosure. It is preferable that it be visible at all times during normal installation or use, but this is not a prerequisite for grant of equipment authorization.

(e) A software defined radio may be equipped with a means such as a user display screen to display the FCC identification number normally contained in the nameplate or label. The information must be readily accessible, and the

user manual must describe how to access the electronic display.

(f) The FCC Identifier including the term ''*FCC ID*'' shall be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and its label. However, the type size for the FCC Identifier is not required to be larger than eight-point. If a device is so small that it is impractical to label it with the FCC Identifier in a font that is four-point or larger, and the device does not have a display that can show electronic labeling, then the FCC Identifier shall be placed in the user manual and must also either be placed on the device packaging or on a removable label attached to the device.

NOTE TO PARAGRAPH (f): As an example, a device intended to be implanted within the body of a test animal or person would probably require an alternate method of identification.

[44 FR 17177, Mar. 21, 1979, as amended at 44 FR 55574, Sept. 27, 1979; 46 FR 21013, Apr. 8, 1981; 52 FR 21687, June 9, 1987; 54 FR 1698, Jan. 17, 1989; 62 FR 10470, Mar. 7, 1997; 66 FR 50840, Oct. 5, 2001; 77 FR 43536, July 25, 2012; 80 FR 33441, June 12, 2015; 82 FR 50826, Nov. 2, 2017]

§ 2.926 FCC identifier.

(a) A grant of certification will list the validated FCC Identifier consisting of the grantee code assigned by the FCC pursuant to paragraph (b) of this section, and the equipment product code assigned by the grantee pursuant to paragraph (c) of this section. *See* § 2.925.

(b) The grantee code assigned pursuant to paragraph (c) of this section is assigned permanently to applicants/grantees and is valid only for the party specified as the applicant/grantee in the code assignment(s).

(c) A grantee code may consist of Arabic numerals, capital letters, or other characters. The format for this code will be specified by the Commission's Office of Engineering and Technology. A prospective grantee or its authorized representative may receive a grantee code electronically via the Internet at *http://www.fcc.gov/eas*. The code may be obtained at any time prior to submittal of the application for equipment authorization. However, the fee required by § 1.1103 of this chapter must be submitted and validated within 30 days of the issuance of the grantee code, or the code will be removed from the Commission's records and a new grantee code will have to be obtained.

(1) After assignment of a grantee code each grantee will continue to use the same grantee code for subsequent equipment authorization applications. In the event the grantee name is changed or ownership is transferred, the circumstances shall be reported to the Commission so that a new grantee code can be assigned, if appropriate. See § 2.929(c) and (d) for additional information.

In the event the grantee name is changed or ownership is transferred, the circumstances shall be reported to the Commission so that a new grantee code can be assigned, if appropriate. See §§ 2.934 and 2.935 for additional information.

(2) [Reserved]

(d) The equipment product code assigned by the grantee shall consist of a series of Arabic numerals, capital letters or a combination thereof, and may include the dash or hyphen (-). The total of Arabic numerals, capital letters and dashes or hyphens shall not exceed 14 and shall be one which has not been previously used in conjunction with:

(1) The same grantee code, or

(2) An application denied pursuant to § 2.919 of this chapter.

(e) No FCC Identifier may be used on equipment to be marketed unless that specific identifier has been validated by a grant of equipment certification. This shall not prohibit placement of an FCC identifier on a transceiver which includes a receiver subject to Suppliers Declaration of Conformity pursuant to § 15.101 of this chapter, provided that the transmitter portion of such transceiver is covered by a valid grant of certification. The FCC Identifier is uniquely assigned to the grantee and may not be placed on the equipment without authorization by the grantee. See § 2.803 for conditions applicable to the display at trade shows of equipment which has not been granted equipment authorization where such grant is required prior to marketing.

Labeling of such equipment may include model or type numbers, but shall not include a purported FCC Identifier.

[44 FR 17179, Mar. 21, 1979, as amended at 46 FR 21014, Apr. 8, 1981; 52 FR 21687, June 9, 1987; 54 FR 1698, Jan. 17, 1989; 62 FR 10471, Mar. 7, 1997; 69 FR 54033, Sept. 7, 2004; 77 FR 43536, July 25, 2012; 80 FR 33441, June 12, 2015; 82 FR 50826, Nov. 2, 2017]

CONDITIONS ATTENDANT TO AN EQUIPMENT AUTHORIZATION

§ 2.927 Limitations on grants.

(a) A grant of certification is valid only when the device is labeled in accordance with § 2.925 and remains effective until set aside, revoked or withdrawn, rescinded, surrendered, or a termination date is otherwise established by the Commission.

(b) A grant of certification recognizes the determination that the equipment has been shown to be capable of compliance with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated. The issuance of a grant of equipment certification shall not be construed as a finding with respect to matters not encompassed by the Commission's rules, especially with respect to compliance with 18 U.S.C. 2512.

(c) No person shall, in any advertising matter, brochure, etc., use or make reference to an equipment authorization in a deceptive or misleading manner or convey the impression that such certification reflects more than a Commission-authorized determination that the device or product has been shown to be capable of compliance with the applicable technical standards of the Commission's rules.

[80 FR 33441, June 12, 2015, as amended at 82 FR 50826, Nov. 2, 2017]

§ 2.929 Changes in name, address, ownership or control of grantee.

(a) An equipment authorization may not be assigned, exchanged or in any other way transferred to a second party, except as provided in this section.

(b) The grantee of an equipment authorization may license or otherwise authorize a second party to manufacture the equipment covered by the grant of the equipment authorization provided:

(1) The equipment manufactured by such second party bears the FCC Identifier as is set out in the grant of the equipment authorization.

NOTE TO PARAGRAPH (b)(1): Any change in the FCC Identifier desired as a result of such production or marketing agreement will require the filing of a new application for an equipment authorization as specified in § 2.933.

(2) The grantee of the equipment authorization shall continue to be responsible to the Commission for the equipment produced pursuant to such an agreement.

(c) Whenever there is a change in the name and/or address of the grantee of certification, notice of such change(s) shall be submitted to the Commission via the Internet at *https://apps.fcc.gov/eas* within 30 days after the grantee starts using the new name and/or address.

(d) In the case of transactions affecting the grantee, such as a transfer of control or sale to another company, mergers, or transfer of manufacturing rights, notice must be given to the Commission via the Internet at *https://apps.fcc.gov/eas* within 60 days after the consummation of the transaction. Depending on the circumstances in each case, the Commission may require new applications for certification. In reaching a decision the Commission will consider whether the acquiring party can adequately ensure and accept responsibility for continued compliance with the regulations. In general, new applications for each device will not be required. A single application for certification may be filed covering all the affected equipment.

[63 FR 36598, July 7, 1998, as amended at 69 FR 54033, Sept. 7, 2004; 80 FR 33441, June 12, 2015]

§ 2.931 Responsibilities.

(a) The responsible party warrants that each unit of equipment marketed under its grant of certification and bearing the identification specified in the grant will conform to the unit that was measured and that the data (design and rated operational characteristics)

filed with the application for certification continues to be representative of the equipment being produced under such grant within the variation that can be expected due to quantity production and testing on a statistical basis.

(b)–(c) [Reserved]

(d) In determining compliance for devices subject to Supplier's Declaration of Conformity, the responsible party warrants that each unit of equipment marketed under Supplier's Declaration of Conformity will be identical to the unit tested and found acceptable with the standards and that the records maintained by the responsible party continue to reflect the equipment being produced under such Supplier's Declaration of Conformity within the variation that can be expected due to quantity production and testing on a statistical basis.

(e) For equipment subject to Supplier's Declaration of Conformity, the responsible party must reevaluate the equipment if any modification or change adversely affects the emanation characteristics of the modified equipment. The responsible party bears responsibility for continued compliance of subsequently produced equipment.

[82 FR 50826, Nov. 2, 2017]

§ 2.932 Modification of equipment.

(a) A new application for an equipment authorization shall be filed whenever there is a change in the design, circuitry or construction of an equipment or device for which an equipment authorization has been issued, except as provided in paragraphs (b) through (d) of this section.

(b) Permissive changes may be made in certificated equipment, and equipment that was authorized under the former type acceptance procedure, pursuant to § 2.1043.

(c) Permissive changes may be made in equipment that was authorized under the former notification procedure without submittal of information to the Commission, unless the equipment is currently subject to authorization under the certification procedure. However, the grantee shall submit information documenting continued compliance with the pertinent requirements upon request.

(d) All requests for permissive changes must be accompanied by the anti-drug abuse certification required under § 1.2002 of this chapter.

[63 FR 36598, July 7, 1998, as amended at 66 FR 50840, Oct. 5, 2001; 70 FR 23039, May 4, 2005; 80 FR 33441, June 12, 2015]

§ 2.933 Change in identification of equipment.

(a) A new application for certification shall be filed whenever there is a change in the FCC Identifier for the equipment with or without a change in design, circuitry or construction. However, a change in the model/type number or trade name performed in accordance with the provisions in § 2.924 of this chapter is not considered to be a change in identification and does not require additional authorization.

(b) An application filed pursuant to paragraph (a) of this section where no change in design, circuitry or construction is involved, need not be accompanied by a resubmission of equipment or measurement or test data customarily required with a new application, unless specifically requested. In lieu thereof, the applicant shall attach a statement setting out:

(1) The original identification used on the equipment prior to the change in identification.

(2) The date of the original grant of the equipment authorization.

(3) How the equipment bearing the modified identification differs from the original equipment.

(4) Whether the original test results continue to be representative of and applicable to the equipment bearing the changed identification.

(5) The photographs required by § 2.1033(b)(7) or (c)(12) showing the exterior appearance of the equipment, including the operating controls available to the user and the identification label. Photographs of the construction, the component placement on the chassis, and the chassis assembly are not required to be submitted unless specifically requested.

(c) If the change in the FCC Identifier also involves a change in design or circuitry which falls outside the purview of a permissive change described in

§ 2.1043, a complete application shall be filed pursuant to § 2.911.

[63 FR 36598, July 7, 1998, as amended at 80 FR 33441, June 12, 2015]

§ 2.935 Electronic labeling of radiofrequency devices.

(a) Any radiofrequency device equipped with an integrated electronic display screen, or a radiofrequency device without an integrated screen that can only operate in conjunction with a device that has an electronic display screen, may display on the electronic display the FCC Identifier, any warning statements, or other information that the Commission's rules would otherwise require to be shown on a physical label attached to the device.

(b) Devices displaying their FCC Identifier, warning statements, or other information electronically must make this information readily accessible on the electronic display. Users must be provided with prominent instructions on how to access the information in the operating instructions, inserts in packaging material, or other easily accessible format at the time of purchase. The access instructions may also be provided via the product-related Web site, if such a Web site exists; the packaging material must provide specific instructions on how to locate the Web site information, and a copy of these instructions must be included in the application for equipment certification.

(c) Devices displaying their FCC Identifier, warning statements, or other information electronically must permit access to the information without requiring special codes, accessories or permissions and the access to this information must not require more than three steps from the device setting menu. The number of steps does not include those steps for use of screen locks, passcodes or similar security protection designed to control overall device access.

(d) The electronically displayed FCC Identifier, warning statements, or other information must be displayed electronically in a manner that is clearly legible without the aid of magnification;

(e) The necessary label information must be programmed by the responsible party and must be secured in such a manner that third-parties cannot modify it.

(f) Devices displaying their FCC Identifier, warning statements, or other information electronically must also be labeled, either on the device or its packaging, with the FCC Identifier or other information (such as a model number and identification of a Web page that hosts the relevant regulatory information) that permits the devices to be identified at the time of importation, marketing, and sales as complying with the FCC's equipment authorization requirements. Devices can be labeled with a stick-on label, printing on the packaging, a label on a protective bag, or by similar means. Any removable label shall be of a type intended to survive normal shipping and handling and must only be removed by the customer after purchase.

[82 FR 50827, Nov. 2, 2017]

§ 2.937 Equipment defect and/or design change.

When a complaint is filed with the Commission concerning the failure of equipment subject to this chapter to comply with pertinent requirements of the Commission's rules, and the Commission determines that the complaint is justified and arises out of an equipment fault attributable to the responsible party, the Commission may require the responsible party to investigate such complaint and report the results of such investigation to the Commission. The report shall also indicate what action if any has been taken or is proposed to be taken by the responsible party to correct the defect, both in terms of future production and with reference to articles in the possession of users, sellers and distributors.

[61 FR 31046, June 19, 1996]

§ 2.938 Retention of records.

(a) For equipment subject to the equipment authorization procedures in this part, the responsible party shall maintain the records listed as follows:

(1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the standards and the requirements of § 2.931.

(2) A record of the procedures used for production inspection and testing to ensure conformance with the standards and the requirements of § 2.931.

(3) A record of the test results that demonstrate compliance with the appropriate regulations in this chapter.

(b) For equipment subject to Supplier's Declaration of Conformity, the responsible party shall, in addition to the requirements in paragraph (a) of this section, maintain a record of the measurements made on an appropriate test site that demonstrates compliance with the applicable regulations in this chapter. The record shall:

(1) Indicate the actual date all testing was performed;

(2) State the name of the test laboratory, company, or individual performing the testing. The Commission may request additional information regarding the test site, the test equipment or the qualifications of the company or individual performing the tests;

(3) Contain a description of how the device was actually tested, identifying the measurement procedure and test equipment that was used;

(4) Contain a description of the equipment under test (EUT) and support equipment connected to, or installed within, the EUT;

(5) Identify the EUT and support equipment by trade name and model number and, if appropriate, by FCC Identifier and serial number;

(6) Indicate the types and lengths of connecting cables used and how they were arranged or moved during testing;

(7) Contain at least two drawings or photographs showing the test set-up for the highest line conducted emission and showing the test set-up for the highest radiated emission. These drawings or photographs must show enough detail to confirm other information contained in the test report. Any photographs used must clearly show the test configuration used;

(8) List all modifications, if any, made to the EUT by the testing company or individual to achieve compliance with the regulations in this chapter;

(9) Include all of the data required to show compliance with the appropriate regulations in this chapter;

(10) Contain, on the test report, the signature of the individual responsible for testing the product along with the name and signature of an official of the responsible party, as designated in § 2.909; and

(11) A copy of the compliance information, as described in § 2.1077, required to be provided with the equipment.

(c) The provisions of paragraph (a) of this section shall also apply to a manufacturer of equipment produced under an agreement with the original responsible party. The retention of the records by the manufacturer under these circumstances shall satisfy the grantee's responsibility under paragraph (a) of this section.

(d) For equipment subject to more than one equipment authorization procedure, the responsible party must retain the records required under all applicable provisions of this section.

(e) For equipment subject to rules that include a transition period, the records must indicate the particular transition provisions that were in effect when the equipment was determined to be compliant.

(f) For equipment subject to certification, records shall be retained for a one year period after the marketing of the associated equipment has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the responsible party (or, under paragraph (c) of this section, the manufacturer) is officially notified that an investigation or any other administrative proceeding involving its equipment has been instituted. For all other records kept pursuant to this section, a two-year period shall apply.

(g) If radio frequency equipment is modified by any party other than the original responsible party, and that party is not working under the authorization of the original responsible party, the party performing the modifications is not required to obtain the original design drawings specified in paragraph (a)(1) of this section. However, the party performing the modifications must maintain records showing the changes made to the equipment along with the records required in paragraph (a)(3) of this section. A new

equipment authorization may also be required.

[82 FR 50827, Nov. 2, 2017]

§ 2.939 Revocation or withdrawal of equipment authorization.

(a) The Commission may revoke any equipment authorization:

(1) For false statements or representations made either in the application or in materials or response submitted in connection therewith or in records required to be kept by § 2.938.

(2) If upon subsequent inspection or operation it is determined that the equipment does not conform to the pertinent technical requirements or to the representations made in the original application.

(3) If it is determined that changes have been made in the equipment other than those authorized by the rules or otherwise expressly authorized by the Commission.

(4) Because of conditions coming to the attention of the Commission which would warrant it in refusing to grant an original application.

(b) Revocation of an equipment authorization shall be made in the same manner as revocation of radio station licenses.

(c) The Commission may withdraw any equipment authorization in the event of changes in its technical standards. The procedure to be followed will be set forth in the order promulgating such new technical standards (after appropriate rulemaking proceedings) and will provide a suitable amortization period for equipment in hands of users and in the manufacturing process.

[39 FR 5919, Feb. 15, 1974, as amended at 51 FR 39535, Oct. 29, 1986]

§ 2.941 Availability of information relating to grants.

(a) Grants of equipment authorization, other than for receivers and equipment authorized for use under parts 15 or 18 of this chapter, will be publicly announced in a timely manner by the Commission. Information about the authorization of a device using a particular FCC Identifier may be obtained by contacting the Commission's Office of Engineering and Technology Laboratory.

(b) Information relating to equipment authorizations, such as data submitted by the applicant in connection with an authorization application, laboratory tests of the device, etc., shall be available in accordance with §§ 0.441 through 0.470 of this chapter.

[62 FR 10472, Mar. 7, 1997]

§ 2.944 Software defined radios.

(a) Manufacturers must take steps to ensure that only software that has been approved with a software defined radio can be loaded into the radio. The software must not allow the user to operate the transmitter with operating frequencies, output power, modulation types or other radio frequency parameters outside those that were approved. Manufacturers may use means including, but not limited to the use of a private network that allows only authenticated users to download software, electronic signatures in software or coding in hardware that is decoded by software to verify that new software can be legally loaded into a device to meet these requirements and must describe the methods in their application for equipment authorization.

(b) Any radio in which the software is designed or expected to be modified by a party other than the manufacturer and would affect the operating parameters of frequency range, modulation type or maximum output power (either radiated or conducted), or the circumstances under which the transmitter operates in accordance with Commission rules, must comply with the requirements in paragraph (a) of this section and must be certified as a software defined radio.

(c) Applications for certification of software defined radios must include a high level operational description or flow diagram of the software that controls the radio frequency operating parameters.

[70 FR 23039, May 4, 2005]

§ 2.945 Submission of equipment for testing and equipment records.

(a) *Prior to certification.* (1) The Commission or a Telecommunication Certification Body (TCB) may require an applicant for certification to submit

one or more sample units for measurement at the Commission's laboratory or the TCB.

(2) If the applicant fails to provide a sample of the equipment, the TCB may dismiss the application without prejudice.

(3) In the event the applicant believes that shipment of the sample to the Commission's laboratory or the TCB is impractical because of the size or weight of the equipment, or the power requirement, or for any other reason, the applicant may submit a written explanation why such shipment is impractical and should not be required.

(4) The Commission may take administrative sanctions against a grantee of certification that fails to respond within 21 days to a Commission or TCB request for an equipment sample, such as suspending action on applications for equipment authorization submitted by that party while the matter is being resolved. The Commission may consider extensions of time upon submission of a showing of good cause.

(b) *Subsequent to equipment authorization.* (1) The Commission may request that the responsible party or any other party marketing equipment subject to this chapter submit a sample of the equipment, or provide a voucher for the equipment to be obtained from the marketplace, to determine the extent to which production of such equipment continues to comply with the data filed by the applicant or on file with the responsible party for equipment subject to Supplier's Declaration of Conformity. The Commission may request that a sample or voucher to obtain a product from the marketplace be submitted to the Commission, or in the case of equipment subject to certification, to the TCB that certified the equipment.

(2) A TCB may request samples of equipment that it has certified from the grantee of certification, or request a voucher to obtain a product from the marketplace, for the purpose of performing post-market surveillance as described in § 2.962. TCBs must document their sample requests to show the date they were sent and provide this documentation to the Commission upon request.

(3) The cost of shipping the equipment to the Commission's laboratory and back to the party submitting the equipment shall be borne by the party from which the Commission requested the equipment.

(4) In the event a party believes that shipment of the sample to the Commission's laboratory or the TCB is impractical because of the size or weight of the equipment, or the power requirement, or for any other reason, that party may submit a written explanation why such shipment is impractical and should not be required.

(5) Failure of a responsible party or other party marketing equipment subject to this chapter to comply with a request from the Commission or TCB for equipment samples or vouchers within 21 days may be cause for actions such as such as suspending action on applications for certification submitted by a grantee or forfeitures pursuant to § 1.80 of this chapter. The Commission or TCB requesting the sample may consider extensions of time upon submission of a showing of good cause.

(c) *Submission of records.* Upon request by the Commission, each responsible party shall submit copies of the records required by § 2.938 to the Commission. Failure of a responsible party or other party marketing equipment subject to this chapter to comply with a request from the Commission for records within 21 days may be cause for forfeiture, pursuant to § 1.80 of this chapter. The Commission may consider extensions of time upon submission of a showing of good cause.

(d) *Inspection by the Commission.* Upon request by the Commission, each responsible party shall make its manufacturing plant and facilities available for inspection.

[80 FR 33442, June 12, 2015, as amended at 82 FR 50828, Nov. 2, 2017]

§ 2.947 Measurement procedure.

(a) Test data must be measured in accordance with the following standards or measurement procedures:

(1) Those set forth in bulletins or reports prepared by the Commission's Office of Engineering and Technology. These will be issued as required, and

specified in the particular part of the rules where applicable.

(2) Those acceptable to the Commission and published by national engineering societies such as the Electronic Industries Association, the Institute of Electrical and Electronic Engineers, Inc., and the American National Standards Institute.

(3) Any measurement procedure acceptable to the Commission may be used to prepare data demonstrating compliance with the requirements of this chapter. Advisory information regarding measurement procedures can be found in the Commission's Knowledge Database, which is available at *www.fcc.gov/labhelp*.

(b) Information submitted pursuant to paragraph (a) of this section shall completely identify the specific standard or measurement procedure used.

(c) In the case of equipment requiring measurement procedures not specified in the references set forth in paragraphs (a)(1) through (3) of this section, the applicant shall submit a detailed description of the measurement procedures actually used.

(d) A listing of the test equipment used shall be submitted.

(e) If deemed necessary, additional information may be required concerning the measurement procedures employed in obtaining the data submitted for equipment authorization purposes.

(f) A composite system is a system that incorporates different devices contained either in a single enclosure or in separate enclosures connected by wire or cable. If the individual devices in a composite system are subject to different technical standards, each such device must comply with its specific standards. In no event may the measured emissions of the composite system exceed the highest level permitted for an individual component. Testing for compliance with the different standards shall be performed with all of the devices in the system functioning. If the composite system incorporates more than one antenna or other radiating source and these radiating sources are designed to emit at the same time, measurements of conducted and radiated emissions shall be performed with all radiating sources that are to be employed emitting.

(g) For each technical requirement in this chapter, the test report shall provide adequate test data to demonstrate compliance for the requirement, or in absence of test data, justification acceptable to the Commission as to why test data is not required.

[42 FR 44987, Sept. 8, 1977, as amended at 44 FR 39181, July 5, 1979; 51 FR 12616, Apr. 14, 1986; 80 FR 33442, June 12, 2015; 82 FR 50828, Nov. 2, 2017]

§ 2.948 Measurement facilities.

(a) Equipment authorized under the certification procedure shall be tested at a laboratory that is accredited in accordance with paragraph (e) of this section.

(b) A laboratory that makes measurements of equipment subject to an equipment authorization under the certification procedure or Supplier's Declaration of Conformity shall compile a description of the measurement facilities employed.

(1) The description of the measurement facilities shall contain the following information:

(i) Location of the test site.

(ii) Physical description of the test site accompanied by photographs that clearly show the details of the test site.

(iii) A drawing showing the dimensions of the site, physical layout of all supporting structures, and all structures within 5 times the distance between the measuring antenna and the device being measured.

(iv) Description of structures used to support the device being measured and the test instrumentation.

(v) List of measuring equipment used.

(vi) Information concerning the calibration of the measuring equipment, *i.e.*, the date the equipment was last calibrated and how often the equipment is calibrated.

(vii) For a measurement facility that will be used for testing radiated emissions, a plot of site attenuation data taken pursuant to paragraph (d) of this section.

(2) The description of the measurement facilities shall be provided to a

laboratory accreditation body upon request.

(3) The description of the measurement facilities shall be retained by the party responsible for authorization of the equipment and provided to the Commission upon request.

(i) The party responsible for authorization of the equipment may rely upon the description of the measurement facilities retained by an independent laboratory that performed the tests. In this situation, the party responsible for authorization of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) No specific site calibration data is required for equipment that is authorized for compliance based on measurements performed at the installation site of the equipment. The description of the measurement facilities may be retained at the site at which the measurements were performed.

(c) The Commission will maintain a list of accredited laboratories that it has recognized. The Commission will make publicly available a list of those laboratories that have indicated a willingness to perform testing for the general public. Inclusion of a facility on the Commission's list does not constitute Commission endorsement of that facility. In order to be included on this list, the accrediting organization (or Designating Authority in the case of foreign laboratories) must submit the information listed below to the Commission's laboratory:

(1) Laboratory name, location of test site(s), mailing address and contact information;

(2) Name of accrediting organization;

(3) Scope of laboratory accreditation;

(4) Date of expiration of accreditation;

(5) Designation number;

(6) FCC Registration Number (FRN);

(7) A statement as to whether or not the laboratory performs testing on a contract basis;

(8) For laboratories outside the United States, the name of the mutual recognition agreement or arrangement under which the accreditation of the laboratory is recognized;

(9) Other information as requested by the Commission.

(d) When the measurement method used requires the testing of radiated emissions on a validated test site, the site attenuation must comply with the requirements of Sections 5.4.4 through 5.5 of the following procedure: ANSI C63.4–2014 (incorporated by reference, see § 2.910). Measurement facilities used to make radiated emission measurements from 30 MHz to 1 GHz shall comply with the site validation requirements in ANSI C63.4–2014 (clause 5.4.4) and for radiated emission measurements from 1 GHz to 40 GHz shall comply with the site validation requirement of ANSI C63.4–2014 (clause 5.5.1 a) 1)), such that the site validation criteria called out in CISPR 16–1–4:2010–04 (incorporated by reference, see § 2.910) is met. Test site revalidation shall occur on an interval not to exceed three years.

(e) A laboratory that has been accredited with a scope covering the measurements required for the types of equipment that it will test shall be deemed competent to test and submit test data for equipment subject to certification. Such a laboratory shall be accredited by a Commission recognized accreditation organization based on the International Organization for Standardization/International Electrotechnical Commission International Standard ISO/IEC 17025, (incorporated by reference, see § 2.910). The organization accrediting the laboratory must be recognized by the Commission's Office of Engineering and Technology, as indicated in § 0.241 of this chapter, to perform such accreditation based on International Standard ISO/IEC 17011 (incorporated by reference, see § 2.910). The frequency for reassessment of the test facility and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization, but shall occur on an interval not to exceed two years.

(f) The accreditation of a laboratory located outside of the United States, or its possessions, will be acceptable only under one of the following conditions:

(1) If the accredited laboratory has been designated by a foreign Designating Authority and recognized by the

Commission under the terms of a government-to-government Mutual Recognition Agreement/Arrangement (MRA); or

(2) If the laboratory is located in a country that does not have an MRA with the United States, then it must be accredited by an organization recognized by the Commission under the provisions of § 2.949 for performing accreditations in the country where the laboratory is located.

[80 FR 33442, June 12, 2015, as amended at 82 FR 50828, Nov. 2, 2017]

§ 2.949 Recognition of laboratory accreditation bodies.

(a) A party wishing to become a laboratory accreditation body recognized by OET must submit a written request to the Chief of OET requesting such recognition. OET will make a determination based on the information provided in support of the request for recognition.

(b) Applicants shall provide the following information as evidence of their credentials and qualifications to perform accreditation of laboratories that test equipment to Commission requirements, consistent with the requirements of § 2.948(e). OET may request additional information, or showings, as needed, to determine the applicant's credentials and qualifications.

(1) Successful completion of an ISO/IEC 17011 (incorporated by reference, see § 2.910) peer review, such as being a signatory to an accreditation agreement that is acceptable to the Commission.

(2) Experience with the accreditation of electromagnetic compatibility (EMC), radio and telecommunications testing laboratories to ISO/IEC 17025 (incorporated by reference, see § 2.910).

(3) Accreditation personnel/assessors with specific technical experience on the Commission equipment authorization rules and requirements.

(4) Procedures and policies developed for the accreditation of testing laboratories for FCC equipment authorization programs.

[80 FR 33443, June 12, 2015]

§ 2.950 Transition periods.

(a) As of July 13, 2015 the Commission will no longer accept applications for Commission issued grants of equipment certification.

(b) Prior to September 15, 2015 a TCB shall be accredited to either ISO/IEC Guide 65 or ISO/IEC 17065 (incorporated by reference, see § 2.910). On or after September 15, 2015 a TCB shall be accredited to ISO/IEC 17065.

(c) Prior to September 15, 2015 an organization accrediting the prospective telecommunication certification body shall be capable of meeting the requirements and conditions of ISO/IEC Guide 61 or ISO/IEC 17011 (incorporated by reference, see § 2.910). On or after September 15, 2015 an organization accrediting the prospective telecommunication certification body shall be capable of meeting the requirements and conditions of ISO/IEC 17011.

(d) Prior to September 15, 2015 an organization accrediting the prospective accredited testing laboratory shall be capable of meeting the requirements and conditions of ISO/IEC Guide 58 or ISO/IEC 17011. On or after September 15, 2015 an organization accrediting the prospective accredited testing laboratory shall be capable of meeting the requirements and conditions of ISO/IEC 17011.

(e) The Commission will no longer accept applications for § 2.948 test site listing as of July 13, 2015. Laboratories that are listed by the Commission under the § 2.948 process will remain listed until the sooner of their expiration date or through July 12, 2017 and may continue to submit test data in support of certification applications through October 12, 2017. Laboratories with an expiration date before July 13, 2017 may request the Commission to extend their expiration date through July 12, 2017.

(f) Measurement facilities used to make radiated emission measurements from 1 GHz to 40 GHz shall comply with the site validation option of ANSI C63.4–2014, (clause 5.5.1a)1)) which references CISPR 16–1–4:2010–04 (incorporated by reference, see § 2.910) by July 13, 2018.

(g) Measurements for intentional radiators subject to part 15 of this chapter are to be made using the procedures

in ANSI C63.10–2013 (incorporated by reference, see § 2.910) by July 13, 2016.

(h) Measurements for unintentional radiators are to be made using the procedures in ANSI C63.4, except clauses 4.5.3, 4.6, 6.2.13, 8.2.2, 9, and 13 (incorporated by reference, see § 2.910), by July 13, 2016.

(i) Radio frequency devices that would have been considered eligible for authorization under either the verification or Declaration of Conformity procedures that were in effect prior to November 2, 2017 may continue to be authorized until November 2, 2018 under the appropriate procedure in accordance with the requirements that were in effect immediately prior to November 2, 2017.

(j) All radio frequency devices that were authorized under the verification or Declaration of Conformity procedures prior to November 2, 2017 must continue to meet all requirements associated with the applicable procedure that were in effect immediately prior to November 2, 2017. If any changes are made to such devices after November 2, 2018, the requirements associated with the Supplier's Declaration of Conformity will apply.

[80 FR 33443, June 12, 2015, as amended at 81 FR 42265, June 29, 2016; 82 FR 50828, Nov. 2, 2017]

TELECOMMUNICATION CERTIFICATION BODIES (TCBs)

§ 2.960 Recognition of Telecommunication Certification Bodies (TCBs).

(a) The Commission may recognize Telecommunication Certification Bodies (TCBs) which have been designated according to requirements of paragraph (b) or (c) of this section to issue grants of certification as required under this part. Certification of equipment by a TCB shall be based on an application with all the information specified in this part. The TCB shall review the application to determine compliance with the Commission's requirements and shall issue a grant of equipment certification in accordance with § 2.911.

(b) In the United States, TCBs shall be accredited and designated by the National Institute of Standards and Technology (NIST) under its National Voluntary Conformity Assessment Evaluation (NVCASE) program, or other recognized programs based on ISO/IEC 17065 (incorporated by reference, see § 2.910) to comply with the Commission's qualification criteria for TCBs. NIST may, in accordance with its procedures, allow other appropriately qualified accrediting bodies to accredit TCBs. TCBs shall comply with the requirements in § 2.962 of this part.

(c) In accordance with the terms of an effective bilateral or multilateral mutual recognition agreement or arrangement (MRA) to which the United States is a party, bodies outside the United States shall be permitted to authorize equipment in lieu of the Commission. A body in an MRA partner economy may authorize equipment to U.S. requirements only if that economy permits bodies in the United States to authorize equipment to its requirements. The authority designating these telecommunication certification bodies shall meet the following criteria.

(1) The organization accrediting the prospective telecommunication certification body shall be capable of meeting the requirements and conditions of ISO/IEC 17011 (incorporated by reference, see § 2.910).

(2) The organization assessing the telecommunication certification body shall appoint a team of qualified experts to perform the assessment covering all of the elements within the scope of accreditation. For assessment of telecommunications equipment, the areas of expertise to be used during the assessment shall include, but not be limited to, electromagnetic compatibility and telecommunications equipment (wired and wireless).

[64 FR 4995, Feb. 2, 1999, as amended at 80 FR 33444, June 12, 2015]

§ 2.962 Requirements for Telecommunication Certification Bodies.

(a) Telecommunication certification bodies (TCBs) designated by NIST, or designated by another authority pursuant to an bilateral or multilateral mutual recognition agreement or arrangement to which the United States is a party, shall comply with the requirements of this section.

(b) *Certification methodology*. (1) The certification system shall be based on type testing as identified in ISO/IEC 17065 (incorporated by reference, see §2.910).

(2) Certification shall normally be based on testing no more than one unmodified representative sample of each product type for which certification is sought. Additional samples may be requested if clearly warranted, such as when certain tests are likely to render a sample inoperative.

(c) *Criteria for designation*. (1) To be designated as a TCB under this section, an entity shall, by means of accreditation, meet all the appropriate specifications in ISO/IEC 17065 for the scope of equipment it will certify. The accreditation shall specify the group of equipment to be certified and the applicable regulations for product evaluation.

(2) The TCB shall demonstrate expert knowledge of the regulations for each product with respect to which the body seeks designation. Such expertise shall include familiarity with all applicable technical regulations, administrative provisions or requirements, as well as the policies and procedures used in the application thereof.

(3) The TCB shall have the technical expertise and capability to test the equipment it will certify and shall also be accredited in accordance with ISO/IEC 17025 (incorporated by reference, see §2.910) to demonstrate it is competent to perform such tests.

(4) The TCB shall demonstrate an ability to recognize situations where interpretations of the regulations or test procedures may be necessary. The appropriate key certification and laboratory personnel shall demonstrate knowledge of how to obtain current and correct technical regulation interpretations. The competence of the TCB shall be demonstrated by assessment. The general competence, efficiency, experience, familiarity with technical regulations and products covered by those technical regulations, as well as compliance with applicable parts of ISO/IEC 17025 and ISO/IEC 17065 shall be taken into consideration during assessment.

(5) A TCB shall participate in any consultative activities, identified by the Commission or NIST, to facilitate a common understanding and interpretation of applicable regulations.

(6) The Commission will provide public notice of the specific methods that will be used to accredit TCBs, consistent with these qualification criteria.

(7) A TCB shall be reassessed for continued accreditation on intervals not exceeding two years.

(d) *External resources*. (1) In accordance with the provisions of ISO/IEC 17065 the evaluation of a product, or a portion thereof, may be performed by bodies that meet the applicable requirements of ISO/IEC 17025 in accordance with the applicable provisions of ISO/IEC 17065 for external resources (outsourcing) and other relevant standards. Evaluation is the selection of applicable requirements and the determination that those requirements are met. Evaluation may be performed using internal TCB resources or external (outsourced) resources.

(2) A TCB shall not outsource review and certification decision activities.

(3) When external resources are used to provide the evaluation function, including the testing of equipment subject to certification, the TCB shall be responsible for the evaluation and shall maintain appropriate oversight of the external resources used to ensure reliability of the evaluation. Such oversight shall include periodic audits of products that have been tested and other activities as required in ISO/IEC 17065 when a certification body uses external resources for evaluation.

(e) *Recognition of a TCB*. (1)(i) The Commission will recognize as a TCB any organization in the United States that meets the qualification criteria and is accredited and designated by NIST or NIST's recognized accreditor as provided in §2.960(b).

(ii) The Commission will recognize as a TCB any organization outside the United States that meets the qualification criteria and is designated pursuant to an bilateral or multilateral MRA as provided in §2.960(c).

(2) The Commission will withdraw its recognition of a TCB if the TCB's designation or accreditation is withdrawn, if the Commission determines there is

just cause for withdrawing the recognition, or if the TCB requests that it no longer hold its designation or recognition. The Commission will limit the scope of equipment that can be certified by a TCB if its accreditor limits the scope of its accreditation or if the Commission determines there is good cause to do so. The Commission will notify a TCB in writing of its intention to withdraw or limit the scope of the TCB's recognition and provide at least 60 days for the TCB to respond. In the case of a TCB designated and recognized pursuant to an bilateral or multilateral mutual recognition agreement or arrangement (MRA), the Commission shall consult with the Office of the United States Trade Representative (USTR), as necessary, concerning any disputes arising under an MRA for compliance with the Telecommunications Trade Act of 1988 (Section 1371–1382 of the Omnibus Trade and Competitiveness Act of 1988).

(3) The Commission will notify a TCB in writing when it has concerns or evidence that the TCB is not certifying equipment in accordance with the Commission's rules and policies and request that it explain and correct any apparent deficiencies. The Commission may require that all applications for the TCB be processed under the pre-approval guidance procedure in § 2.964 for at least 30 days, and will provide a TCB with 30 days' notice of its intent to do so unless good cause exists for providing shorter notice. The Commission may request that a TCB's Designating Authority or accreditation body investigate and take appropriate corrective actions as required, and the Commission may initiate action to limit or withdraw the recognition of the TCB as described in § 2.962(e)(2).

(4) If the Commission withdraws its recognition of a TCB, all certifications issued by that TCB will remain valid unless specifically set aside or revoked by the Commission under paragraph (f)(5) of this section.

(5) A list of recognized TCBs will be published by the Commission.

(f) *Scope of responsibility*. (1) A TCB shall certify equipment in accordance with the Commission's rules and policies.

(2) A TCB shall accept test data from any Commission-recognized accredited test laboratory, subject to the requirements in ISO/IEC 17065 and shall not unnecessarily repeat tests.

(3) A TCB may establish and assess fees for processing certification applications and other Commission-required tasks.

(4) A TCB may only act on applications that it has received or which it has issued a grant of certification.

(5) A TCB shall dismiss an application which is not in accordance with the provisions of this subpart or when the applicant requests dismissal, and may dismiss an application if the applicant does not submit additional information or test samples requested by the TCB.

(6) Within 30 days of the date of grant of certification the Commission or TCB issuing the grant may set aside a grant of certification that does not comply with the requirements or upon the request of the applicant. A TCB shall notify the applicant and the Commission when a grant is set aside. After 30 days, the Commission may revoke a grant of certification through the procedures in § 2.939.

(7) A TCB shall follow the procedures in § 2.964 of this part for equipment on the pre-approval guidance list.

(8) A TCB shall supply an electronic copy of each certification application and all necessary exhibits to the Commission prior to grant or dismissal of the application. Where appropriate, the application must be accompanied by a request for confidentiality of any material that may qualify for confidential treatment under the Commission's rules.

(9) A TCB shall grant or dismiss each certification application through the Commission's electronic filing system.

(10) A TCB may not:

(i) Grant a waiver of the rules;

(ii) Take enforcement actions; or

(iii) Authorize a transfer of control of a grantee.

(11) All TCB actions are subject to Commission review.

(g) *Post-market surveillance requirements*. (1) In accordance with ISO/IEC 17065 a TCB shall perform appropriate post-market surveillance activities. These activities shall be based on type

testing a certain number of samples of the total number of product types which the certification body has certified.

(2) The Chief of the Office of Engineering and Technology (OET) has delegated authority under § 0.241(g) of this chapter to develop procedures that TCBs will use for performing post-market surveillance. OET will publish a document on TCB post-market surveillance requirements, and this document will provide specific information such as the number and types of samples that a TCB must test.

(3) OET may request that a grantee of equipment certification submit a sample directly to the TCB that performed the original certification for evaluation. Any equipment samples requested by the Commission and tested by a TCB will be counted toward the minimum number of samples that the TCB must test.

(4) TCBs may request samples of equipment that they have certified directly from the grantee of certification in accordance with § 2.945.

(5) If during post market surveillance of a certified product, a TCB determines that a product fails to comply with the technical regulations for that product, the TCB shall immediately notify the grantee and the Commission in writing of its findings. The grantee shall provide a report to the TCB describing the actions taken to correct the situation, and the TCB shall provide a report of these actions to the Commission within 30 days.

(6) TCBs shall submit periodic reports to OET of their post-market surveillance activities and findings in the format and by the date specified by OET.

[80 FR 33444, June 12, 2015]

§ 2.964 Pre-approval guidance procedure for Telecommunication Certification Bodies.

(a) The Commission will publish a ''Pre-approval Guidance List'' identifying the categories of equipment or types of testing for which Telecommunication Certification Bodies (TCBs) must request guidance from the Commission before approving equipment on the list.

(b) TCBs shall use the following procedure for approving equipment on the Commission's pre-approval guidance list.

(1) A TCB shall perform an initial review of the application and determine the issues that require guidance from the Commission. The TCB shall electronically submit the relevant exhibits to the Commission along with a specific description of the pertinent issues.

(2) The TCB shall complete the review of the application in accordance with the Commission's guidance.

(3) The Commission may request and test a sample of the equipment before the application can be granted.

(4) The TCB shall electronically submit the application and all exhibits to the Commission along with a request to grant the application.

(5) The Commission will give its concurrence for the TCB to grant the application if it determines that the equipment complies with the rules. The Commission will advise the TCB if additional information or equipment testing is required, or if the equipment cannot be certified because it does not comply with the Commission's rules.

[80 FR 33445, June 12, 2015]

CERTIFICATION

§ 2.1031 Cross reference.

The general provisions of this subpart § 2.901 *et seq.* shall apply to applications for and grants of certification.

§ 2.1033 Application for certification.

(a) An application for certification shall be filed on FCC Form 731 with all questions answered. Items that do not apply shall be so noted.

(b) Applications for equipment operating under Parts 11, 15 and 18 of the rules shall be accompanied by a technical report containing the following information:

(1) The full name and mailing address of the manufacturer of the device and the applicant for certification.

(2) FCC identifier.

(3) A copy of the installation and operating instructions to be furnished the user. A draft copy of the instructions

may be submitted if the actual document is not available. The actual document shall be furnished to the FCC when it becomes available.

(4) A brief description of the circuit functions of the device along with a statement describing how the device operates. This statement should contain a description of the ground system and antenna, if any, used with the device.

(5) A block diagram showing the frequency of all oscillators in the device. The signal path and frequency shall be indicated at each block. The tuning range(s) and intermediate frequency(ies) shall be indicated at each block. A schematic diagram is also required for intentional radiators.

(6) A report of measurements showing compliance with the pertinent FCC technical requirements. This report shall identify the test procedure used (e.g., specify the FCC test procedure, or industry test procedure that was used), the date the measurements were made, the location where the measurements were made, and the device that was tested (model and serial number, if available). The report shall include sample calculations showing how the measurement results were converted for comparison with the technical requirements.

(7) A sufficient number of photographs to clearly show the exterior appearance, the construction, the component placement on the chassis, and the chassis assembly. The exterior views shall show the overall appearance, the antenna used with the device (if any), the controls available to the user, and the required identification label in sufficient detail so that the name and FCC identifier can be read. In lieu of a photograph of the label, a sample label (or facsimile thereof) may be submitted together with a sketch showing where this label will be placed on the equipment. Photographs shall be of size A4 (21 cm × 29.7 cm) or 8 × 10 inches (20.3 cm × 25.4 cm). Smaller photographs may be submitted provided they are sharp and clear, show the necessary detail, and are mounted on A4 (21 cm × 29.7 cm) or 8.5 × 11 inch (21.6 cm × 27.9 cm) paper. A sample label or facsimile together with the sketch showing the placement of this label shall be on the same size paper.

(8) If the equipment for which certification is being sought must be tested with peripheral or accessory devices connected or installed, a brief description of those peripherals or accessories. The peripheral or accessory devices shall be unmodified, commercially available equipment.

(9) For equipment subject to the provisions of part 15 of this chapter, the application shall indicate if the equipment is being authorized pursuant to the transition provisions in § 15.37 of this chapter.

(10) Applications for the certification of scanning receivers shall include a statement describing the methods used to comply with the design requirements of all parts of § 15.121 of this chapter. The application must specifically include a statement assessing the vulnerability of the equipment to possible modification and describing the design features that prevent the modification of the equipment by the user to receive transmissions from the Cellular Radiotelephone Service. The application must also demonstrate compliance with the signal rejection requirement of § 15.121 of this chapter, including details on the measurement procedures used to demonstrate compliance.

(11) Applications for certification of transmitters operating within the 59.0–64.0 GHz band under part 15 of this chapter shall also be accompanied by an exhibit demonstrating compliance with the provisions of § 15.255(g) of this chapter.

(12) An application for certification of a software defined radio must include the information required by § 2.944.

(13) Applications for certification of U–NII devices in the 5.15–5.35 GHz and the 5.47–5.85 GHz bands must include a high level operational description of the security procedures that control the radio frequency operating parameters and ensure that unauthorized modifications cannot be made.

(14) Contain at least one drawing or photograph showing the test set-up for each of the required types of tests applicable to the device for which certification is requested. These drawings or

photographs must show enough detail to confirm other information contained in the test report. Any photographs used must be focused originals without glare or dark spots and must clearly show the test configuration used.

(c) Applications for equipment other than that operating under parts 15, 11 and 18 of this chapter shall be accompanied by a technical report containing the following information:

(1) The full name and mailing address of the manufacturer of the device and the applicant for certification.

(2) FCC identifier.

(3) A copy of the installation and operating instructions to be furnished the user. A draft copy of the instructions may be submitted if the actual document is not available. The actual document shall be furnished to the FCC when it becomes available.

(4) Type or types of emission.

(5) Frequency range.

(6) Range of operating power values or specific operating power levels, and description of any means provided for variation of operating power.

(7) Maximum power rating as defined in the applicable part(s) of the rules.

(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

(9) Tune-up procedure over the power range, or at specific operating power levels.

(10) A schematic diagram and a description of all circuitry and devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation, and for limiting power.

(11) A photograph or drawing of the equipment identification plate or label showing the information to be placed thereon.

(12) Photographs (8″ × 10″) of the equipment of sufficient clarity to reveal equipment construction and layout, including meters, if any, and labels for controls and meters and sufficient views of the internal construction to define component placement and chassis assembly. Insofar as these requirements are met by photographs or drawings contained in instruction manuals supplied with the certification request, additional photographs are necessary only to complete the required showing.

(13) For equipment employing digital modulation techniques, a detailed description of the modulation system to be used, including the response characteristics (frequency, phase and amplitude) of any filters provided, and a description of the modulating wavetrain, shall be submitted for the maximum rated conditions under which the equipment will be operated.

(14) The data required by §§ 2.1046 through 2.1057, inclusive, measured in accordance with the procedures set out in § 2.1041.

(15) The application for certification of an external radio frequency power amplifier under part 97 of this chapter need not be accompanied by the data required by paragraph (b)(14) of this section. In lieu thereof, measurements shall be submitted to show compliance with the technical specifications in subpart C of part 97 of this chapter and such information as required by § 2.1060 of this part.

(16) An application for certification of an AM broadcast stereophonic exciter-generator intended for interfacing with existing certified, or formerly type accepted or notified transmitters must include measurements made on a complete stereophonic transmitter. The instruction book must include complete specifications and circuit requirements for interconnecting with existing transmitters. The instruction book must also provide a full description of the equipment and measurement procedures to monitor modulation and to verify that the combination of stereo exciter-generator and transmitter meet the emission limitations of § 73.44.

(17) Applications for certification required by § 25.129 of this chapter shall include any additional equipment test data required by that section.

(18) An application for certification of a software defined radio must include the information required by § 2.944.

(19) Applications for certification of equipment operating under part 27 of this chapter, that a manufacturer is seeking to certify for operation in the:

(i) 1755–1780 MHz, 2155–2180 MHz, or both bands shall include a statement indicating compliance with the pairing of 1710–1780 and 2110–2180 MHz specified in §§ 27.5(h) and 27.75 of this chapter.

(ii) 1695–1710 MHz, 1755–1780 MHz, or both bands shall include a statement indicating compliance with § 27.77 of this chapter.

(iii) 600 MHz band shall include a statement indicating compliance with § 27.75 of this chapter.

(20) Before equipment operating under part 90 of this chapter and capable of operating on the 700 MHz interoperability channels (See § 90.531(b)(1) of this chapter) may be marketed or sold, the manufacturer thereof shall have a Compliance Assessment Program Supplier's Declaration of Compliance and Summary Test Report or, alternatively, a document detailing how the manufacturer determined that its equipment complies with § 90.548 of this chapter and that the equipment is interoperable across vendors. Submission of a 700 MHz narrowband radio for certification will constitute a representation by the manufacturer that the radio will be shown, by testing, to be interoperable across vendors before it is marketed or sold.

(21) Contain at least one drawing or photograph showing the test set-up for each of the required types of tests applicable to the device for which certification is requested. These drawings or photographs must show enough detail to confirm other information contained in the test report. Any photographs used must be focused originals without glare or dark spots and must clearly show the test configuration used.

(d) Applications for certification of equipment operating under part 20 of this chapter, that a manufacturer is seeking to certify as hearing aid compatible, as set forth in § 20.19 of this chapter, shall include a statement indicating compliance with the test requirements of § 20.19 of this chapter and indicating the appropriate M-rating and T-rating for the equipment. The manufacturer of the equipment shall be responsible for maintaining the test results.

(e) A single application may be filed for a composite system that incorporates devices subject to certification under multiple rule parts, however, the appropriate fee must be included for each device. Separate applications must be filed if different FCC Identifiers will be used for each device.

(f) Radio frequency devices operating under the provisions of this part are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 1.1310, 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of RF sources under this section must contain a statement confirming compliance with these requirements. Technical information showing the basis for this statement must be submitted to the Commission upon request.

[63 FR 36599, July 7, 1998, as amended at 63 FR 42278, Aug. 7, 1998; 64 FR 22561, Apr. 27, 1999; 67 FR 42734, June 25, 2002; 68 FR 54175, Sept. 16, 2003; 68 FR 68545, Dec. 9, 2003; 69 FR 5709, Feb. 6, 2004; 70 FR 23039, May 4, 2005; 77 FR 41928, July 17, 2012; 78 FR 59850, Sept. 30, 2013; 79 FR 24578, May 1, 2014; 79 FR 32410, June 4, 2014; 79 FR 48536, Aug. 15, 2014; 79 FR 71325, Dec. 2, 2014; 80 FR 33446, June 12, 2015; 81 FR 66832, Sept. 29, 2016; 83 FR 30367, June 28, 2018; 85 FR 18146, Apr. 1, 2020]

§ 2.1035 [Reserved]

§ 2.1041 Measurement procedure.

(a) For equipment operating under parts 15 and 18, the measurement procedures are specified in the rules governing the particular device for which certification is requested.

(b) For equipment operating in the authorized radio services, measurements are required as specified in §§ 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057. The measurement procedures in ANSI C63.26–2015 (incorporated by reference, see § 2.910) are acceptable for performing compliance measurements for equipment types covered by the measurement standard. See also § 2.947 for acceptable measurement procedures.

[82 FR 50829, Nov. 2, 2017]

§ 2.1043 Changes in certificated equipment.

(a) Except as provided in paragraph (b)(3) of this section, changes to the basic frequency determining and stabilizing circuitry (including clock or data rates), frequency multiplication

stages, basic modulator circuit or maximum power or field strength ratings shall not be performed without application for and authorization of a new grant of certification. Variations in electrical or mechanical construction, other than these indicated items, are permitted provided the variations either do not affect the characteristics required to be reported to the Commission or the variations are made in compliance with the other provisions of this section. Changes to the software installed in a transmitter that do not affect the radio frequency emissions do not require any additional filings and may be made by parties other than the holder of the grant of certification.

(b) Three classes of permissive changes may be made in certificated equipment without requiring a new application for and grant of certification. None of the classes of changes shall result in a change in identification.

(1) A Class I permissive change includes those modifications in the equipment which do not degrade the characteristics reported by the manufacturer and accepted by the Commission when certification is granted. No filing is required for a Class I permissive change.

(2) A Class II permissive change includes those modifications which degrade the performance characteristics as reported to the Commission at the time of the initial certification. Such degraded performance must still meet the minimum requirements of the applicable rules. When a Class II permissive change is made by the grantee, the grantee shall provide complete information and the results of tests of the characteristics affected by such change. The modified equipment shall not be marketed under the existing grant of certification prior to acknowledgement that the change is acceptable.

(3) A Class III permissive change includes modifications to the software of a software defined radio transmitter that change the frequency range, modulation type or maximum output power (either radiated or conducted) outside the parameters previously approved, or that change the circumstances under which the transmitter operates in accordance with Commission rules. When a Class III permissive change is made, the grantee shall provide a description of the changes and test results showing that the equipment complies with the applicable rules with the new software loaded, including compliance with the applicable RF exposure requirements. The modified software shall not be loaded into the equipment, and the equipment shall not be marketed with the modified software under the existing grant of certification, prior to acknowledgement that the change is acceptable. Class III changes are permitted only for equipment in which no Class II changes have been made from the originally approved device.

NOTE TO PARAGRAPH (b)(3): Any software change that degrades spurious and out-of-band emissions previously reported at the time of initial certification would be considered a change in frequency or modulation and would require a Class III permissive change or new equipment authorization application.

(4) Class I and Class II permissive changes may only be made by the holder of the grant of certification, except as specified.

(c) A grantee desiring to make a change other than a permissive change shall file a new application for certification accompanied by the required information as specified in this part and shall not market the modified device until the grant of certification has been issued. The grantee shall attach a description of the change(s) to be made and a statement indicating whether the change(s) will be made in all units (including previous production) or will be made only in those units produced after the change is authorized.

(d) A modification which results in a change in the identification of a device with or without change in circuitry requires a new application for, and grant of certification. If the changes affect the characteristics required to be reported, a complete application shall be filed. If the characteristics required to be reported are not changed the abbreviated procedure of § 2.933 may be used.

(e) Equipment that has been certificated or formerly type accepted for use in the Amateur Radio Service pursuant to the requirements of part 97 of this chapter may be modified without regard to the conditions specified in

paragraph (b) of this section, provided the following conditions are met:

(1) Any person performing such modifications on equipment used under part 97 of this chapter must possess a valid amateur radio operator license of the class required for the use of the equipment being modified.

(2) Modifications made pursuant to this paragraph are limited to equipment used at licensed amateur radio stations.

(3) Modifications specified or performed by equipment manufacturers or suppliers must be in accordance with the requirements set forth in paragraph (b) of this section.

(4) Modifications specified or performed by licensees in the Amateur Radio Service on equipment other than that at specific licensed amateur radio stations must be in accordance with the requirements set forth in paragraph (b) of this section.

(5) The station licensee shall be responsible for ensuring that modified equipment used at his station will comply with the applicable technical standards in part 97 of this chapter.

(f) For equipment other than that operating under parts 15 or 18 of this chapter, when a Class II permissive change is made by other than the grantee of certification, the information and data specified in paragraph (b)(2) of this section shall be supplied by the person making the change. The modified equipment shall not be operated under an authorization prior to acknowledgement that the change is acceptable.

(g) The interconnection of a certificated or formerly type accepted AM broadcast stereophonic exciter-generator with a certificated or formerly type accepted AM broadcast transmitter in accordance with the manufacturer's instructions and upon completion of measurements showing that the modified transmitter meets the emission limitation requirements of § 73.44 is defined as a Class I permissive change for compliance with this section.

(h) The interconnection of a multiplexing exciter with a certificated or formerly type accepted AM broadcast transmitter in accordance with the manufacturer's instructions without electrical or mechanical modification of the transmitter circuits and completion of equipment performance measurements showing the transmitter meets the minimum performance requirements applicable thereto is defined as a Class I permissive change for compliance with this section.

(i) The addition of TV broadcast subcarrier generators to a certificated or formerly type accepted TV broadcast transmitter or the addition of FM broadcast subcarrier generators to a type accepted FM broadcast transmitter, provided the transmitter exciter is designed for subcarrier operation without mechanical or electrical alterations to the exciter or other transmitter circuits.

(j) The addition of TV broadcast stereophonic generators to a certificated or formerly type accepted TV broadcast transmitter or the addition of FM broadcast stereophonic generators to a certificated or formerly type accepted FM broadcast transmitter, provided the transmitter exciter is designed for stereophonic sound operation without mechanical or electrical alterations to the exciter or other transmitter circuits.

(k) The addition of subscription TV encoding equipment for which the FCC has granted advance approval under the provisions of § 2.1400 in subpart M and § 73.644(c) of part 73 to a certificated or formerly type accepted transmitter is considered a Class I permissive change.

(l) Notwithstanding the provisions of this section, broadcast licensees or permittees are permitted to modify certificated or formerly type accepted equipment pursuant to § 73.1690 of the FCC's rules.

[63 FR 36600, July 7, 1998, as amended at 66 FR 50840, Oct. 5, 2001; 70 FR 23040, May 4, 2005; 80 FR 33446, June 12, 2015]

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with

the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as follows. In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(1) Single sideband transmitters in the A3A or A3J emission modes—by two tones at frequencies of 400 Hz and 1800 Hz (for 3.0 kHz authorized bandwidth), or 500 Hz and 2100 Hz (3.5 kHz authorized bandwidth), or 500 Hz and 2400 Hz (for 4.0 kHz authorized bandwidth), applied simultaneously, the input levels of the tones so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(2) Single sideband transmitters in the A3H emission mode—by one tone at a frequency of 1500 Hz (for 3.0 kHz authorized bandwidth), or 1700 Hz (for 3.5 kHz authorized bandwidth), or 1900 Hz (for 4.0 kHz authorized bandwidth), the level of which is adjusted to produce a radio frequency signal component equal in magnitude to the magnitude of the carrier in this mode.

(3) As an alternative to paragraphs (b) (1) and (2) of this section other tones besides those specified may be used as modulating frequencies, upon a sufficient showing of need. However, any tones so chosen must not be harmonically related, the third and fifth order intermodulation products which occur must fall within the −25 dB step of the emission bandwidth limitation curve, the seventh and ninth order intermodulation product must fall within the 35 dB step of the referenced curve and the eleventh and all higher order products must fall beyond the −35 dB step of the referenced curve.

(4) Independent sideband transmitters having two channels by 1700 Hz tones applied simultaneously in both channels, the input levels of the tones so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(5) Independent sideband transmitters having more than two channels by an appropriate signal or signals applied to all channels simultaneously. The input signal or signals shall simulate the input signals specified by the manufacturer for normal operation.

(6) Single-channel controlled-carrier transmitters in the A3 emission mode—by a 2500 Hz tone.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

[39 FR 5919, Feb. 15, 1974. Redesignated and amended at 63 FR 36599, July 7, 1998]

§ 2.1047 Measurements required: Modulation characteristics.

(a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

(b) *Equipment which employs modulation limiting.* A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

(c) *Single sideband and independent sideband radiotelephone transmitters*

which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of § 2.1049 for the occupied bandwidth tests.

(d) *Other types of equipment.* A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

[39 FR 5919, Feb. 15, 1974. Redesignated and amended at 63 FR 36599, July 7, 1998]

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(a) Radiotelegraph transmitters for manual operation when keyed at 16 dots per second.

(b) Other keyed transmitters—when keyed at the maximum machine speed.

(c) Radiotelephone transmitters equipped with a device to limit modulation or peak envelope power shall be modulated as follows. For single sideband and independent sideband transmitters, the input level of the modulating signal shall be 10 dB greater than that necessary to produce rated peak envelope power.

(1) Other than single sideband or independent sideband transmitters—when modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

(2) Single sideband transmitters in A3A or A3J emission modes—when modulated by two tones at frequencies of 400 Hz and 1800 Hz (for 3.0 kHz authorized bandwidth), or 500 Hz and 2100 Hz (for 3.5 kHz authorized bandwidth), or 500 Hz and 2400 Hz (for 4.0 kHz authorized bandwidth), applied simultaneously. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(3) Single sideband transmitters in the A3H emission mode—when modulated by one tone at a frequency of 1500 Hz (for 3.0 kHz authorized bandwidth), or 1700 Hz (for 3.5 kHz authorized bandwidth), or 1900 Hz (for 4.0 kHz authorized bandwidth), the level of which is adjusted to produce a radio frequency signal component equal in magnitude to the magnitude of the carrier in this mode.

(4) As an alternative to paragraphs (c) (2) and (3) of this section, other tones besides those specified may be used as modulating frequencies, upon a sufficient showing of need. However, any tones so chosen must not be harmonically related, the third and fifth order intermodulation products which occur must fall within the −25 dB step of the emission bandwidth limitation curve, the seventh and ninth order products must fall within the −35 dB step of the referenced curve and the eleventh and all higher order products must fall beyond the −35 dB step of the referenced curve.

(5) Independent sideband transmitters having two channels—when modulated by 1700 Hz tones applied simultaneously to both channels. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(d) Radiotelephone transmitters without a device to limit modulation or peak envelope power shall be modulated as follows. For single sideband and independent sideband transmitters, the input level of the modulating signal should be that necessary to produce rated peak envelope power.

(1) Other than single sideband or independent sideband transmitters—when modulated by a 2500 Hz tone of sufficient level to produce at least 85 percent modulation. If 85 percent modulation is unattainable, the highest percentage modulation shall be used.

(2) Single sideband transmitters in A3A or A3J emission modes—when modulated by two tones at frequencies of 400 Hz and 1800 Hz (for 3.0 kHz authorized bandwidth), or 500 Hz and 2100 Hz (for 3.5 kHz authorized bandwidth),

or 500 Hz and 2400 Hz (for 4.0 kHz authorized bandwidth), applied simultaneously. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(3) Single sideband transmitters in the A3H emission mode—when modulated by one tone at a frequency of 1500 Hz (for 3.0 kHz authorized bandwidth), or 1700 Hz (for 3.5 kHz authorized bandwidth), or 1900 Hz (for 4.0 kHz authorized bandwidth), the level of which is adjusted to produce a radio frequency signal component equal in magnitude to the magnitude of the carrier in this mode.

(4) As an alternative to paragraphs (d) (2) and (3) of this section, other tones besides those specified may be used as modulating frequencies, upon a sufficient showing of need. However any tones so chosen must not be harmonically related, the third and fifth order intermodulation products which occur must fall within the −25 dB step of the emission bandwidth limitation curve, the seventh and ninth order products must fall within the −35 dB step of the referenced curve and the eleventh and all higher order products must fall beyond the −35 dB step of the referenced curve.

(5) Independent sideband transmitters having two channels—when modulated by 1700 Hz tones applied simultaneously to both channels. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(e) Transmitters for use in the Radio Broadcast Services:

(1) AM broadcast transmitters for monaural operation—when amplitude modulated 85% by a 7,500 Hz input signal.

(2) AM broadcast stereophonic operation—when the transmitter operated under any stereophonic modulation condition not exceeding 100% on negative peaks and tested under the conditions specified in § 73.128 in part 73 of the FCC rules for AM broadcast stations.

(3) FM broadcast transmitter not used for multiplex operation—when modulated 85 percent by a 15 kHz input signal.

(4) FM broadcast transmitters for multiplex operation under Subsidiary Communication Authorization (SCA)—when carrier is modulated 70 percent by a 15 kHz main channel input signal, and modulated an additional 15 percent simultaneously by a 67 kHz subcarrier (unmodulated).

(5) FM broadcast transmitter for stereophonic operation—when modulated by a 15 kHz input signal to the main channel, a 15 kHz input signal to the stereophonic subchannel, and the pilot subcarrier simultaneously. The input signals to the main channel and stereophonic subchannel each shall produce 38 percent modulation of the carrier. The pilot subcarrier should produce 9 percent modulation of the carrier.

(6) Television broadcast monaural transmitters—when modulated 85% by a 15 kHz input signal.

(7) Television broadcast stereophonic sound transmitters—when the transmitter is modulated with a 15 kHz input signal to the main channel and the stereophonic subchannel, any pilot subcarrier(s) and any unmodulated auxiliary subcarrier(s) which may be provided. The signals to the main channel and the stereophonic subchannel must be representative of the system being tested and when combined with any pilot subcarrier(s) or other auxiliary subcarriers shall result in 85% deviation of the maximum specified aural carrier deviation.

(f) Transmitters for which peak frequency deviation (D) is determined in accordance with § 2.202(f), and in which the modulating baseband comprises more than 3 independent speech channels—when modulated by a test signal determined in accordance with the following:

(1) A modulation reference level is established for the characteristic baseband frequency. (Modulation reference level is defined as the average power level of a sinusoidal test signal delivered to the modulator input which provides the specified value of per-channel deviation.)

(2) Modulation reference level being established, the total rms deviation of the transmitter is measured when a

test signal consisting of a band of random noise extending from below 20 kHz to the highest frequency in the baseband, is applied to the modulator input through any preemphasis networks used in normal service. The average power level of the test signal shall exceed the modulation reference level by the number of decibels determined using the appropriate formula in the following table:

Number of message circuits that modulate the transmitter	Number of dB by which the average power (P_{avg}) level test signal shall exceed the modulation reference level	Limits of P_{avg} (dBm0)
More than 3, but less than 12	To be specified by the equipment manufacturer subject to FCC approval.	
At least 12, but less than 60	$X + 2 \log_{10} N_c$	X: −2 to + 2.6
At least 60, but less than 240	$X + 4 \log_{10} N_c$	X: −5.6 to −1.0
240 or more	$X + 10 \log_{10} N_c$	X: −19.6 to −15.0

Where X represents the average power in a message circuit in dBm0; N_c is the number of circuits in the multiplexed message load. P_{avg} shall be selected by the transmitter manufacturer and included with the technical data submitted with the application for type acceptance. (See § 2.202(e) in this chapter.)

(g) Transmitters in which the modulating baseband comprises not more than three independent channels—when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

(i) Transmitters designed for other types of modulation—when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

(Secs. 4, 303, 307, 48 Stat., as amended, 1066, 1082, 1083; 47 U.S.C. 154, 303, 307)

[39 FR 5919, Feb. 15, 1974, as amended at 39 FR 35664, Oct. 3, 1974; 47 FR 13164, Mar. 29, 1982; 48 FR 16493, Apr. 18, 1983; 49 FR 18105, Apr. 27, 1984. Redesignated at 63 FR 36599, July 7, 1998]

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

[39 FR 5919, Feb. 15, 1974. Redesignated and amended at 63 FR 36599, July 7, 1998]

§ 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of

each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

[39 FR 5919, Feb. 15, 1974. Redesignated and amended at 63 FR 36599, July 7, 1998]

§ 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.

(3) From 0° to + 50° centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(c) In addition to all other requirements of this section, the following information is required for equipment incorporating heater type crystal oscillators to be used in mobile stations, for which type acceptance is first requested after March 25, 1974, except for battery powered, hand carried, portable equipment having less than 3 watts mean output power.

(1) Measurement data showing variation in transmitter output frequency from a cold start and the elapsed time necessary for the frequency to stabilize within the applicable tolerance. Tests shall be made after temperature stabilization at each of the ambient temperature levels; the lower temperature limit, 0° centigrade and + 30° centigrade with no primary power applied.

(2) Beginning at each temperature level specified in paragraph (c)(1) of

this section, the frequency shall be measured within one minute after application of primary power to the transmitter and at intervals of no more than one minute thereafter until ten minutes have elapsed or until sufficient measurements are obtained to indicate clearly that the frequency has stabilized within the applicable tolerance, whichever time period is greater. During each test, the ambient temperature shall not be allowed to rise more than 10° centigrade above the respective beginning ambient temperature level.

(3) The elapsed time necessary for the frequency to stabilize within the applicable tolerance from each beginning ambient temperature level as determined from the tests specified in this paragraph shall be specified in the instruction book for the transmitter furnished to the user.

(4) When it is impracticable to subject the complete transmitter to this test because of its physical dimensions or power rating, only its frequency determining and stabilizing portions need be tested.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c), and (d) of this section. (For example measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

[39 FR 5919, Feb. 14, 1974, as amended at 51 FR 31304, Sept. 2, 1986; 56 FR 11682, Mar. 20, 1991. Redesignated at 63 FR 36599, July 7, 1998. 68 FR 68545, Dec. 9, 2003]

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in §§ 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

[61 FR 14502, Apr. 2, 1996. Redesignated and amended at 63 FR 36599, July 7, 1998]

§ 2.1060 Equipment for use in the amateur radio service.

(a) The general provisions of §§ 2.925, 2.1031, 2.1033, 2.1041, 2.1043, 2.1051, 2.1053 and 2.1057 shall apply to applications for, and grants of, certification for equipment operated under the requirements of part 97 of this chapter, the Amateur Radio Service.

(b) When performing the tests specified in §§ 2.1051 and 2.1053 of this part,

the center of the transmitted bandwidth shall be within the operating frequency band by an amount equal to 50 percent of the bandwidth utilized for the tests. In addition, said tests shall be made on at least one frequency in each of the bands within which the equipment is capable of tuning.

(c) Certification of external radio frequency power amplifiers may be denied when denial would prevent the use of these amplifiers in services other than the Amateur Radio Service.

[63 FR 36601, July 7, 1998, as amended at 71 FR 66461, Nov. 15, 2006]

SUPPLIER'S DECLARATION OF CONFORMITY

§ 2.1071 Cross reference.

The general provisions of this subpart shall apply to equipment subject to Supplier's Declaration of Conformity.

[82 FR 50829, Nov. 2, 2017]

§ 2.1072 Limitation on Supplier's Declaration of Conformity.

(a) Supplier's Declaration of Conformity signifies that the responsible party, as defined in § 2.909, has determined that the equipment has been shown to comply with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated. Compliance with these standards shall not be construed to be a finding by the responsible party with respect to matters not encompassed by the Commission's rules.

(b) Supplier's Declaration of Conformity by the responsible party, as defined in § 2.909, is effective until a termination date is otherwise established by the Commission.

(c) No person shall, in any advertising matter, brochure, etc., use or make reference to Supplier's Declaration of Conformity in a deceptive or misleading manner or convey the impression that such Supplier's Declaration of Conformity reflects more than a determination by the manufacturer, importer, integrator, or responsible party, as defined in § 2.909, that the device or product has been shown to be capable of complying with the applicable technical standards of the Commission's rules.

[82 FR 50829, Nov. 2, 2017]

§ 2.1074 Identification.

(a) Devices subject only to Supplier's Declaration of Conformity shall be uniquely identified by the party responsible for marketing or importing the equipment within the United States. However, the identification shall not be of a format which could be confused with the FCC Identifier required on certified equipment. The responsible party shall maintain adequate identification records to facilitate positive identification for each device.

(b) Devices subject to authorization under Supplier's Declaration of Conformity may be labeled with the following logo on a voluntary basis as a visual indication that the product complies with the applicable FCC requirements. The use of the logo on the device does not alleviate the requirement to provide the compliance information required by § 2.1077.

[82 FR 50829, Nov. 2, 2017]

§ 2.1077 Compliance information.

(a) If a product must be tested and authorized under Supplier's Declaration of Conformity, a compliance information statement shall be supplied with the product at the time of marketing or importation, containing the following information:

(1) Identification of the product, *e.g.*, name and model number;

(2) A compliance statement as applicable, *e.g.*, for devices subject to part 15 of this chapter as specified in

§ 15.19(a)(3) of this chapter, that the product complies with the rules; and

(3) The identification, by name, address and telephone number or Internet contact information, of the responsible party, as defined in § 2.909. The responsible party for Supplier's Declaration of Conformity must be located within the United States.

(b) If a product is assembled from modular components (*e.g.*, enclosures, power supplies and CPU boards) that, by themselves, are authorized under a Supplier's Declaration of Conformity and/or a grant of certification, and the assembled product is also subject to authorization under Supplier's Declaration of Conformity but, in accordance with the applicable regulations, does not require additional testing, the product shall be supplied, at the time of marketing or importation, with a compliance information statement containing the following information:

(1) Identification of the assembled product, *e.g.*, name and model number.

(2) Identification of the modular components used in the assembly. A modular component authorized under Supplier's Declaration of Conformity shall be identified as specified in paragraph (a)(1) of this section. A modular component authorized under a grant of certification shall be identified by name and model number (if applicable) along with the FCC Identifier number.

(3) A statement that the product complies with part 15 of this chapter.

(4) The identification, by name, address and telephone number or Internet contact information, of the responsible party who assembled the product from modular components, as defined in § 2.909. The responsible party for Supplier's Declaration of Conformity must be located within the United States.

(5) Copies of the compliance information statements for each modular component used in the system that is authorized under Supplier's Declaration of Conformity.

(c) The compliance information statement shall be included in the user's manual or as a separate sheet. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form. The information may be provided electronically as permitted in § 2.935.

[82 FR 50829, Nov. 2, 2017]

RADIOFREQUENCY RADIATION EXPOSURE

§ 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular § 1.1307(b).

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term ''fixed location'' means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

(c)(1) Mobile devices that operate in the Commercial Mobile Radio Services pursuant to part 20 of this chapter; the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Services pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Upper Microwave Flexible Use Service pursuant to part 30 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; the 76–81 GHz

Band Radar Service pursuant to part 95 of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if:

(i) They operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or

(ii) They operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

(2) Unlicensed personal communications service devices, unlicensed millimeter-wave devices, and unlicensed NII devices authorized under §§15.255(f), 15.257(g), 15.319(i), and 15.407(f) of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in §2.1093(b) requiring evaluation under the provisions of that section.

(3) All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§1.1307(c) and 1.1307(d) of this chapter.

(4) Applications for equipment authorization of mobile and unlicensed transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(d) The limits to be used for evaluation are specified in §1.1310 of this chapter. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

(1) For purposes of analyzing mobile transmitting devices under the occupational/controlled criteria specified in §1.1310 of this chapter, time-averaging provisions of the guidelines may be used in conjunction with typical maximum duty factors to determine maximum likely exposure levels.

(2) Time-averaging provisions may not be used in determining typical exposure levels for devices intended for use by consumers in general population/uncontrolled environments as defined in §1.1310 of this chapter. However, ''source-based'' time-averaging based on an inherent property or duty-cycle of a device is allowed. An example of this is the determination of exposure from a device that uses digital technology such as a time-division multiple-access (TDMA) scheme for transmission of a signal. In general, maximum average power levels must be used to determine compliance.

(3) If appropriate, awareness of exposure from devices in this section can be accomplished by the use of visual advisories (such as labeling, embossing, or on an equivalent electronic display) and by providing users with information concerning minimum separation distances from radiating structures and proper installation of antennas.

(i) Visual advisories shall be legible and clearly visible to the user from the exterior of the device.

(ii) Visual advisories used on devices that are subject to occupational/controlled exposure limits must indicate that the device is for occupational use only, must refer the user to specific information on RF exposure, such as that provided in a user manual, and must note that the advisory and its information is required for FCC RF exposure compliance. Such instructional material must provide the user with information on how to use the device in order to ensure compliance with the occupational/controlled exposure limits.

(iii) A sample of the visual advisory, illustrating its location on the device, and any instructional material intended to accompany the device when marketed, shall be filed with the Commission along with the application for equipment authorization.

(iv) For occupational devices, details of any special training requirements pertinent to limiting RF exposure should also be submitted. Holders of grants for mobile devices to be used in occupational settings are encouraged, but not required, to coordinate with end-user organizations to ensure appropriate RF safety training.

(4) In some cases, e.g., modular or desktop transmitters, the potential conditions of use of a device may not allow easy classification of that device as either mobile or portable (also see § 2.1093). In such cases, applicants are responsible for determining minimum distances for compliance for the intended use and installation of the device based on evaluation of either specific absorption rate (SAR), field strength or power density, whichever is most appropriate.

[61 FR 41017, Aug. 7, 1996, as amended at 62 FR 4655, Jan. 31, 1997; 62 FR 9658, Mar. 3, 1997; 62 FR 47966, Sept. 12, 1997; 68 FR 38638, June 30, 2003; 69 FR 3264, Jan. 23, 2004; 70 FR 24725, May 11, 2005; 78 FR 21559, Apr. 11, 2013; 78 FR 29062, May 17, 2013; 78 FR 33651, June 4, 2013; 80 FR 36221, June 23, 2015; 81 FR 79936, Nov. 14, 2016; 82 FR 43870, Sept. 20, 2017; 84 FR 25689, June 4, 2019; 85 FR 38739, June 26, 2020]

EFFECTIVE DATE NOTE: At 85 FR 18146, Apr. 1, 2020, § 2.1091 was amended by revising paragraphs (b) and (c), removing paragraph (d) introductory text, and revising paragraphs (d)(1) and (2), effective June 1, 2020. At 85 FR 33578, June 2, 2020, this revision was delayed indefinitely. For the convenience of the user, the revised text is set forth as follows:

§ 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

* * * * *

(b) For purposes of this section, the definitions in § 1.1307(b)(2) of this chapter shall apply. A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons. In this context, the term ''fixed location'' means that the device is physically secured at one location and is not able to be easily moved to another location while transmitting. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal desktop computer, are considered to be mobile devices if they meet the 20-centimeter separation requirement.

(c)(1) Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for mobile devices with single RF sources having either more than an available maximum time-averaged power of 1 mW or more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), whichever is greater. For mobile devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 of this chapter is necessary if the ERP of the device is greater than ERP_{20cm} in the formula below. If the ERP of a single RF source at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz is not easily obtained, then the available maximum time-averaged power may be used (*i.e.*, without consideration of ERP) in comparison with the following formula only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

$$P_{th}(\text{mW}) = ERP_{20\,cm}\,(\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

(2) For multiple mobile or portable RF sources within a device operating in the same time averaging period, routine environmental evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

(3) Unless otherwise specified in this chapter, any other single mobile or multiple mobile and portable RF source(s) associated with a device is exempt from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in § 1.1307(c) and (d) of this chapter.

(d)(1) Applications for equipment authorization of mobile RF sources subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in § 1.1310 of this chapter as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request. In general, maximum time-averaged power levels must be used for evaluation. All unlicensed personal communications service

(PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

(2)(i) For purposes of analyzing mobile transmitting devices under the occupational/controlled criteria specified in § 1.1310 of this chapter, time averaging provisions of the limits may be used in conjunction with the maximum duty factor to determine maximum time-averaged exposure levels under normal operating conditions.

(ii) Such time averaging provisions based on maximum duty factor may not be used in determining exposure levels for devices intended for use by consumers in general population/uncontrolled environments as defined in § 1.1310 of this chapter. However, ''source-based'' time averaging based on an inherent property of the RF source is allowed over a time period not to exceed 30 minutes. An example of this is the determination of exposure from a device that uses digital technology such as a time-division multiple-access (TDMA) scheme for transmission of a signal.

* * * * *

§ 2.1093 Radiofrequency radiation exposure evaluation: portable devices.

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular § 1.1307(b).

(b) For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

(c)(1) Portable devices that operate in the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Service (PCS) pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Upper Microwave Flexible Use Service pursuant to part 30 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, the 4.9 GHz Band Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; the Wireless Medical Telemetry Service (WMTS), the Medical Device Radiocommunication Service (MedRadio), and the 76–81 GHz Band Radar Service pursuant to subparts H, I, and M of part 95 of this chapter, respectively; unlicensed personal communication service, unlicensed NII devices and millimeter-wave devices authorized under §§ 15.255(f), 15.257(g), 15.319(i), and 15.407(f) of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use.

(2) All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter.

(3) Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (''SAR'') in Section 4.2 of ''IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,'' ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ''Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,'' NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological

hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

(i) Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of visual advisories (such as labeling, embossing, or on an equivalent electronic display) or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(ii) Visual advisories on portable devices designed only for occupational use can be used as part of an applicant's evidence of the device user's awareness of occupational/controlled exposure limits.

(A) Such visual advisories shall be legible and clearly visible to the user from the exterior of the device.

(B) Visual advisories must indicate that the device is for occupational use only, refer the user to specific information on RF exposure, such as that provided in a user manual and note that the advisory and its information is required for FCC RF exposure compliance.

(C) Such instructional material must provide the user with information on how to use the device in order to ensure compliance with the occupational/controlled exposure limits.

(D) A sample of the visual advisory, illustrating its location on the device, and any instructional material intended to accompany the device when marketed, shall be filed with the Commission along with the application for equipment authorization. Details of any special training requirements pertinent to limiting RF exposure should also be submitted.

(E) Holders of grants for portable devices to be used in occupational settings are encouraged, but not required, to coordinate with end-user organizations to ensure appropriate RF safety training.

(2) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

(i) General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.

(ii) Visual advisories (such as labeling, embossing, or on an equivalent electronic display) on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

(3) Compliance with SAR limits can be demonstrated by either laboratory

measurement techniques or by computational modeling. The latter must be supported by adequate documentation showing that the test device and exposure conditions have been correctly modeled in accordance with the operating configurations for normal use. Guidance regarding SAR measurement techniques can be found in the Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB). The staff guidance provided in the KDB does not necessarily represent the only acceptable methods for measuring RF exposure or emissions, and is not binding on the Commission or any interested party.

(4) For purposes of analyzing portable transmitting devices under the occupational/controlled criteria, the time-averaging provisions of the MPE guidelines identified in §1.1310 of this chapter can be used in conjunction with typical maximum duty factors to determine maximum likely exposure levels.

(5) Time-averaging provisions of the MPE guidelines identified in §1.1310 of this chapter may not be used in determining typical exposure levels for portable devices intended for use by consumers, such as hand-held cellular telephones, that are considered to operate in general population/uncontrolled environments as defined above. However, ''source-based'' time-averaging based on an inherent property or duty-cycle of a device is allowed. An example of this would be the determination of exposure from a device that uses digital technology such as a time-division multiple-access (TDMA) scheme for transmission of a signal. In general, maximum average power levels must be used to determine compliance.

[61 FR 41017, Aug. 7, 1996, as amended at 62 FR 4655, Jan. 31, 1997; 62 FR 9658, Mar. 3, 1997; 62 FR 47967, Sept. 12, 1997; 65 FR 44007, July 17, 2000; 68 FR 38638, June 30, 2003; 69 FR 3264, Jan. 23, 2004; 70 FR 24725, May 11, 2005; 74 FR 22704, May 14, 2009; 76 FR 67607, Nov. 2, 2011; 78 FR 21559, Apr. 11, 2013; 78 FR 33652, June 4, 2013; 80 FR 36221, June 23, 2015; 81 FR 79936, Nov. 14, 2016; 82 FR 43870, Sept. 20, 2017; 84 FR 25689, June 4, 2019; 85 FR 38739, June 26, 2020]

EFFECTIVE DATE NOTE: At 85 FR 18147, Apr. 1, 2020, §2.1093 was amended by revising paragraphs (b) through (d), effective June 1, 2020. At 85 FR 33578, June 2, 2020, this revision was delayed indefinitely. For the convenience of the user, the revised text is set forth as follows:

§2.1093 Radiofrequency radiation exposure evaluation: portable devices.

* * * * *

(b) For purposes of this section, the definitions in §1.1307(b)(2) of this chapter shall apply. A portable device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are within 20 centimeters of the body of the user.

(c)(1) Evaluation of compliance with the exposure limits in §1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for portable devices having single RF sources with more than an available maximum time-averaged power of 1 mW, more than the ERP listed in Table 1 to §1.1307(b)(3)(i)(C), or more than the P_{th} in the following formula, whichever is greater. The following formula shall only be used in conjunction with portable devices not exempt by §1.1307(b)(3)(i)(C) at distances from 0.5 centimeters to 20 centimeters and frequencies from 0.3 GHz to 6 GHz.

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \leq 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \leq 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and f is in GHz;}$$

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \leq f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \leq f \leq 6\ \text{GHz} \end{cases}$$

d = the minimum separation distance (cm) in any direction from any part of the device antenna(s) or radiating structure(s) to the body of the device user.

(2) For multiple mobile or portable RF sources within a device operating in the same time averaging period, evaluation is required if the formula in §1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

(3) Unless otherwise specified in this chapter, any other single portable or multiple mobile and portable RF source(s) associated with a device is exempt from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §1.1307(c) and (d) of this chapter.

(d)(1) Applications for equipment authorization of portable RF sources subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in §1.1310 of this chapter as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request. The SAR limits specified in §1.1310(a) through (c) of this chapter shall be used for evaluation of portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz shall be evaluated in terms of the MPE limits specified in Table 1 to §1.1310(e)(1) of this chapter. A minimum separation distance applicable to the operating configurations and exposure conditions of the device shall be used for the evaluation. In general, maximum time-averaged power levels must be used for evaluation. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

(2) Evaluation of compliance with the SAR limits can be demonstrated by either laboratory measurement techniques or by computational modeling. The latter must be supported by adequate documentation showing that the numerical method as implemented in the computational software has been fully validated; in addition, the equipment under test and exposure conditions must be modeled according to protocols established by FCC-accepted numerical computation standards or available FCC procedures for the specific computational method. Guidance regarding SAR measurement techniques can be found in the Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB). The staff guidance provided in the KDB does not necessarily represent the only acceptable methods for measuring RF exposure or RF emissions, and is not binding on the Commission or any interested party.

(3) For purposes of analyzing portable RF sources under the occupational/controlled

SAR criteria specified in § 1.1310 of this chapter, time averaging provisions of the limits may be used in conjunction with the maximum duty factor to determine maximum time-averaged exposure levels under normal operating conditions.

(4) The time averaging provisions for occupational/controlled SAR criteria, based on maximum duty factor, may not be used in determining typical exposure levels for portable devices intended for use by consumers, such as cellular telephones, that are considered to operate in general population/uncontrolled environments as defined in § 1.1310 of this chapter. However, ''source-based'' time averaging based on an inherent property of the RF source is allowed over a time period not to exceed 30 minutes. An example of this would be the determination of exposure from a device that uses digital technology such as a time-division multiple-access (TDMA) scheme for transmission of a signal.

(5) Visual advisories (such as labeling, embossing, or on an equivalent electronic display) on portable devices designed only for occupational use can be used as part of an applicant's evidence of the device user's awareness of occupational/controlled exposure limits. Such visual advisories shall be legible and clearly visible to the user from the exterior of the device. Visual advisories must indicate that the device is for occupational use only, refer the user to specific information on RF exposure, such as that provided in a user manual and note that the advisory and its information is required for FCC RF exposure compliance. Such instructional material must provide users with information on how to use the device and to ensure users are *fully aware* of and able to *exercise control* over their exposure to satisfy compliance with the occupational/controlled exposure limits. A sample of the visual advisory, illustrating its location on the device, and any instructional material intended to accompany the device when marketed, shall be filed with the Commission along with the application for equipment authorization. Details of any special training requirements pertinent to mitigating and limiting RF exposure should also be submitted. Holders of grants for portable devices to be used in occupational settings are encouraged, but not required, to coordinate with end-user organizations to ensure appropriate RF safety training.

(6) General population/uncontrolled exposure limits defined in § 1.1310 of this chapter apply to portable devices intended for use by consumers or persons who are exposed as a consequence of their employment and may not be fully aware of the potential for exposure or cannot exercise control over their exposure. No communication with the consumer including either visual advisories or manual instructions will be considered sufficient to allow consumer portable devices to be evaluated subject to limits for occupational/controlled exposure specified in § 1.1310 of this chapter.

Subpart K—Importation of Devices Capable of Causing Harmful Interference

§ 2.1201 Purpose.

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated. In addition to the technical standards, the rules governing the service may require that such equipment receive an equipment authorization from the Commission as a prerequisite for marketing and importing this equipment into the U.S.A. The marketing rules, § 2.801 *et seq.*, were adopted pursuant to the authority in section 302 of the Communications Act of 1934, as amended (47 U.S.C. 302).

(b) The rules in this subpart set out the conditions under which radio frequency devices as defined in § 2.801 that are capable of causing harmful interference to radio communications may be imported into the U.S.A.

(c) Nothing in this section prevents importers from shipping goods into foreign trade zones or Customs bonded warehouses, such as is the prescribed procedure under § 2.1204(a)(5). Radio frequency devices capable of causing harmful interference, however, cannot be withdrawn from these areas except in accordance with the provisions of this section.

[41 FR 25904, June 23, 1976, as amended at 54 FR 17714, Apr. 25, 1989; 56 FR 26619, June 10, 1991; 57 FR 38286, Aug. 24, 1992; 82 FR 50829, Nov. 2, 2017]

§ 2.1202 Exclusions.

The provisions of this subpart do not apply to the importation of:

(a) Unintentional radiators that are exempted from technical standards and other requirements as specified in

§ 15.103 of this chapter or utilize low level battery power and that do not contain provisions for operation while connected to AC power lines.

(b) Radio frequency devices manufactured and assembled in the U.S.A. that meet applicable FCC technical standards and that have not been modified or received further assembly.

(c) Radio frequency devices previously properly imported that have been exported for repair and re-imported for use.

(d) Subassemblies, parts, or components of radio frequency devices unless they constitute an essentially completed device which requires only the addition of cabinets, knobs, speakers, or similar minor attachments before marketing or use. This exclusion does not apply to computer circuit boards that are actually peripheral devices as defined in § 15.3(r) of this chapter and all devices that, by themselves, are subject to FCC marketing rules.

[82 FR 50830, Nov. 2, 2017]

§ 2.1203 General requirement for entry into the U.S.A.

(a) No radio frequency device may be imported into the Customs territory of the United States unless the importer or ultimate consignee, or their designated customs broker, determines that the device meets one of the conditions for entry set out in § 2.1204.

(b) Failure to satisfy at least one of the entry conditions for importation of radio frequency devices may result in refused entry, refused withdrawal for consumption, required redelivery to the Customs port, and other administrative, civil and criminal remedies provided by law.

(c) Whoever makes a determination pursuant to § 2.1203(a) must provide, upon request made within one year of the date of entry, documentation on how an imported radio frequency device was determined to be in compliance with Commission requirements.

[82 FR 50830, Nov. 2, 2017]

§ 2.1204 Import conditions.

(a) Radio frequency devices may be imported only if one or more of these conditions are met:

(1) The radio frequency device has been issued an equipment authorization by the FCC.

(2) The radio frequency device is not required to have an equipment authorization and the device complies with FCC technical administrative regulations.

(3) The radio frequency device is being imported in quantities of 4,000 or fewer units for testing and evaluation to determine compliance with the FCC Rules and Regulations, product development, or suitability for marketing. The devices will not be offered for sale or marketed.

(i) Prior to importation of a greater number of units than shown in paragraph (a)(3) of this section, written approval must be obtained from the Chief, Office of Engineering and Technology, FCC; and

(ii) Distinctly different models of a device and separate generations of a particular model under development are considered to be separate devices.

(4) The radio frequency device is being imported in limited quantities for demonstration at industry trade shows and the device will not be offered for sale or marketed. The phrase ''limited quantities,'' in this context means:

(i) 400 or fewer devices.

(ii) Prior to importation of a greater number of units than shown above, written approval must be obtained from the Chief, Office of Engineering and Technology, FCC.

(iii) Distinctly different models of a product and separate generations of a particular model under development are considered to be separate devices.

(iv) Distinctly different models of a product and separate generations of a particular model under development are considered to be separate devices.

(5) The radio frequency device is being imported solely for export. The device will not be marketed or offered for sale in the U.S., except:

(i) If the device is a foreign standard cellular phone solely capable of functioning outside the U.S.

(ii) If the device is a multi-mode wireless handset that has been certified under the Commission's rules and a component (or components) of the handset is a foreign standard cellular

phone solely capable of functioning outside the U.S.

(6) The radio frequency device is being imported for use exclusively by the U.S. Government.

(7) Three or fewer radio frequency devices are being imported for the individual's personal use and are not intended for sale. Unless exempted otherwise in this chapter, the permitted devices must be from one or more of the following categories:

(i) Unintentional radiator as defined in part 15 of this chapter which may include radio receivers, computers or other Class B digital devices in part 15 of this chapter.

(ii) Consumer ISM equipment as defined in part 18 of this chapter.

(iii) Intentional radiators subject to part 15 rules only if they can be used in client modes as specified in § 15.202 of this chapter.

(iv) Transmitters operating under rules which require a station license as subscribers permitted under § 1.903 of this chapter and operated under the authority of an operator license issued by the Commission.

(8) The radio frequency device is being imported for repair and will not be offered for sale or marketed.

(9) The radio frequency device is a medical implant transmitter inserted in a person or a medical body-worn transmitter as defined in part 95, granted entry into the United States or is a control transmitter associated with such an implanted or body-worn transmitter, provided, however that the transmitters covered by this provision otherwise comply with the technical requirements applicable to transmitters authorized to operate in the Medical Device Radiocommunication Service (MedRadio) under part 95 of this chapter. Such transmitters are permitted to be imported without the issuance of a grant of equipment authorization only for the personal use of the person in whom the medical implant transmitter has been inserted or on whom the medical body-worn transmitter is applied.

(10) Three or fewer portable earth-station transceivers, as defined in § 25.129 of this chapter, are being imported by a traveler as personal effects and will not be offered for sale or lease in the United States.

(b) The ultimate consignee must be able to document compliance with the selected import condition and the basis for determining the import condition applied.

[56 FR 26619, June 10, 1991, as amended at 57 FR 38286, Aug. 24, 1992; 61 FR 8477, Mar. 5, 1996; 63 FR 31646, June 10, 1998; 64 FR 69929, Dec. 15, 1999; 64 FR 72572, Dec. 28, 1999; 69 FR 5709, Feb. 6, 2004; 74 FR 22704, May 14, 2009; 78 FR 25162, Apr. 29, 2013; 82 FR 50830, Nov. 2, 2017]

§ 2.1207 Examination of imported equipment.

In order to determine compliance with its regulations, Commission representatives may examine or test any radio frequency device that is imported. If such radio frequency device has already entered the U.S., the ultimate consignee or subsequent owners of that device must, upon request, made within one year of the date of entry, make that device available for examination or testing by the Commission.

[56 FR 26620, June 10, 1991]

Subpart L [Reserved]

Subpart M—Advance Approval of Subscription TV Transmission Systems

ADVANCE APPROVAL PROCEDURE

§ 2.1400 Application for advance approval under part 73.

(a) An original application for advance approval of a subscription TV (STV) system and one copy thereof must be filed by the party who will be responsible for the conformance of the system with the subscription TV standards specified in part 73 of the Rules. The application must include information to show that the system conforms to the requirements of § 73.644(b).

(b) Advance approval may be applied for and granted in accordance with and subject to the following conditions and limitations:

(1) A separate request for each different technical system must be made by the applicant in writing.