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.

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

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GENERAL PROVISIONS

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TELECOMMUNICATION CERTIFICATION BODIES (TCBS)

CERTIFICATION

DECLARATION OF CONFORMITY

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

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

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 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 is obtained from active sensors or passive sensors on earth satellites;

(2) Similar information is collected from air-borne or earth-based platforms;

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

(4) Platform interrogation may be included.

NOTE: This service may also include feeder links necesary 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.

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

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

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)

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

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 Beta/2 of the total mean power of a given emission.

NOTE: Unless otherwise specified by the CCIR for the appropriate class of emission, the value of Beta/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 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

[3] See footnote under Accepted Interference.

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

[4] *See* footnote under Duplex Operation.

[5] (See footnote under Duplex Operations.)

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 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]

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 ITU *Radio Regulations*, edition of 2004, have been incorporated to the extent practicable in Subparts A and B of this part.

[70 FR 46583, Aug. 10, 2005]

§ 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.

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision	Metric abbreviations for the bands
4	VLF	3 to 30 kHz	Myriametric waves	B.Mam
5	LF	30 to 300 kHz	Kilometric waves	B.km
6	MF	300 to 3 000 kHz	Hectometric waves	B.hm
7	HF	3 to 30 MHz	Decametric waves	B.dam
8	VHF	30 to 300 MHz	Metric waves	B.m
9	UHF	300 to 3 000 MHz	Decimetric waves	B.dm
10	SHF	3 to 30 GHz	Centimetric waves	B.cm
11	EHF	30 to 300 GHz	Millimetric waves	B.mm
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]

§ 2.102 Assignment of frequencies.

(a) Except as otherwise provided in this section, the assignment of frequencies and bands of frequencies to all stations and classes of stations and the licensing and authorizing of the use of all such frequencies between 9 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) A station for the development of techniques or equipment to be employed by services set forth in column 5 of the Table of Frequency Allocations may be authorized the use of frequencies allocated to those services or classes of stations.

(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 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: Provided, however, that:

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

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

(3) 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

(4) 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.

(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]

§ 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 763–775 MHz and 793–805 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 to use channels in the 763–768 MHz and 793–798 MHz public safety bands with non-Federal entities where:

(1) The Federal entity obtains the prior approval of the Public Safety Broadband Licensee (and such approval

granted by the Public Safety Broadband Licensee is consistent with the terms and conditions of the Network Sharing Agreement under 90.1406 of this chapter); and

(2) Federal operation is in accordance with the Commission's rules governing operation of this band and conforms to any conditions agreed upon by the Commission and NTIA.

[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]

§ 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 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

[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.

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, Iraq, Jordan and that part of the territory of the 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.

FIGURE 1 TO § 2.104—MAP

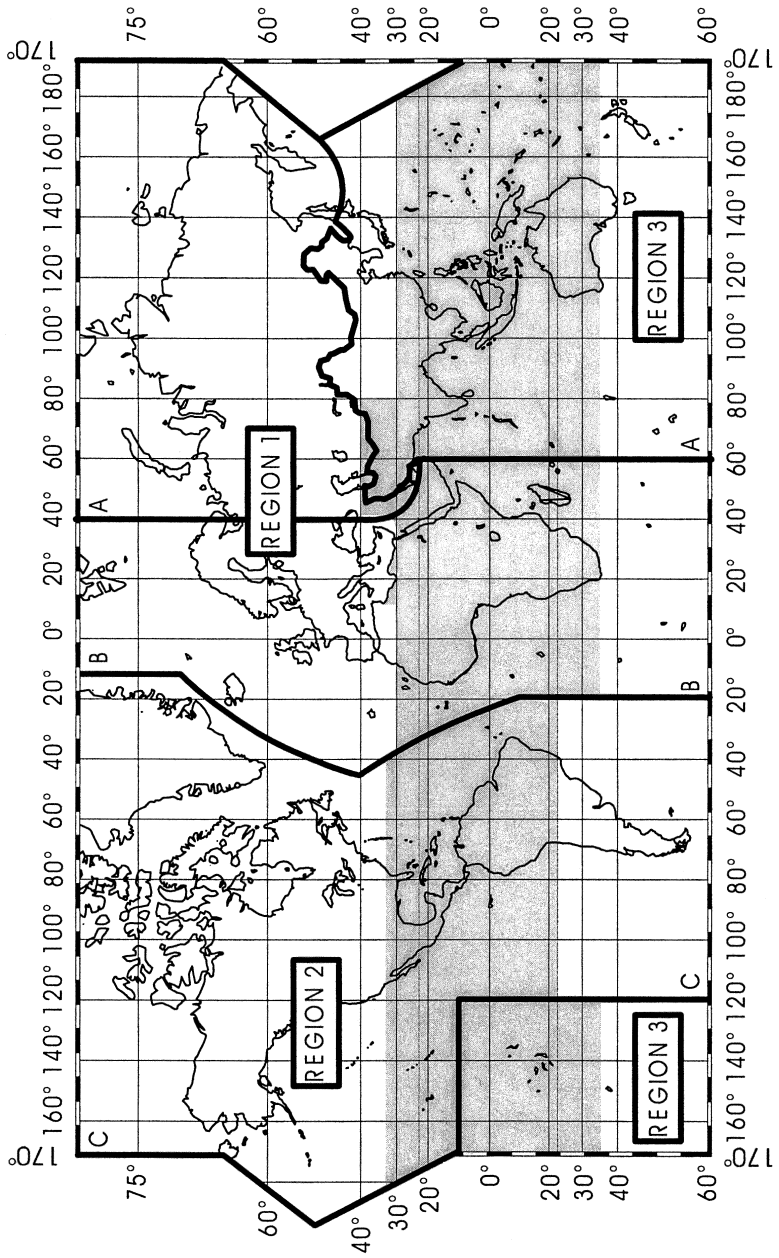

Figure 1: Map identifying Region 1, Region 2, and Region 3, as defined in paragraph 2.104(b), and the Tropical Zone (shaded area), as defined in paragraph 2.104(c)(4).

[65 FR 4636, Jan. 31, 2000, as amended at 70 FR 46586, Aug. 10, 2005]

§ 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 band of frequencies 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 band of frequencies in column 5, then the non-Federal sector has no access to that band except as provided for by § 2.102.

(2) When the Federal Table and the non-Federal Table are exactly the same for a shared band, the line between columns 4 and 5 is deleted and the allocations are shown once.

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

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[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.

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

(i) Any footnote consisting of ''5.'' followed by one or more digits, 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, 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, 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 letter ''G'' followed by one or more digits, 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 for the pertinent FCC Rule part (column 6 of § 2.106). 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., channelling plans, allowable emissions, etc.) is given in the FCC Rule part(s) so indicated. The FCC Rule parts in this column are not allocations and are provided for informational purposes only. This column also may contain explanatory notes for informational purposes only.

(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]

§ 2.106 Table of Frequency Allocations.

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

Table of Frequency Allocations		0-275 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 9 (Not Allocated) 5.53 5.54			Below 9 (Not Allocated) 5.53 5.54		
9-14 RADIONAVIGATION			9-14 RADIONAVIGATION US18 US294		
14-19.95 FIXED MARITIME MOBILE 5.57 5.55 5.56			14-19.95 FIXED MARITIME MOBILE 5.57 US294	14-19.95 Fixed US294	
19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)			19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz) US294		
20.05-70 FIXED MARITIME MOBILE 5.57			20.05-59 FIXED MARITIME MOBILE 5.57 US294	20.05-59 FIXED US294	
			59-61 STANDARD FREQUENCY AND TIME SIGNAL (60 kHz) US294		
5.56 5.58			61-70 FIXED MARITIME MOBILE 5.57 US294	61-70 FIXED US294	
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	US294	US294	

90-110 RADIONAVIGATION 5.62 Fixed 5.64 110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.64 112-115 RADIONAVIGATION 5.60 115-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.66 117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 126-129 RADIONAVIGATION 5.60 129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 130-148.5 FIXED MARITIME MOBILE 5.64 5.67 148.5-255 BROADCASTING 5.68 5.69 5.70 255-283.5 BROADCASTING AERONAUTICAL RADIONAVIGATION 5.70 5.71	110-130 FIXED MARITIME MOBILE MARITIME RADIONAVIGATION 5.60 Radiolocation 5.61 5.64 130-160 FIXED MARITIME MOBILE 5.64 160-190 FIXED 190-200 AERONAUTICAL RADIONAVIGATION 200-275 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 112-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65 117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 126-129 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65 129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 130-160 FIXED MARITIME MOBILE RADIONAVIGATION 5.64 160-190 FIXED Aeronautical radionavigation 190-200 AERONAUTICAL RADIONAVIGATION 200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	90-110 RADIONAVIGATION 5.62 US18 US104 US294 110-130 FIXED MARITIME MOBILE Radiolocation 5.64 US294 130-160 FIXED MARITIME MOBILE 5.64 US294 160-190 FIXED MARITIME MOBILE US294 190-200 AERONAUTICAL RADIONAVIGATION US18 US226 US294 200-275 AERONAUTICAL RADIONAVIGATION US18 Aeronautical mobile US294	160-190 FIXED US294	Aviation (87) Private Land Mobile (90) Maritime (80) Private Land Mobile (90) Maritime (80) Aviation (87)

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Table of Frequency Allocations	275-2065 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	
(See previous page)	275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	(See previous page)	275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons) US18 US294		Aviation (87)
283.5-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 5.72 5.74	285-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73		285-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation (radiobeacons)		
315-325 AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radiobeacons) 5.73 5.72 5.75	315-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation	315-325 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	US18 US294 US364		
325-405 AERONAUTICAL RADIONAVIGATION 5.72	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) US18 US294		Aviation (87)
	335-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile		335-405 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 Aeronautical mobile US294		
405-415 RADIONAVIGATION 5.76 5.72	405-415 RADIONAVIGATION 5.76 Aeronautical mobile		405-415 RADIONAVIGATION 5.76 US18 Aeronautical mobile US294		Maritime (80) Aviation (87)
415-435 MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION 5.72	415-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.80		415-435 MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION US294		
435-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.72 5.82	5.77 5.78 5.82		435-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.82 US231 US294	435-495 MARITIME MOBILE 5.79 5.79A 5.82 US231 US294	
495-505 MOBILE (distress and calling) 5.83			495-505 MOBILE (distress and calling) 5.83		
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION 5.72	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 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 NG128	Radio Broadcast (AM)(73) Alaska Fixed (80) Private Land Mobile (90)
5.87 5.87A	1605-1625		1605-1615	1605-1705	
1606.5-1625 FIXED MARITIME MOBILE 5.90 LAND MOBILE	BROADCASTING 5.89	1606.5-1800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION	MOBILE US221 G127 1615-1705	BROADCASTING 5.89	
5.92	5.90				
1625-1635 RADIOLOCATION	1625-1705 FIXED MOBILE				
5.93					
1635-1800 FIXED MARITIME MOBILE 5.90 LAND MOBILE	BROADCASTING 5.89 Radiolocation 5.90		US299	US299 NG1 NG128	
	1705-1800 FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION		1705-1800 FIXED MOBILE RADIOLOCATION		Maritime (80) Private Land Mobile (90)
5.92 5.96	5.91		US240		
1800-1810 RADIOLOCATION	1800-1850 AMATEUR	1800-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation	1800-1900	1800-1900 AMATEUR	Amateur (97)
5.93					
1810-1850 AMATEUR					
5.98 5.99 5.100 5.101					
1850-2000 FIXED MOBILE except aeronautical mobile	1850-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION		1900-2000 RADIOLOCATION		Private Land Mobile (90) Amateur (97)
5.92 5.96 5.103	5.102	5.97	US290		
2000-2025 FIXED MOBILE except aeronautical mobile (R)	2000-2065 FIXED MOBILE		2000-2065 FIXED MOBILE	2000-2065 MARITIME MOBILE NG19	Maritime (80)
5.92 5.103					
2025-2045 FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104					
5.92 5.103			US340	US340	

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Table of Frequency Allocations — 2065-4438 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	
2045-2160	(See previous page)		(See previous page)		
FIXED	2065-2107		2065-2107		
MARITIME MOBILE	MARITIME MOBILE 5.105		MARITIME MOBILE 5.105		Maritime (80)
LAND MOBILE	5.106		US296 US340		
5.92	2107-2170		2107-2170	2107-2170	
2160-2170	FIXED		FIXED	FIXED	Maritime (80)
RADIOLOCATION	MOBILE		MOBILE	MOBILE except aeronautical mobile NG19	Private Land Mobile (90)
5.93 5.107			US340	US340	
2170-2173.5			2170-2173.5	2170-2173.5	
MARITIME MOBILE			MARITIME MOBILE (telephony)	MARITIME MOBILE	Maritime (80)
			US340	US340	
2173.5-2190.5			2173.5-2190.5		
MOBILE (distress and calling)			MOBILE (distress and calling)		Maritime (80)
5.108 5.109 5.110 5.111			5.108 5.109 5.110 5.111 US279 US340		Aviation (87)
2190.5-2194			2190.5-2194	2190.5-2194	
MARITIME MOBILE			MARITIME MOBILE (telephony)	MARITIME MOBILE	Maritime (80)
			US340	US340	
2194-2300	2194-2300		2194-2495	2194-2495	
FIXED	FIXED		FIXED	FIXED	Maritime (80)
MOBILE except aeronautical mobile (R)	MOBILE		MOBILE	MOBILE except aeronautical mobile NG19	Private Land Mobile (90)
5.92 5.103 5.112	5.112				
2300-2498	2300-2495				
FIXED	FIXED				
MOBILE except aeronautical mobile (R)	MOBILE				
BROADCASTING 5.113	BROADCASTING 5.113		US340	US340	
	2495-2501		2495-2505		
5.103	STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)		STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)		
2498-2501					
STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)					
2501-2502					
STANDARD FREQUENCY AND TIME SIGNAL					
Space research					
2502-2625	2502-2505				
FIXED	STANDARD FREQUENCY AND TIME SIGNAL				
MOBILE except aeronautical mobile (R)			US1 US340		
5.92 5.103 5.114	2505-2850		2505-2850	2505-2850	
2625-2650	FIXED		FIXED	FIXED	Maritime (80)
MARITIME MOBILE	MOBILE		MOBILE US285	MOBILE except aeronautical mobile US285	Aviation (87)
MARITIME RADIONAVIGATION					Private Land Mobile (90)
5.92					
2650-2850					
FIXED					
MOBILE except aeronautical mobile (R)					
5.92 5.103			US340	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) US340		Maritime (80) Private Land Mobile (90)
3200-3230 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116					
3230-3400 FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118			3230-3400 FIXED MOBILE except aeronautical mobile Radiolocation US340		Maritime (80) Aviation (87) Private Land Mobile (90)
3400-3500 AERONAUTICAL MOBILE (R)			3400-3500 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
3500-3800 AMATEUR FIXED MOBILE except aeronautical mobile 5.92	3500-3750 AMATEUR 5.119	3500-3900 AMATEUR FIXED MOBILE	3500-4000 US340	3500-4000 AMATEUR US340	Amateur (97)
3800-3900 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	3750-4000 AMATEUR FIXED MOBILE except aeronautical mobile (R) 5.122 5.125				
3900-3950 AERONAUTICAL MOBILE (OR) 5.123		3900-3950 AERONAUTICAL MOBILE BROADCASTING			
3950-4000 FIXED BROADCASTING		3950-4000 FIXED BROADCASTING 5.126			
4000-4063 FIXED MARITIME MOBILE 5.127 5.126			4000-4063 FIXED MARITIME MOBILE US340		Maritime (80)
4063-4438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128 5.129			4063-4438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 US82 US296 US340		Maritime (80) Aviation (87)

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Table of Frequency Allocations		4438-8100 kHz (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	
4438-4650 FIXED MOBILE except aeronautical mobile (R)		4438-4650 FIXED MOBILE except aeronautical mobile	4438-4650 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Aviation (87) Private Land Mobile (90)
4650-4700 AERONAUTICAL MOBILE (R)			4650-4700 AERONAUTICAL MOBILE (R) US282 US283 US340		Aviation (87)
4700-4750 AERONAUTICAL MOBILE (OR)			4700-4750 AERONAUTICAL MOBILE (OR) US340		
4750-4850 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4750-4850 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4750-4850 FIXED BROADCASTING 5.113 Land mobile	4750-4850 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Private Land Mobile (90)
4850-4995 FIXED LAND MOBILE BROADCASTING 5.113			4850-4995 FIXED MOBILE US340	4850-4995 FIXED US340	Aviation (87) Private Land Mobile (90)
4995-5003 STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)			4995-5005 STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)		
5003-5005 STANDARD FREQUENCY AND TIME SIGNAL Space research			US1 US340		
5005-5060 FIXED BROADCASTING 5.113			5005-5060 FIXED US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5060-5250 FIXED Mobile except aeronautical mobile 5.133			5060-5450 FIXED Mobile except aeronautical mobile		Maritime (80) Aviation (87) Private Land Mobile (90) Amateur (97)
5250-5450 FIXED MOBILE except aeronautical mobile			US212 US340 US381		
5450-5480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5450-5480 AERONAUTICAL MOBILE (R)	5450-5480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5450-5680 AERONAUTICAL MOBILE (R)		Aviation (87)
5480-5680 AERONAUTICAL MOBILE (R) 5.111 5.115			5.111 5.115 US283 US340		
5680-5730 AERONAUTICAL MOBILE (OR) 5.111 5.115			5680-5730 AERONAUTICAL MOBILE (OR) 5.111 5.115 US340		

5730-5900 FIXED LAND MOBILE	5730-5900 FIXED MOBILE except aeronautical mobile (R)	5730-5900 FIXED Mobile except aeronautical mobile (R)	5730-5900 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5900-5950 BROADCASTING 5.134 5.136			5900-5950 BROADCASTING 5.134 US340 US366		Radio Broadcast (HF)(73)
5950-6200 BROADCASTING			5950-6200 BROADCASTING US340		
6200-6525 MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137			6200-6525 MARITIME MOBILE 5.109 5.110 5.130 5.132 US82 US296 US340		Maritime (80)
6525-6685 AERONAUTICAL MOBILE (R)			6525-6685 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
6685-6765 AERONAUTICAL MOBILE (OR)			6685-6765 AERONAUTICAL MOBILE (OR) US340		
6765-7000 FIXED MOBILE except aeronautical mobile (R) 5.138 5.138A 5.139			6765-7000 FIXED MOBILE except aeronautical mobile (R) 5.138 US340 US394		ISM Equipment (18) Private Land Mobile (90)
7000-7100 AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A			7000-7100 US340	7000-7100 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
7100-7200 AMATEUR 5.141A 5.141B 5.141C 5.142			7100-7300	7100-7300 AMATEUR	Radio Broadcast (HF)(73) Amateur (97)
7200-7300 BROADCASTING	7200-7300 AMATEUR 5.142	7200-7300 BROADCASTING	US340 US395	5.142 US340 US395	
7300-7400 BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D			7300-7400 BROADCASTING 5.134 US340 US366 US396		Radio Broadcast (HF)(73) Maritime (80) Private Land Mobile (90)
7400-7450 BROADCASTING 5.143B 5.143C	7400-7450 FIXED MOBILE except aeronautical mobile (R)	7400-7450 BROADCASTING 5.143A 5.143C	7400-8100 FIXED MOBILE except aeronautical mobile (R)		Radio Broadcast (HF)(73) Maritime (80) Aviation (87) Private Land Mobile (90)
7450-8100 FIXED MOBILE except aeronautical mobile (R) 5.143E 5.144			US340		

Table of Frequency Allocations			8100-13600 kHz (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	
8100-8195 FIXED MARITIME MOBILE			8100-8195 FIXED MARITIME MOBILE US340		Maritime (80)
8195-8815 MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111			8195-8815 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 5.111 US296 US340		Maritime (80) Aviation (87)
8815-8965 AERONAUTICAL MOBILE (R)			8815-8965 AERONAUTICAL MOBILE (R) US340		Aviation (87)
8965-9040 AERONAUTICAL MOBILE (OR)			8965-9040 AERONAUTICAL MOBILE (OR) US340		
9040-9400 FIXED			9040-9400 FIXED US340		Maritime (80) Private Land Mobile (90)
9400-9500 BROADCASTING 5.134 5.146			9400-9500 BROADCASTING 5.134 US340 US366		Radio Broadcast (HF)(73)
9500-9900 BROADCASTING 5.147			9500-9900 BROADCASTING US340 US367		
9900-9995 FIXED			9900-9995 FIXED US340		Private Land Mobile (90)
9995-10003 STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz) 5.111			9995-10005 STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz)		
10003-10005 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111			5.111 US1 US340		
10005-10100 AERONAUTICAL MOBILE (R) 5.111			10005-10100 AERONAUTICAL MOBILE (R) 5.111 US283 US340		Aviation (87)
10100-10150 FIXED Amateur			10100-10150 US247 US340	10100-10150 AMATEUR US247 US340	Amateur (97)
10150-11175 FIXED Mobile except aeronautical mobile (R)			10150-11175 FIXED Mobile except aeronautical mobile (R) US340		Private Land Mobile (90)

11175-11275 AERONAUTICAL MOBILE (OR)	11175-11275 AERONAUTICAL MOBILE (OR) US340	
11275-11400 AERONAUTICAL MOBILE (R)	11275-11400 AERONAUTICAL MOBILE (R) US283 US340	Aviation (87)
11400-11600 FIXED	11400-11600 FIXED US340	Private Land Mobile (90)
11600-11650 BROADCASTING 5.134 5.146	11600-11650 BROADCASTING 5.134 US340 US366	Radio Broadcast (HF)(73)
11650-12050 BROADCASTING 5.147	11650-12050 BROADCASTING US340 US367	
12050-12100 BROADCASTING 5.134 5.146	12050-12100 BROADCASTING 5.134 US340 US366	
12100-12230 FIXED	12100-12230 FIXED US340	Private Land Mobile (90)
12230-13200 MARITIME MOBILE 5.109 5.110 5.132 5.145	12230-13200 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340	Maritime (80)
13200-13260 AERONAUTICAL MOBILE (OR)	13200-13260 AERONAUTICAL MOBILE (OR) US340	
13260-13360 AERONAUTICAL MOBILE (R)	13260-13360 AERONAUTICAL MOBILE (R) US283 US340	Aviation (87)
13360-13410 FIXED RADIO ASTRONOMY 5.149	13360-13410 RADIO ASTRONOMY US342 G115	13360-13410 RADIO ASTRONOMY US342
13410-13570 FIXED Mobile except aeronautical mobile (R) 5.150	13410-13570 FIXED Mobile except aeronautical mobile (R) 5.150 US340	13410-13570 FIXED 5.150 US340
13570-13600 BROADCASTING 5.134 5.151	13570-13600 BROADCASTING 5.134 US340 US366	Radio Broadcast (HF)(73)

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Table of Frequency Allocations — 13600-19800 kHz (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	
13600-13800 BROADCASTING			13600-13800 BROADCASTING US340		Radio Broadcast (HF)(73)
13800-13870 BROADCASTING 5.134 5.151			13800-13870 BROADCASTING 5.134 US340 US366		
13870-14000 FIXED Mobile except aeronautical mobile (R)			13870-14000 FIXED Mobile except aeronautical mobile (R) US340	13870-14000 FIXED US340	Private Land Mobile (90)
14000-14250 AMATEUR AMATEUR-SATELLITE			14000-14350	14000-14250 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
14250-14350 AMATEUR 5.152			US340	14250-14350 AMATEUR US340	
14350-14990 FIXED Mobile except aeronautical mobile (R)			14350-14990 FIXED Mobile except aeronautical mobile (R) US340	14350-14990 FIXED US340	Private Land Mobile (90)
14990-15005 STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz) 5.111			14990-15010 STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz)		
15005-15010 STANDARD FREQUENCY AND TIME SIGNAL Space research			5.111 US1 US340		
15010-15100 AERONAUTICAL MOBILE (OR)			15010-15100 AERONAUTICAL MOBILE (OR) US340		
15100-15600 BROADCASTING			15100-15600 BROADCASTING US340		Radio Broadcast (HF)(73)
15600-15800 BROADCASTING 5.134 5.146			15600-15800 BROADCASTING 5.134 US340 US366		
15800-16360 FIXED 5.153			15800-16360 FIXED US340		Private Land Mobile (90)

16360-17410 MARITIME MOBILE 5.109 5.110 5.132 5.145	16360-17410 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340		Maritime (80)
17410-17480 FIXED	17410-17480 FIXED US340		Private Land Mobile (90)
17480-17550 BROADCASTING 5.134 5.146	17480-17550 BROADCASTING 5.134 US340 US366		Radio Broadcast (HF)(73)
17550-17900 BROADCASTING	17550-17900 BROADCASTING US340		
17900-17970 AERONAUTICAL MOBILE (R)	17900-17970 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
17970-18030 AERONAUTICAL MOBILE (OR)	17970-18030 AERONAUTICAL MOBILE (OR) US340		
18030-18052 FIXED 18052-18068 FIXED Space research	18030-18068 FIXED US340		Maritime (80) Private Land Mobile (90)
18068-18168 AMATEUR AMATEUR-SATELLITE 5.154	18068-18168 US340	18068-18168 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
18168-18780 FIXED Mobile except aeronautical mobile	18168-18780 FIXED Mobile US340		Maritime (80) Private Land Mobile (90)
18780-18900 MARITIME MOBILE	18780-18900 MARITIME MOBILE US82 US296 US340		Maritime (80)
18900-19020 BROADCASTING 5.134 5.146	18900-19020 BROADCASTING 5.134 US340 US366		Radio Broadcast (HF)(73)
19020-19680 FIXED	19020-19680 FIXED US340		Private Land Mobile (90)
19680-19800 MARITIME MOBILE 5.132	19680-19800 MARITIME MOBILE 5.132 US340		Maritime (80)

Table of Frequency Allocations — 19800-28950 kHz (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	
19800-19990 FIXED			19800-19990 FIXED US340		Private Land Mobile (90)
19990-19995 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111			19990-20010 STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz)		
19995-20010 STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz) 5.111			5.111 US1 US340		
20010-21000 FIXED Mobile			20010-21000 FIXED Mobile US340	20010-21000 FIXED US340	Private Land Mobile (90)
21000-21450 AMATEUR AMATEUR-SATELLITE			21000-21450 US340	21000-21450 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
21450-21850 BROADCASTING			21450-21850 BROADCASTING US340		Radio Broadcast (HF)(73)
21850-21870 FIXED 5.155A 5.155			21850-21924 FIXED		Aviation (87) Private Land Mobile (90)
21870-21924 FIXED 5.155B			US340		
21924-22000 AERONAUTICAL MOBILE (R)			21924-22000 AERONAUTICAL MOBILE (R) US340		Aviation (87)
22000-22855 MARITIME MOBILE 5.132 5.156			22000-22855 MARITIME MOBILE 5.132 US82 US296 US340		Maritime (80)
22855-23000 FIXED 5.156			22855-23000 FIXED US340		Private Land Mobile (90)
23000-23200 FIXED Mobile except aeronautical mobile (R)			23000-23200 FIXED Mobile except aeronautical mobile (R) US340	23000-23200 FIXED US340	
5.156 23200-23350 FIXED 5.156A AERONAUTICAL MOBILE (OR)			23200-23350 AERONAUTICAL MOBILE (OR) US340		

23350-24000 FIXED MOBILE except aeronautical mobile 5.157	23350-24890 FIXED MOBILE except aeronautical mobile	23350-24890 FIXED	Private Land Mobile (90)
24000-24890 FIXED LAND MOBILE	US340	US340	
24890-24990 AMATEUR AMATEUR-SATELLITE	24890-24990 US340	24890-24990 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
24990-25005 STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz)	24990-25010 STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz)		
25005-25010 STANDARD FREQUENCY AND TIME SIGNAL Space research	US1 US340		
25010-25070 FIXED MOBILE except aeronautical mobile	25010-25070 US340	25010-25070 LAND MOBILE US340 NG112	Private Land Mobile (90)
25070-25210 MARITIME MOBILE	25070-25210 MARITIME MOBILE US82 US281 US296 US340	25070-25210 MARITIME MOBILE US82 US281 US296 US340 NG112	Maritime (80) Private Land Mobile (90)
25210-25550 FIXED MOBILE except aeronautical mobile	25210-25330 US340 25330-25550 FIXED MOBILE except aeronautical mobile US340	25210-25330 LAND MOBILE US340 25330-25550 US340	Private Land Mobile (90)
25550-25670 RADIO ASTRONOMY 5.149	25550-25670 RADIO ASTRONOMY US74 US342		
25670-26100 BROADCASTING	25670-26100 BROADCASTING US25 US340		Radio Broadcast (HF)(73) Remote Pickup (74D)
26100-26175 MARITIME MOBILE 5.132	26100-26175 MARITIME MOBILE 5.132 US25 US340		Remote Pickup (74D) Low Power Auxiliary (74H) Maritime (80)
26175-27500 FIXED MOBILE except aeronautical mobile	26175-26480 US340 26480-26950 FIXED MOBILE except aeronautical mobile US340	26175-26480 LAND MOBILE US340 26480-26950 US340	Remote Pickup (74D) Low Power Auxiliary (74H)
5.150			Page 14

Table of Frequency Allocations — 26.95-42 MHz (HF/VHF) — 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	
(See previous page)			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)
				27.23-27.41 FIXED MOBILE except aeronautical mobile	ISM Equipment (18) Private Land Mobile (90) Personal Radio (95)
			5.150 US340	5.150 US340	
27.5-28 METEOROLOGICAL AIDS FIXED MOBILE			27.41-27.54 US340	27.41-27.54 FIXED LAND MOBILE US340	Private Land Mobile (90)
			27.54-28 FIXED MOBILE US298 US340	27.54-28 US298 US340	
28-29.7 AMATEUR AMATEUR-SATELLITE			28-29.89	28-29.7 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
29.7-30.005 FIXED MOBILE			US340	29.7-29.8 LAND MOBILE US340 29.8-29.89 FIXED US340	Private Land Mobile (90)
			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	36-37	
US220	US220	
37-37.5	37-37.5 LAND MOBILE NG124	Private Land Mobile (90)
37.5-38.25 FIXED MOBILE Radio astronomy	37.5-38 Radio astronomy	37.5-38 LAND MOBILE Radio astronomy
	US342	US342 NG59 NG124
5.149	38-38.25 FIXED MOBILE RADIO ASTRONOMY	38-38.25 RADIO ASTRONOMY
	US91 US342	US91 US342
38.25-39.986 FIXED MOBILE	38.25-39	38.25-39
	39-40	39-40 LAND MOBILE
39.986-40.02 FIXED MOBILE Space research		NG124
	40-42	40-42
40.02-40.98 FIXED MOBILE		
5.150	5.150 US210 US220	5.150 US210 US220

Table of Frequency Allocations — 42-137 MHz (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	
40.98-41.015 FIXED MOBILE Space research 5.160 5.161			(See previous page)		
41.015-44 FIXED MOBILE			42-46.6	42-43.69 FIXED LAND MOBILE NG124 NG141	Public Mobile (22) Private Land Mobile (90)
5.160 5.161				43.69-46.6 LAND MOBILE NG124 NG141	Private Land Mobile (90)
44-47 FIXED MOBILE			46.6-47 FIXED MOBILE	46.6-47	
5.162 5.162A					
47-68 BROADCASTING	47-50 FIXED MOBILE	47-50 FIXED MOBILE BROADCASTING	47-49.6	47-49.6 LAND MOBILE NG124	Private Land Mobile (90)
5.162A 5.163 5.164 5.165 5.169 5.171		5.162A	49.6-50 FIXED MOBILE	49.6-50	
	50-54 AMATEUR 5.162A 5.166 5.167 5.168 5.170		50-73	50-54 AMATEUR	Amateur (97)
	54-68 BROADCASTING Fixed Mobile 5.172	54-68 FIXED MOBILE BROADCASTING 5.162A		54-72 BROADCASTING	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		NG115 NG128 NG142 NG149	
	72-73 FIXED MOBILE			72-73 FIXED MOBILE NG3 NG49 NG56	Public Mobile (22) 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		Private Land Mobile (90)
5.149 5.174 5.175 5.177 5.179		5.149 5.176 5.179	US273		

74.8-75.2 AERONAUTICAL RADIONAVIGATION						74.8-75.2 AERONAUTICAL RADIONAVIGATION		Aviation (87)
5.180 5.181						5.180		
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 NG49 NG56	Public Mobile (22) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	76-88 BROADCASTING Fixed Mobile	5.182 5.183 5.188 87-100 FIXED MOBILE					76-88 BROADCASTING	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
5.175 5.179 5.184 5.187 87.5-100 BROADCASTING 5.190 100-108 BROADCASTING 5.192 5.194	5.185 88-100 BROADCASTING	BROADCASTING				88-108	NG115 NG128 NG142 NG149 88-108 BROADCASTING NG2	Broadcast Radio (FM)(73) FM Translator/Booster (74L)
108-117.975 AERONAUTICAL RADIONAVIGATION 5.197 5.197A 117.975-137 AERONAUTICAL MOBILE (R)						US93 108-117.975 AERONAUTICAL RADIONAVIGATION US93 US343 117.975-121.9375 AERONAUTICAL MOBILE (R)	US93 NG128	Aviation (87)
						5.111 5.198 5.199 5.200 US26 US28		
						121.9375-123.0875	T21.9375-123.0875 AERONAUTICAL MOBILE	
						5.198 US30 US31 US33 US80 US102 US213	5.198 US30 US31 US33 US80 US102 US213	
						123.0875-123.5875 AERONAUTICAL MOBILE		
						5.198 5.200 US32 US33 US112 123.5875-128.8125 AERONAUTICAL MOBILE (R)		
						5.198 US26 128.8125-132.0125	128.8125-132.0125 AERONAUTICAL MOBILE (R)	
						5.198 132.0125-136 AERONAUTICAL MOBILE (R)	5.198	
						5.198 US26 136-137	136-137 AERONAUTICAL MOBILE (R)	
5.111 5.198 5.199 5.200 5.201 5.202 5.203 5.203A 5.203B						US244	US244	

Table of Frequency Allocations 137-157.0375 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	
137-137.025			137-137.025		Satellite Communications (25)
SPACE OPERATION (space-to-Earth)			SPACE OPERATION (space-to-Earth)		
METEOROLOGICAL-SATELLITE (space-to-Earth)			METEOROLOGICAL-SATELLITE (space-to-Earth)		
MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209			MOBILE-SATELLITE (space-to-Earth) US319 US320		
SPACE RESEARCH (space-to-Earth)			SPACE RESEARCH (space-to-Earth)		
Fixed					
Mobile except aeronautical mobile (R)					
5.204 5.205 5.206 5.207 5.208			5.208		
137.025-137.175			137.025-137.175		
SPACE OPERATION (space-to-Earth)			SPACE OPERATION (space-to-Earth)		
METEOROLOGICAL-SATELLITE (space-to-Earth)			METEOROLOGICAL-SATELLITE (space-to-Earth)		
SPACE RESEARCH (space-to-Earth)			SPACE RESEARCH (space-to-Earth)		
Fixed			Mobile-satellite (space-to-Earth) US319 US320		
Mobile-satellite (space-to-Earth) 5.208A 5.209					
Mobile except aeronautical mobile (R)					
5.204 5.205 5.206 5.207 5.208			5.208		
137.175-137.825			137.175-137.825		
SPACE OPERATION (space-to-Earth)			SPACE OPERATION (space-to-Earth)		
METEOROLOGICAL-SATELLITE (space-to-Earth)			METEOROLOGICAL-SATELLITE (space-to-Earth)		
MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209			MOBILE-SATELLITE (space-to-Earth) US319 US320		
SPACE RESEARCH (space-to-Earth)			SPACE RESEARCH (space-to-Earth)		
Fixed					
Mobile except aeronautical mobile (R)					
5.204 5.205 5.206 5.207 5.208			5.208		
137.825-138			137.825-138		
SPACE OPERATION (space-to-Earth)			SPACE OPERATION (space-to-Earth)		
METEOROLOGICAL-SATELLITE (space-to-Earth)			METEOROLOGICAL-SATELLITE (space-to-Earth)		
SPACE RESEARCH (space-to-Earth)			SPACE RESEARCH (space-to-Earth)		
Fixed			Mobile-satellite (space-to-Earth) US319 US320		
Mobile-satellite (space-to-Earth) 5.208A 5.209					
Mobile except aeronautical mobile (R)					
5.204 5.205 5.206 5.207 5.208			5.208		
138-143.6		138-143.6	138-144	138-144	
AERONAUTICAL MOBILE (OR)	138-143.6	FIXED	FIXED		
	FIXED	MOBILE	MOBILE		
	MOBILE	Space research (space-to-Earth)			
	RADIOLOCATION				
5.210 5.211 5.212 5.214	Space research (space-to-Earth)	5.207 5.213			
143.6-143.65	143.6-143.65	143.6-143.65			
AERONAUTICAL MOBILE (OR)	FIXED	FIXED			
SPACE RESEARCH (space-to-Earth)	MOBILE	MOBILE			
	RADIOLOCATION	SPACE RESEARCH (space-to-Earth)			
5.211 5.212 5.214	SPACE RESEARCH (space-to-Earth)	5.207 5.213			
143.65-144	143.65-144	143.65-144			
AERONAUTICAL MOBILE (OR)	FIXED	FIXED			
	MOBILE	MOBILE			
	RADIOLOCATION	Space research (space-to-Earth)			
5.210 5.211 5.212 5.214	Space research (space-to-Earth)	5.207 5.213	G30		

144-146 AMATEUR AMATEUR-SATELLITE			144-148	144-146 AMATEUR AMATEUR-SATELLITE	Amateur (97)	
5.216						
146-148 FIXED MOBILE except aeronautical mobile (R)	146-148 AMATEUR	146-148 AMATEUR FIXED MOBILE		146-148 AMATEUR		
	5.217	5.217				
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.209	148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209		148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) US319 US320 US323 US325	148-149.9 MOBILE-SATELLITE (Earth-to-space) US319 US320 US323 US325	Satellite Communications (25)	
5.218 5.219 5.221	5.218 5.219 5.221		5.218 5.219 G30	5.218 5.219		
149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.224B			149.9-150.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE			
5.220 5.222 5.223			5.223			
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY	150.05-156.7625 FIXED MOBILE		150.05-150.8 FIXED MOBILE	150.05-150.8		
			US216 G30	US216		
			150.8-152.855	150.8-152.855 FIXED LAND MOBILE NG4 NG51 NG112	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)	
			US216	US216 NG124		
5.149 153-154 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)	
154-156.7625 FIXED MOBILE except aeronautical mobile (R)				154-156.2475 FIXED LAND MOBILE NG112	Maritime (80) Private Land Mobile (90)	
				5.226 NG117 NG124 NG148	Personal Radio (95)	
5.226 5.227 156.7625-156.8375 MARITIME MOBILE (distress and calling)	5.225 5.226 5.227		156.2475-157.0375	156.2475-157.0375 MARITIME MOBILE US77 US106 US107 NG117	Maritime (80) Aviation (87)	
5.111 5.226			5.226 5.227 US77 US106 US107 US266	5.226 5.227 US266 NG124		

Table of Frequency Allocations — 157.0375-267 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	
156.8375-174 FIXED MOBILE except aeronautical mobile	156.8375-174 FIXED MOBILE		(See previous page)		
			157.0375-157.1875 MARITIME MOBILE US214	157.0375-157.1875	Maritime (80) Private Land Mobile (90)
			5.226 US266 G109	5.226 US214 US266	
			157.1875-161.575	157.1875-157.45 MOBILE except aeronautical mobile US266	Maritime (80) Aviation (87) Private Land Mobile (90)
				5.226 NG111	
				157.45-161.575 FIXED LAND MOBILE NG28 NG111 NG112	Public Mobile (22) Remote Pickup (74D) Maritime (80)
				5.226 NG6 NG70 NG124 NG148 NG155	Private Land Mobile (90)
			161.575-161.625 MARITIME MOBILE US77	161.575-161.625 MARITIME MOBILE US77	Public Mobile (22) Maritime (80)
			5.226 US77	5.226 NG6 NG17	
			161.625-161.775 LAND MOBILE NG6	161.625-161.775 LAND MOBILE NG6	Public Mobile (22) Remote Pickup (74D) Low Power Auxiliary (74H)
			5.226	5.226	
			161.775-162.0125 MOBILE except aeronautical mobile US266 NG6	161.775-162.0125 MOBILE except aeronautical mobile US266 NG6	Public Mobile (22) Maritime (80) Private Land Mobile (90)
			5.226 US266 US399	5.226 US399	
			162.0125-173.2 FIXED US13 MOBILE	162.0125-173.2	Remote Pickup (74D) Maritime (80) Private Land Mobile (90)
			5.226 US8 US11 US216 US300 US312 US399 G5	5.226 US8 US11 US13 US216 US300 US312 US399	
			173.2-173.4	173.2-173.4 FIXED Land mobile	Private Land Mobile (90)
			173.4-174 FIXED MOBILE	173.4-174	
5.226 5.229	5.226 5.230 5.231 5.232		G5		

174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile	174-223 FIXED MOBILE BROADCASTING	174-216	174-216 BROADCASTING	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
	5.234			NG115 NG128 NG142 NG149	
	216-220 FIXED MARITIME MOBILE Radiolocation 5.241		216-217 Fixed Land mobile Radiolocation 5.241 G2	216-219 FIXED MOBILE except aeronautical mobile	Maritime (80) Private Land Mobile (90) Personal Radio (95)
			US210 US229	US210 US229 NG173	
			217-220 Fixed Mobile	219-220 FIXED MOBILE except aeronautical mobile Amateur NG152	Maritime (80) Private Land Mobile (90) Amateur (97)
	5.242		US210 US229	US210 US229 NG173	
	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241		220-222 FIXED LAND MOBILE Radiolocation 5.241 G2	220-222 FIXED LAND MOBILE	Private Land Mobile (90)
5.235 5.237 5.243		5.233 5.238 5.240 5.245	US335	US335	
223-230 BROADCASTING Fixed Mobile		223-230 FIXED MOBILE BROADCASTING	222-225 Radiolocation 5.241 G2	222-225 AMATEUR	Amateur (97)
5.243 5.246 5.247	225-235 FIXED MOBILE	AERONAUTICAL RADIONAVIGATION Radiolocation	225-235 FIXED MOBILE	225-235	
230-235 FIXED MOBILE		5.250 230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION			
5.247 5.251 5.252		5.250	G27	235-267	
235-267 FIXED MOBILE			235-267 FIXED MOBILE		
5.111 5.199 5.252 5.254 5.256 5.256A			5.111 5.199 5.256 G27 G100	5.111 5.199 5.256	

Table of Frequency Allocations — 267-410 MHz (VHF/UHF) — 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	
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 5.254 5.255					
390-399.9 FIXED MOBILE 5.254			G27 G100		

399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.222 5.224B 5.260 5.220	399.9-400.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE 5.260		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		
400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 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) US345 US384	401-402 METEOROLOGICAL AIDS (radiosonde) US70 SPACE OPERATION (space-to-Earth) Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US345 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) US345 US384	402-403 METEOROLOGICAL AIDS (radiosonde) US70 Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US345 US384	
403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile	403-406 METEOROLOGICAL AIDS (radiosonde) US70 US345 G6	403-406 METEOROLOGICAL AIDS (radiosonde) US70 US345	
406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267	406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267		Maritime (80) Aviation (87) Personal Radio (95)
406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	406.1-410 FIXED US13 MOBILE RADIO ASTRONOMY US74 US117 G5 G6	406.1-410 RADIO ASTRONOMY US74 US13 US117	Private Land Mobile (90)

Table of Frequency Allocations	410-698 MHz (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	
410-420 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268			410-420 FIXED US13 MOBILE SPACE RESEARCH (space-to-space) 5.268 G5	410-420 US13	Private Land Mobile (90)
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271			420-450 RADIOLOCATION US217 G2 G129	420-450 Amateur US7 NG135	Private Land Mobile (90) Amateur (97)
430-432 AMATEUR RADIOLOCATION 5.271 5.272 5.273 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 5.272 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 5.273 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			5.286 US7 US87 US230 US397 G8	5.282 5.286 US87 US217 US230 US397	
450-455 FIXED MOBILE 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E			450-454 5.286 US87	450-454 LAND MOBILE 5.286 US87 NG112 NG124	Remote Pickup (74D) Low Power Auxiliary (74H) Private Land Mobile (90)
			454-456	454-455 FIXED LAND MOBILE NG12 NG112 NG148	Public Mobile (22) Maritime (80)
455-456 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	455-456 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E		455-456 LAND MOBILE	Remote Pickup (74D) Low Power Auxiliary (74H)

456-459 FIXED MOBILE 5.271 5.287 5.288			456-460	456-460 FIXED LAND MOBILE	Public Mobile (22) Maritime (80) Private Land Mobile (90)	
459-460 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209 5.271 5.286A 5.286B 5.286C 5.286E		5.287 5.288	5.287 5.288 NG112 NG124 NG148		
460-470 FIXED MOBILE Meteorological-satellite (space-to-Earth)			460-470 Meteorological-satellite (space-to-Earth)	460-462.5375 FIXED LAND MOBILE 5.289 US201 US209 NG124	Private Land Mobile (90)	
				462.5375-462.7375 LAND MOBILE 5.289 US201	Personal Radio (95)	
				462.7375-467.5375 FIXED LAND MOBILE 5.287 5.289 US201 US209 US216 NG124	Private Land Mobile (90)	
				467.5375-467.7375 LAND MOBILE 5.287 5.289 US201	Personal Radio (95)	
				467.7375-470 FIXED LAND MOBILE	Private Land Mobile (90)	
5.287 5.288 5.289 5.290			5.287 5.288 5.289 US201 US209 US216	5.288 5.289 US201 US216 NG124		
470-790 BROADCASTING	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298	470-608	470-512 FIXED LAND MOBILE BROADCASTING NG66 NG115 NG128 NG142 NG149	Public Mobile (22) Broadcast Radio (TV)/73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H) Private Land Mobile (90)	
	512-608 BROADCASTING 5.297	585-610 FIXED MOBILE		512-608 BROADCASTING NG115 NG128 NG142 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) 5.149 5.305 5.306 5.307	BROADCASTING RADIONAVIGATION 610-890	608-614 LAND MOBILE (medical telemetry and medical telecommand) RADIO ASTRONOMY US74 US246		Personal (95)	
	614-806 BROADCASTING Fixed Mobile	FIXED MOBILE 5.317A BROADCASTING	614-698	614-698 BROADCASTING NG115 NG128 NG142 NG149	Broadcast Radio (TV)/73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)	
5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311 5.312	5.293 5.309 5.311	5.149 5.305 5.306 5.307 5.311 5.320				

Table of Frequency Allocations — 698-941 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	
(See previous page)	(See previous page)	(See previous page)	698-890	698-763 FIXED MOBILE BROADCASTING NG115 NG128 NG142 NG159	Wireless Communications (27) Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
				763-775 FIXED MOBILE NG115 NG128 NG142 NG158 NG159	LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H) Private Land Mobile (90R)
				775-793 FIXED MOBILE BROADCASTING NG115 NG128 NG142 NG159	Wireless Communications (27) Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
790-862 FIXED BROADCASTING				793-805 FIXED MOBILE NG115 NG128 NG142 NG158 NG159	LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H) Private Land Mobile (90R)
				805-806 FIXED MOBILE BROADCASTING NG115 NG128 NG142 NG159	Wireless Communications (27) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
	806-890 FIXED MOBILE 5.317A BROADCASTING			806-809 LAND MOBILE	Private Land Mobile (90)
				809-849 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
5.312 5.314 5.315 5.316 5.319 5.321				849-851 AERONAUTICAL MOBILE	Public Mobile (22)
				851-854 LAND MOBILE	Private Land Mobile (90)
862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322				854-894 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
5.319 5.323	5.317 5.318			US116 US268	

890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation					
5.323	890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation	890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation	890-902	894-896 AERONAUTICAL MOBILE US116 US268	Public Mobile (22)
				896-901 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				901-902 FIXED MOBILE US116 US268	Personal Communications (24)
	5.318 5.325		US116 US268 G2		
	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	ISM Equipment (18) Private Land Mobile (90) Amateur (97)
	928-942 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation		928-932	928-929 FIXED US116 US268 NG120	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)
			US116 US268 G2		
			932-935 FIXED US268 G2	932-935 FIXED US268 NG120	Public Mobile (22) Fixed Microwave (101)
			935-941	935-940 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				940-941 FIXED MOBILE	Personal Communications (24)
	5.325	5.327	US116 US268 G2	US116 US268	

Table of Frequency Allocations — 941-1435 MHz (UHF) — Page 29

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)			941-944	941-944	Public Mobile (22)
942-960	942-960	942-960	FIXED	FIXED	Aural Broadcast Auxiliary (74E)
FIXED	FIXED	FIXED			Fixed Microwave (101)
MOBILE except aeronautical mobile 5.317A	MOBILE 5.317A	MOBILE 5.317A	US268 US301 G2	US268 US301 NG30 NG120	
BROADCASTING 5.322		BROADCASTING	944-960	944-960	Public Mobile (22)
				FIXED	Aural Broadcast Auxiliary (74E)
					Low Power Auxiliary (74H)
5.323		5.320		NG120	Fixed Microwave (101)
960-1164			960-1164		
AERONAUTICAL RADIONAVIGATION 5.328			AERONAUTICAL RADIONAVIGATION 5.328		Aviation (87)
			US224 US400		
1164-1215			1164-1215		
AERONAUTICAL RADIONAVIGATION 5.328			AERONAUTICAL RADIONAVIGATION 5.328		
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B			RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space)		
5.328A			5.328A US224		
1215-1240			1215-1240	1215-1240	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-SATELLITE (active)	Earth exploration-satellite (active)	
RADIOLOCATION			RADIOLOCATION G56	Space research (active)	
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A			RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) G132		
SPACE RESEARCH (active)			SPACE RESEARCH (active)		
5.330 5.331 5.332			5.332		
1240-1300			1240-1300	1240-1300	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-SATELLITE (active)	AERONAUTICAL RADIONAVIGATION	Amateur (97)
RADIOLOCATION			RADIOLOCATION G56	Amateur	
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A			SPACE RESEARCH (active)	Earth exploration-satellite (active)	
SPACE RESEARCH (active)			AERONAUTICAL RADIONAVIGATION	Space research (active)	
Amateur					
5.282 5.330 5.331 5.332 5.335 5.335A			5.332 5.335	5.282	
1300-1350			1300-1350	1300-1350	
AERONAUTICAL RADIONAVIGATION 5.337			AERONAUTICAL RADIONAVIGATION 5.337	AERONAUTICAL RADIONAVIGATION 5.337	Aviation (87)
RADIOLOCATION			Radiolocation G2		
RADIONAVIGATION-SATELLITE (Earth-to-space)					
5.149 5.337A			US342	US342	
1350-1400	1350-1400		1350-1390	1350-1390	
FIXED	RADIOLOCATION		FIXED		
MOBILE			MOBILE		
RADIOLOCATION			RADIOLOCATION G2		
			5.334 5.339 US311 US342 G27 G114	5.334 5.339 US311 US342	

		1390-1395	1390-1392 FIXED MOBILE except aeronautical mobile Fixed-satellite (Earth-to-space) US368 5.339 US311 US342 US351 US398		Wireless Communications (27)
			1392-1395 FIXED MOBILE except aeronautical mobile		
		5.339 US311 US342 US351 US398	5.339 US311 US342 US351 US398		
		1395-1400 LAND MOBILE (medical telemetry and medical telecommand)			Personal (95)
5.149 5.338 5.339 5.339A	5.149 5.334 5.339 5.339A	5.339 US311 US342 US351 US398			
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			
5.340 5.341		5.341 US246			
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile		1427-1429.5 LAND MOBILE (medical telemetry and medical telecommand) US350	1427-1429.5 LAND MOBILE (telemetry and telecommand) Fixed (telemetry)		Private Land Mobile (90) Personal (95)
5.341		5.341 US352 US398	5.341 US350 US352 US398		
1429-1452 FIXED MOBILE except aeronautical mobile	1429-1452 FIXED MOBILE 5.343	1429.5-1432	1429.5-1430 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand)		
			5.341 US350 US352 US398		
			1430-1432 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand) Fixed-satellite (space-to-Earth) US368		
		5.341 US350 US352 US398	5.341 US350 US352 US398		
		1432-1435	1432-1435 FIXED MOBILE except aeronautical mobile		Wireless Communications (27)
		5.341 US361	5.341 US361		
5.339A 5.341 5.342	5.339A 5.341				

Table of Frequency Allocations — 1435-1668.4 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	
(See previous page)			1435-1525		
1452-1492	1452-1492		MOBILE (aeronautical telemetry)		Aviation (87)
FIXED	FIXED				
MOBILE except aeronautical mobile	MOBILE 5.343				
BROADCASTING 5.345 5.347	BROADCASTING 5.345 5.347				
BROADCASTING-SATELLITE 5.345 5.347 5.347A	BROADCASTING-SATELLITE 5.345 5.347 5.347A				
5.341 5.342	5.341 5.344				
1492-1518	1492-1518	1492-1518			
FIXED	FIXED	FIXED			
MOBILE except aeronautical mobile	MOBILE 5.343	MOBILE			
5.341 5.342	5.341 5.344	5.341			
1518-1525	1518-1525	1518-1525			
FIXED	FIXED	FIXED			
MOBILE except aeronautical mobile	MOBILE 5.343	MOBILE			
MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C	MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C	MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C			
5.341 5.342	5.341 5.344	5.341	5.341 US78		
1525-1530	1525-1530	1525-1530	1525-1535		
SPACE OPERATION (space-to-Earth)	SPACE OPERATION (space-to-Earth)	SPACE OPERATION (space-to-Earth)	MOBILE-SATELLITE (space-to-Earth) US315 US380		Satellite Communications (25)
FIXED	MOBILE-SATELLITE (space-to-Earth)	FIXED			Maritime (80)
MOBILE-SATELLITE (space-to-Earth) 5.347A 5.351A		MOBILE-SATELLITE (space-to-Earth) 5.347A 5.351A			
Earth exploration-satellite	Fixed	Earth exploration-satellite			
Mobile except aeronautical mobile 5.349	Mobile 5.343	Mobile 5.349			
5.341 5.342 5.350 5.351 5.352A 5.354	5.341 5.351 5.354	5.341 5.351 5.352A 5.354			
1530-1535	1530-1535				
SPACE OPERATION (space-to-Earth)	SPACE OPERATION (space-to-Earth)				
MOBILE-SATELLITE (space-to-Earth) 5.347A 5.351A 5.353A	MOBILE-SATELLITE (space-to-Earth) 5.347A 5.351A 5.353A				
Earth exploration-satellite	Earth exploration-satellite				
Fixed	Fixed				
Mobile except aeronautical mobile	Mobile 5.343				
5.341 5.342 5.351 5.354	5.341 5.351 5.354		5.341 5.351		
1535-1559			1535-1559		
MOBILE-SATELLITE (space-to-Earth) 5.347A 5.351A			MOBILE-SATELLITE (space-to-Earth) US308 US309 US315 US380		Satellite Communications (25) Maritime (80) Aviation (87)
5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			5.341 5.351 5.356		
1559-1610			1559-1610		
AERONAUTICAL RADIONAVIGATION			AERONAUTICAL RADIONAVIGATION		Aviation (87)
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329A			RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space)		
5.341 5.362B 5.362C 5.363			5.341 US208 US260 US343		

1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.363 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 5.363 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) 5.347A 5.341 5.355 5.359 5.363 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) 5.347A 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) 5.347A 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	
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) 5.341 US246	
1668-1668.4 MOBILE-SATELLITE (Earth-to-space) 5.348C 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A 5.379D				

Table of Frequency Allocations — 1668.4-2200 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	
1668.4-1670 METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.348C 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 5.380 MOBILE-SATELLITE (Earth-to-space) 5.348C 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			1675-1700 METEOROLOGICAL AIDS (radiosonde) METEOROLOGICAL-SATELLITE (space-to-Earth)		
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		5.289 5.341 US211		
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	1700-1710 FIXED G118 METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341	1700-1710 METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed 5.289 5.341	
1710-1930 FIXED MOBILE 5.380 5.384A 5.388A 5.388B			1710-1755 5.341 US311 US378	1710-1755 FIXED MOBILE 5.341 US311 US378	Wireless Communications (27)
5.149 5.341 5.385 5.386 5.387 5.388			1755-1850 FIXED MOBILE SPACE OPERATION (Earth-to-space) G42	1755-1850	

1930-1970 FIXED MOBILE 5.388A 5.388B	1930-1970 FIXED MOBILE 5.388A 5.388B Mobile-satellite (Earth-to-space)	1930-1970 FIXED MOBILE 5.388A 5.388B	1850-2025	1850-2000 FIXED MOBILE	RF Devices (15) Personal Communications (24) Fixed Microwave (101)
5.388	5.388				
1970-1980 FIXED MOBILE 5.388A 5.388B					
5.388				NG177	
1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A				2000-2020 MOBILE-SATELLITE (Earth-to-space) US380	Satellite Communications (25)
5.388 5.389A 5.389B 5.389F				NG156	
2010-2025 FIXED MOBILE 5.388A 5.388B	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	2010-2025 FIXED MOBILE 5.388A 5.388B		2020-2025 FIXED MOBILE	
5.388	5.388 5.389C 5.389E 5.390	5.388		NG177	
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)			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) 5.391 5.392 US90 US222 US346 US347 US393	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US222 US346 US347 US393	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)
5.392					
2110-2120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space)			2110-2120 US252	2110-2120 FIXED MOBILE US252	Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
5.388					
2120-2160 FIXED MOBILE 5.388A 5.388B	2120-2160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth)	2120-2170 FIXED MOBILE 5.388A 5.388B	2120-2200	2120-2180 FIXED MOBILE	
5.388	5.388				
2160-2170 FIXED MOBILE 5.388A 5.388B	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)				
5.388 5.392A	5.388 5.389C 5.389E 5.390	5.388		NG153 NG178	
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A				2180-2200 MOBILE-SATELLITE (space-to-Earth) US380	Satellite Communications (25)
5.388 5.389A 5.389F 5.392A				NG168	

Table of Frequency Allocations — 2200-2655 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	
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 Amateur Radiolocation	2300-2450 FIXED MOBILE RADIOLOCATION Amateur		2300-2305 G122 2305-2310 US338 G122 2310-2320 Fixed Mobile US339 Radiolocation G2 US327 2320-2345 Fixed Radiolocation G2 US327 2345-2360 Fixed Mobile US339 Radiolocation G2 US327 2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed	2300-2305 Amateur 2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US338 2310-2320 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327 2320-2345 BROADCASTING-SATELLITE 5.396 US327 2345-2360 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327 2360-2390 MOBILE US276	Amateur (97) Wireless Communications (27) Amateur (97) Wireless Communications (27) Aviation (87) Satellite Communications (25) Wireless Communications (27) Aviation (87) Aviation (87)

				2390-2395 MOBILE US276	2390-2395 AMATEUR MOBILE US276	Aviation (87) Amateur (97)	
				2395-2400 G122	2395-2400 AMATEUR	Amateur (97)	
				2400-2417	2400-2417 AMATEUR	ISM Equipment (18) Amateur (97)	
				5.150 G122	5.150 5.282		
				2417-2450 Radiolocation G2	2417-2450 Amateur		
				5.150 G124	5.150 5.282		
5.150 5.282 5.395	5.150 5.282 5.393 5.394 5.396			2450-2483.5	2450-2483.5 FIXED MOBILE Radiolocation	ISM Equipment (18) TV Auxiliary Broadcasting (74F) Private Land Mobile (90) Fixed Microwave (101)	
				5.150 US41	5.150 US41		
2450-2483.5 FIXED MOBILE Radiolocation	2450-2483.5 FIXED MOBILE RADIOLOCATION			2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 US391 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398	2483.5-2495 MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398	ISM Equipment (18) Satellite Communications (25)	
5.150 5.397	5.150 5.394				5.150 5.402 US41 NG147		
2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A Radiolocation	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 RADIOLOCATION	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 5.398			2495-2500 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398	ISM Equipment (18) Satellite Communications (25) Wireless Communications (27)	
5.150 5.371 5.397 5.398 5.399 5.400 5.402	5.150 5.402	5.150 5.400 5.402		5.150 5.402 US41	5.150 5.402 US41 US391 NG147		
2500-2520 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to Earth) 5.351A 5.403	2500-2520 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.403			2500-2655	2500-2655 FIXED US205 MOBILE except aeronautical mobile	Wireless Communications (27)	
5.405 5.407 5.412 5.414	5.404 5.407 5.414 5.415A						
2520-2655 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	2520-2655 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	2520-2535 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.415A					
5.339 5.403 5.405 5.412 5.417C 5.417D 5.418B 5.418C	5.339 5.403 5.417C 5.417D 5.418B 5.418C	2535-2655 FIXED 5.409 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.417A 5.417B 5.417C 5.417D 5.418 5.418A 5.418B 5.418C		5.339 US205	5.339		

Table of Frequency Allocations	2655-4990 MHz (UHF/SHF)				Page 37
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2655-2670 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.347A 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412 5.420	2655-2670 FIXED 5.409 5.411 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 5.420 5.347A	2655-2670 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.347A 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.420	2655-2690 Earth exploration-satellite (passive) Radio astronomy US269 Space research (passive)	2655-2690 FIXED US205 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Radio astronomy Space research (passive)	Wireless Communications (27)
2670-2690 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412 5.419 5.420	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.347A 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.419 5.420	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.419 5.420 5.420A	US205	US269	
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 Radiolocation G2 5.423 US18 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 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.430	3300-3400 RADIOLOCATION Amateur 5.149 5.429	3300-3500 RADIOLOCATION US108 G2 US342	3300-3500 Amateur Radiolocation US108 5.282 US342	Private Land Mobile (90) Amateur (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile Radiolocation 5.433 5.282 5.432				
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3500-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 5.435		3500-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110 US245	3500-3600 Radiolocation	Private Land Mobile (90)
				3600-3650 FIXED-SATELLITE (space-to-Earth) US245 Radiolocation	
			3650-3700 US348 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth) NG169 NG185 MOBILE except aeronautical mobile US348 US349	Satellite Communications (25) Private Land Mobile (90)
	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		3700-4200	3700-4200 FIXED NG41 FIXED-SATELLITE (space-to-Earth) NG180	International Fixed (23) Satellite Communications (25) Fixed Microwave (101)
4200-4400 AERONAUTICAL RADIONAVIGATION 5.438 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION 5.440 US261		Aviation (87)
4400-4500 FIXED MOBILE			4400-4500 FIXED MOBILE	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE			4500-4800 FIXED MOBILE US245	4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.442 Radio astronomy 5.149 5.339 5.443			4800-4940 FIXED MOBILE US203 US342	4800-4940 US203 US342	
			4940-4990 5.339 US311 US342 G122	4940-4990 FIXED MOBILE except aeronautical mobile 5.339 US311 US342	Private Land Mobile (90)

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Table of Frequency Allocations			4990-5925 MHz (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	
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 RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367			5000-5010 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367 US211 US344		Aviation (87)
5010-5030 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B 5.367			5010-5030 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.443B 5.367 US211 US344		
5030-5150 AERONAUTICAL RADIONAVIGATION 5.367 5.444 5.444A			5030-5250 AERONAUTICAL RADIONAVIGATION US260	5030-5150 AERONAUTICAL RADIONAVIGATION US260 5.367 5.444 5.444A US211 US344	Satellite Communications (25) Aviation (87)
5150-5250 AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B 5.446 5.447 5.447B 5.447C			 5.367 5.444 US211 US307 US344	5150-5250 AERONAUTICAL RADIONAVIGATION US260 FIXED-SATELLITE (Earth-to-space) 5.447A US344 5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)
5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F 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) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile 5.446A 5.447F 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 SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D			5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION G56 US390 G130	5350-5460 AERONAUTICAL RADIONAVIGATION 5.449 Earth exploration-satellite (active) 5.448B Space research (active) Radiolocation US390	Aviation (87) Private Land Mobile (90)

5460-5470 RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.448D		5460-5470 RADIONAVIGATION 5.449 US65 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56		5460-5470 RADIONAVIGATION 5.449 US65 Earth exploration-satellite (active) Space research (active) Radiolocation	Maritime (80) Aviation (87) Private Land Mobile (90)
5.448B		5.448B US49 G130		5.448B US49	
5470-5570 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B		5470-5570 MARITIME RADIONAVIGATION US65 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56		5470-5570 MARITIME RADIONAVIGATION US65 RADIOLOCATION Earth exploration-satellite (active) Space research (active)	RF Devices (15) Maritime (80) Private Land Mobile (90)
5.448B 5.450 5.451		5.448B US50 G131		US50	
5570-5650 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B		5570-5600 MARITIME RADIONAVIGATION US65 RADIOLOCATION G56		5570-5600 MARITIME RADIONAVIGATION US65 RADIOLOCATION	
		US50 G131		US50	
		5600-5650 MARITIME RADIONAVIGATION US65 METEOROLOGICAL AIDS RADIOLOCATION G56		5600-5650 MARITIME RADIONAVIGATION US65 METEOROLOGICAL AIDS RADIOLOCATION	
5.450 5.451 5.452		5.452 US50 G131		5.452 US50	
5650-5725 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space)		5650-5925 RADIOLOCATION G2		5650-5830 Amateur	RF Devices (15) ISM Equipment (18) Amateur (97)
5.282 5.451 5.453 5.454 5.455					
5725-5830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur	5725-5830 RADIOLOCATION Amateur				
5.150 5.451 5.453 5.455 5.456	5.150 5.453 5.455			5.150 5.282	
5830-5850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth)	5830-5850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth)			5830-5850 Amateur Amateur-satellite (space-to-Earth)	
5.150 5.451 5.453 5.455 5.456	5.150 5.453 5.455			5.150	
5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation		5850-5925 FIXED-SATELLITE (Earth-to-space) US245 MOBILE NG160 Amateur	ISM Equipment (18) Private Land Mobile (90) Personal Radio (95) Amateur (97)
5.150	5.150	5.150	5.150 US245	5.150	

Table of Frequency Allocations 5925-8025 MHz (SHF) Page 41

International Table (Region 1 Table / Region 2 Table / Region 3 Table)	United States Table: Federal Table	United States Table: Non-Federal Table	FCC Rule Part(s)
5925-6700 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE	5925-6425	5925-6425 FIXED NG41 FIXED-SATELLITE (Earth-to-space) NG181	International Fixed (23) Satellite Communications (25) Fixed Microwave (101)
	6425-6525 5.440 5.458	6425-6525 FIXED-SATELLITE (Earth-to-space) MOBILE 5.440 5.458	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
5.149 5.440 5.458	6525-6700 5.458 US342	6525-6700 FIXED FIXED-SATELLITE (Earth-to-space) 5.458 US342	Fixed Microwave (101)
6700-7075 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE	6700-7125	6700-6875 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 5.458 5.458A 5.458B	Satellite Communications (25) Fixed Microwave (101)
		6875-7025 FIXED NG118 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE NG171 5.458 5.458A 5.458B	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78)
5.458 5.458A 5.458B 5.458C		7025-7075 FIXED NG118 FIXED-SATELLITE (Earth-to-space) NG172 MOBILE NG171 5.458 5.458A 5.458B	TV Broadcast Auxiliary (74F) Cable TV Relay (78)
7075-7145 FIXED MOBILE	5.458	7075-7125 FIXED NG118 MOBILE NG171 5.458	
5.458 5.459	7125-7145 FIXED 5.458 G116	7125-7190	
7145-7235 FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460	7145-7190 FIXED SPACE RESEARCH (deep space) (Earth-to-space) US262 5.458 G116	5.458 US262	
5.458 5.459	7190-7235 FIXED SPACE RESEARCH (Earth-to-space) G133 5.458	7190-7235 5.458	

7235-7250 FIXED MOBILE	7235-7250 FIXED	7235-7250	
5.458	5.458	5.458	
7250-7300 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	7250-7300 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Fixed	7250-8025	
5.461	G117		
7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth)		
5.461	G117		
7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth)		
5.461A	G104 G117		
7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth)		
5.461	G117		
7750-7850 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	7750-7850 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth)		
5.461B			
7850-7900 FIXED MOBILE except aeronautical mobile	7850-7900 FIXED		
7900-8025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	7900-8025 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Fixed		
5.461	G117		

Table of Frequency Allocations — 8025-10000 MHz (SHF) — Page 43

International Table		United States Table		FCC Rule Part(s)
Region 1 Table	Region 3 Table	Federal Table	Non-Federal Table	
Region 2 Table				
8025-8175		8025-8175	8025-8400	
EARTH EXPLORATION-SATELLITE (space-to-Earth)		EARTH EXPLORATION-SATELLITE (space-to-Earth)		
FIXED		FIXED		
FIXED-SATELLITE (Earth-to-space)		FIXED-SATELLITE (Earth-to-space)		
MOBILE 5.463		Mobile-satellite (Earth-to-space) (no airborne transmissions)		
		US258 G117		
5.462A				
8175-8215		8175-8215		
EARTH EXPLORATION-SATELLITE (space-to-Earth)		EARTH EXPLORATION-SATELLITE (space-to-Earth)		
FIXED		FIXED		
FIXED-SATELLITE (Earth-to-space)		FIXED-SATELLITE (Earth-to-space)		
METEOROLOGICAL-SATELLITE (Earth-to-space)		METEOROLOGICAL-SATELLITE (Earth-to-space)		
MOBILE 5.463		Mobile-satellite (Earth-to-space) (no airborne transmissions)		
		US258 G104 G117		
5.462A				
8215-8400		8215-8400		
EARTH EXPLORATION-SATELLITE (space-to-Earth)		EARTH EXPLORATION-SATELLITE (space-to-Earth)		
FIXED		FIXED		
FIXED-SATELLITE (Earth-to-space)		FIXED-SATELLITE (Earth-to-space)		
MOBILE 5.463		Mobile-satellite (Earth-to-space) (no airborne transmissions)		
		US258 G117	US258	
5.462A				
8400-8500		8400-8450	8400-8450	
FIXED		FIXED	Space research (deep space) (space-to-Earth)	
MOBILE except aeronautical mobile		SPACE RESEARCH (deep space) (space-to-Earth)		
SPACE RESEARCH (space-to-Earth) 5.465 5.466		8450-8500	8450-8500	
		FIXED	SPACE RESEARCH (space-to-Earth)	
		SPACE RESEARCH (space-to-Earth)		
8500-8550		8500-8550	8500-8550	
RADIOLOCATION		RADIOLOCATION G59	Radiolocation	Private Land Mobile (90)
5.468 5.469				
8550-8650		8550-8650	8550-8650	
EARTH EXPLORATION-SATELLITE (active)		EARTH EXPLORATION-SATELLITE (active)	Earth exploration-satellite (active)	
RADIOLOCATION		RADIOLOCATION G59	Radiolocation	
SPACE RESEARCH (active)		SPACE RESEARCH (active)	Space research (active)	
5.468 5.469 5.469A				

8650-8750 RADIOLOCATION	8650-9000 RADIOLOCATION G59	8650-9000 Radiolocation		Aviation (87) Private Land Mobile (90)
5.468 5.469				
8750-8850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470				
5.471				
8850-9000 RADIOLOCATION MARITIME RADIONAVIGATION 5.472				
5.473				
9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation	US53 9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation G2	US53 9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation		
5.471	US48 G19	US48		
9200-9300 RADIOLOCATION MARITIME RADIONAVIGATION 5.472	9200-9300 MARITIME RADIONAVIGATION 5.472 Radiolocation US110 G59	9200-9300 MARITIME RADIONAVIGATION 5.472 Radiolocation US110		Maritime (80) Private Land Mobile (90)
5.473 5.474	5.474	5.474		
9300-9500 RADIONAVIGATION 5.476 Radiolocation	9300-9500 RADIONAVIGATION 5.476 US66 Radiolocation US51 G56 Meteorological aids	9300-9500 RADIONAVIGATION 5.476 US66 Radiolocation US51 Meteorological aids		Maritime (80) Aviation (87) Private Land Mobile (90)
5.427 5.474 5.475	5.427 5.474 US67 US71	5.427 5.474 US67 US71		
9500-9800 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active)	9500-9800 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)	9500-9800 Earth exploration-satellite (active) Radiolocation Space research (active)		Private Land Mobile (90)
5.476A				
9800-10000 RADIOLOCATION Fixed	9800-10000 RADIOLOCATION	9800-10000 Radiolocation		
5.477 5.478 5.479	5.479	5.479		

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Table of Frequency Allocations	10-14.2 GHz (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	
10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.45 RADIOLOCATION Amateur 5.479 5.480	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.45 RADIOLOCATION G32 5.479 US58 US108	10-10.45 Amateur Radiolocation 5.479 US58 US108 NG42	Private Land Mobile (90) Amateur (97)
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481			10.45-10.5 RADIOLOCATION G32 US58 US108	10.45-10.5 Amateur Amateur-satellite Radiolocation US58 US108 NG42 NG134	
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			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US265 US277	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED US265 SPACE RESEARCH (passive) US277	
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) US246 US355		
10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		10.7-11.7 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US211 US355 NG104 NG182	Satellite Communications (25) Fixed Microwave (101)
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile except aeronautical mobile 5.485 5.488 12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.485 5.488 5.489	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.487 5.487A 5.492	11.7-12.2	11.7-12.2 FIXED-SATELLITE (space-to-Earth) NG143 NG145 NG183 5.488 NG184	Satellite Communications (25)

	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) 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)
5.487 5.487A 5.492 12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space)	5.487A 5.488 5.490 5.492 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 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)
5.494 5.495 5.496 12.75-13.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)			12.75-13.25	12.75-13.25 FIXED NG118 FIXED-SATELLITE (Earth-to-space) 5.441 NG104 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)			13.25-13.4 EARTH EXPLORATION- SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active)	13.25-13.4 AERONAUTICAL RADIONAVIGATION 5.497 Earth exploration-satellite (active) Space research (active)	Aviation (87)
5.498A 5.499 13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space)			5.498A 13.4-13.75 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH 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)
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			13.75-14 RADIOLOCATION G59 Standard frequency and time signal-satellite (Earth-to-space) Space research US337	13.75-14 FIXED-SATELLITE (Earth-to-space) US337 Standard frequency and time signal-satellite (Earth-to-space) Space research Radiolocation	Satellite Communications (25) Private Land Mobile (90)
5.499 5.500 5.501 5.502 5.503 14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504C 5.506A Space research 5.504A 5.505			US356 US357 14-14.2 Space research	US356 US357 14-14.2 FIXED-SATELLITE (Earth-to-space) NG183 Mobile-satellite (Earth-to-space) Space research	Satellite Communications (25)

Table of Frequency Allocations — 14.2-17.7 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	
(See previous page)			14.2-14.4	14.2-14.47	Satellite Communications (25)
14.25-14.3				FIXED-SATELLITE (Earth-to-space)	
FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B				NG183	
RADIONAVIGATION 5.504				Mobile-satellite (Earth-to-space)	
Mobile-satellite (Earth-to-space) 5.506A 5.508A					
Space research					
5.504A 5.505 5.508 5.509					
14.3-14.4	14.3-14.4	14.3-14.4			
FIXED	FIXED-SATELLITE (Earth-to-space)	FIXED			
FIXED-SATELLITE (Earth-to-space)	5.457A 5.484A 5.506 5.506B	FIXED-SATELLITE (Earth-to-space)			
5.457A 5.457B 5.484A 5.506 5.506B	Mobile-satellite (Earth-to-space)	5.457A 5.484A 5.506 5.506B			
MOBILE except aeronautical mobile	5.506A	MOBILE except aeronautical mobile			
Mobile-satellite (Earth-to-space) 5.506A	Radionavigation-satellite	Mobile-satellite (Earth-to-space)			
5.509A		5.506A 5.509A			
Radionavigation-satellite		Radionavigation-satellite			
5.504A	5.504A	5.504A			
14.4-14.47			14.4-14.47		
FIXED			Fixed		
FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B			Mobile		
MOBILE except aeronautical mobile					
Mobile-satellite (Earth-to-space) 5.506A 5.509A					
Space research (space-to-Earth)					
5.504A				NG184	
14.47-14.5			14.47-14.5	14.47-14.5	
FIXED			Fixed	FIXED-SATELLITE (Earth-to-space)	
FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B			Mobile	NG183	
MOBILE except aeronautical mobile				Mobile-satellite (Earth-to-space)	
Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A					
Radio astronomy					
5.149 5.504A			US203 US342	US203 US342	
14.5-14.8			14.5-14.7145	14.5-14.8	
FIXED			FIXED		
FIXED-SATELLITE (Earth-to-space) 5.510			Mobile		
MOBILE			Space research		
Space research			14.7145-14.8		
			MOBILE		
			Fixed		
			Space research		
14.8-15.35			14.8-15.1365	14.8-15.1365	
FIXED			MOBILE		
MOBILE			SPACE RESEARCH		
Space research			Fixed		
			US310	US310	
			15.1365-15.35	15.1365-15.35	
			FIXED		
			SPACE RESEARCH		
			Mobile		
5.339			5.339 US211	5.339 US211	

15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)					15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
5.340 5.511					US246		
15.4-15.43 AERONAUTICAL RADIONAVIGATION					15.4-15.43 AERONAUTICAL RADIONAVIGATION US260		Aviation (87)
5.511D					US211		
15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A AERONAUTICAL RADIONAVIGATION					15.43-15.63 AERONAUTICAL RADIONAVIGATION US260	15.43-15.63 FIXED-SATELLITE (Earth-to-space) AERONAUTICAL RADIONAVIGATION US260	Satellite Communications (25) Aviation (87)
5.511C					5.511C US211 US359	5.511C US211 US359	
15.63-15.7 AERONAUTICAL RADIONAVIGATION					15.63-15.7 AERONAUTICAL RADIONAVIGATION US260		Aviation (87)
5.511D					US211		
15.7-16.6 RADIOLOCATION					15.7-16.6 RADIOLOCATION G59	15.7-17.2 Radiolocation	Private Land Mobile (90)
5.512 5.513 16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space)					16.6-17.1 RADIOLOCATION G59 Space research (deep space) (Earth-to-space)		
5.512 5.513 17.1-17.2 RADIOLOCATION					17.1-17.2 RADIOLOCATION G59		
5.512 5.513 17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)					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)	
5.512 5.513 5.513A 17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation			17.3-17.7 Radiolocation US259 G59	17.3-17.7 FIXED-SATELLITE (Earth-to-space) US271 BROADCASTING-SATELLITE US402 NG163	Satellite Communications (25)
5.514	5.514 5.515 5.517	5.514			US402 G117	US259	

Table of Frequency Allocations — 17.7-23.6 GHz (SHF) — Page 49

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
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) (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.518 5.515 5.517	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-space) US271	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		17.8-18.3 FIXED-SATELLITE (space-to-Earth) G117	17.8-18.3 FIXED	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) G117	18.3-18.6 FIXED-SATELLITE (space-to-Earth) NG164	Satellite Communications (25)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE			US334	US334 NG144	
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 G117 SPACE RESEARCH (passive) US254 US334	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACE RESEARCH (passive) US254 US334 NG144	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US334 NG144	
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 NG144	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 5.516B Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 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 5.516B Mobile-satellite (space-to-Earth) 5.524		19.7-20.1 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528 5.529 US334	Satellite Communications (25)
20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528			US334	20.1-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528 US334	

20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
5.524			G117		
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)		Fixed Microwave (101)
			US263		
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.347A 5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.347A 5.530	21.4-22 FIXED MOBILE		
		5.531			
22-22.21 FIXED MOBILE except aeronautical mobile			22-22.21 FIXED MOBILE except aeronautical mobile		
5.149			US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive)			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive)		
5.149 5.532			US263 US342		
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE		
			US211		
22.55-23.55 FIXED INTER-SATELLITE MOBILE			22.55-23.55 FIXED INTER-SATELLITE US278 MOBILE		Satellite Communications (25) Fixed Microwave (101)
5.149			US342		
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)

Table of Frequency Allocations — 23.6-30 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	
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 (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	ISM Equipment (18) Private Land Mobile (90) Amateur (97)
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 RADIONAVIGATION FIXED MOBILE	24.25-24.45	24.25-24.45 FIXED	Fixed Microwave (101)
24.45-24.75 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		Satellite Communications (25)
	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 FIXED INTER-SATELLITE MOBILE 5.533	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25 FIXED	24.75-25.25 FIXED-SATELLITE (Earth-to-space) 5.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE	24.75-25.05 RADIONAVIGATION 25.05-25.25	24.75-25.05 FIXED-SATELLITE (Earth-to-space) NG167 RADIONAVIGATION 25.05-25.25 FIXED FIXED-SATELLITE (Earth-to-space) NG167	Satellite Communications (25) Aviation (87) Satellite Communications (25) Fixed Microwave (101)
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)	

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)		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)	25.5-27 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	
5.536A		5.536A US258	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		27.5-30	27.5-29.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	Satellite Communications (25) Fixed Microwave (101)
5.538 5.540				
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				
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				
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 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 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25)
5.540 5.542	5.542	5.540 5.542	5.525 5.526 5.527 5.529	
29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543			29.9-30 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space)	
5.525 5.526 5.527 5.538 5.540 5.542			5.525 5.526 5.527 5.543	

Table of Frequency Allocations — 30-39.5 GHz (EHF) — Page 53

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
30-31 FIXED-SATELLITE (Earth-to-space) 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 5.543A 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 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)		
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	US246		
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	31.8-32.3 SPACE RESEARCH (deep space) (space-to-Earth) US262	
32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548			5.548 US211	5.548 US211	
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		33.4-34.2 RADIOLOCATION	33.4-34.2 Radiolocation	Private Land Mobile (90)
5.549		US360 G117	US360	
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space)		34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) US262	34.2-34.7 Radiolocation Space research (deep space) (Earth-to-space) US262	
5.549		US360 G34 G117	US360	
34.7-35.2 RADIOLOCATION Space research 5.550		34.7-35.5 RADIOLOCATION	34.7-35.5 Radiolocation	
5.549				
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION				
5.549		US360 G117	US360	
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)		35.5-36 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)	35.5-36 Earth exploration-satellite (active) Radiolocation Space research (active)	
5.549 5.549A		US360 G117	US360	
36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)		36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)		
5.149		US263 US342		
37-37.5 FIXED MOBILE SPACE RESEARCH (space-to-Earth)		37-38 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	37-37.5 FIXED MOBILE	
5.547				
37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth)			37.5-38.6 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	Satellite Communications (25)
5.547				
38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth)		38-38.6 FIXED MOBILE 38.6-39.5	38.6-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175	Satellite Communications (25) Fixed Microwave (101)
5.547				

Table of Frequency Allocations — 39.5-50.2 GHz (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	
39.5-40			39.5-40	39.5-40	
FIXED			FIXED-SATELLITE (space-to-Earth)	FIXED	Satellite Communications (25)
FIXED-SATELLITE (space-to-Earth) 5.516B			MOBILE-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	Fixed Microwave (101)
MOBILE			US382	MOBILE NG175	
MOBILE-SATELLITE (space-to-Earth)					
Earth exploration-satellite (space-to-Earth)					
			G117	US382	
5.547					
40-40.5			40-40.5	40-40.5	
EARTH EXPLORATION-SATELLITE (Earth-to-space)			EARTH EXPLORATION-SATELLITE (Earth-to-space)	FIXED-SATELLITE (space-to-Earth)	Satellite Communications (25)
FIXED			FIXED-SATELLITE (space-to-Earth)	MOBILE-SATELLITE (space-to-Earth)	
FIXED-SATELLITE (space-to-Earth) 5.516B			MOBILE-SATELLITE (space-to-Earth)		
MOBILE			SPACE RESEARCH (Earth-to-space)		
MOBILE-SATELLITE (space-to-Earth)			Earth exploration-satellite (space-to-Earth)		
SPACE RESEARCH (Earth-to-space)					
Earth exploration-satellite (space-to-Earth)			G117		
40.5-41	40.5-41	40.5-41	40.5-41	40.5-41	
FIXED	FIXED	FIXED	FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	
FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth) 5.516B	FIXED-SATELLITE (space-to-Earth)	Mobile-satellite (space-to-Earth)	BROADCASTING	
BROADCASTING	BROADCASTING	BROADCASTING		BROADCASTING-SATELLITE	
BROADCASTING-SATELLITE	BROADCASTING-SATELLITE	BROADCASTING-SATELLITE		Fixed	
Mobile	Mobile	Mobile		Mobile	
	Mobile-satellite (space-to-Earth)			Mobile-satellite (space-to-Earth)	
5.547	5.547	5.547	US211 G117	US211	
41-42.5			41-42.5	41-42	
FIXED				FIXED	
FIXED-SATELLITE (space-to-Earth) 5.516B				FIXED-SATELLITE (space-to-Earth)	
BROADCASTING				MOBILE	
BROADCASTING-SATELLITE				BROADCASTING	
Mobile				BROADCASTING-SATELLITE	
				US211	
				42-42.5	
				FIXED	
				MOBILE	
				BROADCASTING	
				BROADCASTING-SATELLITE	
5.547 5.551F 5.551H 5.551I			US211	US211	
42.5-43.5			42.5-43.5	42.5-43.5	
FIXED			FIXED	RADIO ASTRONOMY	
FIXED-SATELLITE (Earth-to-space) 5.552			FIXED-SATELLITE (Earth-to-space)		
MOBILE except aeronautical mobile			MOBILE except aeronautical mobile		
RADIO ASTRONOMY			RADIO ASTRONOMY		
5.149 5.547			US342	US342	

43.5-47 MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE		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		RF Devices (15)
		46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE	46.9-47 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE	
5.554		5.554	5.554	
47-47.2 AMATEUR AMATEUR-SATELLITE		47-48.2	47-47.2 AMATEUR AMATEUR-SATELLITE	Amateur (97)
47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE			47.2-48.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE	Satellite Communications (25)
5.552A				
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) 5.516B 5.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264		
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE				
5.149 5.340 5.555	5.149 5.340 5.555	5.555 US342		

Table of Frequency Allocations — 50.2-71 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	
49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	(See previous page)		(See previous page)		
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) MOBILE Mobile-satellite (Earth-to-space)			50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space)	
51.4-52.6 FIXED MOBILE 5.547 5.556			51.4-52.6 FIXED 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)		
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) US263 US353		
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) US263	56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 SPACE RESEARCH (passive)	

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) US263		RF Devices (15)
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		
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	
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	
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	

Table of Frequency Allocations — 71-100 GHz (EHF) — Page 59

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
71-74			71-74		Fixed Microwave (101)
FIXED			FIXED		
FIXED-SATELLITE (space-to-Earth)			FIXED-SATELLITE (space-to-Earth)		
MOBILE			MOBILE		
MOBILE-SATELLITE (space-to-Earth)			MOBILE-SATELLITE (space-to-Earth)		
			US389		
74-76			74-76	74-76	
FIXED			FIXED	FIXED	
FIXED-SATELLITE (space-to-Earth)			FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	
MOBILE			MOBILE	MOBILE	
BROADCASTING			Space research (space-to-Earth)	BROADCASTING	
BROADCASTING-SATELLITE				BROADCASTING-SATELLITE	
Space research (space-to-Earth)				Space research (space-to-Earth)	
5.559A 5.561			US389	US389	
76-77.5			76-77.5	76-77	RF Devices (15)
RADIO ASTRONOMY			RADIO ASTRONOMY	RADIO ASTRONOMY	Amateur (97)
RADIOLOCATION			RADIOLOCATION	RADIOLOCATION	
Amateur			Space research (space-to-Earth)	Amateur	
Amateur-satellite				Space research (space-to-Earth)	
Space research (space-to-Earth)				US342	
				77-77.5	
				RADIO ASTRONOMY	Amateur (97)
				RADIOLOCATION	
				Amateur	
				Amateur-satellite	
				Space research (space-to-Earth)	
5.149			US342	US342	
77.5-78			77.5-78	77.5-78	
AMATEUR			Radio astronomy	AMATEUR	
AMATEUR-SATELLITE			Space research (space-to-Earth)	AMATEUR-SATELLITE	
Radio astronomy				Radio astronomy	
Space research (space-to-Earth)				Space research (space-to-Earth)	
5.149			US342	US342	
78-79			78-79	78-79	
RADIOLOCATION			RADIO ASTRONOMY	RADIO ASTRONOMY	
Amateur			RADIOLOCATION	RADIOLOCATION	
Amateur-satellite			Space research (space-to-Earth)	Amateur	
Radio astronomy				Amateur-satellite	
Space research (space-to-Earth)				Space research (space-to-Earth)	
5.149 5.560			5.560 US342	5.560 US342	
79-81			79-81	79-81	
RADIO ASTRONOMY			RADIO ASTRONOMY	RADIO ASTRONOMY	
RADIOLOCATION			RADIOLOCATION	RADIOLOCATION	
Amateur			Space research (space-to-Earth)	Amateur	
Amateur-satellite				Amateur-satellite	
Space research (space-to-Earth)				Space research (space-to-Earth)	
5.149			US342	US342	

81-84	81-84		Fixed Microwave (101)
FIXED	FIXED		
FIXED-SATELLITE (Earth-to-space)	FIXED-SATELLITE (Earth-to-space) US297		
MOBILE	MOBILE		
MOBILE-SATELLITE (Earth-to-space)	MOBILE-SATELLITE (Earth-to-space)		
RADIO ASTRONOMY	RADIO ASTRONOMY		
Space research (space-to-Earth)	Space research (space-to-Earth)		
5.149 5.561A	US342 US388 US389		
84-86	84-86		
FIXED	FIXED		
FIXED-SATELLITE (Earth-to-space) 5.561B	FIXED-SATELLITE (Earth-to-space)		
MOBILE	MOBILE		
RADIO ASTRONOMY	RADIO ASTRONOMY		
5.149	US342 US388 US389		
86-92	86-92		
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY	RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)		
5.340	US246		
92-94	92-94		
FIXED	FIXED		RF Devices (15)
MOBILE	MOBILE		Fixed Microwave (101)
RADIO ASTRONOMY	RADIO ASTRONOMY		
RADIOLOCATION	RADIOLOCATION		
5.149	US342 US388		
94-94.1	94-94.1	94-94.1	RF Devices (15)
EARTH EXPLORATION-SATELLITE (active)	EARTH EXPLORATION-SATELLITE (active)	RADIOLOCATION	
RADIOLOCATION	RADIOLOCATION	Radio astronomy	
SPACE RESEARCH (active)	SPACE RESEARCH (active)		
Radio astronomy	Radio astronomy		
5.562 5.562A	5.562 5.562A	5.562A	
94.1-95	94.1-95		RF Devices (15)
FIXED	FIXED		Fixed Microwave (101)
MOBILE	MOBILE		
RADIO ASTRONOMY	RADIO ASTRONOMY		
RADIOLOCATION	RADIOLOCATION		
5.149	US342 US388		
95-100	95-100		
FIXED	FIXED		
MOBILE	MOBILE		
RADIO ASTRONOMY	RADIO ASTRONOMY		
RADIOLOCATION	RADIOLOCATION		
RADIONAVIGATION	RADIONAVIGATION		
RADIONAVIGATION-SATELLITE	RADIONAVIGATION-SATELLITE		
5.149 5.554	5.554 US342		

Table of Frequency Allocations — 100-155.5 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	
100-102			100-102		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340 5.341			5.341 US246		
102-105			102-105		
FIXED			FIXED		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
5.149 5.341			5.341 US342		
105-109.5			105-109.5		
FIXED			FIXED		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
SPACE RESEARCH (passive) 5.562B			SPACE RESEARCH (passive) 5.562B		
5.149 5.341			5.341 US342		
109.5-111.8			109.5-111.8		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340 5.341			5.341 US246		
111.8-114.25			111.8-114.25		
FIXED			FIXED		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
SPACE RESEARCH (passive) 5.562B			SPACE RESEARCH (passive) 5.562B		
5.149 5.341			5.341 US342		
114.25-116			114.25-116		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340 5.341			5.341 US246		
116-119.98			116-122.25		ISM Equipment (18)
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
INTER-SATELLITE 5.562C			INTER-SATELLITE 5.562C		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.341					
119.98-122.25					
EARTH EXPLORATION-SATELLITE (passive)					
INTER-SATELLITE 5.562C					
SPACE RESEARCH (passive)					
5.138 5.341			5.138 5.341 US211		

122.25-123	122.25-123	122.25-123	
FIXED	FIXED	FIXED	ISM Equipment (18)
INTER-SATELLITE	INTER-SATELLITE	INTER-SATELLITE	Amateur (97)
MOBILE 5.558	MOBILE 5.558	MOBILE 5.558	
Amateur		Amateur	
5.138	5.138	5.138	
123-130	123-130		
FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)		
MOBILE-SATELLITE (space-to-Earth)	MOBILE-SATELLITE (space-to-Earth)		
RADIONAVIGATION	RADIONAVIGATION		
RADIONAVIGATION-SATELLITE	RADIONAVIGATION-SATELLITE		
Radio astronomy 5.562D	Radio astronomy		
5.149 5.554	5.554 US211 US342		
130-134	130-134		
EARTH EXPLORATION-SATELLITE (active) 5.562E	EARTH EXPLORATION-SATELLITE (active) 5.562E		
FIXED	FIXED		
INTER-SATELLITE	INTER-SATELLITE		
MOBILE 5.558	MOBILE 5.558		
RADIO ASTRONOMY	RADIO ASTRONOMY		
5.149 5.562A	5.562A US342		
134-136	134-136	134-136	
AMATEUR	Radio astronomy	AMATEUR	Amateur (97)
AMATEUR-SATELLITE		AMATEUR-SATELLITE	
Radio astronomy		Radio astronomy	
136-141	136-141	136-141	
RADIO ASTRONOMY	RADIO ASTRONOMY	RADIO ASTRONOMY	
RADIOLOCATION	RADIOLOCATION	RADIOLOCATION	
Amateur		Amateur	
Amateur-satellite		Amateur-satellite	
5.149	US342	US342	
141-148.5	141-148.5		
FIXED	FIXED		
MOBILE	MOBILE		
RADIO ASTRONOMY	RADIO ASTRONOMY		
RADIOLOCATION	RADIOLOCATION		
5.149	US342		
148.5-151.5	148.5-151.5		
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY	RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)		
5.340	US246		
151.5-155.5	151.5-155.5		
FIXED	FIXED		
MOBILE	MOBILE		
RADIO ASTRONOMY	RADIO ASTRONOMY		
RADIOLOCATION	RADIOLOCATION		
5.149	US342		

Table of Frequency Allocations — 155.5-238 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	
155.5-158.5			155.5-158.5		
EARTH EXPLORATION-SATELLITE (passive) 5.562F			EARTH EXPLORATION-SATELLITE (passive) 5.562F		
FIXED			FIXED		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
SPACE RESEARCH (passive) 5.562B			SPACE RESEARCH (passive) 5.562B		
5.149 5.562G			5.562G US342		
158.5-164			158.5-164		
FIXED			FIXED		
FIXED-SATELLITE (space-to-Earth)			FIXED-SATELLITE (space-to-Earth)		
MOBILE			MOBILE		
MOBILE-SATELLITE (space-to-Earth)			MOBILE-SATELLITE (space-to-Earth)		
			US211		
164-167			164-167		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340			US246		
167-174.5			167-174.5		
FIXED			FIXED		
FIXED-SATELLITE (space-to-Earth)			FIXED-SATELLITE (space-to-Earth)		
INTER-SATELLITE			INTER-SATELLITE		
MOBILE 5.558			MOBILE 5.558		
5.149 5.562D			US211 US342		
174.5-174.8			174.5-174.8		
FIXED			FIXED		
INTER-SATELLITE			INTER-SATELLITE		
MOBILE 5.558			MOBILE 5.558		
174.8-182			174.8-182		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
INTER-SATELLITE 5.562H			INTER-SATELLITE 5.562H		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
182-185			182-185		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340			US246		
185-190			185-190		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
INTER-SATELLITE 5.562H			INTER-SATELLITE 5.562H		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
190-191.8			190-191.8		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340			US246		

191.8-200	191.8-200	
FIXED	FIXED	
INTER-SATELLITE	INTER-SATELLITE	
MOBILE 5.558	MOBILE 5.558	
MOBILE-SATELLITE	MOBILE-SATELLITE	
RADIONAVIGATION	RADIONAVIGATION	
RADIONAVIGATION-SATELLITE	RADIONAVIGATION-SATELLITE	
5.149 5.341 5.554	5.341 5.554 US211 US342	
200-209	200-209	
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)	
RADIO ASTRONOMY	RADIO ASTRONOMY US74	
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)	
5.340 5.341 5.563A	5.341 5.563A US246	
209-217	209-217	
FIXED	FIXED	
FIXED-SATELLITE (Earth-to-space)	FIXED-SATELLITE (Earth-to-space)	
MOBILE	MOBILE	
RADIO ASTRONOMY	RADIO ASTRONOMY	
5.149 5.341	5.341 US342	
217-226	217-226	
FIXED	FIXED	
FIXED-SATELLITE (Earth-to-space)	FIXED-SATELLITE (Earth-to-space)	
MOBILE	MOBILE	
RADIO ASTRONOMY	RADIO ASTRONOMY	
SPACE RESEARCH (passive) 5.562B	SPACE RESEARCH (passive) 5.562B	
5.149 5.341	5.341 US342	
226-231.5	226-231.5	
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)	
RADIO ASTRONOMY	RADIO ASTRONOMY	
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)	
5.340	US246	
231.5-232	231.5-232	
FIXED	FIXED	
MOBILE	MOBILE	
Radiolocation	Radiolocation	
232-235	232-235	
FIXED	FIXED	
FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	
MOBILE	MOBILE	
Radiolocation	Radiolocation	
235-238	235-238	
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)	
FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)	
5.563A 5.563B	5.563A 5.563B	

Table of Frequency Allocations			238-1000 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		
238-240			238-240			
FIXED			FIXED			
FIXED-SATELLITE (space-to-Earth)			FIXED-SATELLITE (space-to-Earth)			
MOBILE			MOBILE			
RADIOLOCATION			RADIOLOCATION			
RADIONAVIGATION			RADIONAVIGATION			
RADIONAVIGATION-SATELLITE			RADIONAVIGATION-SATELLITE			
240-241			240-241			
FIXED			FIXED			
MOBILE			MOBILE			
RADIOLOCATION			RADIOLOCATION			
241-248			241-248	241-248		
RADIO ASTRONOMY			RADIO ASTRONOMY	RADIO ASTRONOMY		ISM Equipment (18)
RADIOLOCATION			RADIOLOCATION	RADIOLOCATION		Amateur (97)
Amateur				Amateur		
Amateur-satellite				Amateur-satellite		
5.138 5.149			5.138 US342	5.138 US342		
248-250			248-250	248-250		
AMATEUR			Radio astronomy	AMATEUR		Amateur (97)
AMATEUR-SATELLITE				AMATEUR-SATELLITE		
Radio astronomy				Radio astronomy		
5.149			US342	US342		
250-252			250-252			
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)			
RADIO ASTRONOMY			RADIO ASTRONOMY US74			
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)			
5.340 5.563A			5.563A US246			
252-265			252-265			
FIXED			FIXED			
MOBILE			MOBILE			
MOBILE-SATELLITE (Earth-to-space)			MOBILE-SATELLITE (Earth-to-space)			
RADIO ASTRONOMY			RADIO ASTRONOMY			
RADIONAVIGATION			RADIONAVIGATION			
RADIONAVIGATION-SATELLITE			RADIONAVIGATION-SATELLITE			
5.149 5.554			5.554 US211 US342			
265-275			265-275			
FIXED			FIXED			
FIXED-SATELLITE (Earth-to-space)			FIXED-SATELLITE (Earth-to-space)			
MOBILE			MOBILE			
RADIO ASTRONOMY			RADIO ASTRONOMY			
5.149 5.563A			5.563A US342			
275-1000			275-1000			
(Not allocated)			(Not allocated)			Amateur (97)
5.565			5.565			

INTERNATIONAL FOOTNOTES

5.53 Administrations authorizing the use of frequencies below 9 kHz shall ensure that no harmful interference is caused thereby to the services to which the bands above 9 kHz are allocated.

5.54 Administrations conducting scientific research using frequencies below 9

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.

5.55 *Additional allocation:* in Armenia, Azerbaijan, Bulgaria, Georgia, Kyrgyzstan, the Russian Federation, Tajikistan and Turkmenistan, the band 14–17 kHz is also allocated to the radionavigation service on a primary basis.

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, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions.

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 Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Romania 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.

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

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, Cameroon, the Central African Rep., Congo (Rep. of the), Ethiopia, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, the Dem. Rep. of the Congo, Rwanda, 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.

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

5.72 Norwegian stations of the fixed service situated in northern areas (north of 60° N) subject to auroral disturbances are allowed to continue operation on four frequencies in the bands 283.5–490 kHz and 510–526.5 kHz.

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, Georgia, Moldova, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Bulgaria and 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.

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 Territories of Region 3, India, Indonesia (until 1 January 2005), Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the allocation of the band 415–495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in these countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the band 435–495 kHz do not cause interference to reception by coast stations of ship stations transmitting on frequencies designated for ship stations on a worldwide basis (see No. 52.39).

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–97))[3].

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.

5.82 In the maritime mobile service, the frequency 490 kHz is, from the date of full implementation of the GMDSS (see Resolution 331 (Rev.WRC–97))[3], 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 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.

5.83 The frequency 500 kHz is an international distress and calling frequency for Morse radiotelegraphy. The conditions for its use are prescribed in Articles 31 and 52, and in Appendix 13.

5.84 The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in Articles 31 and 52 and in Appendix 13.

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, South Africa, Swaziland and Zimbabwe, the band 526.5–535 kHz is also allocated to the mobile service on a secondary basis.

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.

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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 Angola, Armenia, Azerbaijan, Belarus, Georgia, Hungary, Kazakstan, Latvia, Lithuania, Moldova, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the Russian Federation, Tajikistan, Chad, Turkmenistan and Ukraine, the bands 1625–1635 kHz, 1800–1810 kHz and 2160–2170 kHz and, in Bulgaria, the bands 1625–1635 kHz and 1800–1810 kHz, are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. 9.21.

5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, 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 bands 1715–1800 kHz and 1850–2000 kHz. However, when allocating the 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.

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

5.99 *Additional allocation:* In Saudi Arabia, Austria, Bosnia and Herzegovina, Iraq, the Libyan Arab Jamahiriya, Uzbekistan, Slovakia, Romania, Serbia and Montenegro, 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.

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.

5.101 *Alternative allocation:* in Burundi and Lesotho, the band 1810–1850 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.102 *Alternative allocation:* in Argentina, Bolivia, Chile, Mexico, Paraguay, Peru, Uruguay and Venezuela, the band 1850–2000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis.

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, the Libyan Arab Jamahiriya, Lesotho, 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.

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 and in Appendix 13.

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, 156.8 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 and in Appendix 13.

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.

5.112 *Alternative allocation:* In Bosnia and Herzegovina, Denmark, Malta, Serbia and Montenegro, and Sri Lanka, the band 2194–2300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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 Bosnia and Herzegovina, Denmark, Iraq, Malta, and Serbia and Montenegro, the band 2502–2625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.115 The carrier (reference) frequencies 3023 kHz and 5680 kHz may also be used, in accordance with Article 31 and Appendix 13 by stations of the maritime mobile service engaged in coordinated search and rescue operations.

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 Bosnia and Herzegovina, Côte d'Ivoire, Denmark, Egypt, Liberia, Malta, Serbia and Montenegro, Sri Lanka and Togo, the band 3155–3200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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 Honduras, Mexico, Peru and Venezuela, the band 3500–3750 kHz is also allocated to the fixed and mobile services on a primary basis.

5.122 *Alternative allocation:* in Argentina, Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay, the band 3750–4000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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 In Afghanistan, Argentina, Armenia, Azerbaijan, Belarus, Botswana, Burkina Faso, the Central African Rep., China, Georgia, India, Kazakstan, Mali, Niger, Kyrgyzstan, Russian Federation, Tajikistan, Chad, Turkmenistan and Ukraine, in the bands 4063–4123 kHz, 4130–4133 kHz and 4408–4438 kHz, stations of limited power in the fixed service which are situated at least 600 km from the coast may operate on condition that harmful interference is not caused to the maritime mobile service.

5.129 On condition that harmful interference is not caused to the maritime mobile service, the 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.

5.130 The conditions for the use of the carrier frequencies 4125 kHz and 6215 kHz are prescribed in Articles 31 and 52 and in Appendix 13.

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).

5.133 *Different category of service:* in Armenia, Azerbaijan, Belarus, Georgia, Kazakstan, Latvia, Lithuania, Moldova, Uzbekistan, Kyrgyzstan, Russian Federation, 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).

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 as from 1 April 2007 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–03).

5.136 The band 5900–5950 kHz is allocated, until 1 April 2007, to the fixed service on a primary basis, as well as to the following services: In Region 1 to the land mobile service on a primary basis, in Region 2 to the mobile except aeronautical mobile (R) service on a primary basis, and in Region 3 to the mobile except aeronautical mobile (R) service on a secondary basis, subject to application of the procedure referred to in Resolution 21 (Rev.WRC–95)[3]. After 1 April 2007, frequencies in this band may be used by stations in the above-mentioned services, 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 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.

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.

5.138A Until 29 March 2009, the band 6765–7000 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis.

5.139 *Different category of service:* Until 29 March 2009, in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 6765–7000 kHz to the land mobile service is on a primary basis (see No. 5.33).

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

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

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:* After 29 March 2009, in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, the Libyan Arab Jamahiriya, Morocco, Mauritania, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, Tunisia, Viet Nam and Yemen, the band 7100–7200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis.

5.141C In Regions 1 and 3, the band 7100–7200 kHz is allocated to the broadcasting service until 29 March 2009 on a primary basis.

5.142 Until 29 March 2009, the use of the band 7100–7300 kHz in Region 2 by the amateur service shall not impose constraints on

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

the broadcasting service intended for use within Region 1 and Region 3. After 29 March 2009 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.

5.143 The band 7300–7350 kHz is allocated, until 1 April 2007, to the fixed service on a primary basis and to the land mobile service on a secondary basis, subject to application of the procedure referred to in Resolution 21 (Rev.WRC–95)[3]. After 1 April 2007, frequencies in this band may be used by stations in the above-mentioned 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. 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.

5.143A In Region 3, the band 7350–7450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned 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. 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.

5.143B In Region 1, the band 7350–7450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, on condition that harmful interference is not caused to the broadcasting service, 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, each station using a total radiated power that shall not exceed 24 dBW.

5.143C *Additional allocation:* After 29 March 2009 in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kuwait, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, the bands 7350–7400 kHz and 7400–7450 kHz are also allocated to the fixed service on a primary basis.

5.143D In Region 2, the band 7350–7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned 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. 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.

5.143E Until 29 March 2009, the band 7450–8100 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis.

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 and in Appendix 13.

5.146 The bands 9400–9500 kHz, 11600–11650 kHz, 12050–12100 kHz, 15600–15800 kHz, 17480–17550 kHz and 18900–19020 kHz are allocated to the fixed service on a primary basis until 1 April 2007, subject to application of the procedure referred to in Resolution 21 (Rev.WRC–95). After 1 April 2007, frequencies in these bands 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.

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, 4990–5000 MHz, 94.1–100 GHz,

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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,
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,
42.77–42.87 GHz,
43.07–43.17 GHz,
43.37–43.47 GHz,
48.94–49.04 GHz,
76–86 GHz,
92–94 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).

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 The bands 13570–13600 kHz and 13800–13870 kHz are allocated, until 1 April 2007, to the fixed service on a primary basis and to the mobile except aeronautical mobile (R) service on a secondary basis, subject to application of the procedure referred to in Resolution 21 (Rev.WRC–95)[3]. After 1 April 2007, frequencies in these bands may be used by stations in the above-mentioned services, 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.

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, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Turkmenistan and Ukraine, the band 21850–21870 kHz is also allocated to the aeronautical mobile (R) service on a primary basis.

5.155A In Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., the Russian Federation, 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.

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.

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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.

5.160 *Additional allocation:* in Botswana, Burundi, Lesotho, Malawi, Dem. Rep. of the Congo, Rwanda and Swaziland, the band 41–44 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

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.

5.162 *Additional allocation:* in Australia and New Zealand, the band 44–47 MHz is also allocated to the broadcasting service on a primary basis.

5.162A *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Moldova, Monaco, Norway, the Netherlands, Poland, Portugal, Slovakia, the Czech Rep., the United Kingdom, the Russian Federation, 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).

5.163 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., 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.

5.164 *Additional allocation:* in Albania, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte; d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Lebanon, Liechtenstein, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, the United Kingdom, Serbia and Montenegro, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 47–68 MHz, in Romania the band 47–58 MHz, in South Africa the band 47–50 MHz, and in the Czech Rep. the band 66–68 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 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 band.

5.165 *Additional allocation:* in Angola, Cameroon, the Congo, Madagascar, Mozambique, Somalia, 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.

5.166 *Alternative allocation:* in New Zealand, the band 50–51 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis; the band 53–54 MHz is allocated to the fixed and mobile services on a primary basis.

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

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, Burundi, Lesotho, Malawi, Namibia, 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.

5.170 *Additional allocation:* in New Zealand, the band 51–53 MHz is also allocated to the fixed and mobile services on a primary basis.

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

5.172 *Different category of service:* in the French Overseas Departments in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 54–68 MHz to the fixed and mobile services is on a primary basis (see No. 5.33).

5.173 *Different category of service:* in the French Overseas Departments in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 68–72 MHz to the fixed and mobile services is on a primary basis (see No. 5.33).

5.174 *Alternative allocation:* in Bulgaria, Hungary and Romania, the band 68–73 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions in the Final Acts of the Special Regional Conference (Geneva, 1960).

5.175 *Alternative allocation:* in Armenia, Azerbaijan, Belarus, Georgia, Kazakstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the bands 68–73 MHz and 76–87.5 MHz are allocated to the broadcasting service 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.

5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), Estonia (subject to agreement obtained under No. 9.21), 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.

5.177 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Latvia, Moldova, 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.

5.178 *Additional allocation:* in Colombia, Costa Rica, 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.

5.179 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Moldova, Mongolia, Kyrgyzstan, Slovakia, 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.

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.

5.184 *Additional allocation:* in Bulgaria and Romania, the band 76–87.5 MHz is also 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).

5.185 *Different category of service:* in the United States, the French Overseas Departments in Region 2, Guyana, Jamaica, Mexico and Paraguay, the allocation of the band 76–88 MHz to the fixed and mobile services is on a primary basis (see No. 5.33).

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, Lebanon, Syria, Kyrgyzstan, Somalia and Turkmenistan, the band 104–108 MHz is also allocated to the mobile, except aeronautical mobile (R), service on a secondary basis.

5.197 *Additional allocation:* in Japan, Pakistan and Syria, 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.

5.197A The band 108–117.975 MHz may also be used by the aeronautical mobile (R) service on a primary basis, limited to systems that transmit navigational information in support of air navigation and surveillance functions in accordance with recognized international aviation standards. Such use shall be in accordance with Resolution 413 (WRC–03) and shall not cause harmful interference to nor claim protection from stations operating in the aeronautical radionavigation service which operate in accordance with international aeronautical standards.

5.198 *Additional allocation:* the band 117.975–136 MHz is also allocated to the aeronautical mobile-satellite (R) service on a

secondary basis, subject to agreement obtained under No. 9.21.

5.199 The bands 121.45–121.55 MHz and 242.95–243.05 MHz are also allocated to the mobile-satellite service for the reception on board satellites of emissions from emergency position-indicating radiobeacons transmitting at 121.5 MHz and 243 MHz (see Appendix 13).

5.200 In the band 117.975–136 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 and Appendix 13 for distress and safety purposes with stations of the aeronautical mobile service.

5.201 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Japan, Kazakstan, Latvia, Moldova, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Russian Federation, Tajikistan, Turkmenistan and Ukraine, the 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.

5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Jordan, Latvia, Moldova, Oman, Uzbekistan, Poland, Syria, Kyrgyzstan, Slovakia, the Czech Rep., Romania, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the 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.

5.203 In the band 136–137 MHz, existing operational meteorological satellites may continue to operate, under the conditions defined in No. 4.4 with respect to the aeronautical mobile service, until 1 January 2002. Administrations shall not authorize new frequency assignments in this band to stations in the meteorological-satellite service.

5.203A *Additional allocation:* in Israel, Mauritania, Qatar and Zimbabwe, the band 136–137 MHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a secondary basis until 1 January 2005.

5.203B *Additional allocation:* in Saudi Arabia, United Arab Emirates, Oman and Syrian Arab Republic, the band 136–137 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis until 1 January 2005.

5.204 *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Bosnia and Herzegovina, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Malaysia, Oman, Pakistan, the Philippines, Qatar, Serbia and Montenegro, 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).

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, Finland, France, Georgia, Greece, Kazakstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Syria, Slovakia, the Czech Rep., Romania, the Russian Federation, 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 Table 1 of Recommendation ITU-R RA.769–1.

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 France, 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.

5.211 *Additional allocation:* in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Bosnia and Herzegovina, Denmark, the United Arab Emirates, Spain, Finland, Greece, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Liechtenstein, Luxembourg, Mali, Malta,

Norway, the Netherlands, Qatar, the United Kingdom, Somalia, Sweden, Switzerland, Tanzania, Tunisia, Turkey and Yugoslavia, the band 138–144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis.

5.212 *Alternative allocation:* in Angola, Botswana, Burundi, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Libyan Arab Jamahiriya, Jordan, Lesotho, Liberia, Malawi, Mozambique, Namibia, Oman, Uganda, 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.

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 Bosnia and Herzegovina, Croatia, Eritrea, Ethiopia, Kenya, The Former Yugoslav Republic of Macedonia, Malta, Somalia, Sudan, Tanzania and Yugoslavia, the band 138–144 MHz is also allocated to the fixed service on a primary basis.

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 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. The mobile-satellite service shall not constrain the development and use of the radionavigation-satellite service in the bands 149.9–150.05 MHz and 399.9–400.05 MHz.

5.221 Stations of the mobile-satellite service in the 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, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the Russian Federation, Finland, France, Gabon, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, the Libyan Arab Jamahiriya, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, 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, Slovakia, Romania, the United Kingdom, Senegal, Serbia and Montenegro, Sierra Leone, Singapore, Slovenia, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia, and Zimbabwe.

5.222 Emissions of the radionavigation-satellite service in the bands 149.9–150.05 MHz and 399.9–400.05 MHz may also be used by receiving earth stations of the space research service.

5.223 Recognizing that the use of the band 149.9–150.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation-satellite service, administrations are urged not to authorize such use in application of No. 4.4.

5.224A The use of the bands 149.9–150.05 MHz and 399.9–400.05 MHz by the mobile-satellite service (Earth-to-space) is limited to the land mobile-satellite service (Earth-to-space) until 1 January 2015.

5.224B The allocation of the bands 149.9–150.05 MHz and 399.9–400.05 MHz to the radionavigation-satellite service shall be effective until 1 January 2015.

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.

5.226 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 are contained in Article 31 and Appendix 13.

In the bands 156–156.7625 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 13).

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 frequency 156.8 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.

5.227 In the maritime mobile VHF service the frequency 156.525 MHz is to be used exclusively for digital selective calling for distress, safety and calling. The conditions for the use of this frequency are prescribed in Articles 31 and 52, and Appendices 13 and 18.

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, China and Pakistan, 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.

5.232 *Additional allocation:* in Japan, the band 170–174 MHz is also allocated to the broadcasting service on a primary basis.

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.

5.234 *Different category of service:* in Mexico, the allocation of the band 174–216 MHz to the fixed and mobile services is on a primary basis (see No. 5.33).

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), Eritrea, Ethiopia, Gambia, Guinea, the Libyan Arab Jamahiriya, Malawi, Mali, Sierra Leone, Somalia, Chad and Zimbabwe, the band 174–223 MHz is also allocated to the fixed and mobile services on a secondary basis.

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 Syria, 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 (see Appendix 13).

5.256A *Additional allocation:* In China, the Russian Federation, Kazakhstan and Ukraine, the 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, nor claim protection from, nor constrain the use and development of the mobile service systems and mobile-satellite service systems operating in the 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.

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, Israel, Japan, and Syria, 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.

5.260 Recognizing that the use of the band 399.9–400.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation satellite service, administrations are urged not to authorize such use in application of No. 4.4.

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, Bosnia and Herzegovina, Botswana, Bulgaria, Colombia, Costa Rica, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Romania, Serbia and Montenegro, Singapore, Somalia, Tajikistan, Turkmenistan and Ukraine, the band 400.05–401 MHz is also allocated to the fixed and mobile services on a primary basis.

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.

5.266 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 and Appendix 13).

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 band 410–420 MHz by the space research service is limited to communications within 5 km of an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities 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. No. 4.10 does not apply to extra-vehicular activities. In this frequency band the space research (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services.

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 Azerbaijan, Belarus, China, India, Latvia, Lithuania, Kyrgyzstan and Turkmenistan, the band 420–460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis.

5.272 *Different category of service:* in France, the allocation of the band 430–434 MHz to the amateur service is on a secondary basis (see No. 5.32).

5.273 *Different category of service:* In the Libyan Arab Jamahiriya, the allocation of the bands 430–432 MHz and 438–440 MHz to the radiolocation service is on a secondary basis (see No. 5.32).

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

5.275 *Additional allocation:* in Bosnia and Herzegovina, Croatia, Estonia, Finland, Latvia, The Former Yugoslav Republic of Macedonia, Libya, Slovenia and Yugoslavia, the bands 430–432 MHz and 438–440 MHz are also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.]

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

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

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 this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU–R SA.1260–1. Additionally, the Earth exploration-satellite service (active) in the 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.

5.280 In Germany, Austria, Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Portugal, Slovenia, Switzerland and Yugoslavia, 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.

5.281 *Additional allocation:* in the French Overseas Departments 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.

5.286B 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, Mexico and Panama, the band 454–455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis.

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

5.287 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 (see Resolution 341 (WRC–97)[7]).

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.1174–1.

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, Japan, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, 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.

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, Finland, Liechtenstein, Norway, Netherlands, the Czech Rep. and Switzerland, the 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).

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

5.293 *Different category of service:* in Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470–512 MHz and 614–806 MHz to the fixed and mobile services 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 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.

5.294 *Additional allocation:* In Burundi, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Ethiopia, Israel, the Libyan Arab Jamahiriya, Kenya, Lebanon, Malawi, the Syrian Arab Republic, Sudan, Chad and Yemen, the band 470–582 MHz is also allocated to the fixed service on a secondary basis.

5.296 *Additional allocation:* in Germany, Austria, Belgium, Côte d'Ivoire, Denmark, Spain, Finland, France, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Lithuania, Malta, Morocco, Monaco, Norway, the Netherlands, Portugal, the Syrian Arab Republic, the United Kingdom, Sweden, Switzerland, Swaziland and Tunisia, the band 470–790 MHz is also allocated on a secondary basis to the

[7] *Note by the Secretariat:* This Resolution was abrogated by WRC–03.

land mobile service, intended for applications ancillary to broadcasting. 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.

5.297 *Additional allocation:* in Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, Honduras, Jamaica and Mexico, the 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.

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 Israel, Libya, Syria and Sudan, the band 582–790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis.

5.302 *Additional allocation:* in the United Kingdom, the band 590–598 MHz is also allocated to the aeronautical radionavigation service on a primary basis. All new assignments to stations in the aeronautical radionavigation service, including those transferred from the adjacent bands, shall be subject to coordination with the Administrations of the following countries: Germany, Belgium, Denmark, Spain, France, Ireland, Luxembourg, Morocco, Norway and the Netherlands.

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.

5.309 *Different category of service:* in Costa Rica, El Salvador and Honduras, the allocation of the 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.

5.311 Within the frequency band 620–790 MHz, assignments may be made to television stations using frequency modulation in the broadcasting-satellite service subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Resolutions 33 (Rev.WRC–03) and 507 (Rev.WRC–03)). Such stations shall not produce a power flux-density in excess of the value -129 dB(W/m^2) for angles of arrival less than 20° (see Recommendation 705) within the territories of other countries without the consent of the administrations of those countries. Resolution 545 (WRC–03) applies.

5.312 *Additional allocation:* In Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 645–862 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.314 *Additional allocation:* in Austria, Italy, Moldova, Uzbekistan, the United Kingdom and Swaziland, the band 790–862 MHz is also allocated to the land mobile service on a secondary basis.

5.315 *Alternative allocation:* in Greece, Italy and Tunisia, the band 790–838 MHz is allocated to the broadcasting service on a primary basis.

5.316 *Additional allocation:* In Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Greece, Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, The Former Yugoslav Republic of Macedonia, Liechtenstein, Mali, Monaco, Norway, the Netherlands, Portugal, the United Kingdom, the Syrian Arab Republic, Serbia and Montenegro, Sweden and Switzerland, the band 790–830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830–862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band.

5.317 *Additional allocation:* in Region 2 (except Brazil and the United States), the 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.

5.317A Administrations wishing to implement International Mobile Telecommunications-2000 (IMT–2000) may use those parts of the band 806–960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (see Resolution 224 (WRC–2000)). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

5.318 *Additional allocation:* in Canada, the United States and Mexico, the ands 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, 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.

5.321 *Alternative allocation:* in Italy, the band 838–854 MHz is allocated to the broadcasting service on a primary basis as from 1 January 1995.

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, Egypt, Spain, Libya, Morocco, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. 9.21.

5.323 *Additional allocation:* In Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 862–960 MHz is 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.

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 Cuba, the allocation of the band 902–915 MHz to the land mobile service is on a primary basis.

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).

5.328 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 (WRC–03) 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.

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.

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 (WRC–03) shall apply.

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 other systems or services operating in accordance with the Table.

5.330 *Additional allocation:* In Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lebanon, Mozambique, Nepal, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1215–1300 MHz is also allocated to the fixed and mobile services on a primary basis.

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, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Nigeria, Norway, Oman, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, the United Kingdom, Serbia and Montenegro, Slovenia, Somalia, 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.

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 Azerbaijan, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Romania and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1350–1400 MHz.

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.

5.339A *Additional allocation:* The band 1390–1392 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a secondary basis and the band 1430–1432 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis. These allocations are limited to use for feeder links for non-geostationary-satellite networks in the mobile-satellite service with service links below 1 GHz, and Resolution 745 (WRC–03) applies.

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.

5.342 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Uzbekistan, Kyrgystan, the Russian Federation and

[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.

Ukraine, the 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 band 1452–1492 MHz is subject to agreement between the administrations concerned.

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 (WARC–92)[3].

5.347 *Different category of service:* in Bangladesh, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cuba, Denmark, Egypt, Greece, Ireland, Italy, Mozambique, Portugal, Serbia and Montenegro, Sri Lanka, Swaziland, Yemen and Zimbabwe, the allocation of the band 1452–1492 MHz to the broadcasting-satellite service and the broadcasting service is on a secondary basis until 1 April 2007.

5.347A In the bands:

1452–1492 MHz,
1525–1559 MHz,
1613.8–1626.5 MHz,
2655–2670 MHz,
2670–2690 MHz,
21.4–22 GHz,
Resolution 739 (WRC–03) applies.

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.

5.348C For the use of the bands 1518–1525 MHz and 1668–1675 MHz by the mobile-satellite service, see Resolution 225 (Rev.WRC–03).

5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Bosnia and Herzegovina, Cameroon, Egypt, France, Iran (Islamic Republic of), Iraq, Israel, Kazakstan, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Morocco, Qatar, Syria, Kyrgyzstan, Romania, Turkmenistan, Yemen and Yugoslavia, the allocation of the band 1525–1530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33).

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 1525–1544 MHz, 1545–1559 MHz, 1610–1626.5 MHz, 1626.5–1645.5 MHz, 1646.5–1660.5 MHz, 1980–2010 MHz, 2170–2200 MHz, 2483.5–2500 MHz, 2500–2520 MHz and 2670–2690 MHz by the mobile-satellite service, see Resolutions 212 (Rev.WRC–97) and 225 (WRC–2000)[3].

5.352A In the 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 France and French overseas territories in Region 3, Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Malta, Morocco, Mauritania, Nigeria, Oman, Pakistan, Philippines, Qatar, Syria, Tanzania, Viet Nam and Yemen notified prior to 1 April 1998.

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

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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 (WRC–2000) shall apply.)

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), Egypt, Eritrea, Iraq, Israel, Kuwait, Lebanon, Malta, Qatar, Syrian Arab Republic, Somalia, 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.

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 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 (WRC–2000) shall apply.)

5.359 *Additional allocation:* In Germany, Saudi Arabia, Armenia, Austria, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Cameroon, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, the Libyan Arab Jamahiriya, Jordan, Kazakhstan, Kuwait, Lebanon, Lithuania, Mauritania, Moldova, Mongolia, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Swaziland, Tajikistan, Tanzania, Tunisia, Turkmenistan and Ukraine, the 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 bands.

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.

5.362B *Additional allocation:* The band 1559–1610 MHz is also allocated to the fixed service on a primary basis until 1 January 2005 in Germany, Armenia, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, Kazakhstan, Lithuania, Moldova, Mongolia, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Senegal, Swaziland, Tajikistan, Tanzania, Turkmenistan and Ukraine, and until 1 January 2010 in Saudi Arabia, Cameroon, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Mali, Mauritania, the Syrian Arab Republic and Tunisia. After these dates, the fixed service may continue to operate on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and the aeronautical radionavigation service and not authorize new frequency assignments to fixed-service systems in this band.

5.362C *Additional allocation:* in Bahrain, Bangladesh, Congo, Egypt, Eritrea, Iraq, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Qatar, Syria, Somalia, Sudan, Chad, Togo and Yemen, the band 1559–1610 MHz is also allocated to the fixed service on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and not authorize new frequency assignments to fixed-service systems in this band.

5.363 *Alternative allocation:* in Sweden, the band 1590–1626.5 MHz is allocated to the aeronautical radionavigation service on a primary basis.

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 bands 1610–1626.5 MHz and 5000–5150 MHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. 9.21.

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, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, Swaziland, 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.

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 bands 1610–1626.5 MHz (Earth-to-space) and 2483.5–2500 MHz (space-to-Earth) are also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under No. 9.21.

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.

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 2000 s.

5.379D For sharing of the band 1668–1675 MHz between the mobile-satellite service and the fixed, mobile and space research (passive) services, Resolution 744 (WRC–03) shall apply.

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.

5.380 The bands 1670–1675 MHz and 1800–1805 MHz are intended for use, on a worldwide basis, by administrations wishing to implement aeronautical public correspondence. The use of the band 1670–1675 MHz by stations in the systems for public correspondence with aircraft is limited to transmissions from aeronautical stations and the use of the band 1800–1805 MHz is limited to transmissions from aircraft stations.

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 in accordance with Resolution 670 (WRC–03).

5.381 *Additional allocation:* In Afghanistan, Costa Rica, 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.

5.382 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Bulgaria, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Hungary, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Romania, Serbia and Montenegro, Somalia, Tajikistan, Tanzania, Turkmenistan, Ukraine and Yemen, the allocation of the 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 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.

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 bands, or portions of the bands, 1710–1885 MHz and 2500–2690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications-2000 (IMT–2000) in accordance with Resolution 223 (WRC–2000). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

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 band 1750–1850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2, 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.

5.387 *Additional allocation:* In Azerbaijan, Belarus, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, 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.

5.388 The bands 1885–2025 MHz and 2110–2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT–2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT–2000 in accordance with Resolution 212 (Rev.WRC–97). (See also Resolution 223 (WRC–2000).)

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—2000 (IMT–2000), in accordance with Resolution 221 (Rev.WRC–03). Their use by IMT–2000 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.

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, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT–2000 mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT–2000 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.

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 (WRC–95)[4]. The use of these bands shall not commence before 1 January 2000; however the use of the band 1980–1990 MHz in Region 2 shall not commence before 1 January 2005.

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 shall not commence before 1 January 2002 and is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (WRC–95).[4]

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, Syria 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.

5.390 In Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Suriname and Uruguay, the use of the bands 2010–2025 MHz and 2160–2170 MHz by the mobile-satellite services shall not cause harmful interference to stations in the fixed and mobile services before 1 January 2005. After this date, the use of these bands is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (WRC–95).[5]

5.391 In making assignments to the mobile service in the bands 2025–2110 MHz and 2200–2290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154, and shall take that Recommendation into account for the introduction of any other type of mobile system.

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.

5.392A *Additional allocation:* in Russian Federation, the band 2160–2200 MHz is also allocated to the space research service (space-to-Earth) on a primary basis until 1 January 2005. Stations in the space research service shall not cause harmful interference to, or claim protection from, stations in the fixed and mobile services operating in this frequency band.

5.393 *Additional allocation:* in the United States, India and Mexico, the 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 (WARC–92), with the exception of resolves 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz.

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 2300–2483.5 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services.

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–97)[3]. Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use.

5.397 *Different category of service:* in France, the band 2450–2500 MHz is allocated on a primary basis to the radiolocation service (see No. 5.33). Such use is subject to agreement with administrations having services operating or planned to operate in accordance with the Table of Frequency Allocations which may be affected.

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.

5.399 In Region 1, in countries other than those listed in No. 5.400, harmful interference shall not be caused to, or protection shall

[4] Note by the Secretariat: This Resolution was revised by WRC–2000.

[5] Note by the Secretariat: This Resolution was revised by WRC–2000.

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

not be claimed from, stations of the radiolocation service by stations of the radiodetermination satellite service.

5.400 *Different category of service:* In Angola, Australia, Bangladesh, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, the Dem. Rep. of the Congo, the Syrian Arab Republic, Sudan, Swaziland, Togo and Zambia, the allocation of the band 2483.5–2500 MHz to the radiodetermination-satellite service (space-to-Earth) is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21 from countries not listed in this provision.

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 (until 1 January 2005 the band 2500–2535 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.

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.

5.405 *Additional allocation:* in France, the band 2500–2550 MHz is also allocated to the radiolocation service on a primary basis. Such use is subject to agreement with the administrations having services operating or planned to operate in accordance with the Table which may be affected.

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.

5.409 Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in the band 2500–2690 MHz.

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.

5.411 When planning new tropospheric scatter radio-relay links in the band 2500–2690 MHz, all possible measures shall be taken to avoid directing the antennae of these links towards the geostationary-satellite orbit.

5.412 *Alternative allocation:* in Azerbaijan, Bulgaria, Kyrgyzstan and Turkmenistan, the band 2500–2690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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) shall be effective on 1 January 2005 and is subject to coordination under No. 9.11A.

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. In the direction space-to-Earth, the power flux-density at the Earth's surface shall not exceed the values given in Article 21, Table 21–4.

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.

5.417A In applying provision No. 5.418, in Korea (Rep. of) and Japan, resolves 3 of Resolution 528 (Rev.WRC–03) is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2605–2630 MHz. This use is limited to systems intended for national coverage. 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. The provisions of No. 5.416 and Table 21–4 of Article 21 do not apply. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) in the band 2605–2630 MHz is subject to the provisions of Resolution 539 (Rev.WRC–03). The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2605–2630 MHz for which complete Appendix 4 coordination information, or notification information, has been received after 4 July

2003, for all conditions and for all methods of modulation, shall not exceed the following limits:

-130 dB(W/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-130 + 0.4\ (\theta - 5)$ dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-122 dB(W/(m^2 · MHz))	for $25° < \theta \le 90°$

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. In the case of the broadcasting-satellite service (sound) networks of Korea (Rep. of), as an exception to the limits above, the power flux-density value of -122 dB(W/(m^2 · MHz)) shall be used as a threshold for coordination under No. 9.11 in an area of 1000 km around the territory of the administration notifying the broadcasting-satellite service (sound) system, for angles of arrival greater than 35°.

5.417B In Korea (Rep. of) and Japan, use of the band 2605–2630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.417A, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, 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 4 July 2003, 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 5 July 2003.

5.417C Use of the band 2605–2630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.417A, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. 9.12.

5.417D Use of the band 2605–2630 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003 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. 5.417A, and No. 22.2 does not apply.

5.418 *Additional allocation:* in Korea (Rep. of), India, Japan, Pakistan and Thailand, the 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–03). 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–03). 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 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/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-130 + 0.4\ (\theta - 5)$ dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-122 dB(W/(m^2 · MHz))	for $25° < \theta \le 90°$

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/(m^2 · 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, the power flux-density value shall not exceed -100 dB(W/(m^2 · MHz)) anywhere on the territory of the Russian Federation.

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.

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 The allocation of the frequency band 2670–2690 MHz to the mobile-satellite service shall be effective from 1 January 2005. When introducing systems of the mobile-satellite service in this band, 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.

5.420 The band 2655–2670 MHz (until 1 January 2005 the band 2655–2690 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.

5.420A *Additional allocation:* in India and Japan, subject to agreement obtained under No. 9.21, the band 2670–2690 MHz may also be used for the aeronautical mobile-satellite service (Earth-to-space) for operation limited to within their national boundaries.

5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Lebanon, Mauritania, Moldova, Mongolia, Nigeria, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Serbia and Montenegro, 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.

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 system (SIT) 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, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3100–3300 MHz is also allocated to the radionavigation service on a primary basis.

5.429 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Congo (Rep. of the), Korea (Rep. of), the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Oman, Pakistan, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea and Yemen, the 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.

5.430 *Additional allocation:* in Azerbaijan, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3300–3400 MHz is also allocated to the radionavigation service on a primary basis.

5.431 *Additional allocation:* in Germany, Israel and the United Kingdom, the band 3400–3475 MHz is also allocated to the amateur service on a secondary basis.

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).

5.433 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.

5.435 In Japan, in the band 3620–3700 MHz, the radiolocation service is excluded.

5.438 Use of the 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. 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 by the radio altimeters).

5.439 *Additional allocation:* in Iran (Islamic Republic of) and Libya, the band 4200–4400 MHz is also allocated to the fixed service on a secondary basis.

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.

5.441 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.

5.442 In the bands 4825–4835 MHz and 4950–4990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service.

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).

5.443B 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 band 5030–5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the 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 band 4990–5000 MHz, radionavigation-satellite service systems operating in the band 5010–5030 MHz shall comply with the limits in the band 4990–5000 MHz defined in Resolution 741 (WRC–03).

5.444 The band 5030–5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band. For the use of this band, No. 5.444A and Resolution 114 (Rev.WRC–03) apply.

5.444A *Additional allocation:* the band 5091–5150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A.

In the band 5091–5150 MHz, the following conditions also apply:

—Prior to 1 January 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–03);

—Prior to 1 January 2018, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5000–5091 MHz band, shall take precedence over other uses of this band;

—After 1 January 2012, no new assignments shall be made to earth stations providing

feeder links of non-geostationary mobile-satellite systems;

—After 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

5.446 *Additional allocation:* in the countries listed in Nos. 5.369 and 5.400, the 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, the 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 Nos. 5.369 and 5.400, the 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 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.

5.446A The use of the bands 5150–5350 MHz and 5470–5725 MHz by the stations in the mobile service shall be in accordance with Resolution 229 (WRC–03).

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.

5.447 *Additional allocation:* In Israel, Lebanon, Pakistan, 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 (WRC–03) do not apply.

5.447A The allocation to the fixed-satellite service (Earth-to-space) 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 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, Sri Lanka, Thailand and Viet Nam. The use of this band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU–R F.1613. 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.

5.447F In the 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 and ITU-R SA.1632.

5.448 *Additional allocation:* In Azerbaijan, Libyan Arab Jamahiriya, Mongolia, Kyrgyzstan, Slovakia, Romania and Turkmenistan, the band 5250–5350 MHz is also allocated to the radionavigation service on a primary basis.

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), Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5470–5650 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.450A In the 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.

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), C‘‘te d’Ivoire, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Madagascar, Malaysia, Nigeria, Oman, 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 (WRC–03) do not apply.

5.454 *Different category of service:* in Azerbaijan, the Russian Federation, Georgia, Mongolia, Uzbekistan, 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).

5.455 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5670–5850 MHz is also allocated to the fixed service on a primary basis.

5.456 *Additional allocation:* in Cameroon, the band 5755–5850 MHz is also allocated to the fixed service on a primary basis.

5.457A In the 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).

5.457B In the 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, the Libyan Arab Jamahiriya, Jordan, Kuwait, 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).

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.

5.458C Administrations making submissions in the band 7025–7075 MHz (Earth-to-

space) for geostationary-satellite systems in the fixed-satellite service after 17 November 1995 shall consult on the basis of relevant ITU-R Recommendations with the administrations that have notified and brought into use non-geostationary-satellite systems in this frequency band before 18 November 1995 upon request of the latter administrations. This consultation shall be with a view to facilitating shared operation of both geostationary-satellite systems in the fixed-satellite service and non-geostationary-satellite systems in this band.

5.459 *Additional allocation:* in 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.

5.460 The use of the band 7145–7190 MHz by the space research service (Earth-to-space) is restricted to deep space; no emissions to deep space shall be effected in the band 7190–7235 MHz. Geostationary satellites in the space research service operating in the 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.

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.

5.461B The use of the band 7750–7850 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems.

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 provisional values for angles of arrival (θ), without the consent of the affected administration:

-174 dB(W/m^2) in a 4 kHz band for $0° \le \theta < 5°$

$-174 + 0.5\ (\theta - 5)$ dB(W/m_2) in a 4 kHz band for $5° \le \theta < 25°$

-164 dB(W/m_2) in a 4 kHz band for $25° \le \theta \le 90°$

These values are subject to study under Resolution 124 (WRC–97). [6]

[6] *Note by the Secretariat:* This Resolution was revised by WRC–2000.

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 Israel, 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).

5.468 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, the Libyan Arab Jamahiriya, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Swaziland, Tanzania, Chad, Togo, Tunisia and Yemen, the band 8500–8750 MHz is also allocated to the fixed and mobile services on a primary basis.

5.469 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Moldova, 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.

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, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), Libya, the Netherlands, Qatar and Sudan, the 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.

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, Bulgaria, Cuba, the Russian Federation, Georgia, Hungary, Moldova, 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.

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).

5.475 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. In the band 9300–9500 MHz, ground-based radars used for meteorological purposes have priority over other radiolocation devices.

5.476 In the band 9300–9320 MHz in the radionavigation service, the use of shipborne radars, other than those existing on 1 January 1976, is not permitted until 1 January 2001.

5.476A In the band 9500–9800 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 radionavigation and radiolocation services.

5.477 *Different category of service:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Pakistan, Qatar, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Trinidad and Tobago, and Yemen, the allocation of the band 9800–10000 MHz to the fixed service is on a primary basis (see No. 5.33).

5.478 *Additional allocation:* in Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 9800–10000 MHz is also allocated to the radionavigation service on a primary basis.

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, Costa Rica, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay and Venezuela, the band 10–10.45 GHz is also allocated to the fixed and mobile services on a primary basis.

5.481 *Additional allocation:* in Germany, Angola, Brazil, China, Costa Rica, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Tanzania, Thailand and Uruguay, the band 10.45–10.5 GHz is also allocated to the fixed and mobile services on a primary basis.

5.482 In the band 10.6–10.68 GHz, stations of the fixed and mobile, except aeronautical mobile, services shall be limited to a maximum equivalent isotropically radiated power of 40 dBW and the power delivered to the antenna shall not exceed –3 dBW. These limits may be exceeded subject to agreement obtained under No. 9.21. However, in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, China, the United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Kuwait, Latvia, Lebanon, Moldova, Nigeria, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Tajikistan and Turkmenistan, the restrictions on the fixed and mobile, except aeronautical mobile, services are not applicable.

5.483 *Additional allocation:* In Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Uzbekistan, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Serbia and Montenegro, 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.

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.

5.485 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 Mexico and the United States, the allocation of the band 11.7–12.1 GHz to the fixed service is on a secondary basis (see No. 5.32).

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, Angola, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Madagascar, Mali, Morocco, Mongolia, Nigeria, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, Chad, Togo and Yemen, the band 12.5–12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.495 *Additional allocation:* In Bosnia and Herzegovina, Croatia, France, Greece, Liechtenstein, Monaco, Uganda, Portugal, Romania, Serbia and Montenegro, Slovenia, Switzerland, Tanzania and Tunisia, the band 12.5–12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis.

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, India and Pakistan, the band 13.25–14 GHz is also allocated to the fixed service on a primary basis.

5.500 *Additional allocation:* In Algeria, Angola, 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, Malta, Morocco, Mauritania, Nigeria, Pakistan, Qatar, the Syrian Arab Republic, Singapore, Sudan, Chad and Tunisia, the band 13.4–14 GHz is also allocated to the fixed and mobile services on a primary basis.

5.501 *Additional allocation:* In Azerbaijan, Hungary, Japan, Mongolia, Kyrgyzstan, Romania, the United Kingdom and Turkmenistan, the band 13.4–14 GHz is also allocated to the radionavigation service on a primary basis.

5.501A The allocation of the band 13.4–13.75 GHz 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.

5.501B 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 size 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) 4.7D + 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 band 14–14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643, with respect to any radio astronomy station performing observations in the 14.47–14.5 GHz band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa.

5.504C In the band 14–14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, C''te d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Lesotho, 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, 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.

5.505 *Additional allocation:* In Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lesotho, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad and Yemen, the band 14–14.3 GHz is also allocated to the fixed service on a primary basis.

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, Greece and Malta, within the minimum distance given in Resolution 902 (WRC–03) from these countries.

5.508 *Additional allocation:* In Germany, Bosnia and Herzegovina, France, Italy, Libyan Arab Jamahiriya, The Former Yugoslav Rep. of Macedonia, the United Kingdom, Serbia and Montenegro and Slovenia, the band 14.25–14.3 GHz is also allocated to the fixed service on a primary basis.

5.508A In the band 14.25–14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, 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, 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.

5.509 *Additional allocation:* in Japan the band 14.25–14.3 GHz is also allocated to the mobile, except aeronautical mobile, service on a primary basis.

5.509A In the band 14.3–14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, 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, 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.

5.510 The use of the 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.

5.511 *Additional allocation:* in Saudi Arabia, Bahrain, Bosnia and Herzegovina, Cameroon, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, Kuwait, Lebanon, Libya, Pakistan, Qatar, Syria, Slovenia, Somalia and Yugoslavia, the band 15.35–15.4 GHz is also allocated to the fixed and mobile services on a secondary basis.

5.511A The band 15.43–15.63 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. Use of the band 15.43–15.63 GHz by the fixed-satellite service (space-to-Earth and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. 9.11A. The use of the frequency band 15.43–15.63 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links of non-geostationary systems in the mobile-satellite service for

which advance publication information has been received by the Bureau prior to 2 June 2000. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. In order to protect the radio astronomy service in the band 15.35–15.4 GHz, the aggregate power flux-density radiated in the 15.35–15.4 GHz band by all the space stations within any feeder-link of a non-geostationary system in the mobile-satellite service (space-to-Earth) operating in the 15.43–15.63 GHz band shall not exceed the level of -156 dB(W/m2) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time.

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. 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.

5.511D Fixed-satellite service systems for which complete information for advance publication has been received by the Bureau by 21 November 1997 may operate in the bands 15.4–15.43 GHz and 15.63–15.7 GHz in the space-to-Earth direction and 15.63–15.65 GHz in the Earth-to-space direction. In the bands 15.4–15.43 GHz and 15.65–15.7 GHz, emissions from a non-geostationary space station shall not exceed the power flux-density limits at the Earth's surface of -146 dB(W/(m^2 · MHz)) for any angle of arrival. In the band 15.63–15.65 GHz, where an administration plans emissions from a non-geostationary space station that exceed -146 dB(W/(m^2 · MHz)) for any angle of arrival, it shall coordinate under No. 9.11A with the affected administrations. Stations in the fixed-satellite service operating in the band 15.63–15.65 GHz in the Earth-to-space direction shall not cause harmful interference to stations in the aeronautical radionavigation service (No. 4.10 applies).

5.512 *Additional allocation:* In Algeria, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Bosnia and Herzegovina, Brunei Darussalam, Cameroon, Congo (Rep. of the), Costa Rica, Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Malaysia, Mali, Morocco, Mauritania, Mozambique, Nepal, Nicaragua, Oman, Pakistan, Qatar, Serbia and Montenegro, Singapore, Slovenia, Somalia, Sudan, Swaziland, Tanzania, Chad, Togo and Yemen, the band 15.7–17.3 GHz is also allocated to the fixed and mobile services on a primary basis.

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, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Bosnia and Herzegovina, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Finland, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Serbia and Montenegro, Slovenia and Sudan, the 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.

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 Region 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 (WRC–03).

5.517 In Region 2, the allocation to the broadcasting-satellite service in the band 17.3–17.8 GHz shall come into effect on 1 April 2007. After that date, use of the fixed-satellite (space-to-Earth) service in the band 17.7–17.8 GHz shall not claim protection from and shall not cause harmful interference to operating systems in the broadcasting-satellite service.

5.518 *Different category of service:* in Region 2, the allocation of the band 17.7–17.8 GHz to the mobile service is on a primary basis until 31 March 2007.

5.519 *Additional allocation:* the band 18.1–18.3 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.

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 Germany, Denmark, the United Arab Emirates and Greece, the 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.

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 20 000 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, Syria, 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, Angola, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, the Congo, 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 Dem. Rep. of the Congo, Syria, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Tanzania, Chad, Togo and Tunisia, the 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 band 19.7–21.2 GHz and of space stations in the mobile-satellite service in the band 19.7–20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter band.

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.

5.528 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.

5.530 In Regions 1 and 3, the allocation to the broadcasting-satellite service in the band 21.4–22 GHz shall come into effect on 1 April 2007. The use of this band by the broadcasting-satellite service after that date and on an interim basis prior to that date is subject to the provisions of Resolution 525 (WARC–92)[3]

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.

5.533 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.

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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 Recommendations ITU–R SA.1278 and ITU–R SA.1625, respectively.

5.536B In Germany, Saudi Arabia, Austria, Belgium, Brazil, Bulgaria, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Lebanon, Libya, Liechtenstein, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, Syria, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Switzerland, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite 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.

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, 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.

5.537 Space services using non-geostationary satellites operating in the inter-satellite service in the band 27–27.5 GHz are exempt from the provisions of No. 22.2.

5.537A In Bhutan, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.5–28.35 GHz may also be used by high altitude platform stations (HAPS). The use of HAPS within the band 27.5–28.35 GHz is limited, within the territory of the countries listed above, to a single 300 MHz sub-band. 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 co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution 145 (WRC–03).

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. In the band 27.500–27.501 GHz, such space-to-Earth transmissions shall not produce a power flux-density in excess of the values specified in Article 21, Table 21–4 on the Earth's surface.

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, Bangladesh, Brunei Darussalam, Cameroon, China, Congo, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Pakistan, the Philippines, Qatar, Syria, the Dem. People's Rep. of Korea, Somalia, 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.

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, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the 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 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 band 31–31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the band 31.3–31.8 GHz, taking into account the protection criterion as given in 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 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 take account of rain attenuation, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions as given above. See Resolution 145 (WRC–03).

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, Azerbaijan, Georgia, Mongolia, 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).

5.546 *Different category of service:* In Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Finland, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Latvia, Lebanon, Moldova, Mongolia, 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).

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 Resolutions 75 (WRC–2000) and 79 (WRC–2000)). 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.

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, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Malaysia, Mali, Malta, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, 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.

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/m²) in this band.

5.550 *Different category of service:* In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Mongolia, Uzbekistan, 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).

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 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 (space-to-Earth) operating in the 42–42.5 GHz band, 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 42.5–43.5 GHz band 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 42.5–43.5 GHz band 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 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θ_{min} 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 Radiocommunication 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.

5.551I 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 (space-to-Earth) 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 (WRC–97)[3].

[3] *Note by the Secretariat:* This Resolution was revised by WRC–03.

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/m^2) 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($W/(m^2 \cdot 100$ 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($W/(m^2 \cdot 100$ 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).

5.559A The band 75.5–76 GHz is also allocated to the amateur and amateur-satellite services on a primary basis until the year 2006.

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/(m² · MHz)) for all angles of arrival.

5.562D *Additional allocation:* In Korea (Rep. of), the 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 until 2015.

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/(m² · 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 frequency band 275–1000 GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:

—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): 275–277 GHz, 294–306 GHz, 316–334 GHz, 342–349 GHz, 363–365 GHz, 371–389 GHz, 416–434 GHz, 442–444 GHz, 496–506 GHz, 546–568 GHz, 624–629 GHz, 634–654 GHz, 659–661 GHz, 684–692 GHz, 730–732 GHz, 851–853 GHz and 951–956 GHz.

Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are urged to take all practicable steps to protect these passive services from harmful interference until the date when the allocation Table is established in the above-mentioned frequency band.

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.

US7 In the band 420–450 MHz and within the following areas, the peak envelope power output of a transmitter employed in the amateur service shall not exceed 50 watts, unless expressly authorized by the FCC after mutual agreement, on a case-by-case basis, between the District Director of the applicable field office and the military area frequency coordinator at the applicable military base. For areas (e) through (g), the appropriate military coordinator is located at Peterson AFB, CO.

(a) Arizona, Florida, and New Mexico.

(b) Those portions of California and Nevada that are south of latitude 37°10′ N.

(c) That portion of Texas that is west of longitude 104° W.

(d) Within 322 km (200 miles) 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).

(e) Within 240 km (150 miles) of Beale AFB, CA (39°08′ N, 121°26′ W).

(f) Within 200 km (124 miles) of Goodfellow AFB, TX (31°25′ N, 100°24′ W) and Robins AFB, GA (32°38′ N, 83°35′ W).

(g) Within 160 km (100 miles) of Clear, 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).

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.

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.

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.

US48 In the band 9000–9200 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 aeronautical radionavigation service or to the Federal radiolocation service.

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.

US51 In the band 9300–9500 MHz, the radiolocation service may be authorized for non-Federal use on the condition that harmful interference is not caused to the Federal radiolocation service.

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.

US58 In the band 10–10.5 GHz, pulsed emissions are prohibited, except for weather radars on board meteorological satellites in the band 10–10.025 GHz. The amateur 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.

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.

US65 The use of the band 5460–5650 MHz by the maritime radionavigation service is limited to shipborne radars.

US66 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.

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.

US74 In the bands 25.55–25.67, 73.0–74.6, 406.1–410.0, 608–614, 1400–1427 (see US368), 1660.5–1670.0, 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 US311.

US77 Federal stations may also be authorized: (a) Port operations use on a simplex basis by coast and ship stations of the frequencies 156.6 and 156.7 MHz; (b) Duplex port operations use of the frequency 157.0 MHz for ship stations and 161.6 MHz for coast stations; (c) Inter-ship use of 156.3 MHz on a simplex basis; and (d) 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. (e) 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

US78 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 with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz.

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).

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.

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°.

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.

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 Electromagnetic Management Unit, Room 1030, National Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230.

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.

US106 The frequency 156.75 MHz is available for assignment to Federal and non-Federal stations for environmental communications in accordance with an agreed plan.

US107 The frequency 156.8 MHz is the national distress, safety and calling frequency for the maritime mobile VHF radiotelephone service for use by Federal and non-Federal

ship and coast stations. Guard bands of 156.7625–156.7875 and 156.8125–156.8375 MHz are maintained.

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.

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.

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.

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 United States Virgin Islands, contact Spectrum Manager, Arecibo Observatory, HC3 Box 53995, Arecibo, PR 00612. Phone: 787–878–2612, Fax: 787–878–1861, E-mail: *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, E-mail: *nrao-rfi@nrao.edu*.

(3) Within 10 km of the Table Mountain Observatory (40°07′50″ N, 105°14′40″ W) and for operations only within the sub-band 407–409 MHz, contact Radio Frequency Coordinator, Department of Commerce, 325 Broadway, Boulder, CO 80303. Phone: 303–497–6548, Fax: 303–497–3384.

(b) Non-Federal use is limited to the radio astronomy service and as provided by US13.

US201 In the band 460–470 MHz, space stations in the Earth exploration-satellite service 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 applications of the Earth exploration-satellite service. 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.

US203 Radio astronomy observations of the formaldehyde line frequencies 4825–4835 MHz and 14.470–14.500 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, Arecibo, Puerto Rico.
X	X	National Radio Astronomy Observatory, Green Bank, W. Va.
X	X	National Radio Astronomy Observatory, Socorro, New Mexico.
X	X	Hat Creek Observatory (U of Calif.), Hat Creek, Cal.
X	X	Haystack Radio Observatory (MIT-Lincoln Lab), Tyngsboro, Mass.
X	X	Owens Vally Radio Observatory (Cal. Tech.), Big Pine, Cal.
.....	X	Five College Radio Astronomy Observatory Quabbin Reservoir (near Amherst), Massachusetts.

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.

US205 Tropospheric scatter systems are prohibited in the band 2500–2690 MHz.

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.

US216 The frequencies 150.775 MHz, 150.790 MHz, 152.0075 MHz, and 163.250 MHz, and the bands 462.94688–463.19688 MHz and 467.94688–468.19688 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 MHz and 150.790 MHz is limited 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 MHz and 163.250 MHz is limited 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 MHz 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.

US217 In the band 420–450 MHz, pulse-ranging radiolocation systems may be authorized for use along the shoreline of the conterminous United States and Alaska. In the sub-band 420–435 MHz, spread spectrum radiolocation systems may be authorized within the conterminous United States and Alaska. All stations operating in accordance with this provision shall be secondary to stations operating in accordance with the Table of Frequency Allocations. Authorizations shall be granted on a case-by-case basis; however, operations proposed to be located within the following geographic areas should not expect to be accommodated:

(a) Arizona, Florida, and New Mexico.

(b) Those portions of California and Nevada that are south of latitude 37°10′ N.

(c) That portion of Texas that is west of longitude 104° W.

(d) Within 322 km (200 miles) 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).

(e) Within 240 km (150 miles) of Beale AFB, CA (39°08′ N, 121°26′ W).

(f) Within 200 km (124 miles) of Goodfellow AFB, TX (31°25′ N, 100°24′ W) and Robins AFB, GA (32°38′ N, 83°35′ W).

(g) Within 160 km (100 miles) of Clear, 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).

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.

US226 In the State of Hawaii, stations in the aeronautical radionavigation service shall not cause harmful interference to U.S. Navy reception from its station at Honolulu on 198 kHz.

US229 Federal 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 shall be limited to telemetering and associated telecommand operations. NTIA shall not authorize new Federal assignments in the sub-band 216–217 MHz. The sub-band 216.88–217.08 MHz is allocated to the radiodetermination service on a primary basis for Federal use, limited to the Navy's Space Surveillance (SPASUR) radar system at the following nine sites.

(a) Three stations transmit at a very high power and other operations may be affected within the following areas:

Transmitter sites	Coordinates	Frequency	Interference radius
Gila River (Phoenix), AZ	33°06′32″ N, 112°01′45″ W	216.97 MHz	150 km (93.2 miles).
Lake Kickapoo (Archer City), TX.	33°32′47″ N, 98°45′46″ W	216.983 MHz	250 km (155.3 miles).
Jordan Lake (Wetumpka), AL	32°39′33″ N, 86°15′52″ W	216.99 MHz	150 km.

(b) Reception of the sub-band 216.965–216.995 MHz shall be protected from harmful interference within 50 kilometers (31.1 miles) of the following sites:

Receive sites	Coordinates
Elephant Butte, NM	33°26′35″ N, 106°59′50″ W
Fort Stewart, GA	31°58′36″ N, 081°30′34″ W
Hawkinsville, GA	32°17′20″ N, 083°32′10″ W
Red River, AR	33°19′48″ N, 093°33′01″ W
San Diego, CA	32°34′42″ N, 116°58′11″ W
Silver Lake, MS	33°08′42″ N, 091°01′16″ W

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 band 435–490 kHz, on a secondary basis, subject to the coordination and agreement of those agencies having assignments within the maritime mobile band which may be affected. Assignments to Federal aeronautical radionavigation radiobeacons in the band 435–490 kHz shall not be a bar to any required changes to the maritime mobile radio 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).

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] 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 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.

[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.

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).

US263 In the bands 21.2–21.4 GHz, 22.21–22.5 GHz, 36–37 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.

US264 In the band 48.94–49.04 GHz, airborne stations shall not be authorized.

US265 In the band 10.6–10.68 GHz, the fixed service shall be limited to an e.i.r.p. of 40 dBW and the power delivered to the antenna shall not exceed −3 dBW per 250 kHz.

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 2655–2690 MHz, radio astronomy observations are performed at the locations listed in US311. Licensees are urged to coordinate their systems through the Electromagnetic Spectrum Management

Unit, Division of Astronomical Sciences, National Science Foundation, Room 1030, 4201 Wilson Blvd., Arlington, VA 2230.

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.

US277 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* 47 CFR 2.106, footnote US355.

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.

US290 In the band 1900–2000 kHz, amateur stations may continue to operate on a secondary basis to the radiolocation service, pending a decision as to their disposition through a future rule making proceeding in conjunction with the implementation of the standard broadcasting service in the band 1625–1705 kHz.

US294 In the spectrum below 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 7 of the *NTIA Manual*, on an unprotected and noninterference basis with respect to authorized radio users. Notification of intent to place new or revised radio frequency assignments or PLC frequency uses in the bands below 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 degree practicable. This footnote does not provide any allocation status to PLC radio frequency uses.

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 Channels 27555 kHz, 27615 kHz, 27635 kHz, 27655 kHz, 27765 kHz, and 27860 kHz are available for use by forest product licensees on a secondary basis to Federal operations including experimental stations. Non-Federal operations on these channels 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, 170.245, 170.305, 171.045, 171.105, 171.845 and 171.905 MHz are available for wireless microphone operations on a secondary basis to Federal and non-Federal operations.

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/m^2 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/m^2 for $0° < \theta \leq 5°$

$-124 + (\theta - 5)/2$ dB(W/m^2) for $5° < \theta \leq 25°$

-114 dB(W/m^2) 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.

US311 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 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. National Radio Astronomy Observatory, Very Long Baseline Array Stations.	Rectangle between latitudes 37°30′ N and 39°15′ N and between longitudes 78°30′ W and 80°30′ W. 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.

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.

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 band 17.8–20.2 GHz, Federal space stations in both geostationary (GSO) and non-geostationary satellite orbits (NGSO) and associated earth stations in the fixed-satellite service (space-to-Earth) may be authorized on a primary basis. For a Federal geostationary satellite network to operate on a primary basis, the space station shall be located outside the arc, measured from east to west, 70° West longitude to 120° West longitude. Coordination between Federal fixed-satellite systems and non-Federal space and terrestrial systems operating in accordance with the United States Table of Frequency Allocations is required.

(a) In the sub-band 17.8–19.7 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°.

(b) In the sub-band 17.8–19.3 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.

US335 In the band 220–222 MHz, Federal and non-Federal use of the fixed and land mobile services is restricted as follows:

(a) The sub-bands 220–220.55/221.0–221.55, 220.6–220.8/221.6–221.8, 220.85–220.9/221.85–221.9 and 220.925–221/221.925–222 MHz (Channels 1–110, 121–160, 171–180 and 186–200, respectively) are available for exclusive non-Federal use. These sub-bands are also available for temporary fixed geophysical telemetry operations on a secondary basis to the fixed and land mobile services.

(b) The sub-bands 220.55–220.6/221.55–221.6 MHz (Channels 111–120) are available for exclusive Federal use.

(c) The sub-bands 220.8–220.85/221.8–221.85 and 220.9–220.925/221.9–221.925 MHz (Channels 161–170 and 181–185, respectively) are available for shared Federal and non-Federal use.

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).

US338 In the band 2305–2310 MHz, space-to-Earth operations are prohibited. Additionally, in the band 2305–2320 MHz, the FCC shall coordinate all Wireless Communications Service (WCS) operations within 50 km of NASA's Deep Space facility in Goldstone, CA (35°20′ N, 116°53′ W) with NTIA in order to minimize harmful interference to deep space reception in the band 2290–2300 MHz.

US339 The bands 2310–2320 and 2345–2360 MHz are also available for 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. The following two 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: 2312.5 and 2352.5 MHz. Other mobile telemetering uses may be provided on a non-interference basis to the above uses. The broadcasting-satellite service (sound) during implementation should also take cognizance of the expendable and reusable launch vehicle frequencies 2312.5 and 2352.5 MHz, to minimize the impact on this mobile service use to the extent possible.

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
25550–25670 kHz
37.5–38.25 MHz
322–328.6 MHz*
1330–1400 MHz*
1610.6–1613.8 MHz*
1660–1660.5 MHz*
1668.4–1670 MHz*
3260–3267 MHz*
3332–3339 MHz*
3345.8–3352.5 MHz*
4825–4835 MHz*
4950–4990 MHz
6650–6675.2 MHz*
14.47–14.5 GHz*
22.01–22.21 GHz*
22.21–22.5 GHz
22.81–22.86 GHz*
23.07–23.12 Gz*
31.2–31.3 GHz
36.43–36.5 GHz*
42.5–43.5 GHz
42.77–42.87 GHz*
43.07–43.17 GHz*
43.37–43.47 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 (*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 Differential-Global-Positioning-System (DGPS) Stations, limited to ground-based transmitters, may be authorized on a primary basis in the bands 108–117.975 and 1559–1610 MHz for the specific purpose of transmitting DGPS information intended for aircraft navigation. Such use shall be in accordance with ITU Resolution 413 (WRC–03).

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.

US345 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.

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

Facility	Coordinates
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.

US348 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 within 80 km of these sites with NTIA on a case-by-case basis.

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 on a primary basis in the band 1427–1429.5 MHz and on a secondary basis in the band 1429.5–1432 MHz in the United States and its insular areas, except in the following locations: Austin/Georgetown, TX; Detroit and Battle Creek, MI; Pittsburgh, PA; Richmond/Norfolk, VA; Spokane, WA; and Washington, DC metropolitan area (collectively, the ''carved-out'' locations). See 47 CFR 90.259(b)(4) and 95.630(b) for a detailed description of these locations.

(2) In the carved-out locations, medical operations shall be authorized on a primary basis in the band 1429–1431.5 MHz and on a secondary basis in the bands 1427–1429 MHz and 1431.5–1432 MHz.

(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.

US351 In the band 1390–1400 MHz, Federal operations (except for medical telemetry and telecommand operations in the sub-band 1395–1400 MHz) are on a non-interference basis to non-Federal operations and shall not constrain implementation of non-Federal operations. However, Federal operations authorized as of March 22, 1995 at 17 sites identified below will be continued on a fully protected basis until January 1, 2009.

80 km radius of operation centered on:		
State	Site	Coordinates
AK	Ft. Greely	63°47′ N, 145°52′ W
AL	Ft. Rucker	31°13′ N, 085°49′ W
AL	Redstone	34°35′ N, 086°35′ W
AZ	Ft. Huachuca	31°33′ N, 110°18′ W
AZ	Yuma	32°29′ N, 114°20′ W
CA	China Lake	35°41′ N, 117°41′ W
CA	Edwards AFB	34°54′ N, 117°53′ W
CA	Pacific Missile Range	34°07′ N, 119°30′ W
FL	Eglin AFB	30°28′ N, 086°31′ W
MD	Aberdeen PG	39°29′ N, 076°08′ W

80 km radius of operation centered on:		
State	Site	Coordinates
MD	Patuxent River	38°17′ N, 076°25′ W
NC	Cherry Point	34°57′ N, 076°56′ W
NM	Holloman AFB	33°29′ N, 106°50′ W
NM	WSM Range	32°10′ N, 106°21′ W
OH	Wright-Patterson AFB	39°50′ N, 084°03′ W
UT	Dugway PG	40°11′ N, 112°53′ W
UT	Utah Test Range	40°57′ N, 113°05′ W

US352 In the band 1427–1432 MHz, Federal operations, except for medical telemetry and medical telecommand operations, are on a non-interference basis to authorized non-Federal operations and shall not hinder the implementation of any non-Federal operations.

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.

US355 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′39″	66°45′10″	496
Green Bank Telescope (GBT), WV	38°25′59″	79°50′23″	825
Very Large Array (VLA), Socorro, NM	34°04′44″	107°37′06″	2126
Very Long Baseline Array (VLBA) Stations:			
Brewster, WA	48°07′52″	119°41′00″	255
Fort Davis, TX	30°38′06″	103°56′41″	1615
Hancock, NH	42°56′01″	71°59′12″	309
Kitt Peak, AZ	31°57′23″	111°36′45″	1916
Los Alamos, NM	35°46′30″	106°14′44″	1967
Mauna Kea, HI	19°48′05″	155°27′20″	3720
North Liberty, IA	41°46′17″	91°34′27″	241
Owens Valley, CA	37°13′54″	118°16′37″	1207
Pie Town, NM	34°18′04″	108°07′09″	2371
St. Croix, VI	17°45′24″	64°35′01″	16

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.

US361 In the band 1432–1435 MHz, Federal stations in the fixed and mobile services may operate indefinitely on a primary basis at the 23 sites listed below. All other Federal stations in the fixed and mobile services shall operate in the band 1432–1435 MHz on a primary basis until reaccommodated in accordance with the National Defense Authorization Act of 1999.

Location	North latitude/west longitude	Operating radius (Km)	Location	North latitude/west longitude	Operating radius (Km)
China Lake/Edwards AFB, CA	35°29′/117°16′	100	AUTEC	24°30′/078°00′	80
White Sands Missile Range/ Holloman AFB, NM.	32°11′/106°20′	160	Beaufort MCAS, SC	32°26′/080°40′	160
Utah Test and Training Range/Dugway Proving Ground, Hill AFB, UT.	40°57′/113°05′	160	MCAS Cherry Point, NC	34°54′/076°53′	100
Patuxent River, MD	38°17′/076°24′	70	NAS Cecil Field, FL	30°13′/081°52′	160
Nellis AFB, NV	37°29′/114°14′	130	CNAS Fallon, NV	39°30′/118°46′	100
Fort Huachuca, AZ	31°33′/110°18′	80	NAS Oceana, VA	36°49′/076°01′	100
Eglin AFB/Gulfport ANG	30°28′/086°31′	140	NAS Whidbey	48°21′/122°39′	70
Range, MS/Fort Rucker, AL			Island, WA.		
Yuma Proving Ground, AZ	32°29′/114°20′	160	NCTAMS, GUM	13°35′/144°51′(East)	80
Fort Greeley, AK	63°47′/145°52′	80	Lemoore, CA	36°20′/119°57′	120
Redstone Arsenal, AL	34°35′/086°35′	80	Savannah River, SC	33°15′/081°39′	3
Alpene Range, MI	44°23′/083°20′	80			
Camp Shelby, MS	31°20′/089°18′	80	Naval Space Operations Center, ME.	44°24′/068°01′	80

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.

US366 In 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, the following provisions shall apply to stations in the fixed and mobile except aeronautical mobile services:

(a) *All Stations.* Federal and non-Federal stations shall:

(1) Be limited to communicating only within the United States and its insular areas;

(2) Not cause harmful interference to the reception of, and must accept interference from, international broadcast stations;

(3) Be limited to the minimum power required to achieve reliable communications; and

(4) Take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU *Radio Regulations*.

(b) *Existing and Future Federal Stations.* (1) Frequencies in all of the above listed frequency bands may be used by existing and future Federal stations in the fixed service; and

(2) Frequencies in the bands 5900–5950 kHz, 7300–7350 kHz, 13570–13600 kHz, and 13800–13870 kHz may also be used by existing and future Federal stations in the mobile except aeronautical mobile service.

(c) *Grandfathered non-Federal Stations.* (1) Frequencies in the bands 5900–5950 kHz, 7300–7350 kHz, 9400–9500 kHz, 11600–11650 kHz, 12050–12100 kHz, 13800–13870 kHz, and 15600–15800 kHz may continue to be used by non-Federal stations in the fixed service that were licensed prior to March 25, 2007; and

(2) Frequencies in the bands 5900–5950 kHz and 7300–7350 kHz may continue to be used by non-Federal stations in the mobile except

aeronautical mobile service that were licensed prior to March 25, 2007.

US367 On the 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 Federal stations in the fixed service communicating within the United States and its insular areas that are authorized as of June 12, 2003. Each such station shall be limited to a total radiated power of 24 dBW.

US368 (a) The use of the bands 1390–1392 MHz and 1430–1432 MHz by the fixed-satellite service is limited to feeder links for the Non-Voice Non-Geostationary Mobile-Satellite Service and is contingent on:

(1) The completion of ITU–R studies on all identified compatibility issues as shown in Annex 1 of Resolution 745 (WRC–2003);

(2) Measurement of emissions from equipment that would be employed in operational systems and demonstrations to validate the studies as called for in Resolution 745 (WRC–2003); and

(3) Compliance with any technical and operational requirements that may be imposed at WRC–07 to protect other services in these bands and passive services in the band 1400–1427 MHz from unwanted emissions.

(b) The FCC shall coordinate individual assignments with NTIA (see, for example, Recommendations ITU–R RA.769–2 and ITU–R SA.1029–2) to ensure the protection of passive services in the band 1400–1427 MHz. As part of the coordination requirements, the feeder uplink and downlink systems shall be tested and certified to be in conformance with the technical and operational out-of-band requirements for the protection of passive services in the band 1400–1427 MHz. Certification and all supporting documentation shall be submitted to the FCC at least three months prior to launch.

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, 076°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
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, 2000–2020 MHz, 2180–2200 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 components and subject to all applicable conditions and provisions of its MSS authorization.

US381 The frequencies 5332 kHz, 5348 kHz, 5368 kHz, 5373 kHz, and 5405 kHz are allocated to the amateur service on a secondary basis. Amateur use of these frequencies shall be limited to 50 watts e.r.p. and to single sideband suppressed carrier modulation (emission designator 2K8J3E), upper sideband voice transmissions only.

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.

US388 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.

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.

Telescope and site	150 kilometer (93 mile) radius centered on:	
	North latitude	West longitude
National Radio Astronomy Observatory (NRAO), Robert C. Byrd Telescope, Green Bank, WV	38°25′59″	79°50′23″
NRAO, Very Large Array, Socorro, NM	34°04′44″	107°37′06″
University of Arizona 12-m Telescope, Kitt Peak, AZ	31°57′12″	111°36′53″
Caltech Telescope, Owens Valley, CA	37°13′54″	118°17′36″
Five College Observatory, Amherst, MA	42°23′30″	72°20′42″
Haystack Observatory, Westford, MA	42°37′24″	71°29′18″
James Clerk Maxwell Telescope, Mauna Kea, HI	19°49′33″	155°28′47″
Combined Array for Research in Millimeter-wave Astronomy (CARMA), CA	37°16′43″	118°08′32″

NRAO, Very Long Baseline Array Stations	25 kilometer (15.5 mile) radius centered on:	
	North latitude	West longitude
Brewster, WA	48°07′52″	119°41′00″
Fort Davis, TX	30°38′06″	103°56′41″
Hancock, NH	42°56′01″	71°59′12″
Kitt Peak, AZ	31°57′23″	111°36′45″
Los Alamos, NM	35°46′30″	106°14′44″
Mauna Kea, HI	19°48′05″	155°27′20″
North Liberty, IA	41°46′17″	91°34′27″
Owens Valley, CA	37°13′54″	118°16′37″
Pie Town, NM	34°18′04″	108°07′09″
Saint Croix, VI	17°45′24″	64°35′01″

US389 In the bands 71–76 GHz and 81–86 GHz, stations in the fixed, mobile, and broadcasting services shall not cause harmful interference to, nor claim protection from, Federal stations in the fixed-satellite service at any of the following 28 military installations:

Military installation	State	Nearby city
Redstone Arsenal	AL	Huntsville
Fort Huachuca	AZ	Sierra Vista
Yuma Proving Ground	AZ	Yuma
Beale AFB	CA	Marysville
Camp Parks Reserve Forces Training Area.	CA	Dublin
China Lake Naval Air Weapons Station.	CA	Ridgecrest
Edwards AFB	CA	Rosamond
Fort Irwin	CA	Barstow
Marine Corps Air Ground Combat Center.	CO	Twentynine Palms
Buckley AFB	GA	Aurora (Denver)
Schriever AFB	CO	Colorado Springs
Fort Gordon	GA	Augusta
Naval Satellite Operations Center	GU	Finegayan (Guam)
Naval Computer and Telecommunications Area Master Station, Pacific.	HI	Wahiawa (Oahu Is.)
Fort Detrick	MD	Frederick
Nellis AFB	NV	Las Vegas
Nevada Test Site	NV	Amargosa Valley
Tonapah Test Range Airfield	NV	Tonapah
Cannon AFB	NM	Clovis
White Sands Missile Range	NM	White Sands
Dyess AFB	TX	Abilene
Fort Bliss	TX	El Paso
Fort Sam Houston	TX	San Antonio
Goodfellow AFB	TX	San Angelo
Kelly AFB	TX	San Antonio
Utah Test and Training Range	UT	
Fort Belvoir	VA	Alexandria
Naval Satellite Operations Center	VA	Chesapeake

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.

US393 In the band 2025–2110 MHz, the military services may operate stations in the fixed and mobile except aeronautical mobile services on a secondary and coordinated basis at the following sites:

Site	Coordinates	Radius of operation (km)
Nellis AFB, NV	36° 14′ N 115° 02′ W	80
China Lake, CA.	35° 41′ N 117° 41′ W	50
Ft. Irwin, CA	35° 16′ N 116° 41′ W	50
Pacific Missile Test Range/Pt. Mugu, CA.	34° 07′ N 119° 30′ W	80
Yuma, AZ	32° 32′ N 113° 58′ W	80
White Sands Missile Range, NM.	33° 00′ N 106° 30′ W	80

US394 Until March 29, 2009, the band 6765–7000 kHz is allocated to the fixed service on a primary basis and to the mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis.

US395 Until March 29, 2009, the use of the band 7100–7200 kHz in Region 1 and Region 3 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3.

US396 The band 7350–7400 kHz is allocated exclusively to the broadcasting service in accordance with the schedule specified below, except that, in Alaska, the sub-band 7368.5–7371.3 kHz is allocated to the fixed service on an exclusive basis for non-Federal use in accordance with 47 CFR 80.387.

(a) Until March 29, 2009, the band 7350–7400 kHz is allocated to the fixed service on a primary basis and to the mobile except aeronautical mobile service on a secondary basis for Federal and non-Federal use.

(b) After March 29, 2009, authority to operate in the band 7350–7400 kHz shall not be extended to new non-Federal stations in the fixed and mobile except aeronautical mobile services.

(c) After March 29, 2009, Federal and non-Federal stations in the fixed and mobile except aeronautical mobile services shall:

(1) Be limited to communications wholly within the United States and its insular areas;

(2) Not cause harmful interference to the broadcasting service;

(3) Be limited to the minimum power needed to achieve communications; and

(4) Take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU *Radio Regulations*.

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.

US398 In the bands 1390–1400 MHz and 1427–1432 MHz, airborne and space-to-Earth operations, except for feeder downlinks for the Non-Voice Non-Geostationary Mobile-Satellite Service in the band 1430–1432 MHz (see US368), are prohibited.

US399 The frequency bands 161.9625–161.9875 MHz (AIS 1 with its center frequency at 161.975 MHz) and 162.0125–162.0375 MHz (AIS 2 with its center frequency at 162.025 MHz) are allocated to the maritime mobile service on a primary basis for Federal Government and non-Federal Government use, and shall be used exclusively for Automatic Identification Systems (AIS). However, in VHF Public Coast Service Areas (VPCSAs) 1–9, site-based stations licensed prior to November 13, 2006, may continue to operate on a co-primary basis in the frequency band 161.9625–161.9875 MHz until expiration of the license term for licenses in active status as of November 13, 2006. Also, in VPCSAs 10–42, site-based stations licensed in the frequency band 161.9625–161.9875 MHz prior to March 2, 2009 may remain authorized to operate on a co-primary basis in that frequency band until March 4, 2024, and geographical stations licensed in the frequency band 161.9625–161.9875 MHz prior to March 2, 2009 may continue to operate on a co-primary basis in that frequency band until March 2, 2011. *See* 47 CFR 80.371(c)(1)(ii) for the definitions of VPCSAs, and geographic license.

US400 The use of the center frequency 978 MHz may be authorized to Universal Access Transceiver (UAT) stations on a primary basis for the specific purpose of transmitting datalink information in support of the Automatic Dependent Surveillance—Broadcast (ADS–B) Service, Traffic Information Services—Broadcast (TIS–B), and Flight Information—Broadcast (FIS–B).

US401 In the band 17.7–17.8 GHz, Federal earth stations in the fixed-satellite service (space-to-Earth) may be authorized in the Denver, CO and Washington, DC areas on a primary basis. Before commencement of operations, the FCC shall coordinate fixed service applications supporting Multichannel Video Programming Distributors (MVPD) with NTIA.

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.

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.

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.

NG12 Frequencies in the bands 454.40–455 MHz and 459.40–460 MHz may be assigned to domestic public land and mobile stations to provide a two-way air-ground public radiotelephone service.

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.

NG19 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 this band on the condition that harmful interference will not be caused to services operating in accordance with the Table of Frequency Allocations.

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).

NG41 Frequencies in the bands 3700–4200 MHz and 5925–6425 MHz, may also be assigned to stations in the international fixed public and international control services located in Puerto Rico, the U.S. Virgin Islands, and Navassa Island.

NG42 In the band 10–10.5 GHz, non-Federal stations in the radiolocation service shall not cause harmful interference to the amateur service.

NG49 The following frequencies may be authorized for mobile operations in the Manufacturers Radio Service subject to the condition that no interference is caused to the reception of television stations operating on channels 4 and 5 and that their use is limited to a manufacturing facility:

MHz	
72.02	72.22
72.04	72.24
72.06	72.26
72.08	72.28
72.10	72.30
72.12	72.32
72.14	72.34
72.16	72.36
72.18	72.38
72.20	72.40

Further, the following frequencies may be authorized for mobile operations in the Special Industrial Radio Service, Manufacturers Radio Service, Railroad Radio Service and Forest Products Radio Service subject to the condition that no interference is caused to the reception of television stations operating on channels 4 and 5; and that their use is limited to a railroad yard, manufacturing plant, logging site, mill, or similar industrial facility.

MHz	
72.44	75.44
72.48	75.48
72.52	75.52
72.56	75.56
72.60	75.60

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.

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.

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.

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.

NG104 The use of the bands 10.7–11.7 GHz (space-to-Earth) and 12.75–13.25 GHz (Earth-to-space) by the fixed-satellite service in the geostationary-satellite orbit shall be limited to international systems, *i.e.*, other than domestic systems.

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 614–806 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.

NG117 The frequency 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 operating in the New Orleans and Houston VTS areas.

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.

NG120 Frequencies in the band 928–960 MHz may be assigned for multiple address systems and mobile operations on a primary basis as specified in 47 CFR part 101.

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).

NG128 In the band 535–1705 kHz, AM broadcast licensees or 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 or 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 614–806 MHz, TV broadcast licensees or permittees are permitted to use subcarriers on a secondary basis for both broadcast and non-broadcast purposes.

NG134 In the band 10.45–10.5 GHz, non-Federal stations in the radiolocation service shall not cause harmful interference to the amateur and amateur-satellite services.

NG135 In the 420–430 MHz band the amateur service is not allocated north of line A (def. § 2.1).

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.

NG142 TV broadcast stations authorized to operate in the bands 54–72 MHz, 76–88 MHz, 174–216 MHz, 470–608 MHz, and 614–806 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.

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.

NG144 Stations authorized as of September 9, 1983 to use frequencies in the bands 17.7–18.3 GHz and 19.3–19.7 GHz may, upon proper application, continue operations. Fixed stations authorized in the band 18.3–19.3 GHz that remain coprimary under the provisions of 47 CFR 21.901(e), 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r) may continue operations consistent with the provisions of those sections.

NG145 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.

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 MHz, 76–88 MHz, 174–216 MHz, 470–512 MHz, 512–608 MHz, and 614–698 MHz are also allocated to the fixed service to permit subscription television operations in accordance with 47 CFR part 73.

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.

NG153 The band 2160–2165 MHz is reserved for future emerging technologies on a co-primary basis with the fixed and mobile services. Allocations to specific services will be made in future proceedings. Authorizations in the band 2160–2162 MHz for stations in the Multipoint Distribution Service applied for after January 16, 1992, shall be on a secondary basis to emerging technologies.

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.

NG156 The band 2000–2020 MHz is also allocated to the fixed and mobile services on a primary basis for facilities where the receipt date of the initial application was prior to June 27, 2000, and on a secondary basis for all other initial applications. Not later than December 9, 2013, the band 2000–2020 MHz is allocated to the fixed and mobile services on a secondary basis.

NG158 The bands 763–775 MHz and 793–805 MHz are available for assignment to the public safety services, as described in 47 CFR part 90.

NG159 Any full-power television licensee that holds a television broadcast license to operate between 698 and 806 megahertz (TV channels 52–69) shall be entitled to protection from harmful interference through February 17, 2009, and may not operate at that frequency after February 17, 2009. Auxiliary broadcast stations (*i.e.*, low-power TV stations, translator stations, booster stations, TV auxiliary (backup) facilities, and low-power auxiliary stations) may continue to operate indefinitely in the band 698–806 MHz 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 18.3–18.8 GHz by the fixed-satellite service (space-to-Earth) is limited to systems in the geostationary-satellite orbit.

NG165 The use of the band 18.8–19.3 GHz by the fixed-satellite service (space-to-Earth) is limited to systems in non-geostationary-satellite orbits.

NG166 The use of the band 19.3–19.7 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links for the mobile-satellite service.

NG167 The use of the band 24.75–25.25 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.

NG168 The band 2180–2200 MHz is also allocated to the fixed and mobile services on a primary basis for facilities where the receipt date of the initial application was prior to January 16, 1992, and on a secondary basis for all other initial applications. Not later than December 9, 2013, the band 2180–2200 MHz is allocated to the fixed and mobile services on a secondary basis.

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.

NG177 In the bands 1990–2000 MHz and 2020–2025 MHz, where the receipt date of the initial application for facilities in the fixed and mobile services was prior to June 27, 2000, said facilities shall operate on a primary basis and all later-applied-for facilities shall operate on a secondary basis to any service licensed pursuant to the allocation adopted in FCC 03–16, 68 FR 11986, March 13, 2003 (''Advanced Wireless Services''). Not later than December 9, 2013, all such facilities in the bands 1990–2000 MHz and 2020–2025 MHz shall operate on a secondary basis to Advanced Wireless Services.

NG178 In the band 2165–2180 MHz, where the receipt date of the initial application for facilities in the fixed and mobile services was prior to January 16, 1992, said facilities shall operate on a primary basis and all later-applied-for facilities shall operate on a secondary basis to any service licensed pursuant to the allocation adopted in FCC 03–16, 68 FR 11986, March 13, 2003 (''Advanced Wireless Services''). Not later than December 9, 2013, all such facilities in the band 2165–2180 MHz shall operate on a secondary basis to Advanced Wireless Services.

NG180 In the band 3700–4200 MHz (space-to-Earth) earth stations on vessels (ESVs) may be authorized to communicate with space stations of the fixed-satellite service and, while docked, may be coordinated for up to 180 days, renewable. ESVs in motion must operate on a secondary basis.

NG181 In the band 5925–6425 MHz (Earth-to-space), earth stations on vessels are an application of the fixed-satellite service (FSS) and may be authorized to communicate with space stations of the FSS on a primary basis.

NG182 In the bands 10.95–11.2 GHz and 11.45–11.7 GHz, earth stations on vessels may be authorized to communicate with U.S. earth stations through space stations of the fixed-satellite service but must accept interference from terrestrial systems operating in accordance with Commission Rules.

NG183 In the bands 11.7–12.2 GHz (space-to-Earth) and 14.0–14.5 GHz (Earth-to-space), earth stations on vessels are an application of the fixed-satellite service (FSS) and may be authorized to communicate with space stations of the FSS on a primary basis.

NG184 Land mobile stations in the bands 11.7–12.2 GHz and 14.2–14.4 GHz and fixed stations in the band 11.7–12.1 GHz that are licensed pursuant to 47 CFR part 101, subpart J as of March 1, 2005 may continue to operate on a secondary basis until their license expires. Existing licenses issued pursuant to 47 CFR part 101, subpart J will not be renewed in the bands 11.7–12.2 GHz and 14.2–14.4 GHz.

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.

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 216–217 MHz, 220–225 MHz, 420–450 MHz (except as provided by US217 and 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 by footnote US108), 5650–5925 MHz, and 9000–9200 MHz, the Federal radiolocation service is limited 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 255–328.6 MHz, 335.4–399.9 MHz, and 1350–1390 MHz, the fixed and mobile services are limited to the military services.

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 subband 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, 17.3–17.7 GHz, 17.8–21.2 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.

G118 Federal fixed stations may be authorized in the band 1700–1710 MHz only if spectrum is not available in the band 1755–1850 MHz.

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.

G124 The band 2417–2450 MHz was identified for reallocation, effective August 10, 1995, for mixed Federal and non-Federal use under Title VI of the Omnibus Budget Reconciliation Act of 1993.

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 (WRC–03) shall apply.

G133 In the band 7190–7235 MHz, emissions to deep space are prohibited. Geostationary satellites in the space research service operating in the band 7190–7235 MHz shall not claim protection from existing and future stations in the fixed service and ITU Radio Regulation No. 5.43A does not apply.

[49 FR 2373, Jan. 19, 1984]

EDITORIAL NOTE: 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 on GPO Access.

§ 2.107 Radio astronomy station notification.

(a) Pursuant to No. 1492 of Article 13 and Section F of Appendix 3 to the international *Radio Regulations* (Geneva, 1982), operators of radio astronomy stations desiring international recognition of their use of specific radio astronomy frequencies or bands of frequencies for reception, should file the following information with the Commission for inclusion in the Master International Frequency Register:

(1) The center of the frequency band observed, in kilohertz up to 28,000 kHz inclusive, in megahertz above 28,000 kHz to 10,500 MHz inclusive and in gigahertz above 10,500 MHz.

(2) The date (actual or foreseen, as appropriate) when reception of the frequency band begins.

(3) The name and location of the station, including geographical coordinates in degrees and minutes.

(4) The width of the frequency band (in kHz) observed by the station.

(5) The antenna type and dimensions, effective area and angular coverage in azimuth and elevation.

(6) The regular hours of reception (in UTC) of the observed frequency.

(7) The overall receiving system noise temperature (in kelvins) referred to the output of the receiving antenna.

(8) The class of observations to be taken. Class A observations are those in which the sensitivity of the equipment is not a primary factor. Class B observations are those of such a nature that they can be made only with advanced low-noise receivers using the best techniques.

(9) The name and mailing address 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.

§ 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) A minimum of three symbols are used to describe the basic characteristics of radio waves. Emissions are classified and symbolized according to the following characteristics:

(1) First symbol—type of modulation of the main character;

(2) Second symbol—nature of signal(s) modulating the main carrier;

(3) Third symbol—type of information to be transmitted.

NOTE: A fourth and fifth symbol are provided for additional information and are shown in Appendix 6, part A of the ITU Radio Regulations. Use of the fourth and fifth symbol is optional. Therefore, the symbols may be used as described in Appendix 6, but are 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 subcarrier, 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]

§ 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.

(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

[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.

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

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
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
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÷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=6.5×10^6 D=50×10^3 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÷2, K=1.2 (typically)	B=100, D=85 Hz (170 Hz shift), Bandwidth: 304 Hz	304HF1B
Four-frequency duplex telegraphy.	B_n2M+2DK, B=Modulation rate in bands of the faster channel. If the channels are synchronized: M=B÷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

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
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
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÷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÷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=(200×10³3×3.76×1.19), Hz=0.895×10⁶, P=0.331×10⁶ Hz; Bandwidth: 2.452×10⁶ 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=(20⁰×10³×3.76×3.63)=2.73×10⁶; M=5.64×10⁶ Hz; P=6.2×10⁶ Hz; (2M+2DK<2P; Bandwidth 16.59×10⁶ 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=(200×10³×3.76×2.565)=1.93×10⁶ Hz; M=2.54×10⁶ Hz; 2DK)≤2P Bandwidth: 17×10⁶ Hz	17M0F8E
Unmodulated pulse emission.	B_n=2K÷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≃t_r, only components down to 27 dB from the strongest are considered) Then t=2×range resolution÷velocity of light=2×150÷3×10⁸=1×10⁻⁶ seconds, Bandwidth: 3×10⁶ Hz=3 MHz	3M00P0N
6. Composite Emissions			
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 us, Bandwidth: 8×10⁶ 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 = 8×10⁶ Hz = 8 MHz (Bandwidth independent of the number of voice channels)	8M00M7E

Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
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 $R = 5\times10^6$ bits per second; K = 1; S = 4; B_n = 5 MHz	5M00K7
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 $R = 1\times10^6$ bps; $D = 0.75\times10^6$ 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 $R = 10\times10^6$ 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 $R = 10\times10^6$ 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; $R = 135\times10^6$ 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 $R = 2.36\times10^6$ 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.

Class of station	Composition of call sign	Call sign blocks
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.	
	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 50239, Dec. 5, 1989]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 2.302, see the List of CFR Sections Affected in the Finding Aids section of this volume.

§ 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).
Fixed: Rural subscriber service	Assigned telephone number.

Class of station	*Identification, other than assigned call sign*
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 Commission at Washington, D.C., and to the Engineer in Charge of the district in which the station is located, 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 Commission at Washington, D.C., and the Engineer in Charge 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]

§ 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) Except as provided elsewhere in this section, no person shall sell or lease, or 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 radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labelled as required by § 2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labelling and identification requirements specified in this chapter.

(b) The provisions of paragraph (a) of this section do not prohibit conditional sales contracts between manufacturers and wholesalers or retailers where delivery is contingent upon compliance with the applicable equipment authorization and technical requirements, nor do they prohibit agreements between such parties to produce new products, manufactured in accordance with designated specifications.

(c) Notwithstanding the provisions of paragraphs (a), (b), (d) and (f) of this section, a radio frequency device may be advertised or displayed, e.g., at a trade show or exhibition, prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the advertising contains, and the display is accompanied by, a conspicuous notice worded as follows:

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.

(1) If the product being displayed is a prototype of a product that has been properly authorized and the prototype, itself, is not authorized due to differences between the prototype and the authorized product, the following disclaimer notice may be used in lieu of the notice stated in paragraph (c) introductory text of this section:

Prototype. Not for sale.

(2) Except as provided elsewhere in this chapter, devices displayed under the provisions of paragraphs (c) introductory text, and (c)(1) of this section may not be activated or operated.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer 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) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that 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. If a product is marketed in compliance with the provisions of this paragraph, the product does not need to be labelled with the statement in paragraph (c) of this section.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific, or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design, or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific, or medical user's site, but not at a residential site, during the development, design or pre-production stages. A product operated under this provision shall be labelled, in a conspicuous location, with the notice in paragraph (c) of this section.

(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not marketing, of the equipment.

(e)(3) The provisions of paragraphs (e)(1)(i), (e)(1)(ii), (e)(1)(iii), (e)(1)(iv), and (e)(1)(v) of this section do not eliminate any requirements for station licenses for products that normally require a license to operate, as specified elsewhere in this chapter.

(i) Manufacturers should note that station licenses are not required for some products, e.g., products operating

under part 15 of this chapter and certain products operating under part 95 of this chapter.

(ii) Instead of obtaining a special temporary authorization or an experimental license, a manufacturer may operate its product for demonstration or evaluation purposes under the authority of a local FCC licensed service provider. However, the licensee must grant permission to the manufacturer to operate in this manner. Further, the licensee continues to remain responsible for complying with all of the operating conditions and requirements associated with its license.

(4) 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.

(5) Products operating under the provisions of this paragraph (e) shall not be recognized to have any vested or recognizable right to continued use of any frequency. Operation is subject to the conditions that no harmful interference is caused and that any interference received must be accepted. Operation shall be required to cease upon notification by a Commission representative that the device is causing harmful interference and shall not resume until the condition causing the harmful interference is corrected.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific, and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment. If the purchase or lease agreement contains this proviso and the responsible party has the product measured to ensure compliance at the end user's location, the product does not need to be labelled with the statement in paragraph (c) of this section.

(g) The provisions in paragraphs (b) through (f) of this section apply only to devices that are designed to comply with, and to the best of the responsible party's knowledge will, upon testing, comply with all applicable requirements in this chapter. The provisions in paragraphs (b) through (f) of this section do not apply to radio frequency devices that could not be authorized or legally operated under the current rules. Such devices shall not be operated, advertised, displayed, offered for sale or lease, sold or leased, or otherwise marketed absent a license issued under part 5 of this chapter or a special temporary authorization issued by the Commission.

(h) The provisions in subpart K of this part continue to apply to imported radio frequency devices.

[62 FR 10468, Mar. 7, 1997, as amended at 63 FR 31646, June 10, 1998; 63 FR 36597, July 7, 1998]

§ 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 (d) 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.

[62 FR 10470, Mar. 7, 1997]

§ 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 verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

[61 FR 31045, June 19, 1996, as amended at 62 FR 10470, Mar. 7, 1997; 63 FR 36597, July 7, 1998]

§ 2.902 Verification.

(a) Verification is a procedure where the manufacturer makes measurements or takes the necessary steps to insure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or

representative data to the Commission demonstrating compliance is not required unless specifically requested by the Commission pursuant to § 2.957, of this part.

(b) Verification attaches to all items subsequently marketed by the manufacturer or importer which are identical as defined in § 2.908 to the sample tested and found acceptable by the manufacturer.

(Secs. 4, 303, 307, 48 Stat., as amended, 1066, 1082, 1083; 47 U.S.C. 154, 303, 307)

[46 FR 23249, Apr. 24, 1981]

§ 2.906 Declaration of Conformity.

(a) A Declaration of Conformity is a procedure where the responsible party, as defined in § 2.909, makes measurements or takes other necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or representative data to the Commission demonstrating compliance is not required unless specifically requested pursuant to § 2.1076.

(b) The Declaration of Conformity attaches to all items subsequently marketed by the responsible party which are identical, as defined in § 2.908, to the sample tested and found acceptable by the responsible party.

[61 FR 31045, June 19, 1996]

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by 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]

§ 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.

The following parties are responsible for the compliance of radio frequency equipment with the applicable standards:

(a) In the case of equipment which requires the issuance by the Commission of a grant of equipment authorization, the party to whom that grant of authorization is issued (the grantee) 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) In the case of equipment subject to authorization under the verification procedure, the manufacturer or, in the case of imported equipment, the importer. If subsequent to manufacture and importation, the radio frequency equipment is modified by any party not working under the authority of the responsible party, the party performing the modification becomes the new responsible party.

(c) In the case of equipment subject to authorization under the Declaration of Conformity procedure:

(1) The manufacturer or, if the equipment is assembled from individual component parts and the resulting system is subject to authorization under a Declaration of Conformity, the assembler.

(2) If the equipment, by itself, is subject to a Declaration of Conformity and that equipment is imported, the importer.

(3) Retailers or original equipment manufacturers may enter into an agreement with the responsible party designated in paragraph (c)(1) or (c)(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.

(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 labelled, following the specifications in §2.925(d), with the following: ''This product has been modified by [insert name, address and telephone number of the party performing the modifications].''

[54 FR 17712, Apr. 25, 1989, as amended at 61 FR 31045, June 19, 1996; 62 FR 10470, Mar. 7, 1997; 62 FR 41880, Aug. 4, 1997]

APPLICATION PROCEDURES FOR EQUIPMENT AUTHORIZATIONS

§2.911 Written application required.

(a) An application for equipment authorization shall be filed on a form prescribed by the Commission.

(b) Each application shall be accompanied by all information required by this subpart and by those parts of the rules governing operation of the equipment, and by requisite test data, diagrams, etc., as specified in this subpart and in those sections of rules whereunder the equipment is to be operated.

(c) Each application including amendments thereto, and related statements of fact required by the Commission, shall be personally 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.

(d) Technical test data 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 may require such person to submit a statement showing that he is qualified to make or supervise the required measurements.

(e) The signatures of the applicant and the person certifying the test data shall be made personally by those persons on the original application; copies of such documents may be conformed. Signatures and certifications need not be made under oath.

(f) Each application shall be accompanied by the processing fee prescribed in subpart G of part 1 of this chapter.

(g) *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 with the intent that such symbol be a signature, including symbols formed by computer-generated electronic impulses.

[39 FR 5919, Feb. 15, 1974, as amended at 39 FR 27802, Aug. 1, 1974; 52 FR 5294, Feb. 20, 1987. Redesignated at 54 FR 17712, Apr. 25, 1989; 63 FR 36598, July 7, 1998]

§2.913 Submittal of equipment authorization application or information to the Commission.

(a) All applications for equipment authorization must be filed electronically via the Internet. Information on the procedures for electronically filing equipment authorization applications can be obtained from the address in paragraph (c) of this section and from the Internet at *https://gullfoss2.fcc.gov/prod/oet/cf/eas/index.cfm*.

(b) Unless otherwise directed, fees for applications for the equipment authorization, pursuant to §1.1103 of this chapter, must be submitted either electronically via the Internet at *https://gullfoss2.fcc.gov/prod/oet/cf/eas/index.cfm* or by following the procedures described in §0.401(b) of this chapter. The address for fees submitted by mail is: Federal Communications Commission, Equipment Approval Services, P.O. Box 979095, St. Louis, MO 63197–9000. If the applicant chooses to make use of an air courier/package delivery service, the following address must appear on the

outside of the package/envelope: Federal Communications Commission, c/o Lockbox 979095, SL–MO–C2–GL, 1005 Convention Plaza, St. Louis, MO 63101.

(c) Any equipment samples requested by the Commission pursuant to the provisions of subpart J of this part shall, unless otherwise directed, be submitted to the Federal Communications Commission Laboratory, 7435 Oakland Mills Road, Columbia, Maryland, 21046.

[69 FR 54033, Sept. 7, 2004, as amended at 73 FR 9030, Feb. 19, 2008]

§ 2.915 Grant of application.

(a) The Commission 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.

[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]

§ 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 by the Commission to file additional documents or information and fails to submit the requested material within 60 days, the application may be dismissed.

[39 FR 5919, Feb. 15, 1974, as amended at 62 FR 10470, Mar. 7, 1997]

§ 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 from the Commission, provided that such devices are electrically identical and the equipment bears an FCC Identifier validated by a grant of equipment authorization. A device will be considered to be electrically identical if no changes are made to the device authorized by the Commission, 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.

[62 FR 10470, Mar. 7, 1997, as amended at 63 FR 36598, July 7, 1998]

§ 2.925 Identification of equipment.

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or 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.

Example: FCC ID XXX123. XXX—Grantee Code 123—Equipment Product Code

(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) Equipment subject only to registration will be identified pursuant to part 68 of this chapter.

(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 telephone equipment subject to part 68 of this chapter, and a radiofrequency device subject to equipment authorization requirements are assembled in a common enclosure, the nameplate/label shall display the FCC Registration Number in the format specified in part 68 and the FCC Identifier in the format specified in paragraph (a) of this section.

(3) Applications filed on or after May 1, 1981, and applications filed earlier requesting equipment authorization using the single system of identification pursuant to section (a)(1) will receive a review of the identification portion by the Commission's Laboratory with respect to nameplate/label design within 30 days after receipt at the Laboratory. Failure by the Laboratory to reject a nameplate design proposed in any particular application within this time period will constitute de-facto acceptance of the nameplate/label design for that particular equipment. Such *de facto* acceptance will be limited to the equipment covered by the particular application and will not be considered to establish a precedent for other applications. This review deadline applies only to the proposed nameplate/label design, not to the remainder of the application.

(4) For a transceiver, the receiver portion of which is subject to verification pursuant to § 15.101 of this chapter, 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) Where it is shown that a permanently affixed nameplate is not desirable or is not feasible, an alternative method of positively identifying the equipment may be used if approved by the Commission. The proposed alternative method of identification and the justification for its use must be included with the application for equipment authorization.

NOTE: 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.

(g) The term *FCC ID* and the coded identification assigned by the Commission shall be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and its nameplate. However, the type size for the FCC Identifier is not required to be larger than eight-point.

[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]

§ 2.926 FCC identifier.

(a) A grant of equipment authorization issued by the Commission 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 will have three characters consisting of Arabic numerals, capital letters, or combination thereof. A prospective grantee or his authorized representative may receive a grantee code electronically via the Internet at *https://gullfoss2.fcc.gov/prod/oet/cf/eas/index.cfm*. 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 §§ 2.934 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 authorization issued by the Commission. This shall not prohibit placement of an FCC identifier on a transceiver which includes a verified receiver subject to § 15.101, provided that the transmitter portion of such transceiver is covered by a valid

grant of type acceptance or 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. Labelling 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]

CONDITIONS ATTENDANT TO AN EQUIPMENT AUTHORIZATION

§ 2.927 Limitations on grants.

(a) A grant of equipment authorization is valid only when the FCC Identifier is permanently affixed on the device and remains effective until revoked or withdrawn, rescinded, surrendered, or a termination date is otherwise established by the Commission.

(b) A grant of an equipment authorization signifies that the Commission has determined 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 authorization shall not be construed as a finding by the Commission 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 equipment authorization reflects more than a Commission determination that the device or product has been shown to be capable of compliance with the applicable technical standards of the Commission's rules.

[39 FR 5919, Feb. 15, 1974, as amended at 44 FR 29066, May 18, 1979; 62 FR 10471, Mar. 7, 1997]

§ 2.929 Changes in name, address, ownership or control of grantee.

(a) An equipment authorization issued by the Commission 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 an equipment authorization, notice of such change(s) shall be submitted to the Commission via the Internet at *https://gullfoss2.fcc.gov/prod/oet/cf/eas/index.cfm* 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://gullfoss2.fcc.gov/prod/oet/cf/eas/index.cfm* within 60 days after the consummation of the transaction. Depending on the circumstances in each case, the Commission may require new applications for equipment authorization. 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

equipment authorization may be filed covering all the affected equipment.

[63 FR 36598, July 7, 1998, as amended at 69 FR 54033, Sept. 7, 2004]

§ 2.931 Responsibility of the grantee.

In accepting a grant of an equipment authorization, the grantee warrants that each unit of equipment marketed under such grant 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.

[63 FR 36598, July 7, 1998]

§ 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 submitted to the Commission 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]

§ 2.933 Change in identification of equipment.

(a) A new application for equipment authorization 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 from the Commission.

(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 by the Commission. 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 § 2.1033(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 by the Commission.

(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]

§ 2.936 FCC inspection.

Upon reasonable request, each responsible party shall submit the following to the Commission or shall make the following available for inspection:

(a) The records required by §§ 2.938, 2.955, and 2.1075.

(b) A sample unit of the equipment covered under an authorization.

(c) The manufacturing plant and facilities.

[62 FR 10471, Mar. 7, 1997]

§ 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 each equipment subject to the Commission's equipment authorization standards, 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) The provisions of paragraph (a) of this section shall also apply to a manufacturer of equipment produced under the provisions of § 2.929(b). The retention of the records by the manufacturer under these circumstances shall satisfy the grantee's responsibility under paragraph (a) of this section.

(c) The records listed in paragraph (a) of this section shall be retained for one year for equipment subject to authorization under the certification procedure or former type acceptance procedure, or for two years for equipment subject to authorization under any other procedure, after the manufacture of said equipment has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the responsible party (or, under paragraph (b) of this section, the manufacturer) is officially notified that an investigation or any other administrative proceeding involving its equipment has been instituted.

(d) 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 paragraphs (a)(3) of this section. A new equipment authorization may also be required. See, for example, §§ 2.909, 2.924, 2.933, and 2.1043.

[62 FR 10471, Mar. 7, 1997, as amended at 63 FR 36599, July 7, 1998]

§ 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]

§ 2.943 Submission of equipment for testing.

(a) The Commission may require an applicant to submit one or more sample units for measurement at the Commission's laboratory.

(b) In the event the applicant believes that shipment of the sample to the Commission's laboratory 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.

[39 FR 5919, Feb. 15, 1974, as amended at 48 FR 3621, Jan. 26, 1983; 63 FR 36599, July 7, 1998]

§ 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 Sampling tests of equipment compliance.

The Commission will, from time to time, request the responsible party to submit equipment subject to this chapter to determine the extent to which subsequent 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 notification or a Declaration of Conformity). Shipping costs to the Commission's laboratory and return shall be borne by the responsible party.

[61 FR 31046, June 19, 1996]

§ 2.946 Penalty for failure to provide test samples and data.

(a) Any responsible party, as defined in § 2.909, or any party who markets equipment subject to the provisions of this chapter, shall provide test sample(s) or data upon request by the Commission. Failure to comply with such a request within 14 days may be cause for forfeiture, pursuant to § 1.80 of this chapter, or other administrative sanctions such as suspending action on any applications for equipment authorization submitted by such party while the matter is being resolved.

(b) The Commission may consider extensions of time upon submission of a showing of good cause.

[63 FR 36599, July 7, 1998]

§ 2.947 Measurement procedure.

(a) The Commission will accept data which have been 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.

(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) and (2) 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, the Commission may require additional information concerning the measurement procedures employed in obtaining the data submitted for equipment authorization purposes.

[42 FR 44987, Sept. 8, 1977, as amended at 44 FR 39181, July 5, 1979; 51 FR 12616, Apr. 14, 1986]

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under part 15 or part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of

the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current. A laboratory that has been accredited in accordance with paragraph (d) of this section is not required to file a description of its facilities with the Commission's laboratory, provided the accrediting organization (or designating authority in the case of foreign laboratories) submits the following information to the Commission's laboratory:

(i) Laboratory name, location of test site(s), mailing address and contact information;

(ii) Name of accrediting organization;

(iii) Date of expiration of accreditation;

(iv) Designation number;

(v) FCC Registration Number (FRN);

(vi) A statement as to whether or not the laboratory performs testing on a contract basis;

(vii) For laboratories outside the United States, the name of the mutual recognition agreement or arrangement under which the accreditation of the laboratory is recognized.

(3) If the equipment is to be authorized under the Declaration of Conformity procedure, the laboratory making the measurements must be accredited in accordance with paragraph (d) of this section.

(b) The description shall contain the following information:

(1) Location of the test site.

(2) Physical description of the test site accompanied by photographs of size A4 (21 cm × 29.7 cm) or 8×10 inches (20.3 cm × 25.4 cm). Smaller photographs may be used if they clearly show the details of the test site and are mounted on full size sheets of paper.

(3) 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.

(4) Description of structures used to support the device being measured and the test instrumentation.

(5) List of measuring equipment used.

(6) Information concerning the calibration of the measuring equipment, i.e., the date the equipment was last calibrated and how often the equipment is calibrated.

(7) If desired, a statement as to whether the test site is available to do measurement services for the public on a fee basis.

(8) For a measurement facility that will be used for testing radiated emissions, a plot of site attenuation data taken pursuant to the procedures contained in Sections 5.4.6 through 5.5 of the following procedure: American National Standards Institute (ANSI) C63.4–2001, entitled ''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'' published by the American National Standards Institute on June 22, 2001 as document number SH94908. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of C63.4–2001 may be obtained from: IEEE Customer Service, P.O. Box 1331, Piscataway, NJ 08855–1331, or *UPS only* IEEE Customer Service, 445 Hoes Lane, Piscataway, NJ 08854; telephone 1–800–678–4333 or +1–732–981–0600 (outside the United States and Canada). Copies of ANSI C63.4–2001 may be inspected at the following locations:

(i) Federal Communications Commission, 445 12th Street, SW., Office of Engineering and Technology (Room 7–B144), Washington, DC 20554,

(ii) Federal Communications Commission Laboratory, 7435 Oakland Mills Road, Columbia, MD 21046, or

(iii) 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*.

(9) A description of the types of equipment intended to be measured or other information regarding the types

of measurements that would be performed at the test facility.

(c) The Commission will publish a list of those parties who have filed the information required by this section, provided they indicate that they wish to perform measurement services for the public on a fee basis. However, it should be noted that the Commission does not endorse or approve any facility on this list.

(d) A laboratory that has been accredited with a scope covering the required measurements shall be deemed competent to test and submit test data for equipment subject to verification, Declaration of Conformity, and certification. Such a laboratory shall be accredited by an approved accreditation organization based on the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Standard 17025, ''General Requirements for the Competence of Calibration and Testing Laboratories.'' The organization accrediting the laboratory must be approved by the Commission's Office of Engineering and Technology, as indicated in §0.241 of this chapter, to perform such accreditation based on ISO/IEC 58, ''Calibration and Testing Laboratory Accreditation Systems—General Requirements for Operation and Recognition.'' The frequency for revalidation of the test site 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. However, in all cases, test site revalidation shall occur on an interval not to exceed two years.

(e) 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; or

(2) If the laboratory has been recognized by the Commission as being accredited by an organization that has entered into an arrangement between accrediting organizations and the arrangement has been recognized by the Commission.

[54 FR 17712, Apr. 25, 1989, as amended at 57 FR 24990, June 12, 1992; 58 FR 37430, July 12, 1993; 58 FR 44893, Aug. 25, 1993; 61 FR 31046, June 19, 1996; 62 FR 41880, Aug. 4, 1997; 63 FR 36599, July 7, 1998; 65 FR 58466, Sept. 29, 2000; 68 FR 68544, Dec. 9, 2003; 69 FR 18803, Apr. 9, 2004; 69 FR 54033, Sept. 7, 2004; 69 FR 55982, Sept. 17, 2004]

VERIFICATION

AUTHORITY: Sections 2.951 through 2.957 are issued under secs. 4, 303, 307, 48 Stat., as amended, 1066, 1082, 1083; 47 U.S.C. 154, 303, 307.

SOURCE: Sections 2.951 through 2.957 appear at 46 FR 23249, Apr. 24, 1981, unless otherwise noted.

§ 2.951 Cross reference.

The provisions of §2.901, *et seq.*, shall apply to equipment subject to verification.

§ 2.952 Limitation on verification.

(a) Verification signifies that the manufacturer or importer has determined 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. Compliance with these standards shall not be construed to be a finding by the manufacturer or importer with respect to matters not encompassed by the Commission's rules.

(b) Verification of the equipment by the manufacturer or importer 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 a verification in a deceptive or misleading manner or convey the impression that such verification reflects more than a determination by the manufacturer or importer that the device or product has been shown to be capable of compliance with the applicable technical standards of the Commission's rules.

§ 2.953 Responsibility for compliance.

(a) In verifying compliance, the responsible party, as defined in §2.909 warrants that each unit of equipment

marketed under the verification procedure 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 verification within the variation that can be expected due to quantity production and testing on a statistical basis.

(b) The importer of equipment subject to verification may upon receiving a written statement from the manufacturer that the equipment complies with the appropriate technical standards rely on the manufacturer or independent testing agency to verify compliance. The test records required by § 2.955 however should be in the English language and made available to the Commission upon a reasonable request, in accordance with § 2.956.

(c) In the case of transfer of control of equipment, as in the case of sale or merger of the grantee, the new manufacturer or importer shall bear the responsibility of continued compliance of the equipment.

(d) Verified equipment shall be reverified if any modification or change adversely affects the emanation characteristics of the modified equipment. The party designated in § 2.909 bears responsibility for continued compliance of subsequently produced equipment.

[39 FR 5919, Feb. 15, 1974, as amended at 62 FR 10472, Mar. 7, 1997]

§ 2.954 Identification.

Devices subject only to verification shall be uniquely identified by the person 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, notified or type accepted equipment. The importer or manufacturer shall maintain adequate identification records to facilitate positive identification for each verified device.

[62 FR 10472, Mar. 7, 1997]

§ 2.955 Retention of records.

(a) For each equipment subject to verification, the responsible party, as shown in § 2.909 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 requirements of § 2.953.

(2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by § 2.953. (Statistical production line emission testing is not required.)

(3) A record of the measurements made on an appropriate test site that demonstrates compliance with the applicable regulations in this chapter. The record shall:

(i) Indicate the actual date all testing was performed;

(ii) State the name of the test laboratory, company, or individual performing the verification testing. The Commission may request additional information regarding the test site, the test equipment or the qualifications of the company or individual performing the verification tests;

(iii) Contain a description of how the device was actually tested, identifying the measurement procedure and test equipment that was used;

(iv) Contain a description of the equipment under test (EUT) and support equipment connected to, or installed within, the EUT;

(v) Identify the EUT and support equipment by trade name and model number and, if appropriate, by FCC Identifier and serial number;

(vi) Indicate the types and lengths of connecting cables used and how they were arranged or moved during testing;

(vii) 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 be focused originals without glare or dark spots and must clearly show the test configuration used;

(viii) List all modifications, if any, made to the EUT by the testing company or individual to achieve compliance with the regulations in this chapter;

(ix) Include all of the data required to show compliance with the appropriate regulations in this chapter; and

(x) 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.

(4) For equipment subject to the provisions in part 15 of this chapter, the records shall indicate if the equipment was verified pursuant to the transition provisions contained in § 15.37 of this chapter.

(b) The records listed in paragraph (a) of this section shall be retained for two years after the manufacture of said equipment item has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the manufacturer or importer is officially notified that an investigation or any other administrative proceeding involving his equipment has been instituted.

[54 FR 17713, Apr. 25, 1989, as amended at 62 FR 10472, Mar. 7, 1997]

§ 2.956 FCC inspection and submission of equipment for testing.

(a) Each responsible party shall upon receipt of reasonable request:

(1) Submit to the Commission the records required by § 2.955.

(2) Submit one or more sample units for measurements at the Commission's Laboratory.

(i) Shipping costs to the Commission's Laboratory and return shall be borne by the responsible party.

(ii) In the event the responsible party believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement, or for any other reason, the responsible party may submit a written explanation why such shipment is impractical and should not be required.

(b) Requests for the submission of the records in § 2.955 or for the submission of sample units are covered under the provisions of § 2.946.

[62 FR 10472, Mar. 7, 1997]

TELECOMMUNICATION CERTIFICATION BODIES (TCBS)

§ 2.960 Designation of Telecommunication Certification Bodies (TCBs).

(a) The Commission may designate Telecommunication Certification Bodies (TCBs) to approve equipment 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 process the application to determine whether the product meets the Commission's requirements and shall issue a written grant of equipment authorization. The grant shall identify the TCB and the source of authority for issuing it.

(b) The Federal Communications Commission shall designate TCBs in the United States to approve equipment subject to certification under the Commission's rules. TCBs shall be accredited 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 Guide 65, 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 and testing laboratories. 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 Guide 61.

(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]

§ 2.962 Requirements for Telecommunication Certification Bodies.

(a) Telecommunication certification bodies (TCBs) designated by the Commission, or designated by another authority pursuant to an effective bilateral or multilateral mutual recognition agreement or arrangement to which the United States is a party, shall comply with the following requirements.

(b) *Certification methodology.* (1) The certification system shall be based on type testing as identified in sub-clause 1.2(a) of ISO/IEC Guide 65.

(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 Guide 65 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 Standard 17025 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 a knowledge of how to obtain current and correct technical regulation interpretations. The competence of the Telecommunication Certification Body shall be demonstrated by assessment. The general competence, efficiency, experience, familiarity with technical regulations and products included in those technical regulations, as well as compliance with applicable parts of the ISO/IEC Standard 17025 and Guide 65, shall be taken into consideration.

(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) *Sub-contractors.* (1) In accordance with the provisions of sub-clause 4.4 of ISO/IEC Guide 65, the testing of a product, or a portion thereof, may be performed by a sub-contractor of a designated TCB, provided the laboratory has been assessed by the TCB as competent and in compliance with the applicable provisions of ISO/IEC Guide 65 and other relevant standards and guides.

(2) When a subcontractor is used, the TCB shall be responsible for the test results and shall maintain appropriate oversight of the subcontractor to ensure reliability of the test results. Such oversight shall include periodic audits of products that have been tested.

(e) *Designation of a TCB.* (1) The Commission will designate as a TCB any organization that meets the qualification criteria and is accredited by NIST or its recognized accreditor.

(2) The Commission will withdraw the designation of a TCB if the TCB's accreditation by NIST or its recognized accreditor is withdrawn, if the Commission determines there is just cause for withdrawing the designation, or if the TCB requests that it no longer hold the designation. The Commission will provide a TCB with 30 days notice of its intention to withdraw the designation and provide the TCB with an opportunity to respond.

(3) A list of designated 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 source, subject to the requirements in ISO/IEC Guide 65, and shall not unnecessarily repeat tests.

(3) A TCB may establish and assess fees for processing certification applications and other tasks as required by the Commission.

(4) A TCB may rescind a grant of certification within 30 days of grant for administrative errors. After that time, a grant can only be revoked by the Commission through the procedures in §2.939 of this part. A TCB shall notify both the applicant and the Commission when a grant is rescinded.

(5) A TCB may not:

(i) Grant a waiver of the rules, or certify equipment for which the Commission rules or requirements do not exist or for which the application of the rules or requirements is unclear.

(ii) Take enforcement actions; or

(iii) Authorize a transfer of control of a grantee.

(6) All TCB actions are subject to Commission review.

(g) *Post-certification requirements.* (1) A TCB shall supply an electronic copy of each approved application form and grant of certification to the Commission.

(2) In accordance with ISO/IEC Guide 65, a TCB is required to conduct appropriate post-market surveillance activities. These activities shall be based on type testing a few samples of the total number of product types which the certification body has certified. Other types of surveillance activities of a product that has been certified are permitted, provided they are no more onerous than testing type. The Commission may at any time request a list of products certified by the certification body and may request and receive copies of product evaluation reports. The Commission may also request that a TCB perform post-market surveillance, under Commission guidelines, of a specific product it has certified.

(3) If during post market surveillance of a certified product, a TCB determines that a product fails to comply with the applicable technical regulations, the Telecommunication Certification Body shall immediately notify the grantee and the Commission. A follow-up report shall also be provided within thirty days of the action taken by the grantee to correct the situation.

(4) Where concerns arise, the TCB shall provide a copy of the application file to the Commission within 30 calendar days of a request for the file made by the Commission to the TCB and the manufacturer. Where appropriate, the file should be accompanied by a request for confidentiality for any material that may qualify for confidential treatment under the Commission's Rules. If the application file is not provided within 30 calendar days, a statement shall be provided to the Commission as to why it cannot be provided.

(h) In case of a dispute with respect to designation or recognition of a TCB and the testing or certification of products by a TCB, the Commission will be the final arbiter. Manufacturers and designated TCBs will be afforded at least 30 days to comment before a decision is reached. In the case of a TCB designated or recognized, or a product certified pursuant to an effective bilateral or multilateral mutual recognition agreement or arrangement (MRA) to which the United States is a party, the Commission may limit or withdraw its recognition of a TCB designated by an MRA party and revoke the certification of products using testing or certification provided by such a TCB. 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).

[64 FR 4995, Feb. 2, 1999, as amended at 66 FR 27601, May 18, 2001; 69 FR 54034, Sept. 7, 2004]

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) and (i) of this chapter.

(12) An application for certification of a software defined radio must include the information required by § 2.944.

(c) Applications for equipment other than that operating under parts 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) 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.

(d) Applications for certification of equipment operating under part 20, that a manufacturer is seeking to certify as hearing aid compatible, as set forth in § 20.19 of that part, shall include a statement indicating compliance with the test requirements of § 20.19 and indicating the appropriate U-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.

[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]

§ 2.1035 [Reserved]

§ 2.1041 Measurement procedure.

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. 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. See also § 2.947.

[63 FR 36600, July 7, 1998]

§ 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 a filing with the Commission 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 with the Commission 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 supply the Commission with 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 by the Commission 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 supply the Commission with 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 by the Commission 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 to the Commission 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 below.

(c) A grantee desiring to make a change other than a permissive change shall file an application on FCC Form 731 accompanied by the required fees. 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, 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 of the Commission prior to acknowledgement by the Commission 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]

§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]

DECLARATION OF CONFORMITY

§ 2.1071 Cross reference.

The general provisions of this subpart, shall apply to equipment subject to a Declaration of Conformity.

[61 FR 31046, June 19, 1996]

§ 2.1072 Limitation on Declaration of Conformity.

(a) The 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) A Declaration of Conformity by the responsible party 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 a Declaration of Conformity in a deceptive or misleading manner or convey the impression that such a Declaration of Conformity reflects more than a determination by the responsible party that the device or product has been shown to be capable of complying with the applicable technical standards of the Commission's rules.

[61 FR 31046, June 19, 1996]

§ 2.1073 Responsibilities.

(a) The responsible party, as defined in § 2.909, must warrant that each unit of equipment marketed under a Declaration of Conformity is 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 the Declaration of Conformity within the variation that can be expected due to quantity

production and testing on a statistical basis.

(b) The responsible party, if different from the manufacturer, may upon receiving a written statement from the manufacturer that the equipment complies with the appropriate technical standards rely on the manufacturer or independent testing agency to determine compliance. However, the test records required by §2.1075 shall be in the English language and shall be made available to the Commission upon a reasonable request in accordance with the provisions of §2.1076.

(c) In the case of transfer of control of the equipment, as in the case of sale or merger of the responsible party, the new responsible party shall bear the responsibility of continued compliance of the equipment.

(d) Equipment shall be retested to demonstrate continued compliance with the applicable technical standards if any modifications or changes that could adversely affect the emanation characteristics of the equipment are made by the responsible party. The responsible party bears responsibility for the continued compliance of subsequently produced equipment.

(e) If any modifications or changes are made by anyone other than the responsible party for the Declaration of Conformity, the party making the modifications or changes, if located within the U.S., becomes the new responsible party. The new responsible party must comply with all provisions for the Declaration of Conformity, including having test data on file demonstrating that the product continues to comply with all of the applicable technical standards.

[61 FR 31046, June 19, 1996]

§2.1074 Identification.

Devices subject only to a Declaration of Conformity shall be uniquely identified by the responsible party. This identification shall not be of a format which could be confused with the FCC Identifier required on certified, notified, type accepted or type approved equipment. The responsible party shall maintain adequate identification records to facilitate positive identification for each device.

[61 FR 31047, June 19, 1996]

§2.1075 Retention of records.

(a) Except as shown in paragraph (b) of this section, for each product subject to a Declaration of Conformity, the responsible party, as shown in §2.909, shall maintain the following records:

(1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the requirements of §2.1073.

(2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by §2.1073. (Statistical production line emission testing is not required.)

(3) A record of the measurements made on an appropriate test site that demonstrates compliance with the applicable regulations. The record shall contain:

(i) The actual date or dates testing was performed;

(ii) 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;

(iii) A description of how the device was actually tested, identifying the measurement procedure and test equipment that was used;

(iv) A description of the equipment under test (EUT) and support equipment connected to, or installed within, the EUT;

(v) The identification of the EUT and support equipment by trade name and model number and, if appropriate, by FCC Identifier and serial number;

(vi) The types and lengths of connecting cables used and how they were arranged or moved during testing;

(vii) At least two photographs showing the test set-up for the highest line conducted emission and showing the test set-up for the highest radiated emission. These photographs must be focused originals which show enough detail to confirm other information contained in the test report;

(viii) A description of any modifications made to the EUT by the testing company or individual to achieve compliance with the regulations;

(ix) All of the data required to show compliance with the appropriate regulations;

(x) 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

(xi) A copy of the compliance information, as described in § 2.1077, required to be provided with the equipment.

(b) If the equipment is assembled using modular components that, by themselves, are subject to authorization under a Declaration of Conformity and/or a grant of certification, and the assembled product is also subject to authorization under a Declaration of Conformity but, in accordance with the applicable regulations, does not require additional testing, the assembler shall maintain the following records in order to show the basis on which compliance with the standards was determined:

(1) A listing of all of the components used in the assembly;

(2) Copies of the compliance information, as described in § 2.1077 for all of the modular components used in the assembly;

(3) A listing of the FCC Identifier numbers for all of the components used in the assembly that are authorized under a grant of certification;

(4) A listing of equipment modifications, if any, that were made during assembly; and

(5) A copy of any instructions included with the components that were required to be followed to ensure the assembly of a compliant product, along with a statement, signed by the assembler, that these instructions were followed during assembly. This statement shall also contain the name and signature of an official of the responsible party, as designated in § 2.909.

(c) The records listed in paragraphs (a) and (b) of this section shall be retained for two years after the manufacture or assembly, as appropriate, of said equipment has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the responsible party is officially notified that an investigation or any other administrative proceeding involving the equipment has been instituted. Requests for the records described in this section and for sample units also are covered under the provisions of § 2.946.

[61 FR 31047, June 19, 1996]

§ 2.1076 FCC inspection and submission of equipment for testing.

(a) Each responsible party, upon receipt of a reasonable request, shall submit to the Commission the records required by § 2.1075 or one or more sample units for measurements at the Commission's laboratory.

(b) Shipping costs to the Commission's Laboratory and return shall be borne by the responsible party. In the event the responsible party believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement, or for any other reason, the responsible party may submit a written explanation why such shipment is impractical and should not be required.

[61 FR 31047, June 19, 1996]

§ 2.1077 Compliance information.

(a) If a product must be tested and authorized under a 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 statement, similar to that contained in § 15.19(a)(3) of this chapter, that the product complies with part 15 of this chapters; and

(3) The identification, by name, address and telephone number, of the responsible party, as defined in § 2.909. The responsible party for a Declaration of Conformity must be located within the United States.

(b) If a product is assembled from modular components that, by themselves, are authorized under a Declaration of Conformity and/or a grant of certification, and the assembled product is also subject to authorization under a 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 a 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, of the responsible party who assembled the product from modular components, as defined in §2.909. The responsible party for a 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 a 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.

[61 FR 31048, June 19, 1996, as amended at 62 FR 41880, Aug. 4, 1997; 69 FR 71383, Dec. 9, 2004]

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) Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, parts 24, 25, 26 and 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more. Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under §§15.253, 15.255, and 15.257, and subparts D and E of part 15 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. 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. 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 as part of their application. 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, compliance with exposure guidelines for devices in this section can be accomplished by the use of warning labels and by providing users with information concerning minimum separation distances from transmitting structures and proper installation of antennas.

(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]

§ 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) Portable devices that operate in the Cellular Radiotelephone Service, the Personal Communications Service (PCS), the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services, the Specialized Mobile Radio Service, the 4.9 GHz Band Service, the Wireless Medical Telemetry Service (WMTS) and the Medical Device Radiocommunication Service (MedRadio), authorized under subpart H of part 22 of this chapter, parts 24, 25, 26, 27, 80 and 90 of this chapter, subparts H and I of part 95 of this chapter, and unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under subparts D and E, 15.253, 15.255 and 15.257 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. 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. 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 as part of their application. 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) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). 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 warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). 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. Warning labels placed 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. Methodologies and references for SAR evaluation are described in numerous technical publications including ''IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields—RF and Microwave,'' IEEE C95.3–1991.

(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]

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 section 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]

§2.1202 Exclusions.

The provisions of this section do not apply to the importation of:

(a) Cameras, musical greeting cards, quartz watches and clocks, modules of quartz watches and clocks, hand-held calculators and electronic games, and other similar unintentional radiators which utilize low level battery power and which do not contain provisions for operation while connected to AC power lines.

(b) Unintentional radiators which are exempted from technical standards and other requirements as specified in §15.103 of this chapter.

(c) Radio frequency devices manufactured and assembled in the U.S.A. that meet applicable FCC technical standards and which have not been modified or received further assembly.

(d) Radio frequency devices previously properly imported that have been exported for repair and re-imported for use.

(e) 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. Form 740 information will be required to be submitted for 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.

[56 FR 26619, June 10, 1991]

§ 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, declares that the device meets one of the conditions for entry set out in this section.

(b) A separate declaration shall be used for each line item in the entry or entry summary containing an RF device, or for each different radio frequency device within a line item when the elements of the declaration are not identical.

(c) Failure to properly declare the importation category for an entry 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.

(d) Whoever makes a declaration 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.

[56 FR 26619, June 10, 1991; 56 FR 32474, July 16, 1991]

§ 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 limited quantities for testing and evaluation to determine compliance with the FCC Rules and Regulations or suitability for marketing. The devices will not be offered for sale or marketed. The phrase ''limited quantities,'' in this context means:

(i) 2000 or fewer units, provided the product is designed solely for operation within one of the Commission's authorized radio services for which an operating license is required to be issued by the Commission; or

(ii) 200 or fewer units for all other products.

(iii) 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.

(iv) Distinctly different models of a product 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) 200 or fewer units, provided the product is designed solely for operation within one of the Commission's authorized radio services for which an operating license is required to be issued by the Commission; or

(ii) 10 or fewer units for all other products.

(iii) 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.

(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 receivers, computers, or other unintentional radiators as defined in part 15 of this chapter, are being imported for the individual's personal use and are not intended for sale.

(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]

§2.1205 Filing of required declaration.

(a) For points of entry where electronic filing with Customs has not been implemented, use FCC Form 740 to provide the needed information and declarations. Attach a copy of the completed FCC Form 740 to the Customs entry papers.

(b)(1) For points of entry where electronic filing with Customs is available, submit the following information to Customs when filing the entry documentation and the entry summary documentation electronically. Follow procedures established by Customs for electronic filing.

(i) The terms under which the device is being imported, as indicated by citing the import condition number specified in §2.1204(a).

(ii) The FCC identifier as specified in §2.925, if the device has been granted an equipment authorization;

(iii) The quantity of devices being imported, regardless of what unit is specified in the Harmonized Tariff Schedule of the United States; and

(iv) A commercial product description which is to include the trade name, a model/type number (or model/type name) and other descriptive information about the device being imported.

(2) For importers unable to participate in the electronic filing process with Customs for good cause, declarations are to be made in accordance with paragraph (a) of this section.

[56 FR 26619, June 10, 1991, as amended at 64 FR 72572, Dec. 28, 1999]

§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.

(2) The applicant must certify that the application was prepared by or under the direction of the applicant and that the facts set forth are true and correct to the best of the applicant's knowledge and belief.

(3) The applicant must identify the technical system by a name or type number and define the system in terms of its technical characteristics; a functional block diagram must be included. In addition, a complete description of the encoded aural and visual baseband and transmitted signals and of the encoding equipment used by the applicant must be supplied. These descriptions must include equipment circuit diagrams and photographs, and diagrams or oscillographs of both baseband and transmitted aural and visual signal waveforms and of the signal basebands and occupied bandwidths. If aural subcarriers are to be used for transmitting aural portion of the subscription program, for decoder control, or for other purposes, a full description and specifications of the multiplex subcarrier signals and all modulation levels must be included.

(4) Preliminary test data must be submitted to show system capability with regard to compliance with the criteria set forth in § 73.644(b).

(5) The applicant must identify the specific requirements of §§ 73.682, 73.687 and 73.699 (Figures 6 and 7) from which the transmitted signal will normally deviate.

(6) The applicant must specify the method to be used in determining and maintaining the operating power of the transmitter if the procedures given in § 73.663 cannot be used due to suppression of the synchronizing pulses or for other reasons. If the operating power of the station must be reduced to accommodate the encoded aural or video signal, the operating power limitations must be specified.

(7) The applicant must supply any additional information and test data requested by the FCC, to show to its satisfaction that the criteria given in § 73.644(b) are met.

(8) The information submitted by the applicant may be subject to check by field tests conducted without expense to the FCC or, if deemed necessary, at the laboratory or in the field by FCC personnel. This may include the actual submission of equipment for system testing under the provisions of § 2.945 of part 2 of the Rules.

(9) No technical system will be deemed approved unless and until the FCC has notified the applicant in writing of the approval. Such notification of approval will be by letter to the applicant.

(10) Approval by the FCC is limited to a determination that the particular technical system (the scheme for encoding and decoding the subscription TV signal) is capable of meeting the criteria given in § 73.644(b).

(11) The FCC will maintain a listing of approved technical systems.

(c) Multichannel sound may be transmitted for stereophonic or bilingual service with encoded subscription programs provided the technical operating specifications for this service are included in the application for advance system approval.

(d) Subscriber decoder devices must comply with any applicable provisions of subpart H, part 15 of the FCC Rules for TV interface devices.

(e) No modifications may be made by either the applicant or the user of a system having advance FCC approval that would change any of the operating conditions as submitted in the application for advance approval. Should system modifications be necessary, a new application must be submitted in accordance with the requirements of this section.

[48 FR 56391, Dec. 21, 1983]

Subpart N—FCC Procedure for Testing Class A, B and S Emergency Position Indicating Radiobeacons (EPIRBs)

SOURCE: 56 FR 11683, Mar. 20, 1991, unless otherwise noted.

GENERAL

§ 2.1501 Introduction.

The procedure described herein sets forth uniform methods for testing Class A, B and S Emergency Position Indicating Radiobeacons (EPIRBs) for compliance with the applicable portions of the FCC Rules and Regulations. Other methods and test results may be used provided they are fully documented and deemed by the Commission to yield results equivalent to the procedures set forth in this section.

§ 2.1503 Test environment.

(a) *Measurement sites.* Radiated emission tests for peak effective radiated power (PERP), spurious emissions and power in the test mode are to be performed on an open field test site as shown in Figure 1. The site is to be located on level ground with an obstruction-free, 60 m by 52 m, elliptical area. The site is to be equipped with an antenna mast capable of adjustment from 1 to 4 m. The center of a metal ground plane at least one wavelength in diameter at 121.5 MHz (2.47 m) is to be located 30 m from the receiving antenna. The ground plane is to have provisions for mounting removable quarter-wave verticle elements to produce a monopole antenna at both 121.5 and 243 MHz with the VSWR of less than 1.5.

NOTE: It is desirable that the level of radiated ambient EME at the test site be at least 6 dB below the FCC limits applicable to the EPIRB. It is, of course, not always possible to meet this condition. If the ambient field strength at some frequencies within the specified measurement ranges is too high, it is recommended that one or more of the following corrective steps be employed:

(1) Perform measurements in critical frequency bands during hours when broadcast and other radio stations are off-the-air and ambients from industrial equipment are lower.

(2) Insofar as is possible, orient the axis of an open area test site to discriminate against strong ambient signals.

(3) Vary the bandwidth of the measuring instrument to separate ambient EME from emissions from the EPIRB.

(b) *Temperature.* Except as otherwise noted, the ambient temperature during testing is to be within the range of 4 to 35 °C (40 to 95 °F).

§ 2.1505 Test instrumentation and equipment.

(a) *Receiver (field intensity meter).* A calibrated field intensity meter (FIM) with a frequency range of 30 to 1000 MHz is required for measuring radiated emission levels. This instrument should be capable of making peak measurements with a bandwidth of 100 kHz.

(b) *Spectrum analyzer.* Spectral measurements are to be made with a spectrum analyzer with a minimum resolution bandwidth no greater than 10 Hz. The video filter, if used, should have a bandwidth wide enough so as to not affect peak readings. A linear video output is desirable for performing measurements of modulation characteristics.

(c) *Storage oscilloscope.* Measurements of modulation characteristics are to be made using a calibrated storage oscilloscope. This instrument is to be DC coupled and capable of manually triggered single sweeps.

(d) *Frequency counter.* A frequency counter with an accuracy of at least 5 parts per million is required for measuring the carrier frequency.

(e) *Signal generator.* A calibrated signal generator with an output of at least 75 mW at 121.5 and 243 MHz is required for generating a reference signal for site calibration.

(f) *Antenna.* Radiated emissions are to be measured with calibrated, tuned, half-wave dipole antennas covering the frequency range of 30 to 1000 MHz.

(g) *Temperature chamber.* Tests which call for subjecting the EPIRB to temperature levels other than the ambient temperature are to be performed in a temperature test chamber which can be adjusted to stable temperatures from −20 to +55 °C. This chamber is to be of sufficient size to accommodate the EPIRB under test.

(h) *Vibration table.* A vibration table capable of vibrating the EPIRB with a sinusoidal motion is required. The table must be capable of varying the frequency of vibration either linearly or logarithmically over a range of 4 to 33 Hz with maximum peak amplitudes of up to 2.5 mm.

(i) *Salt fog chamber.* A chamber capable of producing salt fog at a temperature of 35 °C for 48 hours is required.

This chamber is to be of sufficient size to accommodate the EPIRB under test.

(j) *Drop test facility*. A facility which will permit dropping an EPIRB from a height of 20 m into water is required. The water must be deep enough so that the EPIRB will not touch bottom when dropped.

ENVIRONMENTAL AND OPERATIONAL TEST PROCEDURES

§ 2.1507 Test frequencies.

Testing of an EPIRB for compliance outside a shielded room on a distress frequency is prohibited, since this may interfere with emergency communications. Therefore, all compliance testing outside a shielded room should be conducted on one of the pairs of alternate frequencies specified below:

121.600/243.200 MHz
121.650/243.300 MHz
121.700/243.400 MHz
121.750/243.500 MHz
121.800/243.600 MHz
121.850/243.700 MHz
121.900/243.800 MHz

The above frequencies are to be used for limited testing of EPIRBs for compliance with FCC Rules, subject to the following conditions:

(a) The testing shall not cause harmful interference to authorized communications on these frequencies.

(b) The testing shall be coordinated with the nearest FCC district office.

For simplicity, 121.5 MHz and 243 MHz will be used throughout this test procedure to indicate the alternate test frequency.

§ 2.1509 Environmental and duration tests.

The environmental and operational tests in § 2.1509 (a) through (e) are to be conducted on a single test unit in the order given below. This sequence of tests also includes the electrical tests in §§ 2.1511, 2.1513 and 2.1515 of this part. The test unit is not to be adjusted, nor is the battery to be replaced during these tests, and a log of battery on-time should be maintained. The above tests are to be performed on the same test unit. The tests in § 2.1509 (f) through (i) may be run in any sequence or may be performed on separate test units.

(a) *Vibration test.*

Step (1) Secure the EPIRB to the vibration table. The EPIRB is not to be operated and should not activate while being vibrated.

Step (2) Subject the EPIRB to sinusoidal motion parallel to one of the three major orthogonal axes under the following conditions:

A. Frequency (Hz)	Peak amplitude (mm)
4–10	2.5
10–15	0.8
15–25	0.4
25–33	0.2

B. The frequency is to be changed either linearly or logarithmically with time between 4 Hz and 33 Hz such that a complete cycle (4 Hz to 33 Hz to 4 Hz) takes approximately 5 minutes.

C. The EPIRB is to be vibrated for at least 30 minutes or six complete cycles.

Step (3) Remount the EPIRB, if necessary, and repeat step 2 for each of the other two major orthogonal axes.

Step (4) Upon completion of the test, perform an exterior mechanical inspection and verify operation by turning the unit on and observing the RF power indicator on the unit or monitoring the transmission with a receiver. Record test results.

(b) *Thermal shock tests.* These tests are to be performed on EPIRBs which are required or intended to float. (1) *Low temperature thermal shock test.*

Step (1) Place the EPIRB in a temperature chamber for at least 3 hours at −20 °C or colder. The EPIRB is not to be operated while being cooled.

Step (2) Immediately place the EPIRB in water that has been maintained at +10 °C or warmer.

Step (3) After 15 minutes, perform as exterior mechanical inspection and verify operation by turning the unit on and observing the RF power indicator on the unit or monitoring the transmission with a receiver. Record test results.

(2) *High temperature thermal shock test.*

Step (1) Place the EPIRB in a temperature chamber for at least 3 hours at +55 degrees C or warmer. The EPIRB is not to be operated while being heated.

Step (2) Immediately float the EPIRB in water that is maintained at +25 degrees C or colder.

Step (3) After 15 minutes, perform an exterior mechanical inspection and verify operation by turning the unit on and observing the RF power indicator on the unit or monitoring the transmission with a receiver. Record test results.

(c) *Salt fog test.*

Step (1) Place the EPIRB in a salt fog chamber for a period of at least 2 hours at a temperature of 35 °C (±2 °C) before exposing it to salt fog. The EPIRB is to be turned off during this test.

Step (2) With the chamber temperature maintained at 35 °C, introduce salt fog at the saturation point for 48 hours. The salt fog is to be prepared from a 5% (±1%) salt (sodium chloride solution. For detailed guidance on the preparation of the solution and the apparatus for generating salt fog, refer to MIL-STD-810D (19 July 1983), method 509.2.

Step (3) Upon completion of the salt fog exposure, the EPIRB is to be airdried at room temperature for 12 hours and operation verified by turning the unit on and observing the RF power indicator on the unit or monitoring the transmission with a receiver. Record observations.

(d) *Drop test.* This test is to be performed on EPIRB which are required or intended to float.

Step (1) Turn the EPIRB on, log the time and drop it three times into water from a height of 20 meters. The water is to be deep enough so that the EPIRB does not touch bottom when dropped. Each drop should be initiated from a different orientation as follows: antenna vertical up; antenna vertical down; antenna horizontal.

Step (2) Upon completion of the drop test, an exterior mechanical inspection is to be performed and operation verified by observing the RF power indicator on the unit or monitoring the transmission with a receiver. Record observations. Turn the test unit off and log the total on-time.

(e) *Forty-eight hour operational test.* This test includes the battery life test and all the electrical tests given in §§ 2.1511, 2.1513 and 2.1515 of this part, at various temperatures. The tests are to be performed on the same EPIRB in the sequence specified herein. Be sure to record the on-time of the unit during each test. No more than 8 hours of total on-time is permitted before commencing step 4. When operating the EPIRB in the environmental chamber, a non-radiating load may be substituted for the antenna provided it is electrically equivalent to the standard antenna and does not reduce the battery current drain.

Step (1) Perform the radiated emissions test in § 2.1511 of this part.

Step (2) Perform the modulation characteristic tests in § 2.1513 of this part.

Step (3) Perform the spectral tests in § 2.1515 of this part.

Step (4) With the EPIRB off, place unit in an environmental chamber at a temperature of −20 °C for at least 2 hours.

Step (5) With the EPIRB in the chamber, repeat the carrier frequency test in § 2.1515(d) of this part. (Leave the EPIRB turned on.)

Step (6) Near the end of 48 hours of total on-time for the EPIRB, repeat the carrier frequency test in § 2.1515(d) of this part.

Step (7) At the end of 48 hours of total on-time, remove EPIRB from the chamber and immediately repeat the PERP test for the fundamental emissions in § 2.1511(c) of this part. The unit should be maintained at −20 °C to the extent possible for this test.

(f) *Float free and activation test.* This test is required only for Class A EPIRBs.

Step (1) The EPIRB is to be installed in the automatic release mechanism and the assembly is to be mounted on a fixture simulating a deck or bulkhead as per manufacturer' installation instructions.

Step (2) Submerge the fixture in water in its normal mounted orientation. The EPIRB must float free before reaching a depth of 4 meters and should automatically activate. Activation is to be verified by observing the RF power indicator on the unit or monitoring the transmission with a receiver.

If the EPIRB is equipped with an automatically deployable antenna, the antenna must properly deploy during each immersion. Record observations.

(g) *Stability and buoyancy test.* This test is to be performed on EPIRBs which are required or intended to float. This test is to be conducted in fresh water.

Step (1) With the antenna deployed in its normal operating position, submerge the EPIRB in a horizontal position just below the surface of the water.

Step (2) Release the EPIRB and observe the amount of time required for it to come to an upright position. It must reach its upright position within one second from each position.

The EPIRB must have a reserve buoyancy of at least 5% of its gross weight. It must also float upright in calm water with the base of the antenna a minimum of 5 cm above the water. Record the time required for the test unit to right itself.

(h) *Temperature/frequency test.* The frequency stability shall be measured over an ambient temperature from −20° to +55 °C at intervals of not more than 10 °C. A period of time sufficient to stabilize all of the components of

the oscillator circuit at each temperture level shall be allowed prior to frequency measurement.

Step (1) Place the EPIRB in the environmental test chamber.

Step (2) Adjust the temperature in the chamber to +20 °C and allow sufficient time for the oscillator to stabilize at that temperature.

Step (3) Measure the carrier frequency in accordance with the procedure in §2.1515(d) of this part. Record the carrier frequency in Hertz. The carrier frequency at +20 °C is the reference for determining the frequency tolerance.

Step (4) Increase the temperature in the chamber to +55 °C and allow sufficient time for the oscillator to stabilize at that temperature. Measure the carrier frequency using the procedure in §2.1515(d) of this part.

Step (5) Reduce the temperature in the chamber in 10 °C maximum increments until −20 °C is reached. At each new temperature, allow sufficient time for the oscillator to stabilize at that temperature. Measure the temperature and frequency in each case and plot the frequency vs temperature from −20° to +55 °C.

(i) *Leakage and immersion test.*

Step (1) Completely submerge the EPIRB in water for 48 hours. The EPIRB is to be turned off during this test.

Step (2) Remove the EPIRB from the water and wipe dry.

Step (3) Verify operation by briefly turning the EPIRB on and observing the RF power indicator on the unit or monitoring the transmission with a receiver.

Step (4) Open the EPIRB for examination. There is to be no water inside the unit. Record observations.

§2.1511 Measurements of radiated emissions.

The Commission's Rules require that the peak efficetive radiated power (PERP) of a Class A, B or S EPIRB not be less than 75 mW under certain specified conditions. The PERP of an EPIRB transmitter is determined by comparing its level to a reference PERP generated by a standard quarter-wave monopole antenna located on a one wavelength minimum diameter metal ground plane. The Rules also require that all spurious and harmonic emissions be attenuated by a specified amount with respect to the reference PERP. In addition, there is a limit on the PERP of radiated emissions with the switch in the test mode. These measurements are to be made in accordance with the following procedure.

(a) *General set-up instructions.* Measurements of radiated electromagnetic emissions (EME) are to be performed on the 30 meter open field test site described in §2.1503(a) of this part and on one of the pair of frequencies listed in §2.1507 of this part. A receiver, tuned dipole antennas and a calibrated signal generator as described in §2.1505 of this part are required. The EPIRB should be powered by its own internal battery with its standard antenna attached and deployed.

(b) *Set-up for radiated EME tests.*

Step (1) Place a 121.5 MHz quarter-wave vertical antenna element at the center of the ground plane and connect the output of the calibrated signal generator to the antenna.

Step (2) Mount the tuned dipole antenna on the antenna mast, tune the elements to 121.5 MHz and connect the antenna to the receiver.

Step (3) After an appropriate warm up, turn the receiver to the frequency of the test unit, set the detector to peak mode and the bandwidth to 100 kHz.

(NOTE: It is sometimes helpful to monitor the receiver audio output with a speaker. The EPIRB signal may be identified by its distinctive modulation.)

(c) *Radiated EME tests.*

Fundamental emissions-peak effective radiated power

Step (1) Turn on the signal generator and adjust the output to 75 mW at 121.5 MHz.

Step (2) Vary the antenna height from one to four meters in both vertical and horizontal polarization. Record the highest receiver reading in dBm as the reference level.

Step (3) Disconnect the signal generator and replace the quarter-wave vertical element on the ground plane with the EPIRB under test. The EPIRB is to be positioned directly on the surface of and in the center of the metal ground plane.

Step (4) Activate the EPIRB.

Step (5) Vary the receive antenna height from one to four meters in both vertical and horizontal polarization. Record the highest receiver reading in dBm and the instrument settings, antenna height and direction for maximum radiation, antenna polarization and conversion factors, if any, associated with that reading.

Step (6) Repeat Step 5 with the EPIRB switch in the test position. Return the switch to the normal operation position.

Step (7) Rotate the EPIRB 30 degrees and repeat Steps 5 and 6. Repeat this step for all

successive 30 degrees segments of a full, 360 degree rotation of the EPIRB.

Step (8) Repeat §2.1511(b) and Steps 1 through 7 for 243 MHz.

Step (9) Compute the peak effective radiated power for the maximum level of each measured emission using the following formula:

$$PERP = 75 \times \log_{10}^{-1}\left[\frac{dBm_{meas-dBmref}}{10}\right]$$

where:

dBm_{meas} is the measured receiver reading in dBm, and

dBm_{ref} is the reference receiver reading found in step 2 of §2.1511(c).

Step (10) Record the PERP in mW. The FCC limit for minimum power in the normal operation mode (i.e., with the EPIRB switch in the normal operating position) is 75 mW. The FCC limit for maximum power in the test mode is 0.0001 mW.

Spurious emissions

Step (11) Reset the signal generator to operate at 121.5 MHz.

Step (12) For each spurious and harmonic emission to be measured, retune the receive antenna to the appropriate frequency and repeat Steps 5 and 7.

Step (13) Determine the FCC limit on power for spurious emissions on the frequency of each measured emission as follows:

The rules require that spurious emissions be attenuated at least 30 decibels below the transmit power level. Therefore, the maximum received power limit for a spurious emission can be calculated from the formula:

$$dBm_{spur} = dBm_{meas} + AF_{121.5} - AF_{spurfreq} - 30$$

where:

dBm_{meas} = measured receiver reading (Section 2.1511(c), step 5).

$AF_{121.5}$ = tuned dipole antenna factor at 121.5 MHz.

$AF_{spurfreq}$ = tuned dipole antenna factor at spurious freq.

Step (14) Record in dB below the fundamental emissions the level of all spurious and harmonic emissions within 10 dB of the FCC limits.

§ 2.1513 Measurements of modulation characteristics.

(a) *Set-up.* Test of modulation characteristics are to be performed in an RF shielded room.

Step (1) Place the EPIRB directly on a metal ground plane, such as the shielded room floor.

Step (2) Place a suitable receiving antenna at a convenient distance from the EPIRB and connect it to the input of the spectrum analyzer or receiver to observe the radiated signal from the EPIRB.

Step (3) Set the spectrum analyzer or receiver controls as follows:

I.F. bandwidth: 300 kHz minimum

Video filter: OFF or as wide as possible

Amplitude scale: Linear

Frequency: 121.5 MHz

Scan width: 0 Hz

Step (4) Connect the detected output of the spectrum analyzer or receiver to the input of the storage oscilloscope.

Step (5) Set the oscilloscope controls as necessary to allow the demodulated waveform to be viewed. The input signal is to be DC coupled.

(b) *Measurement of Audio Frequencies.*

Step (1) Activate the EPIRB.

Step (2) Trigger the oscilloscope and store at least one complete cycle of the audio waveform.

Step (3) Measure the period (T) of the waveform. The period is the time difference between the half voltage points at the beginning and end of one complete cycle of the waveform. See Figure 2.

Step (4) Calculate the frequency (F), where:

$F=1/T$.

Step (5) Repeat Steps 2 through 4 until the highest and lowest audio frequencies are found.

NOTE: The lowest and highest frequencies may occur several cycles before or after the transition from low to high frequency.)

Step (6) Determine the audio frequency range (F_{range}), where:

$F_{range}=F_{high}-F_{low}$

Step (7) Record instrument settings and the lowest and highest audio frequencies. Record the audio frequency range in Hertz.

Step (8) Repeat Steps 1–7, above, for 243 MHz.

(c) *Modulation factor.*

Step (1) Activate the EPIRB.

Step (2) Trigger the oscilloscope and store at least one complete cycle of the audio waveform. The input signal is to be DC coupled or erroneous results will be obtained.

Step (3) Measure the maximum voltage (V_{max}), and the minimum voltage (V_{min}) for the cycle. The modulation factor (M) is calculated from the following formula:

$$M = \frac{V_{max} - V_{min}}{V_{max} + V_{min}}$$

See Figure 2.

Step (4) Repeat Steps 2 and 3 until the lowest modulation factor is found.

Step (5) Record instrument settings and the lowest modulation factor, expressed as a ratio between 0 and 1.

Step (6) Repeat the above measurements for 243 MHz.

(d) *Modulation duty cycle.*

Step (1) Activate the EPIRB.

Step (2) Trigger the oscilloscope and store at least one complete cycle of the audio waveform.

Step (3) Measure the period (T) of the waveform. The period is the time difference between the half voltage points at the beginning and end of one cycle of the waveform. See Figure 2.

Step (4) Measure the pulse width (t_p) of the waveform. The pulse width is the time difference between the half voltage points on the rising and falling portions of the waveform. See Figure 2.

Step (5) Calculate the duty cycle (D) as follows:

$$D = \frac{t_p}{T}$$

Step (6) Repeat Steps 2 through 5 a sufficient number of times to determine the highest and lowest duty cycles.

Step (7) Record instrument settings and the highest and lowest duty cycles in percent.

Step (8) Repeat Steps 1–7 for 243 MHz.

(e) *Sweep repetition rate.*

Step (1) Connect a speaker to the detected output of the spectrum analyzer or receiver so the audio frequencies are audible. Alternatively, an FM radio tuned to 108 MHz placed in the vicinity of the EPIRB may be used.

Step (2) Activate the EPIRB.

Step (3) Time the number of audio sweeps (N) for a one minute interval.

Step (4) Calculate the audio sweep rate (R) using R=N/60.

Step (5) Record instrument settings and the sweep repetition rate in Hertz.

§ 2.1515 Spectral measurements.

(a) *Set-up.* Spectral measurements are to be performed in a shielded room.

Step (1) Place the EPIRB directly on a metal ground plane, such as the shielded room floor. The EPIRB should be powered by its own internal battery with its standard antenna attached and deployed.

Step (2) Place a suitable receiving antenna at a convenient distance from the EPIRB and connect it to the input of the spectrum analyzer to observe the radiated signal from the EPIRB. A signal generator and frequency counter capable of operating at 121.5 and 243 MHz are also required for these tests.

(b) *Occupied bandwidth test.*

Step (1) Activate the EPIRB and observe the fundamental frequency on a spectrum analyzer. Adjust location of receiving antenna and spectrum analyzer controls to obtain a suitable signal level (i.e., a level which will not overload the spectrum analyzer, but is far enough above the noise floor to allow determination of whether or not the sidebands are attenuated by at least the amount required in the rules).

Step (2) Set spectrum analyzer controls as follows:

I.F. bandwidth: 10 kHz
Video filter: OFF or as wide as possible
Scan time: 100 ms./div.
Amplitude scale: 10 dB/div.
Scan width: 20 Hz/div.
Center frequency: 121.5 MHz

Step (3) Record the signal level in dbm.

Step (4) Calculate the mean power reference level by adding 10 $\log_{10}$ (D), where D is the modulation duty cycle determined in section 2.1513(d) of this part, to the recorded signal level.

Step (5) Set spectrum analyzer controls as follows:

I.F. bandwidth: 100 Hz
Video filter: OFF or as wide as possible
Scan time: 10 sec./div.
Amplitude scale: 10 dB/div.
Scan width: 20 kHz/div.

Step (6) Check the modulation sidebands for compliance with the required attenuation below the mean power reference level specified in § 80.211 of the rules.

Step (7) Record how the test was performed, instrument settings and the occupied bandwidth in kHz and the 3 dB bandwidth of the carrier in Hz. (See § 2.1517 of this part).

Step (8) Repeat Steps 1 through 7 for the signal at 243 MHz.

(c) *Signal enhancement test.* The setup specified in § 2.1515(a) is to be used in this method of measuring signal enhancement. Other methods may be used if shown to give results equivalent to or more accurate than this method.

Step (1) Activate the EPIRB and locate the carrier frequency at 121.5 MHz on the spectrum analyzer. Adjust location of receiving antenna and spectrum analyzer controls to obtain a suitable signal level (i.e., a level which will not overload the analyzer, but is far enough above the noise floor to allow sidebands at least 40 dB below the carrier to be viewed).

Step (2) Set the spectrum analyzer controls as follows:

I.F. bandwidth: 10 kHz
Video filter: OFF or as wide as possible
Scan time: 100 ms./div.

Amplitude scale: 5 dB/div.
Scan width: 10 kHz/div.
Center frequency: 121.5 MHz

Step (3) Record the amplitude in dBm.

Step (4) Calculate the total power output by adding 10 log(D), where D is the modulation duty cycle determined in §2.1513(d) of this part, to the recorded signal level.

Step (5) Set the spectrum analyzer controls as follows:

I.F. bandwidth: 60 Hz or less
Video filter: OFF or as wide as possible
Scan time: 10 sec./div.
Amplitude scale: 5 dB/div.
Scan width: 20 Hz/div.
Center frequency: 121.5 MHz

Step (6) Measure and record the carrier power dBm as displayed on the spectrum analyzer.

Step (7) Calculate the ratio of carrier power to total power from Steps 4 and 6 using the following formula:

$$\frac{\text{carrier power}}{\text{total power}} = \log_{10}{}^{-1}\left[\frac{dB_c - dB_T}{10}\right]$$

dB_C = carrier power in step 6
dB_T = total power in step 4

Step (8) Record instrument settings, sample calculation and the percent of power within ±30 Hz at 121.5 MHz or ±60 Hz at 243 MHz of the carrier frequency.

Step (9) Repeat the above measurement Steps 1 through 8 for 243 MHz. For the higher frequency, the I.F. bandwidth in step 5 must be 120 Hz or less.

(d) *Carrier frequency test.* The setup specified in §2.1515(a) is to be used in measuring the carrier frequency.

Step (1) Activate the EPIRB and locate the 121.5 MHz signal on the spectrum analyzer. Adjust location of receiving antenna and spectrum analyzer controls to obtain a suitable signal level.

Step (2) Set the spectrum analyzer controls as follows:

I.F. bandwidth: 100 Hz
Video filter: OFF or as wide as possible
Scan time: 10 sec./div.
Amplitude scale: 10 dB/div.
Scan width: 20 Hz/div.
Center frequency: 121.5 MHz

Step (3) Combine the output of the signal generator with the EPIRB signal at the input to the spectrum analyzer.

Step (4) Adjust amplitude and frequency of signal generator output to determine center of carrier frequency component.

Step (5) Measure signal generator frequency with frequency counter with accuracy of 5 PPM or better and record as carrier frequency.

Step (6) If applicable, change the type of modulation of the EPIRB and record the shift in carrier frequency as observed on the spectrum analyzer display.

Step (7) Repeat the above measurement Steps 1 through 6 for 243 MHz.

[56 FR 11683, Mar. 20, 1991; 60 FR 47302, Sept. 12, 1995]

Data Recording/Reporting Requirements

§ 2.1517 Data recording/reporting requirements.

The test report for an EPIRB shall contain the following information:

(a) Specific identification, including the FCC ID, model and serial numbers, of the EPIRB under test.

(b) The name and location of the test sites used for the measurements.

(c) A description of the instrumentation and equipment, including antennas, used to perform the tests. For purchased equipment, the type, manufacturer and model number are generally sufficient as a description.

(d) The test results and associated comparative information.

(e) A description of any modifications made to the EUT or other system components during the testing.

(f) A description and justification of all deviations from the procedures described herein.

(g) The name and qualifications of the person responsible for the tests.

(h) The date the tests were performed.

(i) A statement signed by the individual responsible for the test that the EPIRB as tested complies or does not comply with the applicable FCC rules.

(j) A statement signed by the individual responsible, either directly or indirectly, for production or marketing of the device tested that the unit tested is representative of the equipment that all be marketed.

FIGURE 1 TO SUBPART N OF PART 2—MEASUREMENT SITE

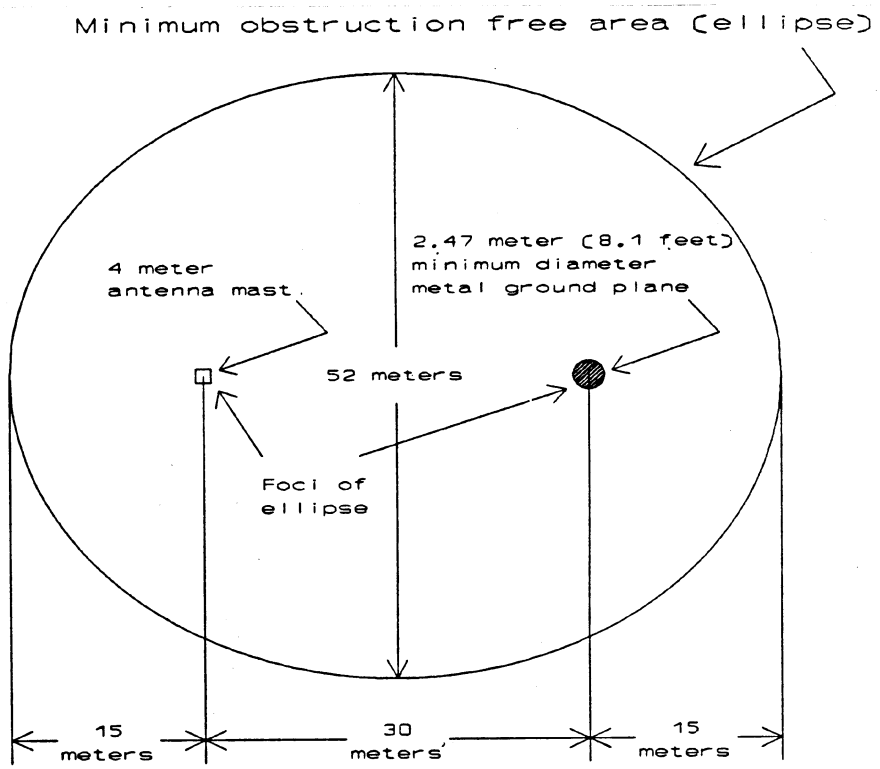
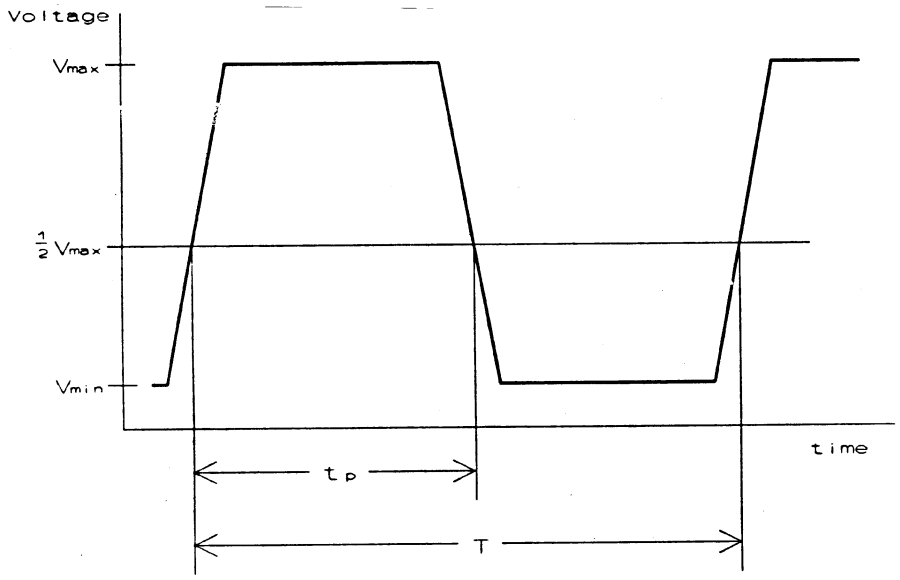


Figure 1 - Measurement Site

FIGURE 2 TO SUBPART N OF PART 2—TYPICAL AUDIO WAVE



Frequency: $f = \frac{1}{T}$

Duty cycle: $D = \frac{t_p}{T}$

Modulation factor: $M = \frac{V_{max} - V_{min}}{V_{max} + V_{min}}$

Figure 2 - Typical Audio Waveform

FIGURE 3 TO SUBPART N OF PART 2—EXAMPLE OF IDEAL EPIRB SPECTRUM

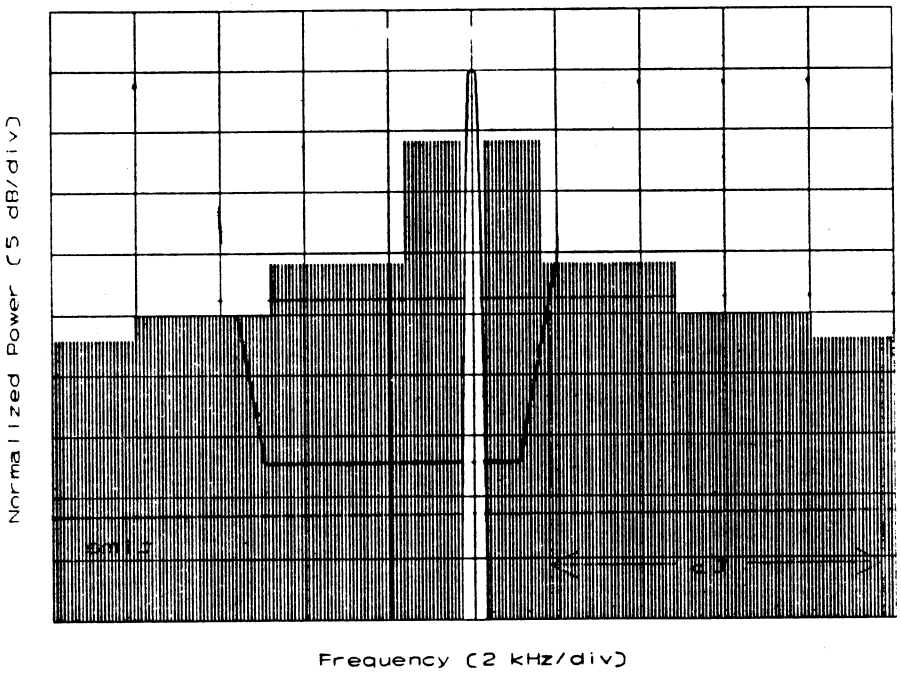


Figure 3 - Example of ideal EPIRB Spectrum

FIGURE 4 TO SUBPART N OF PART 2—EXAMPLE OF EPIRB CARRIER COMPONENT

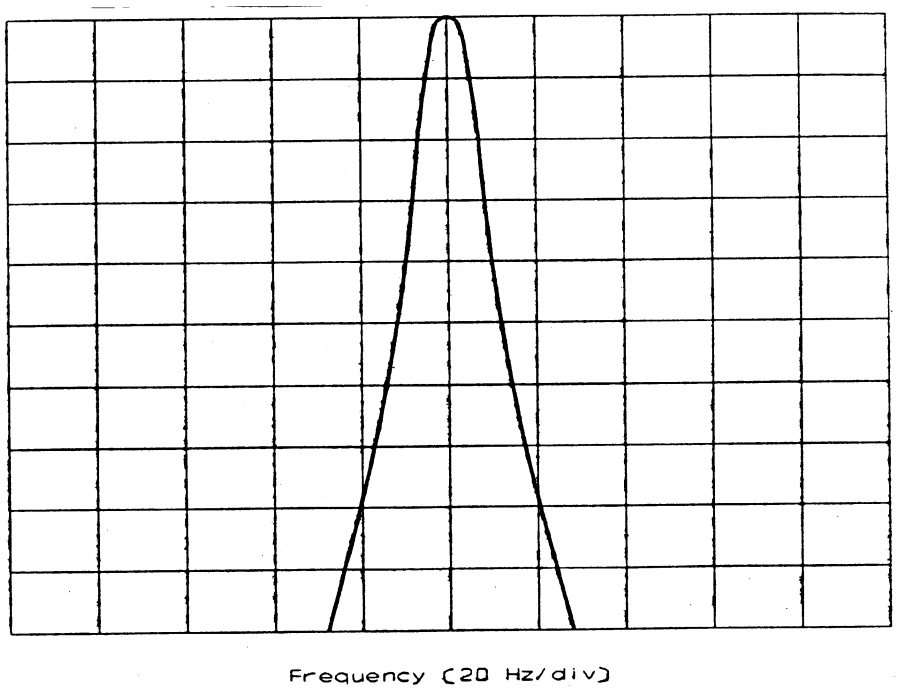


Figure 4 – Example of EPIRB Carrier Component

PART 3—AUTHORIZATION AND ADMINISTRATION OF ACCOUNTING AUTHORITIES IN MARITIME AND MARITIME MOBILE-SATELLITE RADIO SERVICES

GENERAL

Sec.
3.1 Scope, basis, purpose.
3.2 Terms and definitions.

ELIGIBILITY

3.10 Basic qualifications.
3.11 Location of settlement operation.

APPLICATION PROCEDURES

3.20 Application form.
3.21 Order of consideration.
3.22 Number of accounting authority identification codes per applicant.
3.23 Legal applicant.
3.24 Evidence of financial responsibility.
3.25 Number of copies.
3.26 Where application is to be mailed.
3.27 Amended application.
3.28 Denial of privilege.
3.29 Notifications.

SETTLEMENT OPERATIONS

3.40 Operational requirements.
3.41 Amount of time allowed before initial settlements.
3.42 Location of processing facility.
3.43 Applicable rules and regulations.
3.44 Time to achieve settlements.
3.45 Amount of charges.
3.46 Use of gold francs.
3.47 Use of SDRs.
3.48 Cooperation with the Commission.
3.49 Agreement to be audited.
3.50 Retention of settlement records.
3.51 Cessation of operations.
3.52 Complaint/inquiry resolution procedures.
3.53 FCC notification of refusal to provide telecommunications service to U.S. registered vessel(s).
3.54 Notification of change in address.