

## Federal Communications Commission

Pt. 101

incurred in preparing, processing, administering, or coordinating an examination for an amateur operator license.

[66 FR 20752, Apr. 25, 2001]

### APPENDIX 1 TO PART 97—PLACES WHERE THE AMATEUR SERVICE IS REGULATED BY THE FCC

In ITU Region 2, the amateur service is regulated by the FCC within the territorial limits of the 50 United States, District of Columbia, Caribbean Insular areas [Commonwealth of Puerto Rico, United States Virgin Islands (50 islets and cays) and Navassa Island], and Johnston Island (Islets East, Johnston, North and Sand) and Midway Island (Islets Eastern and Sand) in the Pacific Insular areas.

In ITU Region 3, the amateur service is regulated by the FCC within the Pacific Insular territorial limits of American Samoa (seven islands), Baker Island, Commonwealth of Northern Mariana Islands, Guam Island, Howland Island, Jarvis Island, Kingman Reef, Palmyra Island (more than 50 islets) and Wake Island (Islets Peale, Wake and Wilkes).

### APPENDIX 2 TO PART 97—VEC REGIONS

1. Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
2. New Jersey and New York.
3. Delaware, District of Columbia, Maryland and Pennsylvania.
4. Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee and Virginia.
5. Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma and Texas.
6. California.
7. Arizona, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.
8. Michigan, Ohio and West Virginia.
9. Illinois, Indiana and Wisconsin.
10. Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota.
11. Alaska.
12. Caribbean Insular areas.
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AUTHORITY: 47 U.S.C. 154, 303.

SOURCE: 61 FR 26677, May 28, 1996, unless otherwise noted.

### Subpart A—General

#### § 101.1 Scope and authority.

(a) Part 1 of the Commission's rules contains the general rules of practice and procedure applicable to proceedings before the Commission and for the filing of applications for radio station licenses in the fixed microwave services.

(b) The purpose of the rules in this part is to prescribe the manner in which portions of the radio spectrum may be made available for private operational, common carrier, 24 GHz Service and Local Multipoint Distribution Service fixed, microwave operations that require transmitting facilities on land or in specified offshore coastal areas within the continental shelf.

(c) The rules in this part are issued pursuant to the authority contained in Titles I through III of the Communications Act of 1934, as amended, which

vest authority in the Federal Communications Commission to regulate common carriers of interstate and foreign communications, to regulate radio transmissions and issue licenses for radio stations, and to regulate all interstate and foreign communications by wire and radio necessary to the accomplishment of the purposes of the Act.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23163, Apr. 29, 1997; 63 FR 68981, Dec. 14, 1998; 65 FR 59357, Oct. 5, 2000]

### § 101.3 Definitions.

As used in this part:

**24 GHz Service.** A fixed point-to-point, point-to-multipoint, and multipoint-to-multipoint radio system in the 24.25–24.45 GHz band and in the 25.05–25.25 GHz band consisting of a fixed main (nodal) station and a number of fixed user terminals. This service may encompass any digital fixed service.

**Antenna power gain.** The ratio of the maximum radiation intensity to that of an isotropic (omnidirectional) radiator in the far field of its main (forward direction) lobe.

**Antenna power input.** The radio frequency peak or RMS power, as the case may be, supplied to the antenna from the antenna transmission line and its associated impedance matching network.

**Antenna structure.** The antenna, its supporting structure and anything attached to it.

**Assigned frequency.** The center of the frequency band assigned to a station.

**Assigned frequency bandwidth.** 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.

**Authorized bandwidth.** The maximum bandwidth authorized to be used by a station as specified in the station license. (See § 2.202 of this chapter)

**Authorized frequency.** The frequency, or frequency range, assigned to a station by the Commission and specified in the instrument of authorization.

**Authorized power.** The maximum power a station is permitted to use. This power is specified by the Commission in the station's authorization.

**Automatic Transmitter Power Control (ATPC).** ATPC is a feature of a digital microwave radio system that adjusts the transmitter output power. ATPC allows the transmitter to operate at less than maximum power for most of the time. In a radio employing ATPC, the transmit power is reduced during normal operation conditions. When the receiver detects a reduction in signal level, a control signal is sent to the far end transmitter, instructing it to increase the power output to compensate for the signal reduction. The power output is limited to the licensed (maximum) transmit power. Guidelines for use of ATPC are set forth in the TIA Telecommunications Systems Bulletin TSB 10, "Interference Criteria for Microwave Systems (TSB 10)."

**Bandwidth occupied by an emission.** The band of frequencies comprising 99 percent of the total radiated power extended to include any discrete frequency on which the power is at least 0.25 percent of the total radiated power.

**Bit rate.** The rate of transmission of information in binary (two state) form in bits per unit time.

**Carrier.** In a frequency stabilized system, the sinusoidal component of a modulated wave whose frequency is independent of the modulating wave; or the output of a transmitter when the modulating wave is made zero; or a wave generated at a point in the transmitting system and subsequently modulated by the signal; or a wave generated locally at the receiving terminal which when combined with the side bands in a suitable detector, produces the modulating wave.

**Carrier frequency.** The output of a transmitter when the modulating wave is made zero.

**Central office.** A landline termination center used for switching and interconnection of public message communication circuits.

**Common carrier fixed point-to-point microwave service.** A common carrier public radio service rendered on microwave frequencies by fixed and temporary fixed stations between points that lie within the United States or between points to its possessions or to points in Canada or Mexico.

*Communication common carrier.* Any person engaged in rendering communication service for hire to the public.

*Contiguous United States.* For the 3700–4200 MHz band, the contiguous United States consists of the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline (see §27.6(m) of this chapter). In this context, the rest of the United States includes the Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam–Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico PEAs (Nos. 42, 212, 264, 298, 360, 412–416).

*Control point.* An operating position at which an operator responsible for the operation of the transmitter is stationed and which is under the control and supervision of the licensee.

*Control station.* A fixed station, the transmissions of which are used to control automatically the emissions or operations of a radio station, or a remote base station transmitter.

*Coordination area.* The area associated with a station outside of which another station sharing the same or adjacent frequency band neither causes nor is subject to interfering emissions greater than a permissible level.

*Coordination contour.* The line enclosing the coordination area.

*Coordination distance.* The distance on a given azimuth from a station beyond which another station neither causes nor is subject to interfering emissions greater than a permissible level.

*Digital Electronic Message Nodal Station.* A fixed point-to-multipoint radio station in a Digital Electronic Message Service providing two-way communication with Digital Electronic Message User Stations.

*Digital Electronic Message Service.* A two-way end-to-end fixed radio service utilizing digital termination systems for the exchange of digital information in the frequency bands 10,550–10,680 MHz, 18,820–18,920 MHz, and 19,160–19,260 MHz. This service may also make use of point-to-point microwave facilities, satellite facilities or other communications media to interconnect digital ter-

mination systems to comprise a network.

*Digital Electronic Message User Station.* Any one of the fixed microwave radio stations located at users' premises, lying within the coverage area of a Digital Electronic Message Nodal Station, and providing two-way digital communications with the Digital Electronic Message Nodal Station.

*Digital modulation.* The process by which some characteristic (frequency, phase, amplitude or combinations thereof) of a carrier frequency is varied in accordance with a digital signal, e.g., one consisting of coded pulses or states.

*Drop point.* A term used in the point-to-point microwave radio service to designate a terminal point where service is rendered to a subscriber.

*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.

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

*Equivalent Isotropically Radiated Power (EIRP).* The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

*Exchange.* A unit of a communication company or companies for the administration of communication service in a specified area, which usually embraces a city, town, or village and its environs, and consisting of one or more central offices, together with the associated plant, used in furnishing communication service in that area.

*Exchange area.* The geographic area included within the boundaries of an exchange.

*Fixed satellite earth station.* An earth station intended to be used at a specified fixed point.

*Fixed relay station.* A fixed station associated with one or more stations, established to receive radio signals directed to it and to retransmit them

automatically on a fixed service frequency.

*Fixed service.* A radio communications service between specified fixed points.

*Fixed station.* A station in the fixed service.

*Frequency tolerance.* The maximum permissible departure by the center 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 as a percentage or in Hertz.

*General communication.* Two-way voice communication, through a base station, between:

(1) A common carrier land mobile or airborne station and a landline telephone station connected to a public message landline telephone system;

(2) Two common carrier land mobile stations;

(3) Two common carrier airborne stations;

(4) A common carrier land mobile station and a common carrier airborne station.

*Harmful interference.* Interference that 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 these regulations.

*Internodal link.* A point-to-point communications link used to provide communications between nodal stations or to interconnect nodal stations to other communications media.

*Landing area.* A landing area means any locality, either of land or water, including airports and intermediate landing fields, which is used, or approved for use for the landing and take-off of aircraft, whether or not facilities are provided for the shelter, servicing, or repair of aircraft, or for receiving or discharging passengers or cargo.

*Local Multipoint Distribution Service Backbone Link.* A point-to-point radio service link in a Local Multipoint Distribution Service System that is used to interconnect Local Multipoint Distribution Service Hub Stations with each other or with the public switched telephone network.

*Local Multipoint Distribution Service Hub Station.* A fixed point-to-point or point-to-multipoint radio station in a Local Multipoint Distribution Service System that provides one-way or two-way communication with Local Multipoint Distribution Service Subscriber Stations.

*Local Multipoint Distribution Service Subscriber Station.* Any one of the fixed microwave radio stations located at users' premises, lying within the coverage area of a Local Multipoint Distribution Service Hub Station, capable of receiving one-way communications from or providing two-way communications with the Local Multipoint Distribution Service Hub Station.

*Local Multipoint Distribution Service System.* A fixed point-to-point or point-to-multipoint radio system consisting of Local Multipoint Distribution Service Hub Stations and their associated Local Multipoint Distribution Service Subscriber Stations.

*Local television transmission service.* A public radio communication service for the transmission of television material and related communications.

*Long haul system.* A microwave system licensed under this part in which the longest radio circuit of tandem radio paths exceeds 402 kilometers.

*Master station.* A station in a multiple address radio system that controls, activates or interrogates four or more remote stations. Master stations performing such functions may also receive transmissions from remote stations.

*Message center.* The point at which messages from members of the public are accepted by the carrier for transmission to the addressee.

*Microwave frequencies.* As used in this part, this term refers to frequencies of 890 MHz and above.

*Microwave link.* A link is defined as a simplex communications circuit between two points utilizing a single frequency/polarization assignment. A duplex communications circuit would require two links, one link in each direction.

*Miscellaneous common carriers.* Communications common carriers that are not engaged in the business of providing either a public landline message

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telephone service or public message telegraph service.

*Mobile earth station.* An earth station intended to be used while in motion or during halts at unspecified points.

*Mobile service.* A radio communication service between mobile and land stations or between mobile stations.

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

*Multichannel Video Distribution and Data Service (MVDDS).* A fixed microwave service licensed in the 12.2–12.7 GHz band that provides various wireless services. Mobile and aeronautical operations are prohibited.

*Multiple address system (MAS).* A point-to-multipoint or point-to-point radio communications system used for either one-way or two-way transmissions that operates in the 928/952/956 MHz, the 928/959 MHz or the 932/941 MHz bands in accordance with §101.147.

*National Spatial Reference System.* The National Spatial Reference System (NSRS) is the name given to all Geodetic Control information contained in the National Geodetic Survey (NGS) Data Base. This includes: A, B, First, Second, and Third Order horizontal and vertical control observed by NGS as well as data submitted by other agencies (i.e., USGS, BLM, States, Counties, Cities, and private surveying organizations).

*Necessary bandwidth.* For a given class of emission, the width of the frequency band that is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions. The necessary bandwidth may be calculated using the formulas in §2.202 of this chapter.

*Nodal station.* The central or controlling stations in a microwave radio system operating on point-to-multipoint or multipoint-to-multipoint frequencies with one or more user stations or internodal links.

*Occupied bandwidth.* The width of a frequency bandwidth such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage,  $B/2$  of the total mean power of a given emission. Unless otherwise

specified by the CCIR for the appropriate class of emission, the value of  $B/2$  should be taken as 0.5%.

NOTE: The percentage of the total power outside the occupied bandwidth is represented by  $B$ .

*Operational fixed station.* A private fixed station not open to public correspondence.

*Passive repeater.* A re-radiation device associated with a transmitting/receiving antenna system that re-directs intercepted radiofrequency energy. For example, it may consist of reflector(s) or back-to-back parabolic or horn antennas.

*Path length.* The total distance of a path from the transmit to the receive antenna, inclusive of all passive repeaters, if any.

*Payload capacity.* The bit rate available for transmission of data over a radiocommunication system, excluding overhead data generated by the system.

*Periscope antenna system.* An antenna system which involves the use of a passive reflector to deflect radiation from or to a directional transmitting or receiving antenna which is oriented vertically or near vertically.

*Prior coordination.* A bilateral process conducted prior to filing applications which includes the distribution of the technical parameters of a proposed radio system to potentially affected parties for their evaluation and timely response.

*Private carrier.* An entity licensed in the private service and authorized to provide communications service to other private service eligibles on a commercial basis.

*Private line service.* A service whereby facilities for communication between two or more designated points are set aside for the exclusive use or availability for use of a particular customer and authorized users during stated periods of time.

*Private operational fixed point-to-point microwave service.* A private radio service rendered by fixed and temporary fixed stations on microwave frequencies for the exclusive use or availability for use of the licensee or other eligible entities for communication between two or more designated points. Service may be provided between

points within the United States, points within United States possessions, or between the United States and points in Canada or Mexico.

*Public correspondence.* Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission.

*Public message service.* A service whereby facilities are offered to the public for communication between all points served by a carrier or by interconnected carriers on a non-exclusive message by message basis, contemplating a separate connection for each occasion of use.

*Radio station.* A separate transmitter or a group of transmitters under simultaneous common control, including the accessory equipment required for carrying on a radiocommunication service.

*Radiocommunication.* Telecommunication by means of radio waves.

*Rated power output.* The maximum radio frequency power output capability (peak or average power) of a transmitter, under optimum conditions of adjustment and operation, specified by its manufacturer.

*Record communication.* Any transmission of intelligence which is reduced to visual record form at the point of reception.

*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.

*Relay station.* A fixed station used for the reception and retransmission of the signals of another station or stations.

*Remote station.* A fixed station in a multiple address radio system that transmits one-way to one or more central receive sites, controls a master station, or is controlled, activated or interrogated by, and may respond to, a master station.

*Repeater station.* A fixed station established for the automatic retransmission of radiocommunications received from one or more mobile sta-

tions and directed to a specified location; for public mobile radio operations, a fixed station that automatically retransmits the mobile communications and/or transmitter information about the base station, along a fixed point-to-point link between the base station and the central station.

*Secondary operations.* Radio communications which may not cause interference to operations authorized on a primary basis and which are not protected from interference from these primary operations.

*Short haul system.* A microwave system licensed under this part in which the longest radio circuit of tandem radio paths does not exceed 402 kilometers.

*Signal booster.* A device at a fixed location which automatically receives, amplifies, and retransmits on a one-way or two-way basis, the signals received from base, fixed, mobile, and portable stations, with no change in frequency or authorized bandwidth. A signal booster may be either narrowband (Class A), in which case the booster amplifies only those discrete frequencies intended to be retransmitted, or broadband (Class B), in which case all signals within the passband of the signal booster filter are amplified.

*Signaling communication.* One-way communications from a base station to a mobile or fixed receiver, or to multipoint mobile or fixed receivers by audible or subaudible means, for the purpose of actuating a signaling device in the receiver(s) or communicating information to the receiver(s), whether or not the information is to be retained in record form.

*Standby transmitter.* A transmitter installed and maintained for use in lieu of the main transmitter only during periods when the main transmitter is out of service for maintenance or repair.

*Symbol rate.* Modulation rate in bauds. This rate may be higher than the transmitted bit rate as in the case of coded pulses or lower as in the case of multilevel transmission.

*Telegraphy.* A form of telecommunication which is concerned in any process providing transmission and reproduction at a distance of documentary

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matter, such as written or printed matter or fixed images, or the reproduction at a distance of any kind of information in such a form. Unless otherwise specified, telegraphy means a form of telecommunication for the transmission of written matter by the use of signal code.

*Telemetry.* The use of telecommunication for automatic indicating or recording measurements at a distance from the measuring instrument.

*Telephony.* A form of telecommunication set up for the transmission of speech, or in some cases, other sounds.

*Television.* A form of telecommunication for transmission of transient images of fixed or moving objects.

*Temporary fixed station.* A station established in a non-permanent mode (temporary) at a specified location for a short period of time, ranging up to one year. Temporary-fixed operations are itinerant in nature, and are not to be confused with mobile-type operations.

*Universal Licensing System (ULS).* The consolidated database, application filing system and processing system for all Wireless Telecommunications Services. The ULS offers Wireless Telecommunications Bureau (WTB) applicants and the general public electronic filing of all applications requests, and full public access to all WTB licensing data.

*User or subscriber station.* The station(s) in a microwave radio system operating at the users' premises on point-to-multipoint or multipoint-to-multipoint frequencies and communicating with one or more nodal stations.

*Video entertainment material.* The transmission of a video signal (e.g., United States Standard Monochrome or National Television Systems Committee 525-line television) and an associated audio signal which is designed primarily to amuse or entertain, such as movies and games.

[61 FR 26677, May 28, 1996, as amended at 61 FR 29693, June 12, 1996; 61 FR 31052, June 19, 1996; 61 FR 44181, Aug. 28, 1996; 62 FR 23163, Apr. 29, 1997; 63 FR 68981, Dec. 14, 1998; 65 FR 17448, Apr. 3, 2000; 65 FR 38326, June 20, 2000; 65 FR 59357, Oct. 5, 2000; 67 FR 43037, June 26, 2002; 68 FR 4955, Jan. 31, 2003; 77 FR 54432, Sept. 5, 2012; 85 FR 22889, Apr. 23, 2020]

## Subpart B—Applications and Licenses

### GENERAL FILING REQUIREMENTS

#### § 101.4 Transition plan.

(a) All systems subject to parts 21 and 94 of this chapter in effect as of July 31, 1996, which are licensed or which are proposed in an application on file, as of July 31, 1996, are subject to the requirements under part 21 or part 94 of this chapter as contained in the CFR edition revised as of October 1, 1995 and amended in the FEDERAL REGISTER through July 31, 1996, as applicable, indefinitely.

(b) For purposes of this section, a “system” shall include:

- (1) The originally licensed system;
- (2) Any modification to the original system involving a change in antenna azimuth, antenna beam width, channel loading, emission, station location, antenna height, authorized power, or authorized frequencies;
- (3) Additional links constructed to complete an integrated communications network; or
- (4) Operationally connecting new facilities and/or frequencies.

(c) All radio frequency devices authorized pursuant to part 2 of this chapter as being in compliance with applicable part 21 or part 94 of this chapter in effect as of July 31, 1996, requirements can be used indefinitely with systems licensed under this part 101.

[61 FR 26677, May 28, 1996, as amended at 65 FR 38326, June 20, 2000]

#### § 101.5 Station authorization required.

(a) [Reserved]

(b) A separate application form must be filed electronically via ULS for each Digital Electronic Message Service (DEMS) Nodal Station. No license is required for a DEMS User Station or for a Multiple Address System (MAS) remote or mobile station. Authority for a DEMS Nodal Station licensee to serve a specific number of user stations or be licensed in the name of the carrier must be requested on FCC Form 601 filed for the DEMS Nodal Station. Authority for any number of MAS remotes and authority to serve MAS

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mobiles (to the extent this part permits such operation) within a specified area will be included in the authority for the MAS fixed master stations.

(c) [Reserved]

(d) For stations authorized under subpart H (Private Operational Fixed Point-to-Point Microwave Service), subpart I (Common Carrier Fixed Point-to-Point Microwave Service), and subpart L of this part (Local Multipoint Distribution Service), construction of new or modified stations may be initiated prior to grant of an authorization. As a condition to commencing construction under this paragraph (d), the Commission may, at any time and without hearing or notice, prohibit such construction for any reason. Any construction conducted under this paragraph is at the applicant's sole risk.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23164, Apr. 29, 1997; 63 FR 68981, Dec. 14, 1998; 68 FR 4955, Jan. 31, 2003]

### § 101.7 Eligibility for station license.

(a) A station license may not be granted to or held by a foreign government or by a representative of a foreign government.

(b) In the Common Carrier service, a station license may not be granted or held by:

(1) Any alien or the representative of any alien;

(2) Any corporation organized under the laws of any foreign government;

(3) Any corporation of which more than one-fifth of the capital stock is owned of record or voted by: Aliens or their representatives; a foreign government or representatives thereof; or any corporation organized under the laws of a foreign country; or

(4) Any corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens or their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign government, if the Commission finds that the public interest will be served by the refusal or revocation of such license.

[61 FR 26677, May 28, 1996, as amended at 61 FR 55581, Oct. 28, 1996]

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### § 101.17 [Reserved]

### § 101.21 Technical content of applications.

Applications, except FCC Form 175, must contain all technical information required by the application form and any additional information necessary to fully describe the proposed facilities and to demonstrate compliance with all technical requirements of the rules governing the radio service involved (see subparts C, F, G, I, J, and L of this part, as appropriate). The following paragraphs describe a number of technical requirements.

(a)–(d) [Reserved]

(e) Each application in the Private Operational Fixed Point-to-Point Microwave Service and the Common Carrier Fixed Point-to-Point Microwave Service must include the following information:

Applicant's name and address.

Transmitting station name.

Transmitting station coordinates.

Frequencies and polarizations to be added, changed or deleted.

Transmitting equipment, its stability, effective isotropic radiated power, emission designator, and type of modulation (digital).

Transmitting antenna(s), model, gain, and, if required, a radiation pattern provided or certified by the manufacturer.

Transmitting antenna center line height(s) above ground level and ground elevation above mean sea level.

Receiving station name.

Receiving station coordinates.

Receiving antenna(s), model, gain, and, if required, a radiation pattern provided or certified by the manufacturer.

Receiving antenna center line height(s) above ground level and ground elevation above mean sea level.

Path azimuth and distance.

NOTE: The position location of antenna sites shall be determined to an accuracy of no less than  $\pm 1$  second in the horizontal dimensions (latitude and longitude) and  $\pm 1$  meter in the vertical dimension (ground elevation) with respect to the National Spatial Reference System.

(f) All applicants for regular authorization must, before filing an application, major amendments to a pending application, or modifications to a license, prior coordinate the proposed frequency usage with existing users in

the area and other applicants with previously filed applications in accordance with the procedures in §101.103. In those frequency bands shared with the communication-satellite service, an applicant for a new station, for new points of communication, for the initial frequency assignment in a shared band for which coordination has not been previously effected, or for authority to modify the emission or radiation characteristics of an existing station in a manner that may increase the likelihood of harmful interference, must ascertain in advance whether the station(s) involved lie within the great circle coordination distance contours of an existing Earth station or one for which an application has been accepted for filing, and must coordinate his proposal with each such Earth station operator or applicant. For each potential interference path, the applicant must perform the computations required to determine that the expected level of interference to or from the terrestrial station does not exceed the maximum permissible interference power level in accordance with the technical standards and requirements of §25.251 of this chapter. The Commission may, in the course of examining any application, require the submission of additional showings, complete with pertinent data and calculations in accordance with part 25 of this chapter, showing that harmful interference will not likely result from the proposed operation. (Technical characteristics of the Earth stations on file and coordination contour maps for those Earth stations will be kept on file for public inspection in the offices of the Commission's Space Bureau in Washington, DC.)

(g) Each application in the Local Multipoint Distribution Service and 24 GHz Service must contain all technical information required by FCC Form 601 and any other applicable form or associated Public Notices and by any applicable rules in this part.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23164, Apr. 29, 1997; 63 FR 68981, Dec. 14, 1998; 65 FR 38327, June 20, 2000; 65 FR 59357, Oct. 5, 2000; 78 FR 25176, Apr. 29, 2013; 88 FR 21451, Apr. 10, 2023]

#### § 101.23 Waiver of rules.

Waiver of these rules may be granted upon application or on the Commission's own motion in accordance with §1.925 of this chapter.

[63 FR 68981, Dec. 14, 1998]

#### § 101.31 Temporary and conditional authorizations.

(a) *Operation at temporary locations.*

(1) Authorizations may be issued upon proper application for rendition of temporary service to subscribers under the following conditions:

(i) When a fixed station, authorized to operate at temporary locations, is to remain at a single location for more than 6 months, an application for a station authorization designating that single location as the permanent location shall be filed at least 90 days prior to the expiration of the 6 month period;

(ii) The station shall be used only for rendition of communication service at a remote point where the provision of wire facilities is not practicable within the required time frame; and

(iii) The antenna structure height employed at any location shall not exceed the criteria set forth in §17.7 of this chapter unless, in each instance, authorization for use of a specific maximum antenna structure height for each location has been obtained from the Commission prior to erection of the antenna. See §101.125.

(2) Applications for authorizations to operate stations at temporary locations under the provisions of this section shall be made upon FCC Form 601. Blanket applications may be submitted for the required number of transmitters. An application for authority to operate a fixed station at temporary locations must specify the precise geographic area within which the operation will be confined. The area specified must be defined as a radius of operation about a specific coordinate (latitude/longitude), or as a county, or as a State. Exception to this specific requirement may be made for exceptionally large areas, such as the continental United States. Sufficient data must be submitted to show the need for the proposed area of operation.

(3) Operations in the 17.8–19.7 GHz band for any services and in the 17.7–

17.8 GHz band for MVPD operations are prohibited in the areas defined in §1.924 of this chapter. Operations proposed in the areas defined in §1.924 of this chapter may not commence without prior specific notification to, and authorization from, the Commission.

(b) *Conditional authorization.* (1) An applicant for a new point-to-point microwave radio station(s) or a modification of an existing station(s) in the 952.95–956.15 and 956.55–959.75 MHz band segments; the 3700–4200, 5925–6425, 6525–6875, and 6875–7125 MHz bands; the 10.550–10.680, 10.700–11.700, 12.700–13.150, 13.200–13.250, 17.700–18.300, and 19.300–19.700 GHz bands; and the 21.800–22.000 and 23.000–23.200 GHz band segments (see §101.147(s)(8) for specific service usage) may operate the proposed station(s) during the pendency of its applications(s) upon the filing of a properly completed formal application(s) that complies with subpart B of this part, if the applicant certifies that the following conditions are satisfied:

(i) The frequency coordination procedures of §101.103 have been successfully completed;

(ii) The antenna structure(s) has been previously studied by the Federal Aviation Administration and determined to

pose no hazard to aviation safety as required by subpart B of part 17 of this chapter; or the antenna or tower structure does not exceed 6.1 meters above ground level or above an existing man-made structure (other than an antenna structure), if the antenna or tower has not been previously studied by the Federal Aviation Administration and cleared by the FCC;

(iii) The grant of the application(s) does not require a waiver of the Commission's rules;

(iv) The applicant has determined that the facility(ies) will not significantly affect the environment as defined in §1.1307 of this chapter;

(v) The station site does not lie within 56.3 kilometers of any international border, within areas identified in §§1.924(a) through (d) of this chapter unless the affected entity consents in writing to conditional operation or, if for any services on frequencies in the 17.8–19.7 GHz band and for MVPD operations in the 17.7–17.8 GHz band, within any of the areas identified in §1.924 of this chapter;

(vi) If operated on frequencies in the 10.6–10.68 GHz band, the station site does not lie within any of the following regions:

| Name of region                   | Dimensions = radius in kilometers | Center-point          |
|----------------------------------|-----------------------------------|-----------------------|
| Kitt Peak, Arizona .....         | 60                                | N31–57–22; W111–36–42 |
| Big Pine, California .....       | 60                                | N37–13–54; W118–16–34 |
| Vandenberg AFB, California ..... | 75                                | N34–43–00; W120–34–00 |
| Denver, Colorado .....           | 150                               | N39–43–00; W104–46–00 |
| Washington, DC .....             | 150                               | N38–48–00; W76–52–00  |
| Eglin AFB, Florida .....         | 50                                | N30–29–00; W86–32–00  |
| Mauna Kea, Hawaii .....          | 60                                | N19–48–16; W155–27–29 |
| North Liberty, Iowa .....        | 60                                | N41–46–17; W91–34–26  |
| Maryland Point, Maryland .....   | 60                                | N38–22–26; W77–14–00  |
| Hancock, New Hampshire .....     | 60                                | N42–56–01; W71–59–12  |
| Los Alamos, New Mexico .....     | 60                                | N35–46–30; W106–14–42 |
| Pie Town, New Mexico .....       | 60                                | N34–18–04; W108–07–07 |
| Socorro, New Mexico .....        | 160                               | N34–04–43; W107–37–04 |
| WSMR, New Mexico .....           | 75                                | N32–23–00; W106–29–00 |
| Minot AFB, North Dakota .....    | 80                                | N48–15–00; W101–17–00 |
| Arecibo, Puerto Rico .....       | 160                               | N18–20–37; W66–45–11  |
| Fort Davis, Texas .....          | 60                                | N30–38–06; W103–56–39 |
| St. Croix, Virgin Islands .....  | 60                                | N17–45–31; W64–35–03  |
| Brewster, Washington .....       | 60                                | N48–07–53; W119–40–55 |
| Green Bank, West Virginia .....  | 160                               | N38–25–59; W79–50–24  |

Note: Coordinates are referenced to North American Datum 1983 (NAD83).

(vii) With respect to the 21.8–22.1 GHz and 23.0–23.3 GHz band, the filed application(s) does not propose to operate on a frequency pair centered on other than 21.825/23.025 GHz, 21.875/23.075 GHz,

21.925/23.125 GHz, 21.975/23.175 GHz, 22.025/23.225 GHz or 22.075/23.275 GHz and does not propose to operate with an E.I.R.P. greater than 55 dBm. The center frequencies are shifted from the

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center frequencies listed above for certain bandwidths as follows: add 0.005 GHz for 20 MHz bandwidth channels, add 0.010 GHz for 30 megahertz bandwidth channels, and subtract 0.005 GHz for 40 MHz bandwidth channels. *See* specific channel listings in §101.147(s).

(viii) The filed application(s) is consistent with the proposal that was coordinated pursuant to §101.103.

(2) Conditional authority ceases immediately if the application(s) is returned by the Commission because it is not acceptable for filing.

(3) Conditional authorization does not prejudice any action the Commission may take on the subject application(s). Conditional authority is accepted with the express understanding that such authority may be modified or cancelled by the Commission at any time without hearing if, in the Commission's discretion, the need for such action arises. An applicant operating pursuant to this conditional authority assumes all risks associated with such operation, the termination or modification of the conditional authority, or the subsequent dismissal or denial of its applications(s).

[61 FR 26677, May 28, 1996, as amended at 62 FR 55538, Oct. 27, 1997; 63 FR 10779, Mar. 5, 1998; 63 FR 68981, Dec. 14, 1998; 65 FR 38327, June 20, 2000; 68 FR 4955, Jan. 31, 2003; 69 FR 17959, Apr. 6, 2004; 71 FR 69048, Nov. 29, 2006; 75 FR 41771, July 19, 2010; 76 FR 59571, Sept. 27, 2011; 80 FR 38912, July 7, 2015]

### PROCESSING OF APPLICATIONS

#### § 101.45 Mutually exclusive applications.

(a) The Commission will consider applications to be mutually exclusive if their conflicts are such that the grant of one application would effectively preclude by reason of harmful electrical interference, or other practical reason, the grant of one or more of the other applications. The Commission will presume "harmful electrical interference" exists when the levels of §101.105 are exceeded, or when there is a material impairment to service rendered to the public despite full cooperation in good faith by all applicants or parties to achieve reasonable technical adjustments which would avoid electrical conflict.

(b) A common carrier application, except in the Local Multipoint Distribution Service and in the 24 GHz Service, will be entitled to comparative consideration with one or more conflicting applications only if:

(1) The application is mutually exclusive with the other application; and

(2) The application is received by the Commission in a condition acceptable for filing by whichever "cut-off" date is earlier:

(i) Sixty (60) days after the date of the public notice listing the first of the conflicting applications as accepted for filing; or

(ii) One (1) business day preceding the day on which the Commission takes final action on the previously filed application (should the Commission act upon such application in the interval between thirty (30) and sixty (60) days after the date of its public notice).

(c) Whenever three or more applications are mutually exclusive, but not uniformly so, the earliest filed application established the date prescribed in paragraph (b)(2) of this section, regardless of whether or not subsequently filed applications are directly mutually exclusive with the first filed application. (For example, applications A, B, and C are filed in that order. A and B are directly mutually exclusive, B and C are directly mutually exclusive. In order to be considered comparatively with B, C must be filed within the "cut-off" period established by A even though C is not directly mutually exclusive with A.)

(d) Private operational fixed point-to-point microwave applications for authorization under this part will be entitled to comparative consideration with one or more conflicting applications in accordance with the provisions of §1.227(b)(4) of this chapter.

(e) An application otherwise mutually exclusive with one or more previously filed applications, but filed after the appropriate date prescribed in paragraphs (b) or (d) of this section, will be returned without prejudice and will be eligible for refiling only after final action is taken by the Commission with respect to the previously filed application (or applications).

(f) For purposes of this section, any application (whether mutually exclusive or not) will be considered to be a newly filed application if it is amended by a major amendment (as defined by § 1.929 of this chapter), except under any of the following circumstances:

(1) The application has been designated for comparative hearing, or for comparative evaluation (pursuant to § 101.51 of this part), and the Commission or the presiding officer accepts the amendment pursuant to § 1.927 of this chapter;

(2) The amendment resolves frequency conflicts with authorized stations or other pending applications which would otherwise require resolution by hearing or by comparative evaluation pursuant to § 101.51 provided that the amendment does not create new or additional frequency conflicts;

(3) The amendment reflects only a change in ownership or control found by the Commission to be in the public interest, and for which a requested exemption from the “cut-off” requirements of this section is granted;

(4) The amendment reflects only a change in ownership or control which results from an agreement under § 1.935 of this chapter whereby two or more applicants entitled to comparative consideration of their applications join in one (or more) of the existing applications and request dismissal of their other application (or applications) to avoid the delay and cost of comparative consideration;

(5) The amendment corrects typographical, transcription, or similar clerical errors which are clearly demonstrated to be mistakes by reference to other parts of the application, and whose discovery does not create new or increased frequency conflicts; or

(6) The amendment does not create new or increased frequency conflicts, and is demonstrably necessitated by events which the applicant could not have reasonably foreseen at the time of filing, such as, for example:

(i) The loss of a transmitter or receiver site by condemnation, natural causes, or loss of lease or option;

(ii) Obstruction of a proposed transmission path caused by the erection of a new building or other structure; or

(iii) The discontinuance or substantial technological obsolescence of specified equipment, whenever the application has been pending before the Commission for two or more years from the date of its filing.

(g) Applicants for the 932.5–935/941.5–944 MHz bands shall select a frequency pair. Applicants for these bands may select an unpaired frequency only upon a showing that spectrum efficiency will not be impaired and that unpaired spectrum is not available in other bands. During the initial filing window, frequency coordination is not required, except that an application for a frequency in the 942–944 MHz band must be coordinated to ensure that it does not affect an existing broadcast auxiliary service licensee. After the initial filing window, an applicant must submit evidence that frequency coordination has been performed with all licensees affected by the application. All frequency coordination must be performed in accordance with § 101.103. In the event of mutually exclusive applications occurring during the initial filing window for the 932.5–935/941.5–944 MHz bands, applicants shall be given the opportunity to resolve these situations by applying for an alternative frequency pair, if one is available. To the extent that there are no other available frequencies or to the extent that mutually exclusive applications remain after this process is concluded, lotteries shall be conducted for each frequency pair among all remaining mutually exclusive applications, assuming appropriate coordination with existing broadcast auxiliary stations can be concluded, where necessary. In the event of mutually exclusive applications being received for these bands on the same day after the initial filing window has closed and a subsequent filing window opened, lotteries shall be conducted for each frequency pair among all mutually exclusive applications.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23164, Apr. 29, 1997; 62 FR 24582, May 6, 1997; 63 FR 6103, Feb. 6, 1998; 63 FR 68982, Dec. 14, 1998; 65 FR 59357, Oct. 5, 2000]

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### § 101.51 Comparative evaluation of mutually exclusive applications.

(a) In order to expedite action on mutually exclusive applications in services under this rules part where neither competitive bidding nor the random selection processes apply, the applicants may request the Commission to consider their applications without a formal hearing in accordance with the summary procedure outlined in paragraph (b) in this section if:

(1) The applications are entitled to comparative consideration pursuant to § 101.45;

(2) The applications have not been designated for formal evidentiary hearing; and

(3) The Commission determines, initially or at any time during the procedure outline in paragraph (b) of this section, that such procedure is appropriate, and that, from the information submitted and consideration of such other matters as may be officially noticed, there are no substantial and material questions of fact, presented (Other than those relating to the comparative merits of the applications) which would preclude a grant under § 1.915 of this chapter.

(b) Provided that the conditions of paragraph (a) of this section are satisfied, applicants may request the Commission to act upon their mutually exclusive applications without a formal hearing pursuant to the summary procedure outlined below:

(1) To initiate the procedure, each applicant will submit to the Commission a written statement containing:

(i) A waiver of the applicant's right to a formal hearing;

(ii) A request and agreement that, in order to avoid the delay and expense of a comparative formal hearing, the Commission should exercise its judgment to select from among the mutually exclusive applications that proposal (or proposals) which would best serve the public interest; and

(iii) The signature of a principal (and the principal's attorney if represented).

(2) After receipt of the written requests of all of the applicants the Commission (if it deems this procedure appropriate) will issue a notice designating the comparative criteria upon which the applications are to be evalu-

ated and will request each applicant to submit, within a specified period of time, additional information concerning the applicant's proposal relative to the comparative criteria.

(3) Within thirty (30) days following the due date for filing this information, the Commission will accept concise and factual argument on the competing proposals from the rival applicants, potential customers, and other knowledgeable parties in interest.

(4) Within fifteen (15) days following the due date for the filing of comments, the Commission will accept concise and factual replies from the rival applicants.

(5) From time to time during the course of this procedure the Commission may request additional information from the applicants and hold informal conferences at which all competing applicants will have the right to be represented.

(6) Upon evaluation of the applications, the information submitted, and such other matters as may be officially noticed the Commission will issue a decision granting one (or more) of the proposals which it concludes would best serve the public interest, convenience and necessity. The decision will report briefly and concisely the reasons for the Commission's selection and will deny the other application(s). This decision will be considered final.

[61 FR 26677, May 28, 1996, as amended at 63 FR 6104, Feb. 6, 1998; 63 FR 68982, Dec. 14, 1998]

### LICENSE TRANSFERS, MODIFICATIONS, CONDITIONS AND FORFEITURES

### § 101.55 Considerations involving transfer or assignment applications.

(a) Except as provided for in paragraph (d) of this section, licenses not authorized pursuant to competitive bidding procedures may not be assigned or transferred prior to the completion of construction of the facility.

(b) [Reserved]

(c) At its discretion, the Commission may require the submission of an affirmative, factual showing (supported by affidavits of a person or persons with personal knowledge thereof) to demonstrate that the proposed assignor or transferor has not acquired

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an authorization or operated a station for the principal purpose of profitable sale rather than public service. This showing may include, for example, a demonstration that the proposed assignment or transfer is due to changed circumstances (described in detail) affecting the licensee subsequent to the acquisition of the license, or that the proposed transfer of radio facilities is incidental to a sale of other facilities or merger of interests.

(d) If a proposed transfer of radio facilities is incidental to a sale or other facilities or merger of interests, the showing specified under paragraph (c) of this section shall be submitted and include an additional exhibit that:

(1) Discloses complete details as to the sale of facilities or merger of interests;

(2) Segregates clearly by an itemized accounting, the amount of consideration involved in the sale of facilities or merger of interests; and

(3) Demonstrates that the amount of consideration assignable to the facilities or business interests involved represents their fair market value at the time of the transaction.

[61 FR 26677, May 28, 1996, as amended at 63 FR 6104, Feb. 6, 1998; 63 FR 68982, Dec. 14, 1998; 65 FR 38327, June 20, 2000; 68 FR 4955, Jan. 31, 2003]

## § 101.56 [Reserved]

### § 101.61 Certain modifications not requiring prior authorization in the Local Multipoint Distribution Service and 24 GHz Service

In the Local Multipoint Distribution Service (LMDS) licensees may add, remove, or relocate facilities within the area authorized by the license without prior authorization. Upon request by an incumbent licensee or the Commission, an LMDS licensee shall furnish the technical parameters, location and coordinates of the completion of the addition, removal, relocation or modification of any of its facilities within the BTA. The LMDS licensee must provide such information within ten (10) days of receiving a written request. This section also applies to 24 GHz licensees that are licensed according to Economic Areas.

[65 FR 59357, Oct. 5, 2000]

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### § 101.63 Period of construction; certification of completion of construction.

(a) Each Station, except in Multichannel Video Distribution and Data Service, Local Multipoint Distribution Service, and the 24 GHz Service, authorized under this part must be in operation within 18 months from the initial date of grant.

(b) For the 70 GHz, 80 GHz, and 90 GHz bands, the 12-month construction period will commence on the date of each registration of each individual link; adding links will not change the overall renewal period of the license.

(c) Failure to timely begin operation means the authorization cancels automatically.

(d) The frequencies associated with all point-to-multipoint authorizations which have cancelled automatically or otherwise been recovered by the Commission will again be made available for reassignment on a date and under terms set forth by Public Notice. See § 101.1331(d) for treatment of MAS incumbent site-by-site licenses recovered in EAs.

(e) Requests for extension of time may be granted upon a showing of good cause pursuant to § 1.946(e) of this chapter.

(f) Construction of any authorized facility or frequency must be completed by the date specified in the license as pursuant to § 1.946 of this chapter.

(g) MVPD licensees which have both analog and digital emissions designators specified on the license and which already have, or may transition from analog to digital operations, or a combination of both, meet their completion of construction requirements and do not automatically surrender their license provided they are using either set of emissions. If the licensee has completed the transition to digital, the license can remove the unused analog emission designators the next time a

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modification or renewal application is filed.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23165, Apr. 29, 1997; 63 FR 6104, Feb. 6, 1998; 63 FR 68982, Dec. 14, 1998; 64 FR 45893, Aug. 23, 1999; 65 FR 17448, Apr. 3, 2000; 65 FR 38327, June 20, 2000; 65 FR 59357, Oct. 5, 2000; 69 FR 3266, Jan. 23, 2004; 69 FR 16832, Mar. 31, 2004; 71 FR 69048, Nov. 29, 2006; 81 FR 79944, Nov. 14, 2016]

EFFECTIVE DATE NOTE: At 89 FR 33258, Apr. 29, 2024, §101.63 was amended, and the effective date was delayed indefinitely.

### § 101.64 Service areas.

Service areas for 38.6–40.0 GHz service are Economic Areas (EAs) as defined below. EAs are delineated by the Regional Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce. The Commerce Department organizes the 50 States and the District of Columbia into 172 EAs. Additionally, there are four EA-like areas: Guam and Northern Mariana Islands; Puerto Rico and the U.S. Virgin Islands; American Samoa and the Gulf of Mexico. A total of 175 authorizations (excluding the Gulf of Mexico EA-like area) will be issued for each channel block in the 39 GHz band.

[64 FR 45893, Aug. 23, 1999]

### § 101.65 Termination of station authorizations.

In addition to the provisions of §1.953 of this chapter, a site-based license will be automatically terminated in whole or in part without further notice to the licensee upon the voluntary removal or alteration of the facilities, so as to render the station not operational for a period of 30 days or more. A licensee is subject to this provision commencing on the date it is required to be providing service or operating under §101.63. This provision is inapplicable to blanket authorizations to operate fixed stations at temporary locations pursuant to the provisions of §101.31(a)(2). See §101.305 for additional rules regarding temporary and permanent discontinuation of service.

[82 FR 41549, Sept. 1, 2017]

EFFECTIVE DATE NOTE: At 82 FR 41549, Sept. 1, 2017, §101.65 was revised. This section contains information collection and record-keeping requirements and will not become

effective until approval has been given by the Office of Management and Budget.

### § 101.67 License period.

Licenses for stations authorized under this part will be issued for a period not to exceed 10 years. Unless otherwise specified by the Commission, the expiration of regular licenses shall be on the date (month and day) selected by licensees in the year of expiration.

### POLICIES GOVERNING MICROWAVE RELOCATION FROM THE 1850–1990 AND 2110–2200 MHz BANDS

### § 101.69 Transition of the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands from the fixed microwave services to personal communications services and emerging technologies.

Fixed Microwave Services (FMS) in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands have been allocated for use by emerging technology (ET) services, including Personal Communications Services (PCS), Advanced Wireless Services (AWS), and Mobile Satellite Services (MSS). The rules in this section provide for a transition period during which ET licensees may relocate existing FMS licensees using these frequencies to other media or other fixed channels, including those in other microwave bands.

(a) ET licensees may negotiate with FMS licensees authorized to use frequencies in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands, for the purpose of agreeing to terms under which the FMS licensees would:

(1) Relocate their operations to other fixed microwave bands or other media; or alternatively

(2) Accept a sharing arrangement with the ET licensee that may result in an otherwise impermissible level of interference to the FMS operations.

(b)–(c) [Reserved]

(d) Relocation of FMS licensees in the 2110–2150 and 2160–2200 MHz band will be subject to mandatory negotiations only. Except as provided in paragraph (e) of this section, mandatory negotiation periods are defined as follows:

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(1) Non-public safety incumbents will have a two-year mandatory negotiation period; and

(2) Public safety incumbents will have a three-year mandatory negotiation period.

(e) Relocation of FMS licensees by Mobile-Satellite Service (MSS) licensees will be subject to mandatory negotiations only.

(1) The mandatory negotiation period for non-public safety incumbents will end December 8, 2004.

(2) The mandatory negotiation period for public safety incumbents will end December 8, 2005.

(f) AWS licensees operating in the 1910–1920 MHz and 2175–2180 MHz bands will follow the requirements and procedures set forth in ET Docket No. 00–258 and WT Docket No. 04–356.

(g) If no agreement is reached during the mandatory negotiation period, an ET licensee may initiate involuntary relocation procedures. Under involuntary relocation, the incumbent is required to relocate, provided that the ET licensee meets the conditions of § 101.75.

[62 FR 12758, Mar. 18, 1997, as amended at 65 FR 48182, Aug. 7, 2000; 68 FR 3464, Jan. 24, 2003; 68 FR 68253, Dec. 8, 2003; 69 FR 62622, Oct. 27, 2004; 71 FR 29842, May 24, 2006; 78 FR 8271, Feb. 5, 2013; 78 FR 48621, Aug. 9, 2013]

## § 101.71 [Reserved]

## § 101.73 Mandatory negotiations.

(a) A mandatory negotiation period may be initiated at the option of the ET licensee. Relocation of FMS licensees by Mobile Satellite Service (MSS) operators and AWS licensees in the 2110–2150 MHz and 2160–2200 MHz bands will be subject to mandatory negotiations only.

(b) Once mandatory negotiations have begun, an FMS licensee may not refuse to negotiate and all parties are required to negotiate in good faith. Good faith requires each party to provide information to the other that is reasonably necessary to facilitate the relocation process. In evaluating claims that a party has not negotiated in good faith, the FCC will consider, *inter alia*, the following factors:

(1) Whether the ET licensee has made a *bona fide* offer to relocate the FMS li-

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censee to comparable facilities in accordance with Section 101.75(b);

(2) If the FMS licensee has demanded a premium, the type of premium requested (e.g., whether the premium is directly related to relocation, such as system-wide relocations and analog-to-digital conversions, versus other types of premiums), and whether the value of the premium as compared to the cost of providing comparable facilities is disproportionate (*i.e.*, whether there is a lack of proportion or relation between the two);

(3) What steps the parties have taken to determine the actual cost of relocation to comparable facilities;

(4) Whether either party has withheld information requested by the other party that is necessary to estimate relocation costs or to facilitate the relocation process.

(c) Any party alleging a violation of our good faith requirement must attach an independent estimate of the relocation costs in question to any documentation filed with the Commission in support of its claim. An independent cost estimate must include a specification for the comparable facility and a statement of the costs associated with providing that facility to the incumbent licensee.

(d) *Provisions for Relocation of Fixed Microwave Licensees in the 2110–2150 and 2160–2200 MHz bands.* A separate mandatory negotiation period will commence for each FMS licensee when an ET licensee informs that FMS licensee in writing of its desire to negotiate. Mandatory negotiations will be conducted with the goal of providing the FMS licensee with comparable facilities defined as facilities possessing the following characteristics:

(1) *Throughput.* Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, comparable facilities provide an equivalent number of 4 kHz voice channels. If digital facilities are being replaced with digital, comparable facilities provide equivalent data loading bits per second (bps).

(2) *Reliability.* System reliability is the degree to which information is

transferred accurately within a system. Comparable facilities provide reliability equal to the overall reliability of the FMS system. For digital systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired value, and for analog or digital voice transmission, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog system is replaced with a digital system, only the resulting frequency response, harmonic distortion, signal-to-noise and its reliability will be considered in determining comparable reliability.

(3) *Operating Costs.* Operating costs are the cost to operate and maintain the FMS system. ET licensees would compensate FMS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, and increased utility fees) for five years after relocation. ET licensees could satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FMS licensee would be equivalent to the 2 GHz system in order for the replacement system to be comparable.

[61 FR 29694, June 12, 1996, as amended at 62 FR 12758, Mar. 18, 1997; 65 FR 48182, Aug. 7, 2000; 68 FR 3464, Jan. 24, 2003; 68 FR 68253, Dec. 8, 2003; 69 FR 62622, Oct. 27, 2004; 71 FR 29842, May 24, 2006; 78 FR 8272, Feb. 5, 2013; 78 FR 48621, Aug. 9, 2013]

#### § 101.75 Involuntary relocation procedures.

(a) If no agreement is reached during the mandatory negotiation period, an ET licensee may initiate involuntary relocation procedures under the Commission's rules. ET licensees are obligated to pay to relocated only the specific microwave links to which their systems pose an interference problem. Under involuntary relocation, the FMS licensee is required to relocate, provided that the ET licensee:

(1) Guarantees payment of relocation costs, including all engineering, equipment, site and FCC fees, as well as any legitimate and prudent transaction expenses incurred by the FMS licensee that are directly attributable to an involuntary relocation, subject to a cap

of two percent of the hard costs involved. Hard costs are defined as the actual costs associated with providing a replacement system, such as equipment and engineering expenses. ET licensees are not required to pay FMS licensees for internal resources devoted to the relocation process. ET licensees are not required to pay for transaction costs incurred by FMS licensees during the voluntary or mandatory periods once the involuntary period is initiated, or for fees that cannot be legitimately tied to the provision of comparable facilities;

(2) Completes all activities necessary for implementing the replacement facilities, including engineering and cost analysis of the relocation procedure and, if radio facilities are used, identifying and obtaining, on the incumbents' behalf, new microwave frequencies and frequency coordination; and

(3) Builds the replacement system and tests it for comparability with the existing 2 GHz system.

(b) *Comparable facilities.* The replacement system provided to an incumbent during an involuntary relocation must be at least equivalent to the existing FMS system with respect to the following three factors:

(1) *Throughput.* Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, the ET licensee is required to provide the FMS licensee with an equivalent number of 4 kHz voice channels. If digital facilities are being replaced with digital, the ET licensee must provide the FMS licensee with equivalent data loading bits per second (bps). ET licensees must provide FMS licensees with enough throughput to satisfy the FMS licensee's system use at the time of relocation, not match the total capacity of the FMS system.

(2) *Reliability.* System reliability is the degree to which information is transferred accurately within a system. ET licensees must provide FMS licensees with reliability equal to the overall reliability of their system. For digital data systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired

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value, and for analog or digital voice transmissions, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog voice system is replaced with a digital voice system, only the resulting frequency response, harmonic distortion, signal-to-noise ratio and its reliability will be considered in determining comparable reliability.

(3) *Operating costs.* Operating costs are the cost to operate and maintain the FMS system. ET licensees must compensate FMS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, increased utility fees) for five years after relocation. ET licensees may satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FMS licensee must be equivalent to the 2 GHz system in order for the replacement system to be considered comparable.

(c) The FMS licensee is not required to relocate until the alternative facilities are available to it for a reasonable time to make adjustments, determine comparability, and ensure a seamless handoff.

(d) *Twelve-month trial period.* If, within one year after the relocation to new facilities, the FMS licensee demonstrates that the new facilities are not comparable to the former facilities, the ET licensee must remedy the defects or pay to relocate the microwave licensee to one of the following: its former or equivalent 2 GHz channels, another comparable frequency band, a land-line system, or any other facility that satisfies the requirements specified in paragraph (b) of this section. This trial period commences on the date that the FMS licensee begins full operation of the replacement link. If the FMS licensee has retained its 2 GHz authorization during the trial period, it must return the license to the Commission at the end of the twelve months. FMS licensees relocated from the 2110–2150 and 2160–2200 MHz bands may not be returned to their former 2 GHz channels. All other remedies specified in paragraph (d) are available to FMS licensees relocated from the 2110–2150 MHz and 2160–2200 MHz bands, and

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may be invoked whenever the FMS licensee demonstrates that its replacement facility is not comparable, subject to no time limit.

[61 FR 29694, June 12, 1996, as amended at 65 FR 48183, Aug. 7, 2000; 68 FR 3464, Jan. 24, 2003; 71 FR 29842, May 24, 2006]

### § 101.77 Public safety licensees in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands.

(a) In order for public safety licensees to qualify for a three year mandatory negotiation period as defined in § 101.69(d)(2), the department head responsible for system oversight must certify to the ET licensee requesting relocation that:

(1) The agency is a Police licensee, a Fire Licensee, or an Emergency Medical Licensee as defined in § 90.7 of this chapter, or meets the eligibility requirements of § 90.20(a)(2) of this chapter, except for § 90.20(a)(2)(ii) of this chapter, or that it is a licensee of other part 101 facilities licensed on a primary basis under the eligibility requirements of part 90, subpart B of this chapter; and

(2) The majority of communications carried on the facilities at issue involve safety of life and property.

(b) A public safety licensee must provide certification within thirty (30) days of a request from a ET licensee, or the ET licensee may presume that special treatment is inapplicable. If a public safety licensee falsely certifies to an ET licensee that it qualifies for the extended time periods, this licensee will be in violation of the Commission's rules and will subject to appropriate penalties, as well as immediately subject to the non-public safety time periods.

[61 FR 29695, June 12, 1996, as amended at 62 FR 12758, Mar. 18, 1997; 62 FR 18936, Apr. 17, 1997; 71 FR 29842, May 24, 2006]

### § 101.79 Sunset provisions for licensees in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands.

(a) FMS licensees will maintain primary status in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands unless and until an ET licensee requires use of the spectrum. ET licensees are not required to pay relocation costs after the relocation rules sunset. Once

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the relocation rules sunset, an ET licensee may require the incumbent to cease operations, provided that the ET licensee intends to turn on a system within interference range of the incumbent, as determined by TIA TSB 10-F (for terrestrial-to-terrestrial situations) or TIA TSB 86 (for MSS satellite-to-terrestrial situations) or any standard successor. ET licensee notification to the affected FMS licensee must be in writing and must provide the incumbent with no less than six months to vacate the spectrum. After the six-month notice period has expired, the FMS licensee must turn its license back into the Commission, unless the parties have entered into an agreement which allows the FMS licensee to continue to operate on a mutually agreed upon basis. The date that the relocation rules sunset is determined as follows:

(1) For the 2110–2150 MHz and 2160–2175 MHz and 2175–2180 MHz bands, ten years after the first ET license is issued in the respective band; and

(2) For the 2180–2200 MHz band, for MSS/ATC December 8, 2013 (*i.e.*, ten years after the mandatory negotiation period begins for MSS/ATC operators in the service), and for ET licensees authorized under part 27 ten years after the first part 27 license is issued in the band. To the extent that an MSS operator is also an ET licensee authorized under part 27, the part 27 sunset applies to its relocation and cost sharing obligations should the two sets of obligations conflict.

(b) If the parties cannot agree on a schedule or an alternative arrangement, requests for extension will be accepted and reviewed on a case-by-case basis. The Commission will grant such extensions only if the incumbent can demonstrate that:

(1) It cannot relocate within the six-month period (e.g., because no alternative spectrum or other reasonable option is available), and;

(2) The public interest would be harmed if the incumbent is forced to terminate operations (e.g., if public

safety communications services would be disrupted).

[61 FR 29695, June 12, 1996, as amended at 62 FR 12758, Mar. 18, 1997; 68 FR 68254, Dec. 8, 2003; 71 FR 29842, May 24, 2006; 78 FR 8272, Feb. 5, 2013]

### **§ 101.81 Future licensing in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands.**

After April 25, 1996, all major modifications and extensions to existing FMS systems in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands will be authorized on a secondary basis to ET systems. All other modifications will render the modified FMS license secondary to ET operations, unless the incumbent affirmatively justifies primary status and the incumbent FMS licensee establishes that the modification would not add to the relocation costs of ET licensees. Incumbent FMS licensees will maintain primary status for the following technical changes:

- (a) Decreases in power;
- (b) Minor changes (increases or decreases) in antenna height;
- (c) Minor location changes (up to two seconds);
- (d) Any data correction which does not involve a change in the location of an existing facility;
- (e) Reductions in authorized bandwidth;
- (f) Minor changes (increases or decreases) in structure height;
- (g) Changes (increases or decreases) in ground elevation that do not affect centerline height;
- (h) Minor equipment changes.

[61 FR 29695, June 12, 1996, as amended at 62 FR 12759, Mar. 18, 1997; 65 FR 38327, June 20, 2000]

### **§ 101.82 Reimbursement and relocation expenses in the 2110–2150 MHz and 2160–2200 MHz bands.**

(a) Reimbursement and relocation expenses for the 2110–2130 MHz and 2160–2200 MHz bands are addressed in §§ 27.1160–27.1174.

(b) *Cost-sharing obligations between AWS and MSS (space-to-Earth downlink).* Whenever an ET licensee (AWS or Mobile Satellite Service for space-to-Earth downlink in the 2130–2150 or 2180–2200 MHz bands) relocates an incumbent paired microwave link with one

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path in the 2130–2150 MHz band and the paired path in the 2180–2200 MHz band, the relocater is entitled to reimbursement of 50 percent of its relocation costs (see paragraph (e)) of this section from any other AWS licensee or MSS space-to-Earth downlink operator which would have been required to relocate the same fixed microwave link as set forth in paragraphs (c) and (d) of this section.

(c) *Cost-sharing obligations for MSS (space-to-Earth downlinks).* For an MSS space-to-Earth downlink, the cost-sharing obligation is based on the interference criteria for relocation, *i.e.*, TIA TSB 86 or any standard successor, relative to the relocated microwave link. Subsequently entering MSS space-to-Earth downlink operators must reimburse AWS or MSS space-to-Earth relocators (see paragraph (e)) of this section before the later entrant may begin operations in these bands, unless the later entrant can demonstrate that it would not have interfered with the microwave link in question.

(d) *Cost-sharing obligations among terrestrial stations.* For terrestrial stations (AWS), cost-sharing obligations are governed by §§ 27.1160 through 27.1174 of this chapter; provided, however, that MSS operators are not obligated to reimburse voluntarily relocating FMS incumbents in the 2180–2200 MHz band. (AWS reimbursement and cost-sharing obligations relative to voluntarily relocating FMS incumbents are governed by § 27.1166 of this chapter).

(e) The total costs of which 50 percent is to be reimbursed will not exceed \$250,000 per paired fixed microwave link relocated, with an additional \$150,000 permitted if a new or modified tower is required.

[71 FR 29843, May 24, 2006, as amended at 78 FR 8272, Feb. 5, 2013]

### POLICIES GOVERNING FIXED SERVICE RELOCATION FROM THE 18.58–19.30 GHz BAND

SOURCE: 65 FR 54173, Sept. 7, 2000, unless otherwise noted.

## § 101.83 Modification of station license.

Permissible changes in equipment operating in the band 18.3–19.3 GHz:

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Notwithstanding other provisions of this section, stations that remain co-primary under the provisions of § 101.147(r) may not make modifications to their systems that increase interference to satellite earth stations, or result in a facility that would be more costly to relocate.

[68 FR 16968, Apr. 8, 2003]

## § 101.85 Transition of the 18.3–19.3 GHz band from the terrestrial fixed services to the fixed-satellite service (FSS).

Fixed services (FS) frequencies in the 18.3–19.3 GHz bands listed in §§ 21.901(e), 74.502(c), 74.602(g), and 78.18(a)(4) and § 101.147(a) and (r) of this chapter have been allocated for use by the fixed-satellite service (FSS). The rules in this section provide for a transition period during which FSS licensees may relocate existing FS licensees using these frequencies to other frequency bands, media or facilities.

(a) FSS licensees may negotiate with FS licensees authorized to use frequencies in the 18.3–19.30 GHz bands for the purpose of agreeing to terms under which the FS licensees would:

(1) Relocate their operations to other frequency bands, media or facilities; or alternatively

(2) Accept a sharing arrangement with the FSS licensee that may result in an otherwise impermissible level of interference to the FSS operations.

(b)(1) FS operations in the 18.3–18.58 GHz band that remain co-primary under the provisions of §§ 21.901(e), 74.502(c), 74.602(d), 78.18(a)(4) and 101.147(r) of this chapter will continue to be co-primary with the FSS users of this spectrum until November 19, 2012 or until the relocation of the fixed service operations, whichever occurs sooner.

(2) FS operations in the 18.58–19.3 GHz band that remain co-primary under the provisions of §§ 21.901(e), 74.502(c), 74.602(d), 78.18(a)(4) and 101.147(r) of this chapter will continue to be co-primary with the FSS users of this spectrum until June 8, 2010 or until the relocation of the fixed service operations, whichever occurs sooner, except for operations in the band 19.26–19.3 GHz and low power systems operating pursuant to § 101.47(r)(10), which shall operate on

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a co-primary basis until October 31, 2011.

(3) If no agreement is reached during the negotiations pursuant to §101.85(a), an FSS licensee may initiate relocation procedures. Under the relocation procedures, the incumbent is required to relocate, provided that the FSS licensee meets the conditions of §101.91.

(c) Negotiation periods are defined as follows:

(1) Non-public safety incumbents will have a two-year negotiation period.

(2) Public safety incumbents will have a three-year negotiation period.

[65 FR 54173, Sept. 7, 2000, as amended at 66 FR 63516, Dec. 7, 2001; 68 FR 16968, Apr. 8, 2003]

### § 101.89 Negotiations.

(a) The negotiation is triggered by the fixed-satellite service (FSS) licensee, who must contact the fixed services (FS) licensee and request that negotiations begin.

(b) Once negotiations have begun, an FS licensee may not refuse to negotiate and all parties are required to negotiate in good faith. Good faith requires each party to provide information to the other that is reasonably necessary to facilitate the relocation process. In evaluating claims that a party has not negotiated in good faith, the FCC will consider, *inter alia*, the following factors:

(1) Whether the FSS licensee has made a bona fide offer to relocate the FS licensee to comparable facilities in accordance with §101.91(b);

(2) If the FS licensee has demanded a premium, the type of premium requested (e.g., whether the premium is directly related to relocation, such as system-wide relocations and analog-to-digital conversions, versus other types of premiums), and whether the value of the premium as compared to the cost of providing comparable facilities is disproportionate (i.e., whether there is a lack of proportion or relation between the two);

(3) What steps the parties have taken to determine the actual cost of relocation to comparable facilities;

(4) Whether either party has withheld information requested by the other party that is necessary to estimate re-

location costs or to facilitate the relocation process.

(c) Any party alleging a violation of our good faith requirement must attach an independent estimate of the relocation costs in question to any documentation filed with the Commission in support of its claim. An independent cost estimate must include a specification for the comparable facility and a statement of the costs associated with providing that facility to the incumbent licensee.

(d) Negotiations will commence when the FSS licensee informs the FS licensee in writing of its desire to negotiate. Negotiations will be conducted with the goal of providing the FS licensee with comparable facilities, defined as facilities possessing the following characteristics:

(1) *Throughput*. Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, the FSS licensee is required to provide the FS licensee with an equivalent number of 4 kHz voice channels. If digital facilities are being replaced with digital, the FSS licensee must provide the FS licensee with equivalent data loading bits per second (bps). FSS licensees must provide FS licensees with enough throughput to satisfy the FS licensee's system use at the time of relocation, not match the total capacity of the FS system.

(2) *Reliability*. System reliability is the degree to which information is transferred accurately within a system. FSS licensees must provide FS licensees with reliability equal to the overall reliability of their system. For digital data systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired value, and for analog or digital voice transmissions, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog voice system is replaced with a digital voice system, only the resulting frequency response, harmonic distortion, signal-to-noise ratio and its reliability will be considered in determining comparable reliability.

(3) *Operating costs*. Operating costs are the cost to operate and maintain

the FS system. FSS licensees must compensate FS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, increased utility fees) for five years after relocation. FSS licensees may satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FS licensee must be equivalent to the 18 GHz system in order for the replacement system to be considered comparable.

**§ 101.91 Involuntary relocation procedures.**

(a) If no agreement is reached during the negotiations period, an FSS licensee may initiate relocation procedures under the Commission's rules. FSS licensees are obligated to pay to relocate only the specific microwave links from which their systems may receive interference. Under these procedures, the FS licensee is required to relocate, provided that the FSS licensee:

(1) Guarantees payment of relocation costs, including all engineering, equipment, site and FCC fees, as well as any legitimate and prudent transaction expenses incurred by the FS licensee that are directly attributable to the relocation, subject to a cap of two percent of the hard costs involved. Hard costs are defined as the actual costs associated with providing a replacement system, such as equipment and engineering expenses. FSS licensees are not required to pay FS licensees for internal resources devoted to the relocation process. FSS licensees are not required to pay for transaction costs incurred by FS licensees during the negotiations once the negotiation is initiated, or for fees that cannot be legitimately tied to the provision of comparable facilities;

(2) Completes all activities necessary for implementing the replacement facilities, including engineering and cost analysis of the relocation procedure and, if radio facilities are used, identifying and obtaining, on the incumbents' behalf, new microwave frequencies and frequency coordination; and

(3) Builds the replacement system and tests it for comparability with the existing 18 GHz system.

(b) *Comparable facilities.* The replacement system provided to an incumbent during a relocation must be at least equivalent to the existing FS system with respect to the following three factors:

(1) *Throughput.* Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, the FSS licensee is required to provide the FS licensee with an equivalent number of 4 kHz voice channels. If digital facilities are being replaced with digital, the FSS licensee must provide the FS licensee with equivalent data loading bits per second (bps). FSS licensees must provide FS licensees with enough throughput to satisfy the FS licensee's system use at the time of relocation, not match the total capacity of the FS system.

(2) *Reliability.* System reliability is the degree to which information is transferred accurately within a system. FSS licensees must provide FS licensees with reliability equal to the overall reliability of their system. For digital data systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired value, and for analog or digital voice transmissions, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog voice system is replaced with a digital voice system, only the resulting frequency response, harmonic distortion, signal-to-noise ratio and its reliability will be considered in determining comparable reliability.

(3) *Operating costs.* Operating costs are the cost to operate and maintain the FS system. FSS licensees must compensate FS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, increased utility fees) for five years after relocation. FSS licensees may satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FS licensee must be equivalent to the 18 GHz system in order for the replacement system to be considered comparable.

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(c) The FS licensee is not required to relocate until the alternative facilities are available to it for a reasonable time to make adjustments, determine comparability, and ensure a seamless handoff. The FS licensee may take up to 12 months to make such adjustments and perform such testing.

(d) If the FS licensee demonstrates to the Commission that the new facilities are not comparable to the former facilities, the Commission may require the FSS licensee to further modify or replace the FS licensee's equipment.

[65 FR 54173, Sept. 7, 2000, as amended at 66 FR 63516, Dec. 7, 2001]

### § 101.95 Sunset provisions for licensees in the 18.30–19.30 GHz band.

(a) FSS licensees are not required to pay relocation costs after the relocation rules sunset (see §§ 74.502(c), 74.602(g), and 78.18(a)(4) of this chapter, and 101.147 (a) and (r)). Once the relocation rules sunset, an FSS licensee may require the incumbent to cease operations, provided that the FSS licensee intends to turn on a system within interference range of the incumbent, as determined by TIA Bulletin 10–F or any standard successor. FSS licensee notification to the affected FS licensee must be in writing and must provide the incumbent with no less than six months to vacate the spectrum. After the six-month notice period has expired, the FS licensee must turn its license back into the Commission, unless the parties have entered into an agreement which allows the FS licensee to continue to operate on a mutually agreed upon basis.

(b) If the parties cannot agree on a schedule or an alternative arrangement, requests for extension will be accepted and reviewed on a case-by-case basis. The Commission will grant such extensions only if the incumbent can demonstrate that:

(1) It cannot relocate within the six-month period (e.g., because no alternative spectrum or other reasonable option is available); and

(2) The public interest would be harmed if the incumbent is forced to terminate operations (e.g., if public safety communications services would be disrupted).

### § 101.97 Future licensing in the 18.30–19.30 GHz band.

(a) All major modifications and extensions to existing FS systems in the 18.3–18.58 band after November 19, 2002, or in the 18.58–19.30 band after June 8, 2000 (with the exception of certain low power operations authorized under § 101.147(r)(10)) will be authorized on a secondary basis to FSS systems. All other modifications will render the modified FS license secondary to FSS operations, unless the incumbent affirmatively justifies primary status and the incumbent FS licensee establishes that the modification would not add to the relocation costs for FSS licensees. Incumbent FS licensees will maintain primary status for the following technical changes:

- (1) Decreases in power;
- (2) Minor changes (increases or decreases) in antenna height;
- (3) Minor location changes (up to two seconds);
- (4) Any data correction which does not involve a change in the location of an existing facility;
- (5) Reductions in authorized bandwidth;
- (6) Minor changes (increases or decreases) in structure height;
- (7) Changes (increases or decreases) in ground elevation that do not affect centerline height;
- (8) Minor equipment changes.
- (9) Changes in ownership or control.

(b) The provisions of § 101.83 are applicable, notwithstanding any other provisions of this section.

[65 FR 54173, Sept. 7, 2000, as amended at 66 FR 63516, Dec. 7, 2001; 68 FR 19698, Apr. 8, 2003]

## Subpart C—Technical Standards

§ 101.101 Frequency availability.

| Frequency band (MHz) | Radio service             |                          |                               |                                                    | Notes   |
|----------------------|---------------------------|--------------------------|-------------------------------|----------------------------------------------------|---------|
|                      | Common carrier (Part 101) | Private radio (Part 101) | Broadcast auxiliary (Part 74) | Other (parts 15, 21, 22, 24, 25, 27, 74, 78 & 100) |         |
| 928–929 .....        | MAS .....                 | MAS .....                | .....                         | PRS.                                               | (1).    |
| 932.0–932.5 .....    | MAS .....                 | MAS .....                | .....                         | PRS.                                               |         |
| 932.5–935.0 .....    | CC .....                  | OFS .....                | .....                         | .....                                              |         |
| 941.0–941.5 .....    | MAS .....                 | MAS .....                | .....                         | PRS.                                               |         |
| 941.5–944.0 .....    | CC .....                  | OFS .....                | Aural BAS .....               | .....                                              | (1).    |
| 952–958 .....        | .....                     | OFS/MAS .....            | .....                         | PRS.                                               | F/M/TF  |
| 958–960 .....        | MAS .....                 | OFS.                     | .....                         | .....                                              |         |
| 1850–1990 .....      | .....                     | OFS .....                | .....                         | PCS.                                               |         |
| 2110–2130 .....      | CC .....                  | .....                    | .....                         | PET.                                               |         |
| 2130–2150 .....      | .....                     | OFS .....                | .....                         | PET.                                               |         |
| 2160–2180 .....      | CC .....                  | .....                    | .....                         | ET.                                                |         |
| 2180–2200 .....      | .....                     | OFS .....                | .....                         | PET.                                               |         |
| 2450–2500 .....      | CC .....                  | OFS .....                | TV BAS .....                  | ISM .....                                          |         |
| 2650–2690 .....      | .....                     | OFS .....                | .....                         | MDS/ITFS.                                          |         |
| 3700–4200 .....      | CC LTTS .....             | OFS .....                | .....                         | SAT, ET .....                                      | (2).    |
| 5925–6425 .....      | CC LTTS .....             | OFS .....                | .....                         | SAT.                                               | M.      |
| 6425–6525 .....      | LTTS .....                | OFS .....                | TV BAS .....                  | CARS .....                                         |         |
| 6525–6875 .....      | CC .....                  | OFS.                     | .....                         | .....                                              |         |
| 6875–7125 .....      | CC .....                  | OFS .....                | TV BAS .....                  | CARS.                                              |         |
| 10,550–10,680 .....  | CC .....                  | OFS DEMS.                | .....                         | .....                                              | F/M/TF. |
| 10,700–11,700 .....  | CC .....                  | OFS .....                | .....                         | SAT.                                               |         |
| 12,200–12,700 .....  | MVDDS .....               | MVDDS, POFS .....        | .....                         | DBS, NGSO FSS.                                     |         |
| 12,700–13,250 .....  | CC LTTS .....             | OFS .....                | TV BAS .....                  | CARS .....                                         |         |
| 17,700–18,580 .....  | CC .....                  | OFS .....                | TV BAS .....                  | SAT CARS.                                          |         |
| 17,700–18,300 .....  | CC .....                  | OFS .....                | TV BAS .....                  | CARS.                                              |         |
| 18,300–18,580 .....  | CC .....                  | OFS .....                | TV BAS .....                  | CARS SAT.                                          |         |
| 18,580–18,820 .....  | CC .....                  | OFS .....                | Aural BAS .....               | SAT.                                               |         |
| 18,820–18,920 .....  | CC .....                  | OFS .....                | .....                         | SAT .....                                          |         |
| 18,920–19,160 .....  | CC .....                  | OFS .....                | Aural BAS .....               | SAT.                                               |         |
| 19,160–19,260 .....  | CC .....                  | OFS .....                | .....                         | SAT .....                                          | TF.     |
| 19,260–19,700 .....  | CC .....                  | OFS .....                | TV BAS .....                  | CARS SAT.                                          |         |
| 21,200–23,600 .....  | CC LTTS .....             | OFS .....                | .....                         | .....                                              |         |
| 24,250–25,250 .....  | CC .....                  | OFS.                     | .....                         | .....                                              |         |
| 29,100–29,250 .....  | LMDS .....                | LMDS .....               | .....                         | SAT.                                               | F/M/TF. |
| 31,000–31,300 .....  | CC LMDS LTTS .....        | OFS LMDS .....           | .....                         | .....                                              |         |
| 71,000–76,000 .....  | CC .....                  | OFS .....                | .....                         | 25 .....                                           | F/M/TF  |
| 81,000–86,000 .....  | CC .....                  | OFS .....                | .....                         | 25 .....                                           | F/M/TF  |
| 92,000–95,000 .....  | CC .....                  | OFS .....                | .....                         | 15 .....                                           | F/M/TF. |

BAS: Broadcast Auxiliary Service—(Part 74)  
CARS: Cable Television Relay Service—(Part 78)  
CC: Common Carrier Fixed Point-to-Point Microwave Service—(Part 101, Subparts C & I)  
DBS: Direct Broadcast Satellite—(Part 100)  
DEMS: Digital Electronic Message Service—(Part 101, Subpart G)  
ISM: Industrial, Scientific & Medical—(Part 18)  
ITFS: Instructional Television Fixed Service—(Part 74)  
LTTS: Local Television Transmission Service—(Part 101, Subpart J)  
MAS: Multiple Address System—(Part 101)  
MDS: Multipoint Distribution Service—(Part 21)  
OFS: Private Operational Fixed Point-to-Point Microwave Service—(Part 101, Subparts C & H)  
PCS: Personal Communications Service—(Part 24)  
PET: Emerging Technologies (per ET Dkt. No. 92–9, not yet assigned)  
PRS: Paging and Radiotelephone Service—(Part 22, Subpart E)  
SAT: Fixed Satellite Service—(Part 25)

Notes:

F—Fixed  
M—Mobile  
TF—Temporary Fixed

(1)—Applications for frequencies in the 932.5–935/941.5–944 MHz bands may be filed initially during a one-week period to be announced by public notice. After these applications have been processed, the Commission will announce by public notice a filing date for remaining frequencies. From this filing date forward, applications will be processed on a daily first-come, first-served basis.

(2) Frequencies in this band are shared with stations in the fixed satellite service outside the contiguous United States. Applications for new permanent or temporary facilities in these bands will not be accepted for locations in the contiguous United States. Licensees, as of April 19, 2018, of existing permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band. Such licensees may seek reimbursement of their reasonable costs based on the “comparable facilities” standard used for the transition of microwave links out of other bands, *see* § 101.73(d) of this chapter (defining comparable facilities as facilities possessing certain characteristics in terms of throughput, reliability and operating costs) subject to the demonstration requirements and reimbursement administrative provisions administrative provisions in part 27, subpart O, of this chapter.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23165, Apr. 29, 1997; 62 FR 24582, May 6, 1997; 65 FR 38327, June 20, 2000; 65 FR 54175, Sept. 7, 2000; 65 FR 59357, Oct. 5, 2000; 67 FR 43037, June 28, 2002; 69 FR 3266, Jan. 23, 2004; 69 FR 72047, Dec. 10, 2004; 70 FR 4787, Jan. 31, 2005; 76 FR 59571, Sept. 27, 2011; 81 FR 79944, Nov. 14, 2016; 85 FR 22889, Apr. 23, 2020]

**§ 101.103 Frequency coordination procedures.**

(a) Assignment of frequencies will be made only in such a manner as to facilitate the rendition of communication service on an interference-free basis in each service area. Unless otherwise indicated, each frequency available for use by stations in these services will be assigned exclusively to a single applicant in any service area. All applicants for, and licensees of, stations in these services must cooperate in the selection and use of the frequencies assigned in order to minimize interference and thereby obtain the most effective use of the authorized facilities. In the event harmful interference occurs or appears likely to occur between two or more radio systems and such interference cannot be resolved between the licensees thereof, the Commission may specify a time sharing arrangement for the stations involved or may, after notice and opportunity for hearing, require the licensees to make such changes in operating techniques or equipment as it may deem necessary to avoid such interference.

(b)(1) Operations in the bands 31,000–31,075 MHz and 31,225–31,300 MHz licensed prior to March 11, 1997, were licensed on an unprotected basis and are subject to harmful interference from similarly licensed operations in that band.

(i) Operations licensed in the Local Multipoint Distribution Service and those operations licensed prior to March 11, 1997, except in the Local Television Transmission Service, operating in these bands are equally protected against harmful interference from each other.

(ii) In the case of operations licensed prior to March 11, 1997, except in the Local Television Transmission Service, that are licensed on a point-to-radius basis, LMDS licensees shall be subject to the protection requirement established in this section in the case of existing links operated by such licensees,

and in the case of links added by such licensees in the future in accordance with the terms of their point-to-radius licenses.

(iii) An LMDS licensee may not initiate operations within the point-to-radius area licensed to an operator (other than an operator in the Local Television Transmission Service) prior to March 11, 1997, even if such operator has not initiated operations to the fullest extent of the license. An LMDS licensee, however, may initiate operations at the border of such operator's license area without prior coordination if the LMDS licensee's operations would not cause harmful interference to the other operator's existing operations.

(iv) An operator (other than an operator in the Local Television Transmission Service) licensed on a point-to-radius basis prior to March 11, 1997, may add additional stations within its license area. Such operator shall coordinate with any affected LMDS licensee if its new operations might cause harmful interference to the existing operations of such LMDS licensee.

(v) Operations licensed prior to March 11, 1997, on a point-to-point basis may not be extended or otherwise modified through the addition of point-to-point links. Such operations shall be limited to the use of frequency pairs licensed as of March 11, 1997. Operations licensed in the Local Television Transmission Service as of March 11, 1997, may continue to operate, but such operators may not expand existing operations nor initiate new operations.

(2) Operations in the 31,075–31,225 MHz band licensed prior to March 11, 1997, shall receive no protection against harmful interference from authorized operations in the Local Multipoint Distribution Service in that band.

(3) Non-LMDS operations in the entire 31,000–31,300 MHz band licensed after March 11, 1997, based on applications refiled no later than June 26, 1998 are unprotected with respect to each

other and subject to harmful interference from each other.

(i) Such operations and any operations licensed prior to March 11, 1997, in the band are unprotected with respect to each other and subject to harmful interference from each other.

(ii) Such operations are licensed on a secondary basis to LMDS operations licensed in the band, may not cause interference to LMDS operations, and are not protected from interference from LMDS operations.

(iii) Such operations licensed on a point-to-point basis may not be extended or otherwise modified through the addition of point-to-point links. Such operations licensed on a point-to-radius basis may add additional stations within the licensed area.

(c) Frequency diversity transmission will not be authorized in these services in the absence of a factual showing that the required communications cannot practically be achieved by other means. Where frequency diversity is deemed to be justified on a protection channel basis, it will be limited to one protection channel for the bands 3,700–4,200, 5925–6425, and 6525–6875 MHz, and a ratio of one protection channel for three working channels for the bands 10,550–10,680 and 10,700–11,700 MHz. In the bands 3,700–4,200, 5,925–6,425, and 6525–6875 MHz, no frequency diversity protection channel will be authorized unless there is a minimum of three working channels, except that where a substantial showing is made that a total of three working channels will be required within three years, a protection channel may be authorized simultaneously with the first working channel. A protection channel authorized under such exception will be subject to termination if applications for the third working channel are not filed within three years of the grant date of the applications for the first working channel. Where equipment employing digital modulation techniques with cross-polarized operation on the same frequency is used, the protection channel authorized under the above conditions may be considered to consist of both polarizations of the protection frequency where such is shown to be necessary.

(d) *Frequency coordination.* For each frequency authorized under this part, the following frequency usage coordination procedures will apply:

(1) *General requirements.* Proposed frequency usage must be prior coordinated with existing licensees, permittees and applicants in the area, and other applicants with previously filed applications, whose facilities could affect or be affected by the new proposal in terms of frequency interference on active channels, applied-for channels, or channels coordinated for future growth. Coordination must be completed prior to filing an application for regular authorization, or a major amendment to a pending application, or any major modification to a license. In coordinating frequency usage with stations in the fixed satellite service, applicants must also comply with the requirements of §101.21(f). In engineering a system or modification thereto, the applicant must, by appropriate studies and analyses, select sites, transmitters, antennas and frequencies that will avoid interference in excess of permissible levels to other users. All applicants and licensees must cooperate fully and make reasonable efforts to resolve technical problems and conflicts that may inhibit the most effective and efficient use of the radio spectrum; however, the party being coordinated with is not obligated to suggest changes or re-engineer a proposal in cases involving conflicts. Applicants should make every reasonable effort to avoid blocking the growth of systems as prior coordinated. The applicant must identify in the application all entities with which the technical proposal was coordinated. In the event that technical problems are not resolved, an explanation must be submitted with the application. Where technical problems are resolved by an agreement or operating arrangement between the parties that would require special procedures be taken to reduce the likelihood of interference in excess of permissible levels (such as the use of artificial site shielding) or would result in a reduction of quality or capacity of either system, the details thereof may be contained in the application.

(2) Coordination procedure guidelines are as follows:

(i) Coordination involves two separate elements: notification and response. Both or either may be oral or in written form. To be acceptable for filing, all applications and major technical amendments must certify that coordination, including response, has been completed. The names of the licensees, permittees and applicants with which coordination was accomplished must be specified. If such notice and/or response is oral, the party providing such notice or response must supply written documentation of the communication upon request;

(ii) Notification must include relevant technical details of the proposal. At minimum, this should include, as applicable, the following:

Applicant's name and address.

Transmitting station name.

Transmitting station coordinates.

Frequencies and polarizations to be added, changed or deleted.

Transmitting equipment type, its stability, actual output power, emission designator, and type of modulation(s) (loading). Notification shall indicate if modulations lower than the values listed in the table to § 101.141(a)(3) of the Commission's rules will be used.

Transmitting antenna type(s), model, gain and, if required, a radiation pattern provided or certified by the manufacturer.

Transmitting antenna center line height(s) above ground level and ground elevation above mean sea level.

Receiving station name.

Receiving station coordinates.

Receiving antenna type(s), model, gain, and, if required, a radiation pattern provided or certified by the manufacturer.

Receiving antenna center line height(s) above ground level and ground elevation above mean sea level.

Path azimuth and distance.

Estimated transmitter transmission line loss expressed in dB.

Estimated receiver transmission line loss expressed in dB.

For a system utilizing ATPC, maximum transmit power, coordinated transmit power, and nominal transmit power.

NOTE: The position location of antenna sites shall be determined to an accuracy of

no less than  $\pm 1$  second in the horizontal dimensions (latitude and longitude) and  $\pm 1$  meter in the vertical dimension (ground elevation) with respect to the National Spatial Reference System.

(iii) For transmitters employing digital modulation techniques, the notification should clearly identify the type of modulation. Upon request, additional details of the operating characteristics of the equipment must also be furnished;

(iv) Response to notification should be made as quickly as possible, even if no technical problems are anticipated. Any response to notification indicating potential interference must specify the technical details and must be provided to the applicant, in writing, within the 30-day notification period. Every reasonable effort should be made by all applicants, permittees and licensees to eliminate all problems and conflicts. If no response to notification is received within 30 days, the applicant will be deemed to have made reasonable efforts to coordinate and may file its application without a response;

(v) The 30-day notification period is calculated from the date of receipt by the applicant, permittee, or licensee being notified. If notification is by mail, this date may be ascertained by:

(A) The return receipt on certified mail;

(B) The enclosure of a card to be dated and returned by the recipient; or

(C) A conservative estimate of the time required for the mail to reach its destination. In the last case, the estimated date when the 30-day period would expire should be stated in the notification.

(vi) An expedited prior coordination period (less than 30 days) may be requested when deemed necessary by a notifying party. The coordination notice should be identified as "expedited" and the requested response date should be clearly indicated. However, circumstances preventing a timely response from the receiving party should be accommodated accordingly. It is the responsibility of the notifying party to receive written concurrence (or verbal, with written to follow) from affected parties or their coordination representatives.

(vii) All technical problems that come to light during coordination must be resolved unless a statement is included with the application to the effect that the applicant is unable or unwilling to resolve the conflict and briefly the reason therefor;

(viii) Where a number of technical changes become necessary for a system during the course of coordination, an attempt should be made to minimize the number of separate notifications for these changes. Where the changes are incorporated into a completely revised notice, the items that were changed from the previous notice should be identified. When changes are not numerous or complex, the party receiving the changed notification should make an effort to respond in less than 30 days. When the notifying party believes a shorter response time is reasonable and appropriate, it may be helpful for that party to so indicate in the notice and perhaps suggest a response date;

(ix) If, after coordination is successfully completed, it is determined that a subsequent change could have no impact on some parties receiving the original notification, these parties must be notified of the change and of the coordinator's opinion that no response is required;

(x) Applicants, permittees and licensees should supply to all other applicants, permittees and licensees within their areas of operations, the name, address and telephone number of their coordination representatives. Upon request from coordinating applicants, permittees and licensees, data and information concerning existing or proposed facilities and future growth plans in the area of interest should be furnished unless such request is unreasonable or would impose a significant burden in compilation;

(xi) Parties should keep other parties with whom they are coordinating advised of changes in plans for facilities previously coordinated. If applications have not been filed 6 months after coordination was initiated, parties may assume that such frequency use is no longer desired unless a second notification has been received within 10 days of the end of the 6 month period. Renewal notifications are to be sent to all origi-

nally notified parties, even if coordination has not been successfully completed with those parties; and

(xii) Any frequency reserved by a licensee for future use in the bands subject to this part must be released for use by another licensee, permittee or applicant upon a showing by the latter that it requires an additional frequency and cannot coordinate one that is not reserved for future use.

(e) Where frequency conflicts arise between co-pending applications in the Private Operational Fixed Point-to-Point Microwave, Common Carrier Fixed Point-to-Point Microwave and Local Television Transmission Services, it is the obligation of the later filing applicant to amend his application to remove the conflict, unless it can make a showing that the conflict cannot be reasonably eliminated. Where a frequency conflict is not resolved and no showing is submitted as to why the conflict cannot be resolved, the Commission may grant the first filed application and dismiss the later filed application(s) after giving the later filing applicant(s) 30 days to respond to the proposed action.

(f)(1) *Coordination and information sharing between MVDDS and NGSO FSS licensees in the 12.2 GHz to 12.7 GHz band.* Prior to the construction or addition of an MVDDS transmitting antenna in this frequency band, the MVDDS licensee shall provide notice of intent to construct the proposed antenna site to NGSO FSS licensees operating in the 12.2–12.7 GHz frequency band and maintain an Internet web site of all existing transmitting sites and transmitting antennas that are scheduled for operation within one year including the “in service” dates. In addition to the location of a proposed new transmitting antenna, MVDDS licensees shall provide to the NGSO FSS licensees a technical description of the operating characteristics of the proposed transmission facility. At a minimum, the following information must be included in each notification:

(i) Name of MVDDS licensee;

(ii) Geographic location (including NAD83 coordinates) of proposed MVDDS transmitting antenna;

(iii) Maximum EIRP per 24 MHz;

- (iv) Height above average terrain of the transmitting antenna;
- (v) Type of antenna to be utilized;
- (vi) Main beam azimuth and altitude orientation for the proposed transmitting antenna;
- (vii) Theoretically modeled antenna radiation pattern;
- (viii) Type(s) of emissions, and;
- (ix) Description of the proposed service area.

(2) If the proposed MVDDS antenna site does not meet the minimum spacing requirements on the date of original notification or on subsequent annual anniversary dates of non-operation as set forth in §101.129, then the MVDDS licensee shall not construct the proposed transmission facility unless all NGSO FSS licensees having active subscribers within the minimum separation distance agree to a shorter spacing. Nothing in this section shall preclude MVDDS and NGSO FSS licensees from agreeing to accept the siting of new MVDDS transmitting antennas that do not meet the minimum distance set forth in §101.129. Incumbent point-to-point licensees' (those not licensed as MVDDS) facilities are to be operated in the band 12,200–12,700 MHz following the procedures, technical standards, and requirements of §101.105 in order to protect stations providing Direct Broadcast Satellite Service.

(g) *Licensees operating in Basic Trading Areas authorized in the Local Multipoint Distribution Service.* (1) When the transmitting facilities in a Basic Trading Area (BTA) are to be operated in the bands 29,100–29,250 MHz and 31,000–31,300 MHz and the facilities are located within 20 kilometers of the boundaries of a BTA, each licensee must complete the frequency coordination process of paragraph (d)(2) of this section with respect to neighboring BTA licensees that may be affected by its operations prior to initiating service. In addition, all licensed transmitting facilities operating in the bands 31,000–31,075 MHz and 31,225–31,300 MHz and located within 20 kilometers of neighboring facilities must complete the frequency coordination process of paragraph (d)(2) of this section with respect to such authorized operations before initiating service.

(2) Response to notification should be made as quickly as possible, even if no technical problems are anticipated. Any response to notification indicating potential interference must specify the technical details and must be provided to the applicant, either electronically or in writing, within the 30-day notification period. Every reasonable effort should be made by all licensees to eliminate all problems and conflicts. If no response to notification is received within 30 days, the licensee will be deemed to have made reasonable efforts to coordinate and commence operation without a response. The beginning of the 30-day period is determined pursuant to paragraph (d)(2)(v) of this section.

(h) *Special requirements for operations in the band 29,100–29,250 MHz.* (1)(i) Local Multipoint Distribution Service (LMDS) receive stations operating on frequencies in the 29,100–29,250 MHz band within a radius of 75 nautical miles of the geographic coordinates provided by a non-GSO-MSS licensee pursuant to §101.113(c)(2) or (c)(3)(i) (the “feeder link earth station complex protection zone”) shall accept any interference caused to them by such earth station complexes and shall not claim protection from such earth station complexes.

(ii) LMDS licensees operating on frequencies in the 29,100–29,250 MHz band outside a feeder link earth station complex protection zone shall cooperate fully and make reasonable efforts to resolve technical problems with the non-GSO MSS licensee to the extent that transmissions from the non-GSO MSS operator's feeder link earth station complex interfere with an LMDS receive station.

(2) No more than 15 days after the release of a public notice announcing the commencement of LMDS auctions, feeder link earth station complexes to be licensed pursuant to §25.257 of this chapter shall be specified by a set of geographic coordinates in accordance with the following requirements: no feeder link earth station complex may be located in the top eight (8) metropolitan statistical areas (MSAs), ranked by population, as defined by the Office of Management and Budget as of June 1993, using estimated populations

as of December 1992; two (2) complexes may be located in MSAs 9 through 25, one of which must be Phoenix, AZ (for a complex at Chandler, AZ); two (2) complexes may be located in MSAs 26 to 50; three (3) complexes may be located in MSAs 51 to 100, one of which must be Honolulu, Hawaii (for a complex at Waimea); and the three (3) remaining complexes must be located at least 75 nautical miles from the borders of the 100 largest MSAs or in any MSA not included in the 100 largest MSAs. Any location allotted for one range of MSAs may be taken from an MSA below that range.

(3)(i) Any non-GSO MSS licensee may at any time specify sets of geographic coordinates for feeder link earth station complexes with each earth station contained therein to be located at least 75 nautical miles from the border of the 100 largest MSAs.

(ii) For purposes of paragraph (h)(3)(i) of this section, non-GSO MSS feeder link earth station complexes shall be entitled to accommodation only if the affected non-GSO MSS licensee preapplies to the Commission for a feeder link earth station complex or certifies to the Commission within sixty days of receiving a copy of an LMDS application that it intends to file an application for a feeder link earth station complex within six months of the date of receipt of the LMDS application.

(iii) If said non-GSO MSS licensee application is filed later than six months after certification of the Commission, the LMDS and non-GSO MSS entities shall still cooperate fully and make reasonable efforts to resolve technical problems, but the LMDS licensee shall not be obligated to re-engineer its proposal or make changes to its system.

(4) LMDS licensees or applicants proposing to operate hub stations on frequencies in the 29,100–29,250 MHz band at locations outside of the 100 largest MSAs or within a distance of 150 nautical miles from a set of geographic coordinates specified under paragraphs (h)(2) or (h)(3)(i) of this section shall serve copies of their applications on all non-GSO MSS applicants, permittees or licensees meeting the criteria specified in § 25.257(a). Non-GSO MSS licensees or applicants shall serve copies of

their feeder link earth station applications, after the LMDS auction, on any LMDS applicant or licensee within a distance of 150 nautical miles from the geographic coordinates that it specified under § 101.113(c)(2) or (c)(3)(i). Any necessary coordination shall commence upon notification by the party receiving an application to the party who filed the application. The results of any such coordination shall be reported to the Commission within sixty days. The non-GSO MSS earth station licensee shall also provide all such LMDS licensees with a copy of its channel plan.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23165, Apr. 29, 1997; 63 FR 6105, Feb. 6, 1998; 63 FR 9448, Feb. 25, 1998; 63 FR 14039, Mar. 24, 1998; 63 FR 68983, Dec. 14, 1998; 64 FR 45893, Aug. 23, 1999; 65 FR 38328, June 20, 2000; 67 FR 43037, June 26, 2002; 76 FR 59571, Sept. 27, 2011; 81 FR 79944, Nov. 14, 2016]

**§ 101.105 Interference protection criteria.**

(a) The interference protection criteria for fixed stations subject to this part are as follows:

(1) To long-haul analog systems, employing frequency modulated radio and frequency division multiplexing to provide multiple voice channels, the allowable interference level per exposure:

(i) Due to co-channel sideband-to-sideband interference must not exceed 5 pwpO (Picowatts of absolute noise power psophometrically weighted (pwpO), appearing in an equivalent voice band channel of 300–3400 Hz); or

(ii) Due to co-channel carrier-beat interference must not exceed 50 pwpO.

(2) To short-haul analog systems employing frequency modulated radio and frequency division multiplexing to provide multiple voice channels, the allowable interference level per exposure:

(i) Due to co-channel sideband-to-sideband interference must not exceed 25 pwpO except in the 952–960 MHz band interference into single link fixed relay and control stations must not exceed 250 pwpO per exposure; or

(ii) Due to co-channel carrier-beat interference must not exceed 50 pwpO except in the 952–960 MHz band interference into single link fixed relay and control stations must not exceed 1000 pwpO per exposure.

(3) FM-TV. In analog systems employing frequency modulated radio that is modulated by a standard, television (visual) signal, the allowable interference level per exposure may not exceed the levels which would apply to long-haul or short-haul FM-FDM systems, as outlined in paragraphs (b) (1) and (2) of this section, having a 600–1200 voice channel capacity.

(4) 12.2–12.7 GHz band. (i) To accommodate co-primary NGSO FSS earth stations in the 12.2–12.7 GHz band, the PFD of an MVDDS transmitting system must not exceed  $-135$  dBW/m<sup>2</sup> in any 4 kHz band at a reference point at the surface of the earth at a distance greater than 3 kilometers from the MVDDS transmitting antenna.

(ii) To accommodate co-primary Direct Broadcast Satellite Service earth

stations, an MVDDS transmitting system must not exceed the EPFD levels specified in paragraph (a)(4)(ii)(B) of this section at any DBS subscriber location in accordance with the procedures listed in § 101.1440 of this part.

(A) Definition of equivalent power flux density: The equivalent power flux density (EPFD) is the power flux density produced at a direct broadcast service (DBS) receive earth station, taking into account shielding effects and the off-axis discrimination of the receiving antenna assumed to be pointing at the appropriate DBS satellite(s) from the transmitting antenna of a multichannel video distribution and data service (MVDDS) transmit station. The EPFD in dBW/m<sup>2</sup> in the reference bandwidth is calculated using the following formula:

$$\text{EPFD} = 10 * \log_{10} \left[ \frac{P_{\text{out}} * G_m(\theta_m, \phi_m) * G_e(\theta_e, \phi_e) * I}{G_{e, \text{max}} * 4 * \pi * d^2} \right]$$

Where:

$P_{\text{out}}$  = Total output power of the MVDDS transmitter (watts) into antenna

$G_m(\theta_m, \phi_m)$  = Gain of the MVDDS antenna in the direction of the DBS earth station

$G_e(\theta_e, \phi_e)$  = Gain of the earth station in the direction of the MVDDS antenna

$I$  = Interference scaling factor for the earth station (1 dB for MVDDS transmitters employing the modulation discussed in Section 3.1.5 of the MITRE Report (*i.e.*, a QPSK modulated signal passed through a square-root raised cosine filter). For other modulation and filtering schemes, the interference scaling factor can be measured using the procedures described in Appendix A of the MITRE Report available at [http://www.fcc.gov/oet/info/mitrereport/mitrereport\\_4\\_01.pdf](http://www.fcc.gov/oet/info/mitrereport/mitrereport_4_01.pdf).

$G_{e, \text{max}}$  = Maximum gain of the DBS earth station

$d$  = the distance between the MVDDS transmitting antenna and the DBS earth station (meters)

(B) Regional equivalent power flux density levels:

(1)  $-168.4$  dBW/m<sup>2</sup>/4kHz in the Eastern region consisting of the District of Columbia and the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania,

Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, and Florida;

(2)  $-169.8$  dBW/m<sup>2</sup>/4kHz in the Midwestern region consisting of the following states: Ohio, Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, Arkansas, South Dakota, Nebraska, Kansas, Oklahoma, and Texas;

(3)  $-171.0$  dBW/m<sup>2</sup>/4kHz in the Southwestern region consisting of the following states: Wyoming, Colorado, New Mexico, Utah, Arizona, Nevada, and California (south of 37° North Latitude);

(4)  $-172.1$  dBW/m<sup>2</sup>/4kHz in the Northwestern region consisting of the following states: Washington, Oregon, California (north of 37° North Latitude), Idaho, Montana, North Dakota, Alaska, and Hawaii.

(iii) Except for public safety entities, harmful interference protection from MVDDS stations to incumbent point-to-point 12 GHz fixed stations is not required. Incumbent point-to-point private operational fixed 12 GHz stations,

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except for public safety entities, are required to protect MVDDS stations under the process described in § 101.103(d) of this part.

(5) *71,000–76,000 MHz; 81,000–86,000 MHz.* In these bands the following interference criteria shall apply:

(i) For receivers employing digital modulation: based upon manufacturer data and following TSB 10-F or other generally acceptable good engineering practice, for each potential case of interference a threshold-to-interference ratio (T/I) shall be determined that would cause 1.0 dB of degradation to the static threshold of the protected receiver. For the range of carrier power levels (C) between the clear-air (unfaded) value and the fully-faded static threshold value, in no case shall interference cause C/I to be less than the T/I so determined unless it can be shown that the availability of the affected receiver would still be acceptable despite the interference.

(ii) For receivers employing analog modulation: manufacturer data or industry criteria will specify a baseband signal-to-noise requirement (S/N) of the receiver that will result in acceptable signal quality for continuous operation. Following TSB 10-F or other generally acceptable good engineering practice, for each potential case of interference a C/I objective shall be calculated to ensure that this S/N will not be degraded by more than 1.0 dB. For the range of carrier power levels (C) between the clear-air (unfaded) value and the fully-faded threshold value, in no case shall interference cause the C/I to be less than the objective so determined unless it can be shown that the signal quality and availability of the affected receiver would still be acceptable despite the interference.

(6) *92,000–94,000 MHz; 94,100–95,000 MHz.* In these bands prior links shall be protected to a threshold-to-interference ratio (T/I) level of 1.0 dB of degradation to the static threshold of the protected receiver. Any new link shall not decrease a previous link's desired-to-undesired (D/U) signal ratio below a minimum of 36 dB, unless the earlier link's licensee agrees to accept a lower D/U.

(7) All stations operating under this part must protect the radio quiet zones

as required by § 1.924 of this chapter. Stations authorized by competitive bidding are cautioned that they must receive the appropriate approvals directly from the relevant quiet zone entity prior to operating.

(b) In addition to the requirements of paragraph (a) of this section the adjacent channel interference protection criteria to be afforded, regardless of system length, or type of modulation, multiplexing, or frequency band, must be such that the interfering signal does not produce more than 1.0 dB degradation of the practical threshold of the protected receiver. The “practical threshold” of the protected receiver can be based upon the definition in TSB 10, referenced in paragraph (c) of this section, or upon alternative generally acceptable good engineering standards.

(c) *Applying the criteria.* (1) Guidelines for applying the interference protection criteria for fixed stations subject to this part are specified in the Telecommunications Industry Association's Telecommunications Systems Bulletin TSB 10, “Interference Criteria for Microwave Systems” (TSB 10). Other procedures that follow generally acceptable good engineering practices are also acceptable to the Commission.

(2) If TSB 10 guidelines cannot be used, the following interference protection criteria may be used by calculating the ratio in dB between the desired (carrier signal) and the undesired (interfering) signal (C/I ratio) appearing at the input to the receiver under investigation (victim receiver). Except as provided in § 101.147 where the applicant's proposed facilities are of a type not included in paragraphs (a) and (b) of this section or where the development of the carrier-to-interference (C/I) ratio is not covered by generally acceptable procedures, or where the applicant does not wish to develop the carrier-to-interference ratio, the applicant must, in the absence of criteria or a developed C/I ratio, employ the following C/I protection ratios:

(i) *Co-Channel Interference.* Both side band and carrier-beat, applicable to all bands; the existing or previously authorized system must be afforded a carrier to interfering signal protection ratio of at least 90 dB, except in the

952–960 MHz band where it must be 75dB, and in the 71,000–76,000 MHz and 81,000–86,000 MHz bands where the criteria in paragraph (a)(5) of this section applies, and in the 92,000–94,000 MHz and 94,100–95,000 MHz bands, where the criteria in paragraph (a)(6) of this section applies; or

(ii) *Adjacent Channel Interference*. Applicable to all bands; the existing or previously authorized system must be afforded a carrier to interfering signal protection ratio of at least 56 dB, except in the 71,000–76,000 MHz and 81,000–86,000 MHz bands where the criteria in paragraph (a)(5) of this section applies, and in the 92,000–94,000 MHz and 94,100–95,000 MHz bands, where the criteria in paragraph (a)(6) of this section applies.

(3) Applicants for frequencies listed in § 101.147(b)(1) through (4) must make the following showings that protection criteria have been met over the entire service area of existing systems. Such showings may be made by the applicant or may be satisfied by a statement from a frequency coordinator.

(i) For site-based multiple address stations in the 928–929/952–960 MHz and the 932–932.5/941–941.5 MHz bands, a statement that the proposed system complies with the following co-channel separations from all existing stations and pending applications:

Fixed-to-fixed—145 km;  
Fixed-to-mobile—113 km;  
Mobile-to-mobile—81 km

NOTE TO PARAGRAPH (C)(3)(i): Multiple address systems employing only remote stations will be treated as mobile for the purposes of determining the appropriate separation. For mobile operation, the mileage is measured from the reference point specified on the license application. For fixed operation on subfrequencies in accordance with § 101.147 the mileage also is measured from the reference point specified on the license application.

(ii) In cases where the geographic separation standard in paragraph (c)(3)(i) of this section is not followed, an engineering analysis must be submitted to show the coordination of the proposed assignment with existing systems located closer than those standards. The engineering analyses will include:

(A) Specification of the interference criteria and system parameters used in the interference study;

(B) Nominal service areas of each system included in the interference analysis;

(C) Modified service areas resulting from the proposed system. The propagation models used to establish the service boundary limits must be specified and any special terrain features considered in computing the interference impact should be described; and

(D) A statement that all parties affected have agreed to the engineering analysis and will accept the calculated levels of interference.

(iii) MAS EA licensees shall provide protection in accordance with § 101.1333.

(4) Multiple address systems operating on subfrequencies in accordance with § 101.147 that propose to operate master stations at unspecified locations must define the operating area by a radius about a geographical coordinate and describe how interference to co-channel users will be controlled.

(5) Multiple address frequencies in the 956.25–956.45 MHz bands may be assigned for use by mobile master stations on a primary basis. Multiple address frequencies in the 941.0–941.5 MHz bands that are licensed on a site-by-site basis and the 952 MHz bands may be assigned for use by primary mobile master stations on a case-by-case basis if the 956.25–956.45 MHz frequencies are unavailable. Multiple address mobile (master and remote) operation is permitted on frequencies licensed by geographic area subject to the interference protection criteria set forth in § 101.1333, *i.e.*, adjacent channel site-based licensees and co-channel operations in adjacent EAs. Mobile operation in the 959.85–960 MHz band is not permitted.

(6) Each application for new or modified nodal station on channels numbered 4A, 4B, 7, 9, and 19/20 in the 10.6 GHz band must demonstrate that all existing co-channel stations are at least 56 kilometers from the proposed nodal station site. Applicants for these channels must certify that all licensees and applicants for stations on the adjacent channels within 56 kilometers of the proposed nodal station have been notified of the proposed station and do not object. Alternatively, or if one of the affected adjacent channel interests does object, the applicant may show

that all affected adjacent channel parties are provided a C/I protection ratio of 0 dB. An applicant proposing to operate at an AAT greater than 91 meters must reduce its EIRP in accordance with the following table; however, in no case may EIRP exceed 70 dBm on the 10.6 GHz channels:

| AAT (meters)        | EIRP<br>dBm |
|---------------------|-------------|
| Above 300 .....     | + 38        |
| 251 to 300 .....    | 41          |
| 201 to 250 .....    | 43          |
| 151 to 200 .....    | 49          |
| 101 to 150 .....    | 55          |
| 100 and below ..... | 85          |

(7) Each application for new or modified nodal station on channels numbered 21, 22, 23, and 24 in the 10.6 GHz band must include an analysis of the potential for harmful interference to all other licensed and previously applied for co-channel and adjacent channel stations located within 80 kilometers of the location of the proposed station. The criteria contained in §101.103(d)(2) must be used in this analysis. Applicants must certify that copies of this analysis have been served on all parties which might reasonably be expected to receive interference above the levels set out in §101.103(d)(2) within 5 days of the date the subject application is filed with the Commission.

(8) If the potential interference will exceed the prescribed limits, a statement shall be submitted with the application for new or modified stations to the effect that all parties have agreed to accept the higher level of interference.

(d) Effective August 1, 1985, when a fixed station that conforms to the technical standards of this subpart (or, in the case of the 12,200–12,700 MHz band, for an incumbent non-MVDDS station or a direct broadcast satellite station) receives or will receive interference in excess of the levels specified in this section as a result of an existing licensee's use of non-conforming equipment authorized between July 20, 1961 and July 1, 1976, and the interference would not result if the interfering station's equipment complied with the current technical standards, the licensee of the non-conforming station must take whatever steps are necessary to correct the situation up to

the point of installing equipment which fully conforms to the technical standards of this subpart. In such cases, if the engineering analysis demonstrates that:

(1) The conforming station would receive interference from a non-conforming station in excess of the levels specified in this section; and

(2) The interference would be eliminated if the non-conforming equipment were replaced with equipment which complies with the standards of this subpart, the licensee (or prospective licensee) of the station which would receive interference must provide written notice of the potential interference to both the non-conforming licensee and the Commission's office in Gettysburg, PA. The non-conforming licensee must make all required equipment changes within 180 days from the date of official Commission notice informing the licensee that it must upgrade its equipment, unless an alternative solution has been agreed to by all parties involved in the interference situation. If a non-conforming licensee fails to make all required changes within the specified period of time, the Commission may require the licensee to suspend operation until the changes are completed.

(e) *Interference dispute resolution procedures.* Should a licensee licensed under this part receive harmful interference from another licensee licensed under this chapter, the parties involved shall comply with the dispute resolution procedures set forth herein:

(1) The licensee experiencing the harmful interference shall notify the licensee believed to be causing the harmful interference and shall supply information describing its problem and supporting its claim;

(2) Upon receipt of the harmful interference notice, the licensee alleged to be causing the harmful interference shall respond immediately and make every reasonable effort to identify and resolve the conflict; and

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(3) Licensees are encouraged to resolve the harmful interference prior to contacting the Commission.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68983, Dec. 14, 1998; 65 FR 17449, Apr. 3, 2000; 65 FR 38329, June 20, 2000; 65 FR 59358, Oct. 5, 2000; 66 FR 35110, July 3, 2001; 67 FR 43038, June 28, 2002; 69 FR 31746, June 7, 2004; 70 FR 29996, May 25, 2005]

### § 101.107 Frequency tolerance.

(a) The carrier frequency of each transmitter authorized in these services must be maintained within the following percentage of the reference frequency except as otherwise provided in paragraph (b) of this section or in the applicable subpart of this part (unless otherwise specified in the instrument of station authorization the reference frequency will be deemed to be the assigned frequency):

| Frequency (MHz)                 | Frequency tolerance (percent) |
|---------------------------------|-------------------------------|
| 928 to 929 <sup>5</sup>         | 0.0005                        |
| 932 to 932.5                    | 0.00015                       |
| 932.5 to 935                    | 0.00025                       |
| 941 to 941.5                    | 0.00015                       |
| 941.5 to 944                    | 0.00025                       |
| 952 to 960 <sup>5</sup>         | 0.0005                        |
| 1,850 to 1,990                  | 0.002                         |
| 2,110 to 2,200                  | 0.001                         |
| 2,450 to 2,500 <sup>1</sup>     | 0.001                         |
| 3,700 to 4,200 <sup>1</sup>     | 0.005                         |
| 5,925 to 6,875 <sup>1</sup>     | 0.005                         |
| 6,875 to 7,125 <sup>1</sup>     | 0.005                         |
| 10,550 to 11,700 <sup>1,2</sup> | 0.005                         |
| 11,700 to 12,200 <sup>1</sup>   | 0.005                         |
| 12,200 to 13,250 <sup>4</sup>   | 0.005                         |
| 14,200 to 14,400                | 0.03                          |
| 17,700 to 18,820 <sup>3</sup>   | 0.003                         |
| 18,820 to 18,920 <sup>3</sup>   | 0.001                         |
| 928 to 929 <sup>5</sup>         | 0.0005                        |
| 18,920 to 19,700 <sup>3</sup>   | 0.003                         |
| 19,700 to 27,500 <sup>4,7</sup> | 0.001                         |
| 29,100 to 29,250                | 0.001                         |
| 31,000 to 31,300 <sup>6</sup>   | 0.001                         |
| 31,300 to 40,000 <sup>4</sup>   | 0.03                          |
| 71,000 to 76,000 <sup>8</sup>   |                               |
| 81,000 to 86,000 <sup>8</sup>   |                               |
| 92,000 to 95,000 <sup>8</sup>   |                               |

<sup>1</sup>Applicable only to common carrier LTTS stations. Tolerance for 2450–2500 MHz is 0.005%. Beginning Aug. 9, 1975, this tolerance will govern the marketing of LTTS equipment and the issuance of all such authorizations for new radio equipment. Until that date new equipment may be authorized with a frequency tolerance of .03% in the frequency range 2,200 to 10,500 MHz and .05% in the range 10,500 MHz to 12,200 MHz, and equipment so authorized may continue to be used for its life provided that it does not cause interference to the operation of any other licensee. Beginning March 1, 2005, new LTTS operators will not be licensed and existing LTTS licensees will not be renewed in the 11.7–12.2 GHz band.

<sup>2</sup>See subpart G of this part for the stability requirements for transmitters used in the Digital Electronic Message Service.

<sup>3</sup>Existing type accepted equipment with a frequency tolerance of  $\pm 0.03\%$  may be marketed until December 1, 1988. Equipment installed and operated prior to December 1, 1988 may continue to operate after that date with a minimum frequency tolerance of  $\pm 0.03\%$ . However, the replacement of equipment requires that the current tolerance be met.

<sup>4</sup>Applicable to private operational fixed point-to-point microwave and stations providing MVDDS.

<sup>5</sup>For private operational fixed point-to-point microwave systems, with a channel greater than or equal to 50 KHz bandwidth,  $\pm 0.0005\%$ ; for multiple address master stations, regardless of bandwidth,  $\pm 0.00015\%$ ; for multiple address remote stations with 12.5 KHz bandwidths,  $\pm 0.00015\%$ ; for multiple address remote stations with channels greater than 12.5 KHz bandwidth,  $\pm 0.0005\%$ .

<sup>6</sup>For stations authorized prior to March 11, 1997, transmitter tolerance shall not exceed 0.03%.

<sup>7</sup>The frequency tolerance for stations authorized on or before April 1, 2005 is 0.03%. Existing licensees and pending applicants on that date may continue to operate after that date with a frequency tolerance of 0.03%, provided that it does not cause harmful interference to the operation of any other licensee. For analog systems, if the channel bandwidth is greater than 30 MHz up to 50 MHz, the frequency tolerance standard will be 0.03%; if the channel bandwidth is 30 MHz or less, then the frequency tolerance standard will be 0.003%. This analog standard is conditional provided that harmful interference is not caused to digital stations operating within the 0.001% tolerance standards. If harmful interference is caused to stations operating with the more stringent standard, the onus shall be on the operators with the less stringent parameters to develop an engineering solution to the problem. For exceptions, see § 101.147 and § 101.507.

<sup>8</sup>Equipment authorized to be operated in the 71,000–76,000 MHz, 81,000–86,000 MHz, 92,000–94,000 MHz and 94,100–95,000 MHz bands is exempt from the frequency tolerance requirement noted in the table of paragraph (a) of this section.

(b) Heterodyne microwave radio systems may be authorized at a somewhat less restrictive frequency tolerance (up to .01 percent) to compensate for frequency shift caused by numerous repeaters between base band signal insertion. Where such relaxation is sought, applicant must provide all calculations and indicate the desired tolerance over each path. In such instances the radio transmitters and receivers used must individually be capable of complying with the tolerance specified in paragraph (a) of this section. Heterodyne operation is restricted to channel bandwidth of 10 MHz or greater.

(c) As an additional requirement in any band where the Commission makes assignments according to a specified channel plan, provisions must be made to prevent the emission included within the occupied bandwidth from radiating outside the assigned channel at a level greater than that specified in § 101.111.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23167, Apr. 29, 1997; 63 FR 6105, Feb. 6, 1998; 63 FR 9448, Feb. 25, 1998; 63 FR 14039, Mar. 24, 1998; 63 FR 36611, July 7, 1998; 66 FR 35110, July 3, 2001; 67 FR 43038, June 26, 2002; 68 FR 4956, Jan. 31, 2003; 69 FR 3266, Jan. 23, 2004; 69 FR 16832, Mar. 31, 2004; 70 FR 4787, Jan. 31, 2005; 76 FR 59572, Sept. 27, 2011; 81 FR 79945, Nov. 14, 2016]

## § 101.109

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### § 101.109 Bandwidth.

(a) Each authorization issued pursuant to these rules will show, as the emission designator, a symbol representing the class of emission which must be prefixed by a number specifying the necessary bandwidth. This figure does not necessarily indicate the bandwidth actually occupied by the emission at any instant. In those cases where part 2 of this chapter does not provide a formula for the computation of the necessary bandwidth, the occupied bandwidth may be used in the emission designator.

(b) Stations in this service will be authorized any type of emission, method of modulation, and transmission characteristic, consistent with efficient use of the spectrum and good engineering practice, except that Type B, damped-wave emission will not be authorized.

(c) The maximum bandwidth which will be authorized per frequency assigned is set out in the table that follows. Regardless of the maximum authorized bandwidth specified for each frequency band, the Commission reserves the right to issue a license for less than the maximum bandwidth if it appears that a lesser bandwidth would be sufficient to support an applicant's intended communications.

| Frequency band (MHz)                | Maximum authorized bandwidth |
|-------------------------------------|------------------------------|
| 928 to 929 .....                    | 25 kHz <sup>1 5 6</sup>      |
| 932 to 932.5, 941 to 941.5 ....     | 12.5 kHz <sup>1 5 6</sup>    |
| 932.5 to 935, 941.5 to 944 ....     | 200 kHz <sup>1</sup>         |
| 952 to 960 .....                    | 200 kHz <sup>1 5 6</sup>     |
| 1,850 to 1,990 .....                | 10 MHz <sup>1</sup>          |
| 2,110 to 2,130 .....                | 3.5 MHz                      |
| 2,130 to 2,150 .....                | 800 or 1600 KHz <sup>1</sup> |
| 2,150 to 2,160 .....                | 10 MHz                       |
| 2,160 to 2,180 .....                | 3.5 MHz                      |
| 2,180 to 2,200 .....                | 800 or 1600 KHz <sup>1</sup> |
| 2,450 to 2,483.5 .....              | 625 KHz <sup>2</sup>         |
| 2,483.5 to 2,500 .....              | 800 KHz                      |
| 3,700 to 4,200 .....                | 20 MHz                       |
| 5,925 to 6,425 .....                | <sup>1</sup> 60              |
| 6,425 to 6,525 .....                | 25 MHz                       |
| 6,525 to 6,875 .....                | 30 MHz <sup>1</sup>          |
| 6,875 to 7,125 .....                | 25 MHz <sup>1</sup>          |
| 10,550 to 10,680 .....              | 5 MHz <sup>1</sup>           |
| 10,700 to 11,700 .....              | <sup>1</sup> 80              |
| 12,200 to 12,700 <sup>3</sup> ..... | 500 megahertz                |
| 12,700 to 13,150 .....              | 50 MHz                       |
| 13,200 to 13,250 .....              | 25 MHz                       |
| 17,700 to 18,140 .....              | 220 MHz <sup>1</sup>         |
| 18,140 to 18,142 .....              | 2 MHz                        |
| 18,142 to 18,580 .....              | 6 MHz                        |
| 18,580 to 18,820 .....              | 20 MHz <sup>1</sup>          |
| 18,820 to 18,920 .....              | 10 MHz                       |
| 18,920 to 19,160 .....              | 20 MHz <sup>1</sup>          |
| 19,160 to 19,260 .....              | 10 MHz                       |
| 19,260 to 19,700 .....              | 220 MHz <sup>1</sup>         |

| Frequency band (MHz)   | Maximum authorized bandwidth |
|------------------------|------------------------------|
| 21,200 to 23,600 ..... | 50 MHz <sup>1 4</sup>        |
| 24,250 to 25,250 ..... | 40 MHz <sup>7</sup>          |
| 29,100 to 29,250 ..... | 150 MHz                      |
| 31,000 to 31,075 ..... | 75 MHz                       |
| 31,075 to 31,225 ..... | 150 MHz                      |
| 31,225 to 31,300 ..... | 75 MHz                       |
| 71,000 to 76,000 ..... | 5000 MHz                     |
| 81,000 to 86,000 ..... | 5000 MHz                     |
| 92,000 to 95,000 ..... | ( <sup>2</sup> )             |

<sup>1</sup>The maximum bandwidth that will be authorized for each particular frequency in this band is detailed in the appropriate frequency table in § 101.147. If contiguous channels are aggregated in the 928–928.85/952–952.85/956.25–956.45 MHz, the 928.85–929/959.85–960 MHz, or the 932–932.5/941–941.5 MHz bands, then the bandwidth may exceed that which is listed in the table.

<sup>2</sup>1250 KHz, 1875 KHz, or 2500 KHz on a case-by-case basis.

<sup>3</sup>To be specified in authorization. For the band 92 to 95 GHz, maximum bandwidth is licensed in one segment of 2 GHz from 92–94 GHz and one 0.9 GHz segment from 94.1 to 95 GHz, or the total of the loaded band if smaller than the assigned bandwidth.

<sup>4</sup>For exceptions, see § 101.147(s).

<sup>5</sup>A 12.5 kHz bandwidth applies only to frequencies listed in § 101.147(b)(1) through (4).

<sup>6</sup>For frequencies listed in § 101.147(b)(1) through (4), consideration will be given on a case-by-case basis to authorizing bandwidths up to 50 kHz.

<sup>7</sup>For channel block assignments in the 24,250–25,250 MHz band, the authorized bandwidth is equivalent to an unpaired channel block assignment or to either half of a symmetrical paired channel block assignment. When adjacent channels are aggregated, equipment is permitted to operate over the full channel block aggregation without restriction.

NOTE TO FOOTNOTE 7: Unwanted emissions shall be suppressed at the aggregate channel block edges based on the same roll-off rate as is specified for a single channel block in § 101.111(a)(1) or in § 101.111(a)(2)(ii) and (iii) as appropriate.

<sup>8</sup>For incumbent private operational fixed point-to-point stations in this band (those not licensed as MVDDS), the maximum bandwidth shall be 20 MHz.

[61 FR 26677, May 28, 1996, as amended at 61 FR 44181, Aug. 28, 1996; 62 FR 23167, Apr. 29, 1997; 62 FR 24582, May 6, 1997; 63 FR 6105, Feb. 6, 1998; 65 FR 17449, Apr. 3, 2000; 65 FR 38329, June 20, 2000; 65 FR 59358, Oct. 5, 2000; 67 FR 43038, June 26, 2002; 68 FR 4956, Jan. 31, 2003; 69 FR 3266, Jan. 23, 2004; 70 FR 29997, May 25, 2005; 75 FR 41771, July 19, 2010; 76 FR 59572, Sept. 27, 2011; 77 FR 54432, Sept. 5, 2012; 81 FR 79945, Nov. 14, 2016]

### § 101.111 Emission limitations.

(a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) When using transmissions other than those employing digital modulation techniques:

(i) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 decibels;

(ii) On any frequency removed from the assigned frequency by more than

100 percent up to and including 250 percent of the authorized bandwidth: At least 35 decibels;

(iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log_{10}$  (mean output power in watts) decibels, or 80 decibels, whichever is the lesser attenuation.

(2) When using transmissions employing digital modulation techniques (see § 101.141(b)) in situations not covered in this section:

(i) For operating frequencies below 15 GHz, in any 4 KHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels:

$A = 35 + 0.8(P - 50) + 10 \log_{10} B$ . (Attenuation greater than 80 decibels or to an absolute power of less than -13 dBm/1MHz is not required.) where:

A = Attenuation (in decibels) below the mean output power level.

P = Percent removed from the center frequency of the transmitter bandwidth.

B = Authorized bandwidth in MHz.

NOTE: MVDDS operations in the 12.2-12.7 GHz band shall use 24 megahertz for the value of B in the emission mask equation set forth in this section. The emission mask limitation shall only apply at the 12.2-12.7 GHz band edges and does not restrict MVDDS channelization bandwidth within the band.

(ii) For operating frequencies above 15 GHz, in any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 11 decibels:

$A = 11 + 0.4(P - 50) + 10 \log_{10} B$ . (Attenuation greater than 56 decibels or to an absolute power of less than -13 dBm/1MHz is not required.)

(iii) In any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log_{10}$  (the mean output power in watts) decibels, or 80 decibels, whichever is the lesser attenuation.

The authorized bandwidth includes the nominal radio frequency bandwidth of an individual transmitter/modulator in block-assigned bands. Equipment licensed prior to April 1, 2005 shall only be required to meet this standard in any 4 kHz band.

(iv) The emission mask for LMDS and the 24 GHz Service shall use the equation in paragraph (a)(2)(ii) of this section and apply it only to the band edge of each block of spectrum, but not to subchannels established by licensees. The value of P in the equation is the percentage removed from the carrier frequency and assumes that the carrier frequency is the center of the actual bandwidth used. The emission mask can be satisfied by locating a carrier of the subchannel sufficiently far from the channel edges so that the emission levels of the mask are satisfied. The LMDS or 24 GHz emission mask shall use a value B (bandwidth) of 40 MHz, for all cases even in the case where a narrower subchannel is used (for instance the actual bandwidth is 10 MHz) and the mean output power used in the calculation is the sum of the output power of a fully populated channel. For block assigned channels, the out-of-band emission limits apply only outside the assigned band of operation and not within the band.

(v) The emission mask for the 71-76 GHz, 81-86 GHz, 92-94 GHz, and 94.1-95 GHz bands used in the equation in paragraph (a)(2)(ii) of this section applies only to the edge of each channel, but not to sub-channels established by licensees. The value of P in the equation is for the percentage removed from the carrier frequency and assumes that the carrier frequency is the center of the actual bandwidth used. The value of B will always be 500 MHz. In the case where a narrower sub-channel is used within the assigned bandwidth, such sub-carrier will be located sufficiently far from the channel edges to satisfy the emission levels of the mask. The mean output power used in the calculation is the sum of the output power of a fully populated channel.

(vi)(A) In order to protect Federal Earth Exploration-Satellite Service (passive), aeronautical and maritime endpoints in motion operating in the 70

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and 80 GHz bands must comply with the following limits:

(1) Ground-to-air transmissions shall not exceed an unwanted emission level of –38.5 dBW per 100 MHz in any portion of the 86–92 GHz passive band;

(2) Air-to-air, ship-to-shore, and aerostat-to-shore transmissions shall not exceed an unwanted emission level of –29.7 dBW per 100 MHz in any portion of the 86–92 GHz passive band.

(B) Any changes to system specifications, operations, or deployment scenarios for aeronautical or maritime end points in motion shall be pre-coordinated with NTIA and affected Federal agencies, and licensees of aeronautical or maritime end points in motion must cooperate fully with any updates to the required unwanted emission limits that may result from these modifications.

(3) For Digital Termination System channels used in the Digital Electronic Message Service (DEMS) operating in the 10,550–10,680 MHz band:

(i) In any 4 KHz band, the center frequency of which is removed from the edge of the DEMS channel by up to and including 1.125 times the DEMS subchannel bandwidth: As specified by the following equation may in no event be less than  $50 + 10 \log_{10} N$  decibels:

$$A = 50 + 0.0333(F - 0.5B) + 10 \log_{10} N \text{ decibels}$$

Where:

A = Attenuation (in decibels) below means output power level contained within the DEMS channel for a given polarization.

B = Bandwidth of DEMS channel (in KHz).

F = Absolute value of the difference between the center frequency of the 4 KHz band measured and the center frequency of the DEMS channel (in KHz).

N = Number of active subchannels of the given polarization within the DEMS channel.

(ii) In any 4 KHz band within the authorized DEMS band the center frequency of which is removed from the center frequency of the DEMS channel by more than the sum of 50% of the DEMS channel bandwidth plus 1.125 times the subchannel bandwidth: As specified by the following equation but in no event less than 80 decibels:

$$A = 80 + 10 \log_{10} N \text{ decibels}$$

(iii) In any 4 KHz band the center frequency of which is outside the authorized DEMS band: At least  $43 + 10 \log_{10}$  (mean output power in watts) decibels.

(4) For DEMS channels in the 17,700–19,700 MHz band:

(i) In any 4 KHz band, the center frequency of which is removed from the frequency of the center of the DEMS channel by more than 50 percent of the DEMS channel bandwidth up to and including 50 percent plus 500 KHz: As specified by the following equation but in no event be less than  $50 + 10 \log_{10} N$  decibels:

$$A = 50 + 0.06(F - 0.5B) + 10 \log_{10} N \text{ decibels}$$

Where:

A = Attenuation (in decibels) below means output power level contained within the DEMS channel for a given polarization.

B = Bandwidth of DEMS channel (in KHz).

F = Absolute value of the difference between the center frequency of the 4 KHz band measured and the center frequency of the DEMS channel (in KHz).

N = Number of active subchannels of the given polarization within the DEMS channel.

(ii) In any 4 KHz band within the authorized DEMS band, the center frequency of which is removed from the center frequency of the DEMS channel by more than the sum of 50 percent of the channel bandwidth plus 500 KHz: As specified by the following equation but in no event less than 80 decibels:

$$A = 80 + 10 \log_{10} N \text{ decibels}$$

(iii) In any 4 KHz band the center frequency of which is outside the authorized Digital Message Service band: At least  $43 + 10 \log_{10}$  (mean output power in watts) decibels.

(5) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a 12.5 KHz bandwidth, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 2.5 KHz up to and including 6.25 KHz: At least  $53 \log_{10} (fd/2.5)$  decibels;

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 6.25 KHz up to and including 9.5 KHz: At least  $103 \log_{10} (fd/3.9)$  decibels;

(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 9.5 KHz up to and including 15 KHz: At least  $157 \log_{10} (fd/5.3)$  decibels; and

(iv) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 KHz: At least 50 plus  $10 \log_{10}(P)$  or 70 decibels, whichever is the lesser attenuation.

(6) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a bandwidth greater than 12.5 KHz, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 5 KHz up to and including 10 KHz: At least  $83 \log_{10} (fd/5)$  decibels;

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 10 KHz up to and including 250 percent of the authorized bandwidth: At least  $116 \log_{10} (fd/6.1)$  decibels or 50 plus  $10 \log_{10} (P)$  or 70 decibels, whichever is the lesser attenuation; and

(iii) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 plus  $10 \log_{10}$  (output power in watts) decibels or 80 decibels, whichever is the lesser attenuation.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraph (a) of this section.

(c) The emission of an unmodulated carrier is prohibited except for test purposes as required for proper station and system maintenance.

(d) *Interference to passive sensors.* These limitations are necessary to minimize the probability of harmful interference to reception in the 10.6–10.68 GHz and 31–31.3 GHz bands onboard space stations in the Earth exploration-satellite service (passive).

(1) *10.6–10.68 GHz.* (i) Fixed stations are restricted to point-to-point operations, with each station supplying not more than –3 dBW of transmitter power to the antenna, producing not more than 40 dBW of EIRP, and radiating at an antenna main beam elevation angle of 20° or less. Licensees holding a valid authorization on August 6, 2015 to operate in this band may continue to operate as authorized, subject to proper license renewal. Licensees are urged to:

(A) Limit the maximum transmitter power supplied to the antenna to –15 dBW; and

(B) Employ automatic transmitter power control (ATPC).

(ii) The maximum transmitter power supplied to the antenna of stations using ATPC may be increased by a value corresponding to the ATPC range, up to a maximum of –3 dBW.

(2) *31–31.3 GHz.* For fixed stations authorized after August 6, 2018, the unwanted emissions power in any 100 MHz of the 31.3–31.5 GHz band shall be limited to –38 dBW (–38 dBW/100 MHz), as measured at the input to the antenna.

[61 FR 26677, May 28, 1996, as amended at 62 FR 24582, May 6, 1997; 65 FR 59358, Oct. 5, 2000; 67 FR 43038, June 26, 2002; 68 FR 4957, Jan. 31, 2003; 69 FR 3266, Jan. 23, 2004; 69 FR 31746, June 7, 2004; 80 FR 38912, July 7, 2015; 89 FR 33259, Apr. 29, 2024]

#### § 101.113 Transmitter power limitations.

(a) On any authorized frequency, the average power delivered to an antenna in this service must be the minimum amount of power necessary to carry out the communications desired. Application of this principle includes, but is not to be limited to, requiring a licensee who replaces one or more of its antennas with larger antennas to reduce its antenna input power by an amount appropriate to compensate for the increased primary lobe gain of the replacement antenna(s). In no event shall the average equivalent

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isotropically radiated power (EIRP), as referenced to an isotropic radiator, exceed the values specified below. In cases of harmful interference, the Commission may, after notice and opportunity for hearing, order a change in the effective radiated power of this station. Further, the output power of a transmitter on any authorized frequency in this service may not exceed the following:

| Frequency band (MHz)                  | Maximum allowable EIRP <sup>1 2</sup> |              |
|---------------------------------------|---------------------------------------|--------------|
|                                       | Fixed <sup>1 2</sup><br>(dBW)         | Mobile (dBW) |
| 928.0–929.0(2) .....                  | + 17                                  |              |
| 932.0–932.5(2) .....                  | + 17                                  |              |
| 932.5–935.0 .....                     | + 40                                  |              |
| 941.0–941.5(2) .....                  | + 30                                  | + 14         |
| 941.5–944.0 .....                     | + 40                                  |              |
| 952.0–960.0(2) .....                  | + 40                                  | + 14         |
| 1,850–1,990 .....                     | + 45                                  |              |
| 2,110–2,150 .....                     | + 45                                  |              |
| 2,150–2,180 <sup>3</sup> .....        | + 45                                  |              |
| 2,180–2,200 .....                     | + 45                                  |              |
| 2,450–2,500 .....                     | + 45                                  |              |
| 2,500–2,686 .....                     |                                       |              |
| 2,686–2,690 .....                     | + 45                                  |              |
| 3,700–4,200 .....                     | + 55                                  |              |
| 5,925–6,425 .....                     | + 55                                  |              |
| 6,425–6,525 .....                     |                                       | + 35         |
| 6,525–6,875 .....                     | + 55                                  |              |
| 6,875–7,125 .....                     | + 55                                  |              |
| 10,550 to 10,600 <sup>5</sup> .....   | + 55                                  |              |
| 10,600 to 10,680 <sup>5</sup> .....   | + 40                                  |              |
| 10,700–11,700 .....                   | + 55                                  |              |
| 12,200–12,700 <sup>11</sup> .....     | + 50                                  |              |
| 12,700–13,200 <sup>4</sup> .....      | + 50                                  |              |
| 13,200–13,250 <sup>4</sup> .....      | + 55                                  |              |
| 14,200–14,400 <sup>12</sup> .....     | + 45                                  |              |
| 17,700–18,600 .....                   | + 55                                  |              |
| 18,600–18,800 <sup>6</sup> .....      | + 35                                  |              |
| 18,800–19,700 .....                   | + 55                                  |              |
| 21,200–23,600 <sup>10</sup> .....     | + 55                                  |              |
| 24,250–25,250 .....                   | + 55                                  |              |
| 29,100–29,250 .....                   | (7)                                   |              |
| 31,000 to 31,075 <sup>8 9</sup> ..... | 30 dBW/MHz                            | 30 dBW/MHz   |
| 31,075 to 31,225 <sup>8 9</sup> ..... | 30 dBW/MHz                            | 30 dBW/MHz   |
| 31,225 to 31,300 <sup>8 9</sup> ..... | 30 dBW/MHz                            | 30 dBW/MHz   |
| 71,000–76,000 <sup>13 14</sup> .....  | +55                                   | +55          |
| 81,000–86,000 <sup>13 14</sup> .....  | +55                                   | +55          |
| 92,000–95,000 .....                   | + 55                                  | + 55         |

<sup>1</sup> Per polarization.

<sup>2</sup> For multiple address operations, see § 101.147. Remote alarm units that are part of a multiple address central station projection system are authorized a maximum of 2 watts.

<sup>3</sup> When an omnidirectional antenna is authorized in the 2150–2160 MHz band, the maximum power shall be 60 dBm.

<sup>4</sup> Also see § 101.145.

<sup>5</sup> The output power of a DEMS System nodal transmitter shall not exceed 0.5 watt per 250 kHz. The output power of a DEMS System user transmitter shall not exceed 0.04 watt per 250 kHz. The transmitter power in terms of the watts specified is the peak envelope power of the emission measured at the associated antenna input port. The operating power shall not exceed the authorized power by more than 10 percent of the authorized power in watts at any time. Frequencies from 10,600–10,680 MHz are subject to footnote US265 in the Table of Frequency Allocations in § 2.106 of the Commission's Rules. Stations authorized prior to April 1, 2003 to exceed the 40 dBW limit may continue to operate at their authorized output power level indefinitely, provided that neither end point of the relevant link is relocated.

<sup>6</sup> Maximum power delivered to the antenna shall not exceed –3 dBw.

<sup>7</sup> See § 101.113(c).

<sup>8</sup> For stations authorized prior to March 11, 1997, and for non-Local Multipoint Distribution Service stations authorized pursuant to applications relied no later than June 26, 1998, the transmitter output power shall not exceed 0.050 watt.

<sup>9</sup> For subscriber transceivers authorized in these bands, the EIRP shall not exceed 55 dBw or 42 dBw/MHz.

<sup>10</sup> See § 101.147(s).

<sup>11</sup> The EIRP for MVDDS stations is limited to 14.0 dBm per 24 MHz (–16.0 dBw per 24 MHz). Incumbent point-to-point stations may use up to + 50 dBW except for low power systems which were licensed under § 101.147(q).

<sup>12</sup> Beginning March 1, 2005, no new LTTS operators will be licensed and no existing LTTS licensees will be renewed in the 14.2–14.4 GHz band.

<sup>13</sup> The maximum transmitter power is limited to 3 watts (5 dBW) unless a proportional reduction in maximum authorized EIRP is required under § 101.115. The maximum transmitter power spectral density is limited to 150 mW per 100 MHz.

(b) The power of transmitters that use Automatic Transmitter Power Control shall not exceed the power input or output specified in the instrument of station authorization. The power of non-ATPC transmitters shall be maintained as near as practicable to the power input or output specified in the instrument of station authorization.

(c)(1) *Transmitter power limitations.* Point-to-point stations in the 29.1–29.25 GHz band for the LMDS backbone between LMDS hubs shall be limited to a maximum allowable e.i.r.p. density per carrier of 23 dBW/MHz in any one megahertz in clear air, and may exceed this limit by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value due to precipitation and only to the extent that the link is impaired.

(2) *Hub transmitter EIRP spectral area, density limit.* LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1–29.25 GHz band will not transmit a co-frequency hub-to-subscriber e.i.r.p. spectral area density in any azimuthal direction in excess of X dBW/(MHz-km<sup>2</sup>) when averaged over any 4.375 MHz band, where X is defined in Table 1. Individual hub stations may exceed their clear air e.i.r.p.s by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(i) The e.i.r.p. aggregate spectral area density is calculated as follows:

$$10 \log_{10} \frac{1}{A} \sum_{i=1}^N p_i \text{ dBW/MHz-km}^2$$

where:

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N = number of co-frequency hubs in BTA.  
A = Area of BTA in km<sup>2</sup>.  
pi = spectral power density into antenna of i-th hub (in W/MHz).  
gi = gain of i-th hub antenna at zero degree elevation angle.  
Each pi and gi are in the same 1 MHz within the designated frequency band.

(ii) The climate zones in Table 1 are defined for different geographic locations within the US as shown in Appendix 28 of the ITU Radio Regulations.

TABLE 1<sup>1</sup>

| Climate zone | e.i.r.p. Spectral Density (Clear Air) (dBW/MHz-km <sup>2</sup> ) <sup>2</sup> |
|--------------|-------------------------------------------------------------------------------|
| 1            | -23                                                                           |
| 2            | -25                                                                           |
| 3,4,5        | -26                                                                           |

<sup>1</sup> LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO 20/30 GHz MSS providers.

<sup>2</sup> See § 21.1007(c)(i) for the population density of the BTA.

(3) *Hub transmitter e.i.r.p. spectral area density limit at elevation angles above the horizon.* LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1–29.25 GHz band will not transmit a co-frequency hub-to-subscriber e.i.r.p. spectral area density in any azimuthal direction in excess of X dBW/(MHz-km<sup>2</sup>) when averaged over any 4.375 MHz band where X is defined in Table 2. Individual hub stations may exceed their clear air e.i.r.p.s by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(i) The e.i.r.p. aggregate spectral area density is calculated as follows:

$$10 \log_{10} \frac{1}{A} \sum_{i=1}^N e.i.r.p.(a_i) \text{ dBW/MHz-km}^2$$

where:

N = number of co-frequency hubs in BTA.  
A = Area of BTA in km<sup>2</sup>.  
e.i.r.p. (ai) = equivalent isotropic radiated spectral power density of the i-th hub (in W/MHz) at elevation angle a where a is the angle in degrees of elevation above horizon. e.i.r.p.(0°) is the hub e.i.r.p. area density at the horizon used in Section

101.113c(2). The nominal antenna pattern will be used for elevation angles between 0° and 8°, and average levels will be used for angles beyond 8°, where average levels will be calculated by sampling the antenna patterns in each 1° interval between 8° and 9015, dividing by 83.

TABLE 2

| Elevation angle (a) | Relative e.i.r.p. density (dBW/MHz-km <sup>2</sup> )                          |
|---------------------|-------------------------------------------------------------------------------|
| 0° ≤ a ≤ 4.0°       | e.i.r.p.(a) = e.i.r.p.(0°) + 20 log (sin Π x)/(1/Π x) where x = (a + 1)/7.5°. |
| 4.0° < a ≤ 7.7°     | e.i.r.p.(a) = e.i.r.p.(0°) - 3.85a + 7.7.                                     |
| a > 7.7°            | e.i.r.p.(a) = e.i.r.p.(0°) - 22.                                              |

(ii) LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO MSS providers.

(4) *Power reduction techniques.* LMDS hub transmitters shall employ methods to reduce average power levels received by non-geostationary mobile satellite receivers, to the extent necessary to comply with paragraphs (c)(1) and (c)(2) of this section, by employing the methods set forth below:

(i) *Alternate polarizations.* LMDS hub transmitters in the LMDS service area may employ both vertical and horizontal linear polarizations such that 50 percent (plus or minus 10 percent) of the hub transmitters shall employ vertical polarization and 50 percent (plus or minus 10 percent) shall employ horizontal polarization.

(ii) *Frequency interleaving.* LMDS hub transmitters in the LMDS service area may employ frequency interleaving such that 50 percent (plus or minus 10 percent) of the hub transmitters shall employ channel center frequencies which are different by one-half the channel bandwidth of the other 50 percent (plus or minus 10 percent) of the hub transmitters.

(iii) *Alternative methods.* As alternatives to paragraphs (c)(4)(i) and

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(c)(4)(ii) of this section, LMDS operators may employ such other methods as may be shown to achieve equivalent reductions in average power density received by non-GSO MSS satellite receivers.

[61 FR 26677, May 28, 1996]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 101.113, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

### § 101.115 Directional antennas.

(a) Unless otherwise authorized upon specific request by the applicant, each station authorized under the rules of this part must employ a directional antenna adjusted with the center of the major lobe of radiation in the horizontal plane directed toward the receiving station with which it communicates: *provided, however*, where a station communicates with more than one point, a multi- or omni-directional antenna may be authorized if necessary. New Periscope antenna systems will

not, under ordinary circumstances, be authorized.

(b) Fixed stations (other than temporary fixed stations and DEMS nodal stations) operating at 932.5 MHz or higher must employ transmitting and receiving antennas (excluding second receiving antennas for operations such as space diversity) meeting the appropriate performance Standard A indicated below, except that in areas not subject to frequency congestion, antennas meeting performance Standard B may be used, subject to the requirements set forth in paragraph (d) of this section. For frequencies with a Standard B1 and a Standard B2, in order to comply with Standard B an antenna must fully meet either Standard B1 or Standard B2. Licensees shall comply with the antenna standards table shown in this paragraph in the following manner:

(1) With either the maximum beamwidth to 3 dB points requirement or with the minimum antenna gain requirement; and

(2) With the minimum radiation suppression to angle requirement.

ANTENNA STANDARDS

| Frequency (MHz)                     | Category | Maximum beamwidth to 3 dB points <sup>1</sup> (included angle in degrees) | Minimum antenna gain (dbi) | Minimum radiation suppression to angle in degrees from centerline of main beam in decibels |            |            |            |             |              |              |
|-------------------------------------|----------|---------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------|------------|------------|------------|-------------|--------------|--------------|
|                                     |          |                                                                           |                            | 5° to 10°                                                                                  | 10° to 15° | 15° to 20° | 20° to 30° | 30° to 100° | 100° to 140° | 140° to 180° |
| 932.5 to 935 .....                  | A        | 14.0                                                                      | n/a                        | n/a                                                                                        | 6          | 11         | 14         | 17          | 20           | 24           |
|                                     | B        | 20.0                                                                      | n/a                        | n/a                                                                                        | n/a        | 6          | 10         | 13          | 15           | 20           |
| 941.5 to 944 .....                  | A        | 14.0                                                                      | n/a                        | n/a                                                                                        | 6          | 11         | 14         | 17          | 20           | 24           |
|                                     | B        | 20.0                                                                      | n/a                        | n/a                                                                                        | n/a        | 6          | 10         | 13          | 15           | 20           |
| 952 to 960 <sup>2,3</sup> .....     | A        | 14.0                                                                      | n/a                        | n/a                                                                                        | 6          | 11         | 14         | 17          | 20           | 24           |
|                                     | B        | 20.0                                                                      | n/a                        | n/a                                                                                        | n/a        | 6          | 10         | 13          | 15           | 20           |
| 1,850 to 2,500 <sup>4</sup> .....   | A        | 5.0                                                                       | n/a                        | 12                                                                                         | 18         | 22         | 25         | 29          | 33           | 39           |
|                                     | B        | 8.0                                                                       | n/a                        | 5                                                                                          | 18         | 20         | 20         | 25          | 28           | 36           |
| 3,700 to 4,200 .....                | A        | 2.7                                                                       | 36                         | 23                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                     | B        | 2.7                                                                       | 36                         | 20                                                                                         | 24         | 28         | 32         | 32          | 32           | 32           |
|                                     | B        | 2.2                                                                       | 38                         | 21                                                                                         | 25         | 29         | 32         | 35          | 39           | 45           |
| 5,925 to 6,425 <sup>5</sup> .....   | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                     | B1       | 2.2                                                                       | 38                         | 21                                                                                         | 25         | 29         | 32         | 35          | 39           | 45           |
|                                     | B2       | 4.1                                                                       | 32                         | 15                                                                                         | 20         | 23         | 28         | 29          | 60           | 60           |
| 6,525 to 6,875 <sup>5</sup> .....   | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                     | B1       | 2.2                                                                       | 38                         | 21                                                                                         | 25         | 29         | 32         | 35          | 39           | 45           |
|                                     | B2       | 4.1                                                                       | 32                         | 15                                                                                         | 20         | 23         | 28         | 29          | 60           | 60           |
| 6,875 to 7,125 .....                | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                     | B1       | 2.2                                                                       | 38                         | 21                                                                                         | 25         | 29         | 32         | 35          | 39           | 45           |
|                                     | B2       | 4.1                                                                       | 32                         | 15                                                                                         | 20         | 23         | 28         | 29          | 60           | 60           |
| 10,550 to 10,680 <sup>7</sup> ..... | A        | 3.5                                                                       | 33.5                       | 18                                                                                         | 24         | 28         | 32         | 35          | 55           | 55           |
|                                     | B        | 3.5                                                                       | 33.5                       | 17                                                                                         | 24         | 28         | 32         | 35          | 40           | 45           |
| 10,565 to 10,615 .....              | n/a      | 360                                                                       | n/a                        | n/a                                                                                        | n/a        | n/a        | n/a        | n/a         | n/a          | n/a          |
| 10,630 to 10,680 <sup>8</sup> ..... | n/a      | 3.5                                                                       | 34                         | 20                                                                                         | 24         | 28         | 32         | 35          | 36           | 36           |
| 10,700–11,700 <sup>9</sup> .....    | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |

## ANTENNA STANDARDS—Continued

| Frequency (MHz)                                    | Category | Maximum beamwidth to 3 dB points <sup>1</sup> (included angle in degrees) | Minimum antenna gain (dbi) | Minimum radiation suppression to angle in degrees from centerline of main beam in decibels |            |            |            |             |              |              |
|----------------------------------------------------|----------|---------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------|------------|------------|------------|-------------|--------------|--------------|
|                                                    |          |                                                                           |                            | 5° to 10°                                                                                  | 10° to 15° | 15° to 20° | 20° to 30° | 30° to 100° | 100° to 140° | 140° to 180° |
| 12,200 to 13,250 <sup>9</sup> .....                | B        | 3.5                                                                       | 33.5                       | 17                                                                                         | 24         | 28         | 32         | 35          | 40           | 45           |
|                                                    | A        | 1.0                                                                       | n/a                        | 23                                                                                         | 28         | 35         | 39         | 41          | 42           | 50           |
|                                                    | B        | 2.0                                                                       | n/a                        | 20                                                                                         | 25         | 28         | 30         | 32          | 37           | 47           |
| 17,700 to 18,820 .....                             | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                                    | B1       | 2.2                                                                       | 38                         | 20                                                                                         | 24         | 28         | 32         | 35          | 36           | 36           |
|                                                    | B2       | 3.3                                                                       | 33.5                       | 18                                                                                         | 22         | 29         | 31         | 35          | 55           | 55           |
| 18,920 to 19,700 <sup>10</sup> .....               | A        | 2.2                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 55           |
|                                                    | B1       | 2.2                                                                       | 38                         | 20                                                                                         | 24         | 28         | 32         | 35          | 36           | 36           |
|                                                    | B2       | 3.3                                                                       | 33.5                       | 18                                                                                         | 22         | 29         | 31         | 35          | 55           | 55           |
| 21,200 to 23,600 <sup>7 11</sup> .....             | A        | 3.3                                                                       | 33.5                       | 18                                                                                         | 26         | 26         | 33         | 33          | 55           | 55           |
|                                                    | B1       | 3.3                                                                       | 33.5                       | 17                                                                                         | 24         | 24         | 29         | 29          | 40           | 50           |
|                                                    | B2       | 4.5                                                                       | 30.5                       | 14                                                                                         | 19         | 22         | 24         | 29          | 52           | 52           |
| 24,250 to 25,250 <sup>10</sup> .....               | A        | 2.8                                                                       | 38                         | 25                                                                                         | 29         | 33         | 36         | 42          | 55           | 60           |
|                                                    | B        | 2.8                                                                       | 38                         | 20                                                                                         | 24         | 28         | 32         | 35          | 36           | 45           |
|                                                    | n/a      | 4.0                                                                       | 38                         | n/a                                                                                        | n/a        | n/a        | n/a        | n/a         | n/a          | n/a          |
| 31,000 to 31,300 <sup>12 13</sup> .....            | B        | n/a                                                                       | 38                         | 20                                                                                         | 24         | 28         | 32         | 35          | 36           | 36           |
|                                                    | N/A      | 2.2                                                                       | 38                         | 22                                                                                         | 28         | 32         | 35         | 37          | 55           | 55           |
|                                                    | N/A      | 2.2                                                                       | 38                         | 35                                                                                         | 35         | 40         | 42         | 47          | 55           | 55           |
| 71,000 to 76,000 (co-polar) <sup>14</sup> .....    | N/A      | 2.2                                                                       | 38                         | 22                                                                                         | 28         | 32         | 35         | 37          | 55           | 55           |
| 71,000 to 76,000 (cross-polar) <sup>14</sup> ..... | N/A      | 2.2                                                                       | 38                         | 22                                                                                         | 28         | 32         | 35         | 37          | 55           | 55           |
| 81,000 to 86,000 (co-polar) <sup>14</sup> .....    | N/A      | 2.2                                                                       | 38                         | 35                                                                                         | 35         | 40         | 42         | 47          | 55           | 55           |
| 81,000 to 86,000 (cross-polar) <sup>14</sup> ..... | N/A      | 2.2                                                                       | 38                         | 35                                                                                         | 35         | 40         | 42         | 47          | 55           | 55           |
| 92,000 to 95,000 .....                             | N/A      | 0.6                                                                       | 50.0                       | 36                                                                                         | 40         | 45         | 50         | 55          | 55           | 55           |

<sup>1</sup> If a licensee chooses to show compliance using maximum beamwidth to 3 dB points, the beamwidth limit shall apply in both the azimuth and the elevation planes.

<sup>2</sup> Except for Multiple Address System frequencies listed in §§ 101.147(b)(1) through (b)(4), where omnidirectional antennas may be used.

<sup>3</sup> Antennas used at outlying stations as part of a central protection alarm system need conform to only the following 2 standards:

- (i) The minimum on-beam forward gain must be at least 10 dBi, and
- (ii) The minimum front-to-back ratio must be at least 20 dB.

<sup>4</sup> Omnidirectional antennas may be authorized in the band 2150–2160 MHz.

<sup>5</sup> These antenna standards apply to all point-to-point stations authorized after June 1, 1997. Existing licensees and pending applicants on that date are grandfathered and need not comply with these standards.

<sup>6</sup> These antenna standards apply to all point-to-point stations authorized on or before June 1, 1997.

<sup>7</sup> For stations authorized or pending on April 1, 2003, the minimum radiation suppression for Category B is 35dB in the 10,550–10,680 MHz band and 36 dB in the 21,200–23,600 MHz band for discrimination angles from 100° to 180°.

<sup>8</sup> These antenna standards apply only to DEMS User Stations licensed, in operation, or applied for prior to July 15, 1993.

<sup>9</sup> Except for Temporary-fixed operations in the band 13200–13250 MHz with output powers less than 250 mW and as provided in § 101.147(q), and except for antennas in the MVDDS service in the band 12.2–12.7 GHz.

<sup>10</sup> DEMS User Station antennas in this band must meet performance Standard B and have a minimum antenna gain of 34 dBi. The maximum beamwidth requirement does not apply to DEMS User Stations. DEMS Nodal Stations need not comply with these standards. Stations authorized to operate in the 24,250–25,250 MHz band do not have to meet these standards, however, the Commission may require the use of higher performance antennas where interference problems can be resolved by the use of such antennas.

<sup>11</sup> Except as provided in § 101.147(s).

<sup>12</sup> The minimum front-to-back ratio shall be 38 dBi.

<sup>13</sup> Mobile, except aeronautical mobile, stations need not comply with these standards.

<sup>14</sup> Antenna gain less than 50 dBi (but greater than or equal to 38 dBi) is permitted only with a proportional reduction in maximum authorized EIRP in a ratio of 2 dB of power per 1 dB of gain, so that the maximum allowable EIRP (in dBW) for antennas of less than 50 dBi gain becomes +55–2(50–G), where G is the antenna gain in dBi. In addition, antennas in these bands must meet the following additional standard for minimum radiation suppression: At angles of less than 5 degrees from the centerline of main beam, cross-polar discrimination must be at least 21 dB.

(c) The Commission shall require the replacement of any antenna or periscope antenna system of a permanent fixed station operating at 932.5 MHz or higher that does not meet performance Standard A specified in paragraph (c) of this section, at the expense of the li-

censee operating such antenna, upon a showing that said antenna causes or is likely to cause interference to (or receive interference from) any other authorized or applied for station whereas a higher performance antenna is not

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likely to involve such interference. Antenna performance is expected to meet the standards of paragraph (c) of this section for parallel polarization. For cases of potential interference, an antenna will not be considered to meet Standard A unless the parallel polarization performance for the discrimination angle involved meets the requirements, even if the cross-polarization performance controls the interference.

(d) In cases where passive reflectors are employed in conjunction with transmitting antenna systems, the foregoing paragraphs of this section also will be applicable. However, in such instances, the center of the major lobe of radiation from the antenna normally must be directed at the passive reflector, and the center of the major lobe of radiation from the passive reflector directed toward the receiving station with which it communicates.

(e) Periscope antennas used at an electric power facility plant area will be excluded from the requirements of paragraph (c) of this section on a case-by-case basis where technical considerations or safety preclude the use of other types of antenna systems.

(f) In the 10,700–11,700 MHz band, a fixed station may employ transmitting and receiving antennas meeting performance standard B in any area. If a Fixed Service or Fixed Satellite Service licensee or applicant makes a showing that it is likely to receive interference from such fixed station and that such interference would not exist if the fixed station used an antenna meeting performance standard A, the fixed station licensee must modify its use. Specifically, the fixed station licensee must either substitute an antenna meeting performance standard A or operate its system with an EIRP reduced so as not to radiate, in the direction of the other licensee, an EIRP in excess of that which would be radiated by a station using a Category A antenna and operating with the maximum EIRP allowed by the rules. A licensee or prior applicant using an antenna that does not meet performance Standard A may object to a prior coordination notice based on interference only if such interference would be predicted to exist if the licensee or prior

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applicant used an antenna meeting performance standard A.

(g) In the event harmful interference is caused to the operation of other stations, the Commission may, after notice and opportunity for hearing, order changes to be made in the height, orientation, gain and radiation pattern of the antenna system.

[61 FR 26677, May 28, 1996]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 101.115, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.fdsys.gov](http://www.fdsys.gov).

### § 101.117 Antenna polarization.

Except as set forth herein, stations operating in the radio services included in this part are not limited as to the type of polarization of the radiated signal that may be employed. However, in the event interference in excess of permissible levels is caused to the operation of other stations as a result of employing other than linear polarization, the Commission may order a licensee to change its system polarization to mitigate the interference. No change in polarization may be made without prior authorization from the Commission. Unless otherwise allowed, only linear polarization (horizontal and vertical) shall be used. For LMDS systems, unless otherwise authorized, system operators are permitted to use any polarization within its service area, but only vertical and/or horizontal polarization for antennas located within 20 kilometers of the outermost edge of their service area.

[68 FR 4957, Jan. 31, 2003]

### § 101.119 Simultaneous use of common antenna structures.

The simultaneous use of common antenna structures by more than one radio station, or by one of more domestic public radio stations and one or more stations of any other class or service, may be authorized: provided, however, that each licensee or user of any such structure is responsible for maintaining the structure, and for painting and illuminating the structure when obstruction marking is required by the Commission. (See § 101.21(a).)

**§ 101.125 Temporary fixed antenna height restrictions.**

The overall antenna structure heights employed by mobile stations in the Local Television Transmission Service and by stations authorized to operate at temporary fixed locations may not exceed the height criteria set forth in § 17.7 of this chapter, unless in each instance, authorization for use of a specific maximum antenna height (above ground and above mean sea level) for each location has been obtained from the Commission prior to erection of the antenna. Requests for such authorization must show the inclusive dates of the proposed operation. (Complete information as to rules concerning the construction, marking and lighting of antenna structures is contained in part 17 of this chapter.)

**§ 101.129 Transmitter location.**

(a) The applicant must determine, prior to filing an application for a radio station authorization, that the antenna site specified therein is adequate to render the service proposed. In cases of questionable antenna locations, it is desirable to conduct propagation tests to indicate the field intensity which may be expected in the principal areas or at the fixed points of communication to be served, particularly where severe shadow problems may be expected. In considering applications proposing the use of such locations, the Commission may require site survey tests to be made pursuant to an experimental license under part 5 of this chapter. In such cases, propagation tests should be conducted in accordance with recognized engineering methods and should be made with a transmitting antenna simulating, as near as possible, the proposed antenna installation. Full data obtained from such surveys and its analysis, including a description of the methods used and the name, address and qualifications of the engineer making the survey, must be supplied to the Commission.

(b) In the 12.2–12.7 GHz band, licensees must not locate MVDDS transmitting antennas within 10 km of any qualifying NGSO FSS receiver unless mutual agreement is obtained between the MVDDS and NGSO FSS licensees.

Such agreements must be retained by the licensees and made available for inspection by interested parties upon request.

(1) A qualifying NGSO FSS receiver, for the purposes of this section, is deemed to be one that is in regular use by an NGSO FSS subscriber for normal reception purposes in the 12.2–12.7 GHz band and not one for monitoring or testing purposes. In addition, qualifying receivers must either be in operation on the date or already be under construction and then operating within thirty days of the date that the MVDDS licensee notifies the NGSO FSS licensee of its intent to construct a new MVDDS transmitting antenna at a specified location.

(2) Except as provided in paragraph (b)(3) of this section, the 10 kilometer spacing requirement for each MVDDS transmitting antenna site shall not apply with respect to NGSO FSS receivers that might be installed or become operational (except for those under construction and operating within thirty days as specified in paragraph (b)(1) of this section) subsequent to the original date that the MVDDS licensee provided notice of its intention to construct a given transmission facility.

(3) In the event that a proposed MVDDS transmitting antenna for which notice has been duly given to the NGSO FSS licensees has not been placed in normal operation within one calendar year of the date of notice, then the MVDDS licensee loses the benefit of the original notice. Upon such anniversary, the MVDDS licensee must re-determine compliance with the minimum 10 kilometer spacing requirement based upon locations of qualifying NGSO FSS receivers on that anniversary date. A new determination of compliance with the spacing requirement shall be made for each succeeding anniversary of non-operation for each proposed MVDDS transmission site or additional antenna. This provision contemplates that failure to commence normal operation at a given MVDDS transmitting antenna site within one year of the date of NGSO FSS notification may require successive relocations of the proposed transmitter site in order to meet the minimum spacing

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distance as determined on each anniversary of non-operation.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68983, Dec. 14, 1998; 67 FR 43038, June 26, 2002; 78 FR 25176, Apr. 29, 2013]

### § 101.131 Transmitter construction and installation.

(a) The equipment at the operating and transmitting positions must be so installed and protected that it is not accessible to, or capable of being operated by, persons other than those duly authorized by the licensee.

(b) In any case where the maximum modulating frequency of a transmitter is prescribed by the Commission, the transmitter must be equipped with a low-pass or band-pass modulation filter of suitable performance characteristics. In those cases where a modulation limiter is employed, the modulation filter must be installed between the transmitter stage in which limiting is effected and the modulated stage of the transmitter.

(c) Each transmitter employed in these services must be equipped with an appropriately labeled pilot lamp or meter which will provide continuous visual indication at the transmitter when its control circuits have been placed in a condition to activate the transmitter. In addition, facilities must be provided at each transmitter to permit the transmitter to be turned on and off independently of any remote control circuits associated therewith.

(d) At each transmitter control point the following facilities must be installed:

(1) A carrier operated device which will provide continuous visual indication when the transmitter is radiating, or, in lieu thereof, a pilot lamp or meter which will provide continuous visual indication when the transmitter control circuits have been placed in a condition to activate the transmitter; and

(2) Facilities which will permit the operator to turn transmitter carrier on and off at will.

(e) Transmitter control circuits from any control point must be so installed that grounding or shorting any line in the control circuit will not cause the transmitter to radiate: provided, however, That this provision will not be

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applicable to control circuits of stations which normally operate with continuous radiation or to control circuits which are under the effective operational control of responsible operating personnel 24 hours per day.

### § 101.133 Limitations on use of transmitters.

(a) Transmitters licensed for operation in Common Carrier services may be concurrently licensed or used for non-common carrier communication purposes. Mobile units may be concurrently licensed or used for non-common carrier communication purposes provided that the transmitter is certificated for use in each service.

(b) Private operational fixed point-to-point microwave stations authorized in this service may communicate with associated operational-fixed stations and fixed receivers and with units of associated stations in the mobile service licensed under Private Radio Service rule parts. In addition, intercommunication is permitted with other licensed stations and with U.S. Government stations in those cases which require cooperation or coordination of activities or when cooperative use arrangements in accordance with § 101.135 are contemplated; provided, however, that where communication is desired with stations authorized to operate under the authority of a foreign jurisdiction, prior approval of this Commission must be obtained; And provided further, That the authority under which such other stations operate does not prohibit the intercommunication.

(c) Two or more persons or governmental entities eligible for private operational fixed point-to-point microwave licenses may use the same transmitting equipment under the following terms and conditions:

(1) Each licensee complies with the general operating requirements set out in this part;

(2) Each licensee is eligible for the frequency(ies) on which the facility operates; and

(3) Each licensee must have the ability to access the transmitter(s) that it is authorized to operate under the multiple licensing arrangement.

(d) *LMDS subscriber transmissions.* LMDS licensees shall not operate

transmitters from subscriber locations in the 29.1–29.25 GHz band.

(e) Existing private operational fixed wireless licensees applying to become common carrier wireless licensees shall comply with all provisions of the Communications Act and the Commission's rules. Applicants must take all required filings, including FCC Form 601, and receive all necessary Commission approval prior to operating as a common carrier wireless licensee. The regulatory fee associated with FCC wireless application Form 601 is waived for applicants who are existing private operational fixed licensees seeking common carrier status, provided that such licensees have also complied with all other discontinuance requirements of Title II of the Act. Applicants are responsible for all other Commission regulatory fees.

[61 FR 26677, May 28, 1996, as amended at 61 FR 44183, Aug. 28, 1996; 63 FR 36611, July 7, 1998; 68 FR 4957, Jan. 31, 2003]

**§ 101.135 Shared use of radio stations and the offering of private carrier service.**

Licensees of Private Operational Fixed Point-to-Point Microwave radio stations may share the use of their facilities on a non-profit basis or may offer service on a for-profit private carrier basis, subject to the following conditions and limitations:

(a) Persons or governmental entities licensed to operate radio systems pursuant to subpart H of this part on any of the private radio frequencies set out in § 101.101 may share such systems with, or provide private carrier service to, any eligible entity for licensing under this part, regardless of individual eligibility restrictions, provided that the communications being carried are permissible under § 101.603.

(b) The licensee must maintain access to and control over all facilities authorized under its license;

(c) All sharing and private carrier arrangements must be conducted pursuant to a written agreement to be kept as part of the station records; and

(d) The licensee must keep an up-to-date list of system sharers and private carrier subscribers and the basis of their eligibility under this part. Such records must be kept current and must

be made available upon request for inspection by the Commission.

(e) Applicants licensed in the MAS frequencies after June 2, 2000, shall not provide service to others on a for-profit private carrier basis in the 928–928.85/952–952.85/956.25–956.45 MHz bands and the 932.25–932.5/941.25–941.5 MHz bands.

[61 FR 26677, May 28, 1996, as amended at 65 FR 17449, Apr. 3, 2000; 65 FR 38330, June 20, 2000; 66 FR 35110, July 3, 2001; 68 FR 4958, Jan. 31, 2003]

**§ 101.137 Interconnection of private operational fixed point-to-point microwave stations.**

Private operational fixed point-to-point microwave stations may be interconnected with facilities of common carriers subject to applicable tariffs.

**§ 101.139 Authorization of transmitters.**

(a) Unless specified otherwise, transmitters used in the private operational fixed and common carrier fixed point-to-point microwave and point-to-multipoint services under this part must be a type that has been approved for compliance under Supplier's Declaration of Conformity.

NOTE 1 TO PARAGRAPH (a): The verification procedure has been replaced by Supplier's Declaration of Conformity. Equipment previously authorized under subpart J of part 2 of this chapter may remain in use. See § 2.950 of this chapter.

(b) Any transmitter to be produced for use under the rules of this part may be approved under the equipment authorization procedures set forth in part 2 of this chapter.

(c) Certification for an individual transmitter may also be requested by an applicant for a station authorization, pursuant to the procedures set forth in part 2 of this chapter.

(d) A transmitter presently shown on an instrument of authorization, which operates on an assigned frequency in the 890–940 MHz band and has not received a grant of certification, may continue to be used by the licensee without certification provided such transmitter continues otherwise to comply with the applicable requirements of this chapter.

(e) Certification or Supplier's Declaration of Conformity is not required for portable transmitters operating

with peak output power not greater than 250 mW. If operation of such equipment causes harmful interference the FCC may, at its discretion, require the licensee to take such corrective action as is necessary to eliminate the interference.

(f) After July 15, 1996, the manufacturer (except for export) or importation of equipment employing digital modulation techniques in the 3700–4200, 5925–6425, 6525–6875, 10,550–10,680 and 10,700–11,700 MHz bands must meet the minimum payload capacity requirements of § 101.141.

(g) After April 1, 2005, the manufacturer (except for export) or importation of equipment for operation in the 21,200–23,600 MHz band must meet:

(1) The 0.001% frequency tolerance requirement for digital systems in § 101.107(a) or the 0.03–0.003% frequency tolerance for analog systems; and

(2) For equipment employing digital modulation techniques, the minimum bit rate requirements of § 101.141(a).

(h) *71,000–76,000 MHz; 81,000–86,000 MHz.* For equipment employing digital modulation techniques, the minimum bit rate requirement is 0.125 bit per second per Hz.

(i) *92,000–94,000 MHz; 94,100–95,000 MHz.* For equipment employing digital modulation techniques, the minimum bit rate requirement is 1.0 bit per second per Hz.

[63 FR 36611, July 7, 1998, as amended at 65 FR 59358, Oct. 5, 2000; 67 FR 43038, June 26, 2002; 68 FR 4958, Jan. 31, 2003; 70 FR 29998, May 25, 2005; 82 FR 50838, Nov. 2, 2017]

**§ 101.141 Microwave modulation.**

(a) Microwave transmitters employing digital modulation techniques and operating below 25.25 GHz (except for MVDDS stations in the 12,200–12,700 MHz band) must, with appropriate multiplex equipment, comply with the following additional requirements:

(1) The bit rate, in bits per second, must be equal to or greater than the bandwidth specified by the emission designator in Hertz (e.g., to be acceptable, equipment transmitting at a 20 Mb/s rate must not require a bandwidth of greater than 20 MHz), except the bandwidth used to calculate the min-

imum rate may not include any authorized guard band.

(i) Stations authorized prior to December 1, 1988 may install equipment after that date with no minimum bit rate. Equipment applied for or authorized prior to April 1, 2005 in the 21.2–23.6 GHz band may be installed with no minimum bit rate.

(ii) However, any digital equipment applied for after April 1, 2005 and equipment replacing existing equipment in the 21.2–23.6 GHz band must meet the bit rate standard.

(2) Equipment to be used for voice transmission placed in service, authorized, or applied for on or before June 1, 1997 in the 2110 to 2130 and 2160 to 2180 MHz bands must be capable of satisfactory operation within the authorized bandwidth to encode at least 96 voice channels. Equipment placed in service, authorized, or applied for on or before June 1, 1997 in the 3700–4200, 5925–6425 (30 MHz bandwidth), and 10,700–11,700 MHz (30 and 40 MHz bandwidths) bands must be capable of satisfactory operation within the authorized bandwidth to encode at least 1152 voice channels. These required loading levels may be reduced by a factor of 1/N provided that N transmitters may be operated satisfactorily, over the same radio path, within an authorized bandwidth less than, or equal to, the maximum authorizable bandwidth (e.g., the 1152 channel requirement may be reduced to 576 if two transmitters can be satisfactorily operated over the same path within the maximum bandwidth). Where certificated equipment is designed to operate on the same frequency in a cross polarized configuration to meet the above capacity requirements, the Commission will require, at the time additional transmitters are authorized, that both polarizations of a frequency be used before a new frequency assignment is made, unless a single transmitter installation was found to be justified by the Commission at the time it authorized the first transmitter.

(3)(i) Except as noted in paragraph (a)(7) of this section, the payload capacity of equipment shall meet the following minimum efficiency standards:

| Frequency               | Emission bandwidth ≤5 MHz   | Emission bandwidth >5 MHz<br>and ≤20 MHz | Emission bandwidth >20 MHz |
|-------------------------|-----------------------------|------------------------------------------|----------------------------|
| 3,700–10,550 MHz .....  | 2.4 bits/second/Hertz ..... | 4.4 bits/second/Hertz .....              | 4.4 bits/second/Hertz.     |
| 10,550–13,250 MHz ..... | 2.4 bits/second/Hertz ..... | 4.4 bits/second/Hertz .....              | 3.0 bits/second/Hertz.     |

(ii) Traffic loading payload shall exceed 50 percent of payload capacity within 30 months of licensing. During anomalous signal fading, licensees subject to the capacity and loading requirements may adjust to a modulation specified in their authorization if such modulation is necessary to allow licensees to maintain communications, even if the modulation will not comply with the capacity and loading requirements specified in this paragraph. Links that must comply with the capacity and loading requirements that use equipment capable of adjusting modulation must be designed using generally accepted multipath fading and rain fading models to meet the specified capacity and loading requirements at least 99.95% of the time, in the aggregate of both directions in a two-way link.

(4) If a transmitter is authorized to operate in a bandwidth that is not listed in paragraph (a)(3) of this section, it must meet the minimum payload capacity and traffic loading requirements of the next largest channel bandwidth listed in the table; e.g., if the authorized bandwidth is 3.5 MHz, the minimum payload capacity must be 12.3 Mbits/s.

(5) Transmitters carrying digital motion video motion material are exempt from the requirements specified in paragraphs (a)(2) and (a)(3) of this section, provided that at least 50 percent of the payload is digital video motion material and the minimum bit rate specified in paragraph (a)(1) of this section is met. In the 6, 10, and 11 GHz bands, concatenation of multiple contiguous channels is permitted for channels of equal bandwidth on center frequencies, provided no other channels are available and the minimum payload capacity requirements are met.

(6) Digital systems using bandwidths of 10 MHz or larger will be considered 50 percent loaded when at least 50 percent of their total capacity is being used. For purposes of this subsection, a Fixed Service channel is being used if

it is attached to a communications system that is capable of providing data to it at a rate that is sufficient to occupy at least 50 percent of the payload capacity of the Fixed Service channel, after header compression is applied.

(7) Equipment placed in service after June 1, 1997 and prior to October 5, 2012 may comply with the provisions of § 101.141(a)(3) in effect as of the date the equipment was placed in service.

(b) For purposes of compliance with the emission limitation requirements of § 101.111(a)(2) and the requirements of paragraph (a) of this section, digital modulation techniques are considered as being employed when digital modulation occupies 50 percent or more to the total peak frequency deviation of a transmitted radio frequency carrier. The total peak frequency deviation will be determined by adding the deviation produced by the digital modulation signal and the deviation produced by any frequency division multiplex (FDM) modulation used. The deviation (D) produced by the FDM signal must be determined in accordance with § 2.202(f) of this chapter.

(c) Analog Modulation. Except for video transmission, an application for an initial working channel for a given route will not be accepted for filing where the anticipated loading (within five years for voice, or other period subject to reasonable projection) is less than the minimum specified for the following frequency bands. Absent extraordinary circumstances, applications proposing additional frequencies over existing routes will not be granted unless it is shown that the traffic load will shortly exhaust the capacity of the existing equipment. Where no construction of radio facilities is requested, licensees must submit this evidence with their filing of any necessary authority required pursuant to section 214 of the Communications Act and part 63 of this chapter.

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| Frequency band (MHz)                      | Minimum number of voice channels (4 KHz or equivalent) |
|-------------------------------------------|--------------------------------------------------------|
| 3700 to 4200 (20 MHz bandwidth) .....     | 900                                                    |
| 5925 to 6425 (10 MHz bandwidth) .....     | 300                                                    |
| 5925 to 6425 (20 MHz bandwidth) .....     | 600                                                    |
| 5925 to 6425 (30 MHz bandwidth) .....     | 900                                                    |
| 6525 to 6875 (10 MHz bandwidth) .....     | 300                                                    |
| 10,700 to 11,700 (10 MHz bandwidth) ..... | 300                                                    |
| 10,700 to 11,700 (20 MHz bandwidth) ..... | 600                                                    |
| 10,700 to 11,700 (30 MHz bandwidth) ..... | 900                                                    |
| 10,700 to 11,700 (40 MHz bandwidth) ..... | 900                                                    |

[61 FR 26677, May 28, 1996, as amended at 62 FR 24583, May 6, 1997; 63 FR 36611, July 7, 1998; 65 FR 59358, Oct. 5, 2000; 67 FR 43039, June 26, 2002; 68 FR 4958, Jan. 31, 2003; 76 FR 59572, Sept. 27, 2011; 77 FR 54433, Sept. 5, 2012]

**§ 101.143 Minimum path length requirements.**

(a) The distance between end points of a fixed link in the private operational fixed point-to-point and the common carrier fixed point-to-point microwave services must equal or exceed the value set forth in the table below or the EIRP must be reduced in accordance with the equation set forth below:

| Frequency band (MHz)   | Minimum path length (km) |
|------------------------|--------------------------|
| Below 1,850 .....      | N/A                      |
| 1,850 to 7,125 .....   | 17                       |
| 10,550 to 13,250 ..... | 5                        |
| Above 17,700 .....     | N/A                      |

(b) For paths shorter than those specified in the table in paragraph (a) of this section, the EIRP shall not exceed the value derived from the following equation:

$$\text{EIRP} = \text{MAXEIRP} - 40 \log(A/B) \text{ dBW}$$

Where: EIRP = The new maximum EIRP (equivalent isotropically radiated power) in dBW. MAXEIRP = Maximum EIRP as set forth in the Table in Section 101.113(a).

A = Minimum path length from the Table above for the frequency band in kilometers.

B = The actual path length in kilometers.

NOTE TO PARAGRAPH (b): For transmitters using Automatic Transmitter Power Control, EIRP corresponds to the maximum transmitter power available, not the coordinated transmit power or the nominal transmit power.

(c) Upon an appropriate technical showing, applicants and licensees unable to meet the minimum path length requirement may be granted an exception to these requirements.

NOTE TO PARAGRAPH (c): Links authorized prior to April 1, 1987, need not comply with this requirement.

[61 FR 26677, May 28, 1996, as amended at 65 FR 38330, June 20, 2000]

**§ 101.145 Interference to geostationary-satellites.**

These limitations are necessary to minimize the probability of harmful interference to reception in the bands 2655–2690 MHz, 5925–7075 MHz, and 12.7–13.25 GHz on board geostationary-space stations in the fixed-satellite service.

(a) Stations authorized prior to July 1, 1976 in the band 2655–2690 MHz, which exceed the power levels in paragraphs (b) and (c) of this section are permitted to operate indefinitely, provided that the operation of such stations does not result in harmful interference to reception in these bands on board geostationary space stations.

(b) *2655 to 2690 MHz and 5925 to 7075 MHz.* No directional transmitting antenna utilized by a fixed station operating in these bands with EIRP greater than 35 dBW may be aimed within 2 degrees of the geostationary-satellite orbit, taking into account atmospheric refraction. However, exception may be made in unusual circumstances upon a showing that there is no reasonable alternative to the transmission path proposed. If there is no evidence that such exception would cause possible harmful interference to an authorized satellite system, said transmission path may be authorized on waiver basis where the maximum value of the equivalent isotropically radiated power (EIRP) does not exceed:

(1) + 47 dBW for any antenna beam directed within 0.5 degrees of the stationary satellite orbit; or

(2) + 47 to + 55 dBW, on a linear decibel scale (8 dB per degree) for any antenna beam directed between 0.5 degrees and 1.5 degrees of the stationary orbit.

(c) *12.7 to 13.25 GHz.* No directional transmitting antenna utilized by a fixed station operating in this band with EIRP greater than 45 dBW may be

aimed within 1.5 degrees of the geostationary-satellite orbit, taking into account atmospheric refraction.

(d) Methods for calculating the azimuths to be avoided may be found in: CCIR Report No. 393 (Green Books), New Delhi, 1970; in “Radio-Relay Antenna Pointing for controlled Interference With Geostationary-Satellites” by C. W. Lundgren and A. S. May, Bell System Technical Journal, Vol. 48, No. 10, pp. 3387-3422, December 1969; and in “Geostationary Orbit Avoidance Computer Program” by Richard G. Gould, Common Carrier Bureau Report CC-7201, FCC, Washington, DC, 1972. This latter report is available through the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151, in printed form (PB-211 500) or source card deck (PB-211 501).

[61 FR 26677, May 28, 1996, as amended at 65 FR 38330, June 20, 2000; 68 FR 12777, Mar. 17, 2003; 77 FR 54433, Sept. 5, 2012]

#### § 101.147 Frequency assignments.

(a) Frequencies in the following bands are available for assignment for fixed microwave services.

928.0–929.0 MHz (28)  
 932.0–932.5 MHz (27)  
 932.5–935 MHz (17)  
 941.0–941.5 MHz (27)  
 941.5–944 MHz (17) (18)  
 952.0–960.0 MHz (28)  
 1,850–1,990 MHz (20) (22)  
 2,110–2,130 MHz (1) (3) (7) (20) (23)  
 2,130–2,150 MHz (20) (22)  
 2,160–2,180 MHz (1) (2) (20) (23)  
 2,180–2,200 MHz (20) (22)  
 2,450–2,500 MHz (12)  
 2,650–2,690 MHz  
 3,700–4,200 MHz (8) (14) (25)  
 5,925–6,425 MHz (6) (14) (25)  
 6,425–6,525 MHz (24)  
 6,525–6,875 MHz (14) (33)  
 6,875–7,125 MHz (10), (34)  
 10,550–10,680 MHz (19)  
 10,700–11,700 MHz (8) (9) (19) (25)  
 11,700–12,200 MHz (24)  
 12,200–12,700 MHz (31)  
 12,700–13,200 MHz (22), (34)  
 13,200–13,250 MHz (4) (24) (25)  
 14,200–14,400 MHz (24)  
 17,700–18,820 MHz (5) (10) (15)  
 17,700–18,300 MHz (10) (15)  
 18,820–18,920 MHz (22)  
 18,300–18,580 MHz (5) (10) (15)  
 18,580–19,300 MHz (22) (30)  
 18,920–19,160 MHz (5) (10) (15)  
 19,160–19,260 MHz (22)

19,260–19,700 MHz (5) (10) (15)  
 19,300–19,700 MHz (5) (10) (15)  
 21,200–22,000 MHz (4) (11) (12) (13) (24) (25) (26)  
 22,000–23,600 MHz (4) (11) (12) (24) (25) (26)  
 24,250–25,250 MHz  
 29,100–29,250 MHz (5), (16)  
 31,000–31,300 MHz (16)  
 42,000–42,500 MHz  
 71,000–76,000 MHz (5) (17)  
 81,000–86,000 MHz (5) (17)  
 92,000–94,000 MHz (17)  
 94,100–95,000 MHz (17)

#### Notes

(1) Frequencies in this band are shared with control and repeater stations in the Public Mobile Services and with stations in the International Fixed Public Radio communication Services located south of 25°30' north latitude in the State of Florida and U. S. possessions in the Caribbean area. Additionally, the band 2160–2162 MHz is shared with stations in the Multipoint Distribution Service.

(2) Except upon showing that no alternative frequencies are available, no new assignments will be made in the band 2160–2162 MHz for stations located within 80.5 kilometers (50 miles) of the coordinates of the cities listed in § 21.901(c) of this chapter.

(3) Television transmission in this band is not authorized and radio frequency channel widths may not exceed 3.5 MHz.

(4) Frequencies in this band are shared with fixed and mobile stations licensed in other services.

(5) Frequencies in this band are shared with stations in the fixed-satellite service.

(6) These frequencies are not available for assignment to mobile earth stations.

(7) Frequencies in the band 2110–2120 MHz may be authorized on a case-by-case basis to Government or non-Government space research earth stations for telecommand purposes in connection with deep space research.

(8) This frequency band is shared with station(s) in the Local Television Transmission Service for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, for permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band. This frequency band is also shared in the U.S. Possessions in the Caribbean area, with stations in the International Fixed Public Radiocommunications Services.

(9) The band segments 10.95–11.2 and 11.45–11.7 GHz are shared with space stations (space to earth) in the fixed-satellite service.

(10) This band is co-equally shared with stations in the fixed services under parts 74, 78 and 101 of this chapter.

(11) Frequencies in this band are shared with Government stations.

(12) Frequencies in this band are available for assignment to the common carrier and private-operational fixed point-to-point microwave services.

(13) Frequencies in this band are shared with stations in the earth exploration satellite service (space to earth).

(14) Frequencies in this band are shared with stations in the fixed satellite service. For 3,700–4,200 MHz, frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, of permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz.

(15) Stations licensed as of September 9, 1983 to use frequencies in the 17.7–19.7 GHz band may, upon proper application, continue to be authorized for such operation.

(16) As of June 30, 1997, frequencies in these bands are available for assignment only to LMDS radio stations, except for non-LMDS radio stations authorized pursuant to applications refiled no later than June 26, 1998.

(17) Frequencies in these bands are shared with Government fixed stations and stations in the Private Operational Fixed Point-to-Point Microwave Service (part 101).

(18) Frequencies in the 942 to 944 MHz band are also shared with broadcast auxiliary stations.

(19) Frequencies in this band are shared with stations in the private-operational fixed point-to-point microwave service.

(20) New facilities in these bands will be licensed only on a secondary basis. Facilities licensed or applied for before January 16, 1992, are permitted to make minor modifications in accordance with §101.81 and retain their primary status.

(21) Any authorization of additional stations to use the 2160–2162 MHz band for Multipoint Distribution Service applied for after January 16, 1992, will be secondary to use of the band for emerging technology services.

(22) Frequencies in these bands are for the exclusive use of Private Operational Fixed Point-to-Point Microwave Service (part 101). Frequencies in the 12,700–13,200 MHz band, which were available only to stations authorized in the 12,200–12,700 MHz band as of September 9, 1983, are not available for new facilities.

(23) Frequencies in these bands are for the exclusive use of Common Carrier Fixed Point-to-Point Microwave Service (part 101).

(24) Frequencies in these bands are available for assignment to television pickup and television non-broadcast pickup stations. The maximum power for the local television transmission service in the 14.2–14.4 GHz band is + 45 dBW except that operations are not permitted within 1.5 degrees of the geostationary orbit. Beginning March 1, 2005, no new LTTS operators will be licensed and no existing LTTS licenses shall be issued in the 11.7–12.2 and 14.2–14.4 GHz bands.

(25) Frequencies in these bands are available for assignment to television STL stations. For 3,700–4,200 MHz, frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, of permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band.

(26) Frequencies from 21.8–22.0 GHz and 23.0–23.2 GHz may be authorized for low power, limited coverage systems subject to the provisions of paragraph (s)(8) of this section.

(27) Frequencies in the 932 to 932.5 MHz and 941 to 941.5 MHz bands are shared with Government fixed point-to-multipoint stations. Frequencies in these bands are paired with one another and are available for flexible use for transmission of the licensee's products and information services, excluding video entertainment material. 932.00625/941.00625 MHz to 932.24375/941.24375 MHz is licensed by Economic Area. 932.25625/941.25625 MHz to 932.49375/941.49375 MHz is licensed on a site-by-site basis.

(28) Licensees that obtain authorizations in the 928/952/956 MHz MAS bands subsequent to July 1, 1999 are limited to private internal services, as defined in §101.1305. Incumbent operations in the 928/952/956 MHz MAS bands, as defined in §101.1331(a), are subject to grandfather rights pursuant to §101.1331. The 928.85–929.0 MHz and 959.85–960.0 MHz bands are licensed on a geographic area basis with no eligibility restrictions. The 928.0–928.85 MHz band paired with the 952.0–952.85 MHz band, in addition to unpaired frequencies in the 956.25–956.45 MHz band, are licensed on a site-by-site basis and used for terrestrial point-to-point and point-to-multipoint fixed and limited mobile operations. The 928.85–929.0 MHz band paired with the 959.85–960.0 MHz band is licensed by Economic Area and used for terrestrial point-to-point and point-to-multipoint fixed operations.

(29) Frequencies in this band are shared with stations in the Multipoint Distribution Service (part 21). These frequencies may be used for the transmission of the licensee's products and information services, excluding

video entertainment material to the licensee's customers.

(30) The frequency band 18,580–19,300 GHz is not available for new licensees after June 8, 2000, except for low power indoor stations in the band 18,820–18,870 MHz and 19,160–19,210 MHz.

(31) This frequency band can be used for Multichannel Video Distribution and Data Service (MVDDS) shared with Direct Broadcast Satellite (DBS) Services on a co-primary non-harmful interference basis and on a co-primary basis with NGSO FSS satellite earth stations. Incumbent private operational fixed point-to-point licensees can also use these frequencies on a site by site basis.

(32) Frequencies in this band are shared with stations in the fixed-satellite service, subject to the conditions specified in footnote 15 of § 25.202(a)(1) of this chapter, see 47 CFR 47.25.202(a)(1) n.16.

(33) The coordination of a new 30 megahertz link in the 6,525–6,875 MHz band should be attempted only if it cannot be accommodated in the 5,925–6,425 MHz band.

(34) In the bands 6,875–7,125 MHz and 12,700–13,150 MHz, links shall not intersect with the service areas of television pickup stations.

(b) Frequencies normally available for assignment in this service are set forth with applicable limitations in the following tables: 928–960 MHz Multiple address system (MAS) frequencies are available for the point-to-multipoint and point-to-point transmission of a licensee's products or services, excluding video entertainment material, to a licensee's customer or for its own internal communications. The paired frequencies listed in this section are used for two-way communications between a master station and remote stations. Ancillary one-way communications on paired frequencies are permitted on a case-by-case basis. Ancillary communications between interrelated master stations are permitted on a secondary basis. The normal channel bandwidth assigned will be 12.5 kHz. EA licensees, however, may combine contiguous channels without limit or justification. Site-based licensees may combine contiguous channels up to 50 kHz, and more than 50 kHz only upon a showing of adequate justification. Any bandwidth (12.5 kHz, 25 kHz or greater) authorized in accordance with this section may be subdivided into narrower bandwidths to create additional (or sub) frequencies without the need to specify each discrete frequency within

the specific bandwidth. Equipment that is used to create additional frequencies by narrowing bandwidth (whether authorized for a 12.5 kHz, 25 kHz or greater bandwidth) will be required to meet, at a minimum, the  $\pm 0.00015$  percent tolerance requirement so that all subfrequencies will be within the emission mask. Systems licensed for frequencies in these MAS bands prior to August 1, 1975, may continue to operate as authorized until June 11, 1996, at which time they must comply with current MAS operations based on the 12.5 kHz channelization set forth in this paragraph. Systems licensed between August 1, 1975, and January 1, 1981, inclusive, are required to comply with the grandfathered 25 kHz standard bandwidth and channelization requirements set forth in this paragraph. Systems originally licensed after January 1, 1981, and on or before May 11, 1988, with bandwidths of 25 kHz and above, will be grandfathered indefinitely.

NOTE TO PARAGRAPH (b) INTRODUCTORY TEXT: Paragraphs (b)(1) through (b)(5) and Tables 1 through 7 of this section pertain to Multiple Address System (MAS) frequencies and paragraph (b)(6) and Tables 8 through 11 of this section pertain to Point-To-Point frequencies.

(1) Frequencies listed in this paragraph are designated for private internal use and are subject to site-based licensing.

TABLE 1—PAIRED FREQUENCIES (MHZ)  
[12.5 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.00625 ..... | 952.00625       |
| 928.01875 ..... | 952.01875       |
| 928.03125 ..... | 952.03125       |
| 928.04375 ..... | 952.04375       |
| 928.05625 ..... | 952.05625       |
| 928.06875 ..... | 952.06875       |
| 928.08125 ..... | 952.08125       |
| 928.09375 ..... | 952.09375       |
| 928.10625 ..... | 952.10625       |
| 928.11875 ..... | 952.11875       |
| 928.13125 ..... | 952.13125       |
| 928.14375 ..... | 952.14375       |
| 928.15625 ..... | 952.15625       |
| 928.16875 ..... | 952.16875       |
| 928.18125 ..... | 952.18125       |
| 928.19375 ..... | 952.19375       |
| 928.20625 ..... | 952.20625       |
| 928.21875 ..... | 952.21875       |
| 928.23125 ..... | 952.23125       |
| 928.24375 ..... | 952.24375       |
| 928.25625 ..... | 952.25625       |
| 928.26875 ..... | 952.26875       |

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TABLE 1—PAIRED FREQUENCIES (MHZ)—  
Continued  
[12.5 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.28125 ..... | 952.28125       |
| 928.29375 ..... | 952.29375       |
| 928.30625 ..... | 952.30625       |
| 928.31875 ..... | 952.31875       |
| 928.33125 ..... | 952.33125       |
| 928.34375 ..... | 952.34375       |

UNPAIRED FREQUENCIES (MHZ)  
[12.5 kHz bandwidth]

|           |           |           |
|-----------|-----------|-----------|
| 956.25625 | 956.33125 | 956.39375 |
| 956.26875 | 956.34375 | 956.40625 |
| 956.28125 | 956.35625 | 956.41875 |
| 956.29375 | 956.36875 | 956.43125 |
| 956.30625 | 956.38125 | 956.44375 |
| 956.31875 |           |           |

TABLE 2—PAIRED FREQUENCIES (MHZ)  
[25 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.0125 .....  | 952.0125        |
| 928.0375 .....  | 952.0375        |
| 928.0625 .....  | 952.0625        |
| 928.0875 .....  | 952.0875        |
| 928.1125 .....  | 952.1125        |
| 928.1375 .....  | 952.1375        |
| 928.1625 .....  | 952.1625        |
| 928.1875 .....  | 952.1875        |
| 928.2125 .....  | 952.2125        |
| 928.2375 .....  | 952.2375        |
| 928.2625 .....  | 952.2625        |
| 928.2875 .....  | 952.2875        |
| 928.3125 .....  | 952.3125        |
| 928.3375 .....  | 952.3375        |

UNPAIRED FREQUENCIES (MHZ)  
[25 kHz bandwidth]

|          |          |          |
|----------|----------|----------|
| 956.2625 | 956.3375 | 956.4125 |
| 956.2875 | 956.3625 | 956.4375 |
| 956.3125 | 956.3875 |          |

(2) Frequencies listed in this paragraph are designated for private internal use and are subject to site-based licensing.

TABLE 3—PAIRED FREQUENCIES (MHZ)  
[12.5 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.35625 ..... | 952.35625       |
| 928.36875 ..... | 928.36875       |
| 928.38125 ..... | 952.38125       |
| 928.39375 ..... | 952.39375       |
| 928.40625 ..... | 952.40625       |

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TABLE 3—PAIRED FREQUENCIES (MHZ)—  
Continued  
[12.5 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.41875 ..... | 952.41875       |
| 928.43125 ..... | 952.43125       |
| 928.44375 ..... | 952.44375       |
| 928.45625 ..... | 952.45625       |
| 928.46875 ..... | 952.46875       |
| 928.48125 ..... | 952.48125       |
| 928.49375 ..... | 952.49375       |
| 928.50625 ..... | 952.50625       |
| 928.51875 ..... | 952.51875       |
| 928.53125 ..... | 952.53125       |
| 928.54375 ..... | 952.54375       |
| 928.55625 ..... | 952.55625       |
| 928.56875 ..... | 952.56875       |
| 928.58125 ..... | 952.58125       |
| 928.59375 ..... | 952.59375       |
| 928.60625 ..... | 952.60625       |
| 928.61875 ..... | 952.61875       |
| 928.63125 ..... | 952.63125       |
| 928.64375 ..... | 952.64375       |
| 928.65625 ..... | 952.65625       |
| 928.66875 ..... | 952.66875       |
| 928.68125 ..... | 952.68125       |
| 928.69375 ..... | 952.69375       |
| 928.70625 ..... | 952.70625       |
| 928.71875 ..... | 952.71875       |
| 928.73125 ..... | 952.73125       |
| 928.74375 ..... | 952.74375       |
| 928.75625 ..... | 952.75625       |
| 928.76875 ..... | 952.76875       |
| 928.78125 ..... | 952.78125       |
| 928.79375 ..... | 952.79375       |
| 928.80625 ..... | 952.80625       |
| 928.81875 ..... | 952.81875       |
| 928.83125 ..... | 952.83125       |
| 928.84375 ..... | 952.84375       |

TABLE 4—PAIRED FREQUENCIES (MHZ)  
[25 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.3625 .....  | 952.3625        |
| 928.3875 .....  | 952.3875        |
| 928.4125 .....  | 952.4125        |
| 928.4375 .....  | 952.4375        |
| 928.4625 .....  | 952.4625        |
| 928.4875 .....  | 952.4875        |
| 928.5125 .....  | 952.5125        |
| 928.5375 .....  | 952.5375        |
| 928.5625 .....  | 952.5625        |
| 928.5875 .....  | 952.5875        |
| 928.6125 .....  | 952.6125        |
| 928.6375 .....  | 952.6375        |
| 928.6625 .....  | 952.6625        |
| 928.6875 .....  | 952.6875        |
| 928.7125 .....  | 952.7125        |
| 928.7375 .....  | 952.7375        |
| 928.7625 .....  | 952.7625        |
| 928.7875 .....  | 952.7875        |
| 928.8125 .....  | 952.8125        |
| 928.8375 .....  | 952.8375        |

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(3) Frequencies listed in this paragraph are not restricted to private internal use and are licensed by geographic area. Incumbent facilities must be protected.

TABLE 5—PAIRED FREQUENCIES (MHZ)  
[12.5 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.85625 ..... | 959.85625       |
| 928.86875 ..... | 959.86875       |
| 928.88125 ..... | 959.88125       |
| 928.89375 ..... | 959.89375       |
| 928.90625 ..... | 959.90625       |
| 928.91875 ..... | 959.91875       |
| 928.93125 ..... | 959.93125       |
| 928.94375 ..... | 959.94375       |
| 928.95625 ..... | 959.95625       |
| 928.96875 ..... | 959.96875       |
| 928.98125 ..... | 959.98125       |
| 928.99375 ..... | 959.99375       |

TABLE 6—PAIRED FREQUENCIES (MHZ)  
[25 kHz bandwidth]

| Remote transmit | Master transmit |
|-----------------|-----------------|
| 928.8625 .....  | 959.8625        |
| 928.8875 .....  | 959.8875        |
| 928.9125 .....  | 959.9125        |
| 928.9375 .....  | 959.9375        |
| 928.9625 .....  | 959.9625        |
| 928.9875 .....  | 959.9875        |

(4) Frequencies listed in this paragraph are licensed by either economic area or on a site-by-site basis.

TABLE 7—PAIRED FREQUENCIES

| Remote transmit                                                                      | Master transmit |
|--------------------------------------------------------------------------------------|-----------------|
| Licensed by Economic Area<br>(12.5 kHz bandwidth):                                   |                 |
| 932.00625 .....                                                                      | 941.00625       |
| 932.01875 .....                                                                      | 941.01875       |
| 932.03125 .....                                                                      | 941.03125       |
| 932.04375 .....                                                                      | 941.04375       |
| 932.05625 .....                                                                      | 941.05625       |
| 932.06875 .....                                                                      | 941.06875       |
| 932.08125 .....                                                                      | 941.08125       |
| 932.09375 .....                                                                      | 941.09375       |
| (50 kHz bandwidth):                                                                  |                 |
| 932.12500 .....                                                                      | 941.12500       |
| (12.5 kHz bandwidth):                                                                |                 |
| 932.15625 .....                                                                      | 941.15625       |
| 932.16875 .....                                                                      | 941.16875       |
| 932.18125 .....                                                                      | 941.18125       |
| 932.19375 .....                                                                      | 941.19375       |
| 932.20625 .....                                                                      | 941.20625       |
| 932.21875 .....                                                                      | 941.21875       |
| 932.23125 .....                                                                      | 941.23125       |
| 932.24375 .....                                                                      | 941.24375       |
| Reserved for public safety and private internal use. Licensed on site-by-site basis. |                 |
| (12.5 kHz bandwidth):                                                                |                 |
| 932.25625 .....                                                                      | 941.25625       |

TABLE 7—PAIRED FREQUENCIES—Continued

| Remote transmit                                                                                                 | Master transmit |
|-----------------------------------------------------------------------------------------------------------------|-----------------|
| 932.26875 .....                                                                                                 | 941.26875       |
| 932.28125 .....                                                                                                 | 941.28125       |
| 932.29375 .....                                                                                                 | 941.29375       |
| 932.30625 .....                                                                                                 | 941.30625       |
| 932.31875 .....                                                                                                 | 941.31875       |
| 932.33125 .....                                                                                                 | 941.33125       |
| 932.34375 .....                                                                                                 | 941.34375       |
| 932.35625 .....                                                                                                 | 941.35625       |
| 932.36875 .....                                                                                                 | 941.36875       |
| 932.38125 .....                                                                                                 | 941.38125       |
| 932.39375 .....                                                                                                 | 941.39375       |
| 932.40625 .....                                                                                                 | 941.40625       |
| 932.41875 .....                                                                                                 | 941.41875       |
| 932.43125 .....                                                                                                 | 941.43125       |
| Reserved for Public Safety and Federal Government Use. Licensed on site-by-site basis.<br>(12.5 kHz bandwidth): |                 |
| 932.44375 .....                                                                                                 | 941.44375       |
| 932.45625 .....                                                                                                 | 941.45625       |
| 932.46875 .....                                                                                                 | 941.46875       |
| 932.48125 .....                                                                                                 | 941.48125       |
| 932.49375 .....                                                                                                 | 941.49375       |

(5) Equivalent power and antenna heights for multiple address master stations:

| Antenna height (AAT) in meters | Maximum effective radiated power |     |
|--------------------------------|----------------------------------|-----|
|                                | Watts                            | dBm |
| Above 305 .....                | 200                              | 53  |
| Above 274 to 305 .....         | 250                              | 54  |
| Above 244 to 274 .....         | 315                              | 55  |
| Above 213 to 244 .....         | 400                              | 56  |
| Above 182 to 213 .....         | 500                              | 57  |
| Above 152.5 to 182 .....       | 630                              | 58  |
| 152.5 and below .....          | 1,000                            | 60  |

For mobile operations the maximum ERP is 25 watts (44 dBm).

(6) Fixed point-to-point frequencies.

TABLE 8—PAIRED FREQUENCIES

[All frequencies may be used by Common Carrier Fixed Point-to-Point and Private Operational Fixed Point-to-Point Microwave Service licensees; 25 kHz bandwidth]

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 932.5125 .....           | 941.5125                 |
| 932.5375 .....           | 941.5375                 |
| 932.5625 .....           | 941.5625                 |
| 932.5875 .....           | 941.5875                 |
| 932.6125 .....           | 941.6125                 |
| 932.6375 .....           | 941.6375                 |
| 932.6625 .....           | 941.6625                 |
| 934.8375 .....           | 943.8375                 |
| 934.8625 .....           | 943.8625                 |
| 934.8875 .....           | 943.8875                 |
| 934.9125 .....           | 943.9125                 |
| 934.9375 .....           | 943.9375                 |
| 934.9625 .....           | 943.9625                 |
| 934.9875 .....           | 943.9875                 |

TABLE 9—PAIRED FREQUENCIES

[Frequencies may be used only by Private Operational Fixed Point-to-Point Microwave Service licensees, unless otherwise noted; 50 kHz bandwidth]

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 932.70 <sup>1</sup>      | <sup>1</sup> 941.70      |
| 932.75 <sup>1</sup>      | <sup>1</sup> 941.75      |
| 934.80 <sup>1</sup>      | <sup>1</sup> 943.80      |
| 956.65                   | 953.05                   |
| 956.75                   | 953.15                   |
| 956.85                   | 953.25                   |
| 956.95                   | 953.35                   |
| 957.05                   | 953.45                   |
| 957.25                   | 953.65                   |
| 957.35                   | 953.75                   |
| 957.45                   | 953.85                   |
| 957.65                   | 954.05                   |
| 957.75                   | 954.15                   |
| 957.85                   | 954.25                   |
| 958.05                   | 954.45                   |
| 958.15                   | 954.55                   |
| 958.25                   | 954.65                   |
| 958.45                   | 954.85                   |
| 958.55                   | 954.95                   |
| 958.65                   | 955.05                   |
| 958.85                   | 955.25                   |
| 958.95                   | 955.35                   |
| 959.05                   | 955.45                   |
| 959.25                   | 955.65                   |
| 959.35                   | 955.75                   |
| 959.45                   | 955.85                   |
| 959.55                   | 955.95                   |
| 959.65                   | 956.05                   |

<sup>1</sup> These frequencies also may be used by Common Carrier Fixed Point-to-Point Microwave licensees.

TABLE 10—PAIRED FREQUENCIES

[Frequencies may be used only by Private Operational Fixed Point-to-Point Microwave licensees, unless otherwise noted; 100 kHz bandwidth]

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 932.8250 <sup>1</sup>    | <sup>1</sup> 941.8250    |
| 932.9250 <sup>1</sup>    | <sup>1</sup> 941.9250    |
| 933.0250 <sup>1</sup>    | <sup>1</sup> 942.0250    |
| 934.5250 <sup>1</sup>    | <sup>1</sup> 943.5250    |
| 934.6250 <sup>1</sup>    | <sup>1</sup> 943.6250    |
| 934.7250 <sup>1</sup>    | <sup>1</sup> 943.7250    |
| 956.6                    | 953.0                    |
| 956.7                    | 953.1                    |
| 956.8                    | 953.2                    |
| 956.9                    | 953.3                    |
| 957.0                    | 953.4                    |
| 957.1                    | 953.5                    |
| 957.2                    | 953.6                    |
| 957.3                    | 953.7                    |
| 957.4                    | 953.8                    |
| 957.5                    | 953.9                    |
| 957.6                    | 954.0                    |
| 957.7                    | 954.1                    |
| 957.8                    | 954.2                    |
| 957.9                    | 954.3                    |
| 958.0                    | 954.4                    |
| 958.1                    | 954.5                    |
| 958.2                    | 954.6                    |
| 958.3                    | 954.7                    |
| 958.4                    | 954.8                    |
| 958.5                    | 954.9                    |
| 958.6                    | 955.0                    |

TABLE 10—PAIRED FREQUENCIES—Continued

[Frequencies may be used only by Private Operational Fixed Point-to-Point Microwave licensees, unless otherwise noted; 100 kHz bandwidth]

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 958.7                    | 955.1                    |
| 958.8                    | 955.2                    |
| 958.9                    | 955.3                    |
| 959.0                    | 955.4                    |
| 959.1                    | 955.5                    |
| 959.2                    | 955.6                    |
| 959.3                    | 955.7                    |
| 959.4                    | 955.8                    |
| 959.5                    | 955.9                    |
| 959.6                    | 956.0                    |
| 959.7                    | 956.1                    |

<sup>1</sup> These frequencies also may be used by Common Carrier Fixed Point-to-Point Microwave licensees.

TABLE 11—PAIRED FREQUENCIES

[Frequencies may be used only by Private Operational Fixed Point-to-Point Microwave licensees, unless otherwise noted; (200 kHz bandwidth)]

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 933.1750 <sup>1</sup>    | <sup>1</sup> 942.1750    |
| 933.3750 <sup>1</sup>    | <sup>1</sup> 942.3750    |
| 933.5750 <sup>1</sup>    | <sup>1</sup> 942.5750    |
| 933.7750 <sup>1</sup>    | <sup>1</sup> 942.7750    |
| 933.9750 <sup>1</sup>    | <sup>1</sup> 942.9750    |
| 934.1750 <sup>1</sup>    | <sup>1</sup> 943.1750    |
| 934.3750 <sup>1</sup>    | <sup>1</sup> 943.3750    |
| 957.15                   | 953.55                   |
| 957.55                   | 953.95                   |
| 957.95                   | 954.35                   |
| 958.35                   | 954.75                   |
| 958.75                   | 955.15                   |
| 959.15                   | 955.55                   |

<sup>1</sup> These frequencies also may be used by Common Carrier Fixed Point-to-Point Microwave licensees.

(c) 1850–1990 MHz. (1) 10 MHz maximum bandwidth.

PAIRED FREQUENCIES

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 1855                     | 1935                     |
| 1865                     | 1945                     |
| 1875                     | 1955                     |
| 1885                     | 1965                     |
| 1895                     | 1975                     |
| 1905                     | 1985                     |

UNPAIRED FREQUENCIES

|                   |
|-------------------|
| 1915 <sup>1</sup> |
| 1925 <sup>1</sup> |

<sup>1</sup> Available for systems employing one-way transmission.

(2) 5 MHz maximum bandwidth.

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## PAIRED FREQUENCIES

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 1860 .....               | 1940                     |
| 1870 .....               | 1950                     |
| 1880 .....               | 1960                     |
| 1890 .....               | 1970                     |
| 1900 .....               | 1980                     |

(d) 2130–2150 MHz; 2180–2200 MHz. 800 kHz maximum bandwidth, unless noted.

## PAIRED FREQUENCIES

| 2130–2150                | 2180–2200                |
|--------------------------|--------------------------|
| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
| 2130.8 .....             | 2180.8                   |
| 2131.6 .....             | <sup>1</sup> 2181.6      |
| 2132.4 .....             | 2182.4                   |
| 2133.2 .....             | <sup>1</sup> 2183.2      |
| 2134.0 .....             | 2184.0                   |
| 2134.8 .....             | <sup>1</sup> 2184.8      |
| 2135.6 .....             | 2185.6                   |
| 2136.4 .....             | <sup>1</sup> 2186.4      |
| 2137.2 .....             | 2187.2                   |
| 2138.0 .....             | <sup>1</sup> 2188.0      |
| 2139.6 .....             | <sup>1</sup> 2189.6      |
| 2138.8 .....             | 2188.8                   |
| 2140.4 .....             | 2190.4                   |
| 2141.2 .....             | <sup>1</sup> 2191.2      |
| 2142.0 .....             | 2192.0                   |
| 2142.8 .....             | <sup>1</sup> 2192.8      |
| 2143.6 .....             | 2193.6                   |
| 2144.4 .....             | <sup>1</sup> 2194.4      |
| 2145.2 .....             | 2195.2                   |
| 2146.0 .....             | <sup>1</sup> 2196.0      |
| 2146.8 .....             | 2196.8                   |
| 2147.6 .....             | <sup>1</sup> 2197.6      |
| 2148.4 .....             | 2198.4                   |
| 2149.2 .....             | 2199.2                   |

<sup>1</sup> Consideration will be given on a case-by-case basis to assigning these frequency pairs to systems employing 1600 KHz bandwidth transmissions.

(e) [Reserved]

(f) 2450–2500 MHz. (1) This band is shared with other communications services and is not subject to protection from interference from industrial, scientific, and medical devices operating on 2450 MHz.

(2) Stations licensed in this band under this part prior to March 1, 1996, are grandfathered and may continue their authorized operations. Stations licensed in the 2483.5–2500 MHz portion of the band as of July 25, 1985, and licensees whose initial applications were filed on or before July 25, 1985, are grandfathered, and may continue operations, subject only to license renewal, on a co-primary basis with with the

mobile-satellite and radiodetermination-satellite services, and in the segment 2495–2500 MHz, their operations are also on a co-primary basis with part 27 fixed and mobile except aeronautical mobile service operations.

(3) 625 KHz bandwidth channels. The normal bandwidth authorized will be 625 KHz. Upon adequate justification, additional contiguous channels may be authorized to provide up to a 2500 KHz bandwidth.

## PAIRED FREQUENCIES

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 2450.3125 .....          | 2467.5625                |
| 2450.9375 .....          | 2468.1875                |
| 2451.5625 .....          | 2468.8125                |
| 2452.1875 .....          | 2469.4375                |
| 2452.8125 .....          | 2470.0625                |
| 2453.4375 .....          | 2470.6875                |
| 2454.0625 .....          | 2471.3125                |
| 2454.6875 .....          | 2471.9375                |
| 2455.3125 .....          | 2472.5625                |
| 2455.9375 .....          | 2473.1875                |
| 2456.5625 .....          | 2473.8125                |
| 2457.1875 .....          | 2474.4375                |
| 2457.8125 .....          | 2475.0625                |
| 2458.4375 .....          | 2475.6875                |
| 2459.0625 .....          | 2476.3125                |
| 2459.6875 .....          | 2476.9375                |
| 2460.3125 .....          | 2477.5625                |
| 2460.9375 .....          | 2478.1875                |
| 2461.5625 .....          | 2478.8125                |
| 2462.1875 .....          | 2479.4375                |
| 2462.8125 .....          | 2480.0625                |
| 2463.4375 .....          | 2480.6875                |
| 2464.0625 .....          | 2481.3125                |
| 2464.6875 .....          | 2481.9375                |
| 2465.3125 .....          | 2482.5625                |
| 2465.9375 .....          | 2483.1875                |

(g) [Reserved]

(h) 3,700 to 4,200 MHz outside the contiguous United States. 20 MHz maximum authorized bandwidth.

20 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 3710 .....               | 3750                     |
| 3730 .....               | 3770                     |
| 3790 .....               | 3830                     |
| 3810 .....               | 3850                     |
| 3870 .....               | 3910                     |
| 3890 .....               | 3930                     |
| 3950 .....               | 3990                     |
| 3970 .....               | 4010                     |
| 4030 .....               | 4070                     |
| 4050 .....               | 4090                     |
| 4110 .....               | 4150                     |
| 4130 .....               | 4170                     |
| N/A .....                | <sup>1</sup> 4190        |

<sup>1</sup> This frequency may be assigned for unpaired use.

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(i) *5,925 to 6,425 MHz*. 60 MHz authorized bandwidth.

(1) 400 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5925.225 .....           | 6177.100                 |
| 5925.625 .....           | 6177.500                 |
| 5926.050 .....           | 6177.925                 |
| 5926.450 .....           | 6178.325                 |
| 5926.875 .....           | 6178.750                 |
| 5927.275 .....           | 6179.150                 |
| 5927.725 .....           | 6179.600                 |
| 5928.125 .....           | 6180.000                 |
| 5928.550 .....           | 6180.425                 |
| 5928.950 .....           | 6180.825                 |
| 5929.375 .....           | 6181.250                 |
| 5929.775 .....           | 6181.650                 |
| 6168.350 .....           | 6420.225                 |
| 6168.750 .....           | 6420.625                 |
| 6169.175 .....           | 6421.050                 |
| 6169.575 .....           | 6421.450                 |
| 6170.000 .....           | 6421.875                 |
| 6170.400 .....           | 6422.275                 |
| 6170.850 .....           | 6422.725                 |
| 6171.250 .....           | 6423.125                 |
| 6171.675 .....           | 6423.550                 |
| 6172.075 .....           | 6423.950                 |
| 6172.500 .....           | 6424.375                 |
| 6172.900 .....           | 6424.775                 |

(2) 800 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5925.425 .....           | 6177.300                 |
| 5926.250 .....           | 6178.125                 |
| 5927.075 .....           | 6178.950                 |
| 5927.925 .....           | 6179.800                 |
| 5928.750 .....           | 6180.625                 |
| 5929.575 .....           | 6181.450                 |
| 6168.550 .....           | 6420.425                 |
| 6169.375 .....           | 6421.250                 |
| 6170.200 .....           | 6422.075                 |
| 6171.050 .....           | 6422.925                 |
| 6171.875 .....           | 6423.750                 |
| 6172.700 .....           | 6424.575                 |

(3) 1.25 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5925.625 .....           | 6177.500                 |
| 5926.875 .....           | 6178.750                 |
| 5928.125 .....           | 6180.000                 |
| 5929.375 .....           | 6181.250                 |
| 6108.893 .....           | 6360.933                 |
| 6110.128 .....           | 6362.168                 |
| 6111.364 .....           | 6363.404                 |
| 6112.599 .....           | 6364.639                 |
| 6113.834 .....           | 6365.874                 |
| 6115.070 .....           | 6367.110                 |
| 6116.305 .....           | 6368.345                 |
| 6117.541 .....           | 6369.581                 |
| 6118.776 .....           | 6370.816                 |
| 6120.011 .....           | 6372.051                 |
| 6121.247 .....           | 6373.287                 |
| 6122.482 .....           | 6374.522                 |
| 6123.718 .....           | 6375.758                 |
| 6124.953 .....           | 6376.993                 |

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6126.189 .....              | 6378.229                 |
| 6127.424 .....              | 6379.464                 |
| 6128.659 .....              | 6380.699                 |
| 6129.895 .....              | 6381.935                 |
| 6131.130 .....              | 6383.170                 |
| 6132.366 .....              | 6384.406                 |
| 6133.601 .....              | 6385.641                 |
| 6134.836 .....              | 6386.876                 |
| 6136.072 .....              | 6388.112                 |
| 6137.307 .....              | 6389.347                 |
| 6138.543 .....              | 6390.583                 |
| 6139.778 .....              | 6391.818                 |
| 6141.014 .....              | 6393.054                 |
| 6142.249 .....              | 6394.289                 |
| 6143.484 .....              | 6395.524                 |
| 6144.720 .....              | 6396.760                 |
| 6145.955 .....              | 6397.995                 |
| 6147.191 .....              | 6399.231                 |
| 6148.426 .....              | 6400.466                 |
| 6149.661 .....              | 6401.701                 |
| 6150.897 .....              | 6402.937                 |
| 6152.132 .....              | 6404.172                 |
| 6153.368 .....              | 6405.408                 |
| 6154.603 .....              | 6406.643                 |
| 6155.839 .....              | 6407.879                 |
| 6157.074 .....              | 6409.114                 |
| 6158.309 .....              | 6410.349                 |
| 6159.545 .....              | 6411.585                 |
| 6160.780 .....              | 6412.820                 |
| 6162.016 .....              | 6414.056                 |
| 6163.251 .....              | 6415.291                 |
| 6164.486 .....              | 6416.526                 |
| 6165.722 .....              | 6417.762                 |
| 6166.957 .....              | 6418.997                 |
| 6168.750 .....              | 6420.625                 |
| 6170.000 .....              | 6421.875                 |
| 6171.250 .....              | 6423.125                 |
| 6172.500 .....              | 6424.375                 |
| 6173.750 <sup>1</sup> ..... | N/A                      |
| 6175.000 <sup>1</sup> ..... | N/A                      |
| 6176.250 <sup>1</sup> ..... | N/A                      |

<sup>1</sup> These frequencies may be assigned for unpaired use.

(4) 2.5 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5926.250 .....           | 6178.125                 |
| 5928.750 .....           | 6180.625                 |
| 6109.510 .....           | 6361.550                 |
| 6111.981 .....           | 6364.021                 |
| 6114.452 .....           | 6366.492                 |
| 6116.923 .....           | 6368.963                 |
| 6119.394 .....           | 6371.434                 |
| 6121.865 .....           | 6373.905                 |
| 6124.335 .....           | 6376.375                 |
| 6126.806 .....           | 6378.846                 |
| 6129.277 .....           | 6381.317                 |
| 6131.748 .....           | 6383.788                 |
| 6134.219 .....           | 6386.259                 |
| 6136.690 .....           | 6388.730                 |
| 6139.160 .....           | 6391.200                 |
| 6141.631 .....           | 6393.671                 |
| 6144.102 .....           | 6396.142                 |
| 6146.573 .....           | 6398.613                 |
| 6149.044 .....           | 6401.084                 |
| 6151.515 .....           | 6403.555                 |
| 6153.985 .....           | 6406.025                 |
| 6156.456 .....           | 6408.496                 |
| 6158.927 .....           | 6410.967                 |

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| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6161.398 .....              | 6413.438                 |
| 6163.869 .....              | 6415.909                 |
| 6166.340 .....              | 6418.380                 |
| 6169.375 .....              | 6421.250                 |
| 6171.875 .....              | 6423.750                 |
| 6175.625 <sup>1</sup> ..... | N/A                      |

<sup>1</sup> This frequency may be assigned for unpaired use.

## (5) 3.75 MHz bandwidth channels:

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6111.364 .....              | 6363.404                 |
| 6116.305 .....              | 6368.345                 |
| 6121.247 .....              | 6373.287                 |
| 6126.189 .....              | 6378.229                 |
| 6131.130 .....              | 6383.170                 |
| 6136.072 .....              | 6388.112                 |
| 6141.014 .....              | 6393.054                 |
| 6145.955 .....              | 6397.995                 |
| 6150.897 .....              | 6402.937                 |
| 6155.839 .....              | 6407.879                 |
| 6160.780 .....              | 6412.820                 |
| 6165.722 .....              | 6417.762                 |
| 6175.000 <sup>1</sup> ..... | N/A                      |

<sup>1</sup> This frequency may be assigned for unpaired use.

## (6) 5 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6110.75 .....            | 6362.79                  |
| 6115.69 .....            | 6367.73                  |
| 6120.63 .....            | 6372.67                  |
| 6125.57 .....            | 6377.61                  |
| 6130.51 .....            | 6382.55                  |
| 6135.45 .....            | 6387.49                  |
| 6140.40 .....            | 6392.44                  |
| 6145.34 .....            | 6397.38                  |
| 6150.28 .....            | 6402.32                  |
| 6155.22 .....            | 6407.26                  |
| 6160.16 .....            | 6412.20                  |
| 6165.10 .....            | 6417.14                  |

## (7) 10 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5935.32 .....            | 6187.36                  |
| 5945.20 .....            | 6197.24                  |
| 5955.08 .....            | 6207.12                  |
| 5964.97 .....            | 6217.01                  |
| 5974.85 .....            | 6226.89                  |
| 5984.73 .....            | 6236.77                  |
| 5994.62 .....            | 6246.66                  |
| 6004.50 .....            | 6256.54                  |
| 6014.38 .....            | 6266.42                  |
| 6024.27 .....            | 6276.31                  |
| 6034.15 .....            | 6286.19                  |
| 6044.03 .....            | 6296.07                  |
| 6053.92 .....            | 6305.96                  |
| 6063.80 .....            | 6315.84                  |
| 6073.68 .....            | 6325.72                  |
| 6083.57 .....            | 6335.61                  |
| 6093.45 .....            | 6345.49                  |
| 6103.33 .....            | 6355.37                  |

| Transmit (receive) (MHz)   | Receive (transmit) (MHz) |
|----------------------------|--------------------------|
| 6113.22 <sup>1</sup> ..... | <sup>1</sup> 6365.26     |
| 6123.10 <sup>1</sup> ..... | <sup>1</sup> 6375.14     |
| 6132.98 <sup>1</sup> ..... | <sup>1</sup> 6385.02     |
| 6142.87 <sup>1</sup> ..... | <sup>1</sup> 6394.91     |
| 6152.75 <sup>1</sup> ..... | <sup>1</sup> 6404.79     |
| 6162.63 <sup>1</sup> ..... | <sup>1</sup> 6414.67     |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

## (8) 30 MHz bandwidth channels:

| Transmit (receive) (MHz)   | Receive (transmit) (MHz) |
|----------------------------|--------------------------|
| 5945.20 .....              | 6197.24                  |
| 5974.85 .....              | 6226.89                  |
| 6004.50 .....              | 6256.54                  |
| 6034.15 .....              | 6286.19                  |
| 6063.80 .....              | 6315.84                  |
| 6093.45 .....              | 6345.49                  |
| 6123.10 <sup>1</sup> ..... | <sup>1</sup> 6375.14     |
| 6152.75 <sup>1</sup> ..... | <sup>1</sup> 6404.79     |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

## (9) 60 MHz bandwidth channels:<sup>1</sup>

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 5960.025                 | 6212.065                 |
| 6019.325                 | 6271.365                 |
| 6078.625                 | 6330.665                 |
| 6137.925                 | 6389.965                 |

(j) 6,425 to 6,525 MHz: *Mobile*. Paired and un-paired operations permitted. Use of this spectrum for direct delivery of video programs to the general public or multi-channel cable distribution is not permitted. This band is co-equally shared with mobile stations licensed pursuant to parts 74 and 78 of the Commission's Rules. Stations not intended to be operated while in motion will be licensed under the provision of §101.31. The following channel plans apply.

## (1) 1 MHz maximum authorized bandwidth channels:

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6425.5 .....                | 6475.5                      |
| 6450.5 .....                | 6500.5                      |

## (2) 8 MHz maximum authorized bandwidth channels:

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6430.0 .....                | 6480.0                      |

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6438.0 .....                | 6488.0                      |
| 6446.0 .....                | 6496.0                      |
| 6455.0 .....                | 6505.0                      |
| 6463.0 .....                | 6513.0                      |
| 6471.0 .....                | 6521.0                      |

(3) 25 MHz maximum authorized bandwidth channels:

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6437.5 .....                | 6487.5                      |
| 6462.5 .....                | 6512.5                      |

(k) 6,525 to 6,875 MHz. 10 MHz authorized bandwidth.

(1) 400 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6525.225 .....           | 6870.225                 |
| 6525.625 .....           | 6870.625                 |
| 6526.050 .....           | 6871.050                 |
| 6526.450 .....           | 6871.450                 |
| 6526.875 .....           | 6871.875                 |
| 6527.275 .....           | 6872.275                 |
| 6527.725 .....           | 6872.725                 |
| 6528.125 .....           | 6873.125                 |
| 6528.550 .....           | 6873.550                 |
| 6528.950 .....           | 6873.950                 |
| 6529.375 .....           | 6874.375                 |
| 6529.775 .....           | 6874.775                 |

(2) 800 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6525.425 .....           | 6870.425                 |
| 6526.250 .....           | 6871.250                 |
| 6527.075 .....           | 6872.075                 |
| 6527.925 .....           | 6872.925                 |
| 6528.750 .....           | 6873.750                 |
| 6529.575 .....           | 6874.575                 |

(3) 1.25 MHz bandwidth channels:

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6525.625 .....              | 6870.625                 |
| 6526.875 .....              | 6871.875                 |
| 6528.125 .....              | 6873.125                 |
| 6529.375 .....              | 6874.375                 |
| 6540.625 <sup>1</sup> ..... | <sup>1</sup> 6718.125    |
| 6541.875 <sup>1</sup> ..... | <sup>1</sup> 6719.375    |
| 6543.125 <sup>1</sup> ..... | <sup>1</sup> 6713.125    |
| 6544.375 <sup>1</sup> ..... | <sup>1</sup> 6714.375    |
| 6545.625 <sup>1</sup> ..... | <sup>1</sup> 6715.625    |
| 6546.875 <sup>1</sup> ..... | <sup>1</sup> 6716.875    |
| 6548.125 .....              | 6728.125                 |
| 6549.375 .....              | 6729.375                 |
| 6550.625 .....              | 6730.625                 |
| 6551.875 .....              | 6731.875                 |
| 6553.125 <sup>1</sup> ..... | <sup>1</sup> 6723.125    |

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6554.375 <sup>1</sup> ..... | <sup>1</sup> 6724.375    |
| 6555.625 <sup>1</sup> ..... | <sup>1</sup> 6725.625    |
| 6556.875 <sup>1</sup> ..... | <sup>1</sup> 6726.875    |
| 6558.125 .....              | 6738.125                 |
| 6559.375 .....              | 6739.375                 |
| 6560.625 .....              | 6740.625                 |
| 6561.875 .....              | 6741.875                 |
| 6563.125 .....              | 6733.125                 |
| 6564.375 .....              | 6734.375                 |
| 6565.625 .....              | 6735.625                 |
| 6566.875 .....              | 6736.875                 |
| 6568.125 <sup>1</sup> ..... | <sup>1</sup> 6720.625    |
| 6569.375 <sup>1</sup> ..... | <sup>1</sup> 6721.875    |
| 6580.625 <sup>1</sup> ..... | <sup>1</sup> 6868.125    |
| 6581.875 <sup>1</sup> ..... | <sup>1</sup> 6869.375    |
| 6583.125 .....              | 6743.125                 |
| 6584.375 .....              | 6744.375                 |
| 6585.625 .....              | 6745.625                 |
| 6586.875 .....              | 6746.875                 |
| 6588.125 .....              | 6748.125                 |
| 6589.375 .....              | 6749.375                 |
| 6590.625 .....              | 6750.625                 |
| 6591.875 .....              | 6751.875                 |
| 6593.125 .....              | 6753.125                 |
| 6594.375 .....              | 6754.375                 |
| 6595.625 .....              | 6755.625                 |
| 6596.875 .....              | 6756.875                 |
| 6598.125 .....              | 6758.125                 |
| 6599.375 .....              | 6759.375                 |
| 6600.625 .....              | 6760.625                 |
| 6601.875 .....              | 6761.875                 |
| 6603.125 .....              | 6763.125                 |
| 6604.375 .....              | 6764.375                 |
| 6605.625 .....              | 6765.625                 |
| 6606.875 .....              | 6766.875                 |
| 6608.125 .....              | 6768.125                 |
| 6609.375 .....              | 6769.375                 |
| 6610.625 .....              | 6770.625                 |
| 6611.875 .....              | 6771.875                 |
| 6613.125 .....              | 6773.125                 |
| 6614.375 .....              | 6774.375                 |
| 6615.625 .....              | 6775.625                 |
| 6616.875 .....              | 6776.875                 |
| 6618.125 .....              | 6778.125                 |
| 6619.375 .....              | 6779.375                 |
| 6620.625 .....              | 6780.625                 |
| 6621.875 .....              | 6781.875                 |
| 6623.125 .....              | 6783.125                 |
| 6624.375 .....              | 6784.375                 |
| 6625.625 .....              | 6785.625                 |
| 6626.875 .....              | 6786.875                 |
| 6628.125 .....              | 6788.125                 |
| 6629.375 .....              | 6789.375                 |
| 6630.625 .....              | 6790.625                 |
| 6631.875 .....              | 6791.875                 |
| 6633.125 .....              | 6793.125                 |
| 6634.375 .....              | 6794.375                 |
| 6635.625 .....              | 6795.625                 |
| 6636.875 .....              | 6796.875                 |
| 6638.125 .....              | 6798.125                 |
| 6639.375 .....              | 6799.375                 |
| 6640.625 .....              | 6800.625                 |
| 6641.875 .....              | 6801.875                 |
| 6643.125 .....              | 6803.125                 |
| 6644.375 .....              | 6804.375                 |
| 6645.625 .....              | 6805.625                 |
| 6646.875 .....              | 6806.875                 |
| 6648.125 .....              | 6808.125                 |
| 6649.375 .....              | 6809.375                 |
| 6650.625 .....              | 6810.625                 |
| 6651.875 .....              | 6811.875                 |
| 6653.125 .....              | 6813.125                 |

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| Transmit (receive) (MHz)    | Receive (transmit) (MHz) | Transmit (receive) (MHz)   | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|----------------------------|--------------------------|
| 6654.375 .....              | 6814.375                 | 6593.75 .....              | 6753.75                  |
| 6655.625 .....              | 6815.625                 | 6596.25 .....              | 6756.25                  |
| 6656.875 .....              | 6816.875                 | 6598.75 .....              | 6758.75                  |
| 6658.125 .....              | 6818.125                 | 6601.25 .....              | 6761.25                  |
| 6659.375 .....              | 6819.375                 | 6603.75 .....              | 6763.75                  |
| 6660.625 .....              | 6820.625                 | 6606.25 .....              | 6766.25                  |
| 6661.875 .....              | 6821.875                 | 6608.75 .....              | 6768.75                  |
| 6663.125 .....              | 6823.125                 | 6611.25 .....              | 6771.25                  |
| 6664.375 .....              | 6824.375                 | 6613.75 .....              | 6773.75                  |
| 6665.625 .....              | 6825.625                 | 6616.25 .....              | 6776.25                  |
| 6666.875 .....              | 6826.875                 | 6618.75 .....              | 6778.75                  |
| 6668.125 .....              | 6828.125                 | 6621.25 .....              | 6781.25                  |
| 6669.375 .....              | 6829.375                 | 6623.75 .....              | 6783.75                  |
| 6670.625 .....              | 6830.625                 | 6626.25 .....              | 6786.25                  |
| 6671.875 .....              | 6831.875                 | 6628.75 .....              | 6788.75                  |
| 6673.125 .....              | 6833.125                 | 6631.25 .....              | 6791.25                  |
| 6674.375 .....              | 6834.375                 | 6633.75 .....              | 6793.75                  |
| 6675.625 .....              | 6835.625                 | 6636.25 .....              | 6796.25                  |
| 6676.875 .....              | 6836.875                 | 6638.75 .....              | 6798.75                  |
| 6678.125 .....              | 6838.125                 | 6641.25 .....              | 6801.25                  |
| 6679.375 .....              | 6839.375                 | 6643.75 .....              | 6803.75                  |
| 6680.625 .....              | 6840.625                 | 6646.25 .....              | 6806.25                  |
| 6681.875 .....              | 6841.875                 | 6648.75 .....              | 6808.75                  |
| 6683.125 .....              | 6843.125                 | 6651.25 .....              | 6811.25                  |
| 6684.375 .....              | 6844.375                 | 6653.75 .....              | 6813.75                  |
| 6685.625 .....              | 6845.625                 | 6656.25 .....              | 6816.25                  |
| 6686.875 .....              | 6846.875                 | 6658.75 .....              | 6818.75                  |
| 6688.125 .....              | 6848.125                 | 6661.25 .....              | 6821.25                  |
| 6689.375 .....              | 6849.375                 | 6663.75 .....              | 6823.75                  |
| 6690.625 .....              | 6850.625                 | 6666.25 .....              | 6826.25                  |
| 6691.875 .....              | 6851.875                 | 6668.75 .....              | 6828.75                  |
| 6693.125 .....              | 6853.125                 | 6671.25 .....              | 6831.25                  |
| 6694.375 .....              | 6854.375                 | 6673.75 .....              | 6833.75                  |
| 6695.625 .....              | 6855.625                 | 6676.25 .....              | 6836.25                  |
| 6696.875 .....              | 6856.875                 | 6678.75 .....              | 6838.75                  |
| 6698.125 .....              | 6858.125                 | 6681.25 .....              | 6841.25                  |
| 6699.375 .....              | 6859.375                 | 6683.75 .....              | 6843.75                  |
| 6700.625 .....              | 6860.625                 | 6686.25 .....              | 6846.25                  |
| 6701.875 .....              | 6861.875                 | 6688.75 .....              | 6848.75                  |
| 6703.125 .....              | 6863.125                 | 6691.25 .....              | 6851.25                  |
| 6704.375 .....              | 6864.375                 | 6693.75 .....              | 6853.75                  |
| 6705.625 .....              | 6865.625                 | 6696.25 .....              | 6856.25                  |
| 6706.875 .....              | 6866.875                 | 6698.75 .....              | 6858.75                  |
| 6708.125 <sup>1</sup> ..... | <sup>1</sup> 6710.625    | 6701.25 .....              | 6861.25                  |
| 6709.375 <sup>1</sup> ..... | <sup>1</sup> 6711.875    | 6703.75 .....              | 6863.75                  |
|                             |                          | 6706.25 .....              | 6866.25                  |
|                             |                          | 6708.75 <sup>1</sup> ..... | <sup>1</sup> 6711.25     |

<sup>1</sup> These frequencies may be assigned for unpaired use.

**(4) 2.5 MHz bandwidth channels:**

| Transmit (receive) (MHz)   | Receive (transmit) (MHz) |
|----------------------------|--------------------------|
| 6526.25 .....              | 6871.25                  |
| 6528.75 .....              | 6873.75                  |
| 6541.25 <sup>1</sup> ..... | <sup>1</sup> 6718.75     |
| 6543.75 <sup>1</sup> ..... | <sup>1</sup> 6713.75     |
| 6546.25 <sup>1</sup> ..... | <sup>1</sup> 6716.25     |
| 6548.75 .....              | 6728.75                  |
| 6551.25 .....              | 6731.25                  |
| 6553.75 <sup>1</sup> ..... | <sup>1</sup> 6723.75     |
| 6556.25 <sup>1</sup> ..... | <sup>1</sup> 6726.25     |
| 6558.75 .....              | 6738.75                  |
| 6561.25 .....              | 6741.25                  |
| 6563.75 .....              | 6733.75                  |
| 6566.25 .....              | 6736.25                  |
| 6568.75 <sup>1</sup> ..... | <sup>1</sup> 6721.25     |
| 6581.25 <sup>1</sup> ..... | <sup>1</sup> 6868.75     |
| 6583.75 .....              | 6743.75                  |
| 6586.25 .....              | 6746.25                  |
| 6588.75 .....              | 6748.75                  |
| 6591.25 .....              | 6741.25                  |

<sup>1</sup> These frequencies may be assigned for unpaired use.

**(5) 3.75 MHz bandwidth channels:**

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6545.625 <sup>1</sup> ..... | 6715.625 <sup>1</sup>    |
| 6550.625 .....              | 6730.625                 |
| 6555.625 <sup>1</sup> ..... | 6725.625 <sup>1</sup>    |
| 6560.625 .....              | 6740.625                 |
| 6565.625 .....              | 6735.625                 |
| 6585.625 .....              | 6745.625                 |
| 6590.625 .....              | 6750.625                 |
| 6595.625 .....              | 6755.625                 |
| 6600.625 .....              | 6760.625                 |
| 6605.625 .....              | 6765.625                 |
| 6610.625 .....              | 6770.625                 |
| 6615.625 .....              | 6775.625                 |
| 6620.625 .....              | 6780.625                 |
| 6625.625 .....              | 6785.625                 |
| 6630.625 .....              | 6790.625                 |
| 6635.625 .....              | 6795.625                 |
| 6640.625 .....              | 6800.625                 |

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 6645.625 .....              | 6805.625                 |
| 6650.625 .....              | 6810.625                 |
| 6655.625 .....              | 6815.625                 |
| 6660.625 .....              | 6820.625                 |
| 6665.625 .....              | 6825.625                 |
| 6670.625 .....              | 6830.625                 |
| 6675.625 .....              | 6835.625                 |
| 6680.625 .....              | 6840.625                 |
| 6685.625 .....              | 6845.625                 |
| 6690.625 .....              | 6850.625                 |
| 6695.625 .....              | 6855.625                 |
| 6700.625 .....              | 6860.625                 |
| 6705.625 .....              | 6865.625                 |
| 6710.625 <sup>1</sup> ..... | <sup>1</sup> 6720.625    |

<sup>1</sup> These frequencies may be assigned for unpaired use.

(6) 5 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6545 <sup>1</sup> .....  | <sup>1</sup> 6715        |
| 6550 .....               | 6730                     |
| 6555 <sup>1</sup> .....  | <sup>1</sup> 6725        |
| 6560 .....               | 6740                     |
| 6565 .....               | 6735                     |
| 6585 .....               | 6745                     |
| 6590 .....               | 6750                     |
| 6595 .....               | 6755                     |
| 6600 .....               | 6760                     |
| 6605 .....               | 6765                     |
| 6610 .....               | 6770                     |
| 6615 .....               | 6775                     |
| 6620 .....               | 6780                     |
| 6625 .....               | 6785                     |
| 6630 .....               | 6790                     |
| 6635 .....               | 6795                     |
| 6640 .....               | 6800                     |
| 6645 .....               | 6805                     |
| 6650 .....               | 6810                     |
| 6655 .....               | 6815                     |
| 6660 .....               | 6820                     |
| 6665 .....               | 6825                     |
| 6670 .....               | 6830                     |
| 6675 .....               | 6835                     |
| 6680 .....               | 6840                     |
| 6685 .....               | 6845                     |
| 6690 .....               | 6850                     |
| 6695 .....               | 6855                     |
| 6700 .....               | 6860                     |
| 6705 .....               | 6865                     |
| 6710 <sup>1</sup> .....  | <sup>1</sup> 6720        |

<sup>1</sup> These frequencies may be assigned for unpaired use.

(7) 10 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6545 <sup>1</sup> .....  | <sup>1</sup> 6715        |
| 6555 <sup>1</sup> .....  | <sup>1</sup> 6725        |
| 6565 .....               | 6735                     |
| 6585 .....               | 6745                     |
| 6595 .....               | 6755                     |
| 6605 .....               | 6765                     |
| 6615 .....               | 6775                     |
| 6625 .....               | 6785                     |
| 6635 .....               | 6795                     |
| 6645 .....               | 6805                     |
| 6655 .....               | 6815                     |

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6665 .....               | 6825                     |
| 6675 .....               | 6835                     |
| 6685 .....               | 6845                     |
| 6695 .....               | 6855                     |
| 6705 .....               | 6865                     |
| 6535 <sup>2</sup> .....  | <sup>2</sup> 6575        |

<sup>1</sup> These frequencies may be assigned for unpaired use.

<sup>2</sup> Available only for emergency restoration, maintenance by-pass, or other temporary-fixed purposes. Such uses are authorized on a non-interference basis to other frequencies in this band. Interference analysis required by § 101.105 does not apply to this frequency pair.

(8) 30 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6555 .....               | 6725                     |
| 6595 .....               | 6755                     |
| 6625 .....               | 6785                     |
| 6655 .....               | 6815                     |
| 6685 .....               | 6845                     |

(1) 6875 to 7125 MHz. 25 MHz authorized bandwidth.

(1) 5 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6877.5                   | 7027.5                   |
| 6882.5                   | 7032.5                   |
| 6887.5                   | 7037.5                   |
| 6892.5                   | 7042.5                   |
| 6897.5                   | 7047.5                   |
| 6902.5                   | 7052.5                   |
| 6907.5                   | 7057.5                   |
| 6912.5                   | 7062.5                   |
| 6917.5                   | 7067.5                   |
| 6922.5                   | 7072.5                   |
| 6927.5                   | 7077.5                   |
| 6932.5                   | 7082.5                   |
| 6937.5                   | 7087.5                   |
| 6942.5                   | 7092.5                   |
| 6947.5                   | 7097.5                   |
| 6952.5                   | 7102.5                   |
| 6957.5                   | 7107.5                   |
| 6962.5                   | 7112.5                   |
| 6967.5                   | 7117.5                   |
| 6972.5                   | 7122.5                   |

(2) 8.33 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 6879.165                 | 7029.165                 |
| 6887.495                 | 7037.495                 |
| 6895.825                 | 7045.825                 |
| 6904.155                 | 7054.155                 |
| 6912.485                 | 7062.485                 |
| 6920.815                 | 7070.815                 |
| 6929.145                 | 7079.145                 |
| 6937.475                 | 7087.475                 |
| 6945.805                 | 7095.805                 |
| 6954.135                 | 7104.135                 |
| 6962.465                 | 7112.465                 |
| 6970.795                 | 7120.795                 |

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## (3) 12.5 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 6881.25                        | 7031.25                        |
| 6893.75                        | 7043.75                        |
| 6906.25                        | 7056.25                        |
| 6918.75                        | 7068.75                        |
| 6931.25                        | 7081.25                        |
| 6943.75                        | 7093.75                        |
| 6956.25                        | 7106.25                        |
| 6968.75                        | 7118.75                        |

## (4) 25 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 6887.5                         | 7037.5                         |
| 6912.5                         | 7062.5                         |
| 6937.5                         | 7087.5                         |
| 6962.5                         | 7112.5                         |

(m) 10,550 to 10,680 MHz. 5 MHz authorized bandwidth.

## (1) 400 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|
| 10605.225 .....          | 10670.225                      |
| 10605.625 .....          | 10670.625                      |
| 10606.050 .....          | 10671.050                      |
| 10606.450 .....          | 10671.450                      |
| 10606.875 .....          | 10671.875                      |
| 10607.275 .....          | 10672.275                      |
| 10607.725 .....          | 10672.725                      |
| 10608.125 .....          | 10673.125                      |
| 10608.550 .....          | 10673.550                      |
| 10608.950 .....          | 10673.950                      |
| 10609.375 .....          | 10674.375                      |
| 10609.775 .....          | 10674.775                      |
| 10610.225 .....          | 10675.225                      |
| 10610.625 .....          | 10675.625                      |
| 10611.050 .....          | 10676.050                      |
| 10611.450 .....          | 10676.450                      |
| 10611.875 .....          | 10676.875                      |
| 10612.275 .....          | 10677.275                      |
| 10612.725 .....          | 10677.725                      |
| 10613.125 .....          | 10678.125                      |
| 10613.550 .....          | 10678.550                      |
| 10613.950 .....          | 10678.950                      |
| 10614.375 .....          | 10679.375                      |
| 10614.775 .....          | 10679.775                      |

## (2) 800 kHz bandwidth channels:

| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|
| 10605.425 .....          | 10670.425                      |
| 10606.250 .....          | 10671.250                      |
| 10607.075 .....          | 10672.075                      |
| 10607.925 .....          | 10672.925                      |
| 10608.750 .....          | 10673.750                      |
| 10609.575 .....          | 10674.575                      |
| 10610.425 .....          | 10675.425                      |
| 10611.250 .....          | 10676.250                      |
| 10612.075 .....          | 10677.075                      |
| 10612.925 .....          | 10677.925                      |

| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|
| 10613.750 .....          | 10678.750                      |
| 10614.575 .....          | 10679.575                      |

## (3) 1.25 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|
| 10550.625 .....          | 10615.625                      |
| 10551.875 .....          | 10616.875                      |
| 10553.125 .....          | 10618.125                      |
| 10554.375 .....          | 10619.375                      |
| 10555.625 .....          | 10620.625                      |
| 10556.875 .....          | 10621.875                      |
| 10558.125 .....          | 10623.125                      |
| 10559.375 .....          | 10624.375                      |
| 10560.625 .....          | 10625.625                      |
| 10561.875 .....          | 10626.875                      |
| 10563.125 .....          | 10628.125                      |
| 10564.375 .....          | 10629.375                      |
| 10565.625 .....          | 10630.625                      |
| 10566.875 .....          | 10631.875                      |
| 10568.125 .....          | 10633.125                      |
| 10569.375 .....          | 10634.375                      |
| 10570.625 .....          | 10635.625                      |
| 10571.875 .....          | 10636.875                      |
| 10573.125 .....          | 10638.125                      |
| 10574.375 .....          | 10639.375                      |
| 10575.625 .....          | 10640.625                      |
| 10576.875 .....          | 10641.875                      |
| 10578.125 .....          | 10643.125                      |
| 10579.375 .....          | 10644.375                      |
| 10580.625 .....          | 10645.625                      |
| 10581.875 .....          | 10646.875                      |
| 10583.125 .....          | 10648.125                      |
| 10584.375 .....          | 10649.375                      |
| 10585.625 .....          | 10650.625                      |
| 10586.875 .....          | 10651.875                      |
| 10588.125 .....          | 10653.125                      |
| 10589.375 .....          | 10654.375                      |
| 10590.625 .....          | 10655.625                      |
| 10591.875 .....          | 10656.875                      |
| 10593.125 .....          | 10658.125                      |
| 10594.375 .....          | 10659.375                      |
| 10595.625 .....          | 10660.625                      |
| 10596.875 .....          | 10661.875                      |
| 10598.125 .....          | 10663.125                      |
| 10599.375 .....          | 10664.375                      |
| 10600.625 .....          | 10665.625                      |
| 10601.875 .....          | 10666.875                      |
| 10603.125 .....          | 10668.125                      |
| 10604.375 .....          | 10669.375                      |
| 10605.625 .....          | 10670.625                      |
| 10606.875 .....          | 10671.875                      |
| 10608.125 .....          | 10673.125                      |
| 10609.375 .....          | 10674.375                      |
| 10610.625 .....          | 10675.625                      |
| 10611.875 .....          | 10676.875                      |
| 10613.125 .....          | 10678.125                      |
| 10614.375 .....          | 10679.375                      |

## (4) 2.5 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|
| 10551.25 .....           | 10616.25                       |
| 10553.75 .....           | 10618.75                       |
| 10556.25 .....           | 10621.25                       |
| 10558.75 .....           | 10623.75                       |

| Transmit (receive) (MHz)    | Receive (transmit) (MHz) |
|-----------------------------|--------------------------|
| 10561.25 .....              | 10626.25                 |
| 10563.75 .....              | 10628.75                 |
| 10566.25 .....              | 10631.25                 |
| 10568.75 .....              | 10633.75                 |
| 10571.25 .....              | 10636.25                 |
| 10573.75 .....              | 10638.75                 |
| 10576.25 .....              | 10641.25                 |
| 10578.75 .....              | 10643.75                 |
| 10581.25 <sup>1</sup> ..... | <sup>1</sup> 10646.25    |
| 10583.75 <sup>1</sup> ..... | <sup>1</sup> 10648.75    |
| 10586.25 <sup>1</sup> ..... | <sup>1</sup> 10651.25    |
| 10588.75 <sup>1</sup> ..... | <sup>1</sup> 10653.75    |
| 10591.25 <sup>1</sup> ..... | <sup>1</sup> 10656.25    |
| 10593.75 <sup>1</sup> ..... | <sup>1</sup> 10658.75    |
| 10596.25 <sup>1</sup> ..... | <sup>1</sup> 10661.25    |
| 10598.75 <sup>1</sup> ..... | <sup>1</sup> 10663.75    |
| 10601.25 <sup>1</sup> ..... | <sup>1</sup> 10666.25    |
| 10603.75 <sup>1</sup> ..... | <sup>1</sup> 10668.75    |
| 10606.25 <sup>1</sup> ..... | <sup>1</sup> 10671.25    |
| 10608.75 <sup>1</sup> ..... | <sup>1</sup> 10673.75    |
| 10611.25 <sup>1</sup> ..... | <sup>1</sup> 10676.25    |
| 10613.75 <sup>1</sup> ..... | <sup>1</sup> 10678.75    |

<sup>1</sup> These frequencies are also available for DEMS stations licensed, in operation, or applied for prior to July 15, 1993.

(5) 3.75 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 10553.125 .....          | 10618.125                |
| 10558.125 .....          | 10623.125                |
| 10563.125 .....          | 10628.125                |
| 10568.125 .....          | 10633.125                |
| 10573.125 .....          | 10638.125                |
| 10578.125 .....          | 10643.125                |
| 10583.125 .....          | 10648.125                |
| 10588.125 .....          | 10653.125                |
| 10593.125 .....          | 10658.125                |
| 10598.125 .....          | 10663.125                |
| 10603.125 .....          | 10668.125                |

(6) 5 MHz bandwidth channels:

| Transmit (receive) (MHz)   | Receive (transmit) (MHz) |
|----------------------------|--------------------------|
| 10552.5 .....              | 10617.5                  |
| 10557.5 .....              | 10622.5                  |
| 10562.5 .....              | 10627.5                  |
| 10567.5 <sup>1</sup> ..... | <sup>1</sup> 10632.5     |
| 10572.5 <sup>1</sup> ..... | <sup>1</sup> 10637.5     |
| 10577.5 <sup>1</sup> ..... | <sup>1</sup> 10642.5     |
| 10582.5 <sup>1</sup> ..... | <sup>1</sup> 10647.5     |
| 10587.5 .....              | 10652.5                  |
| 10592.5 .....              | 10657.5                  |
| 10597.5 .....              | 10662.5                  |
| 10602.5 .....              | 10667.5                  |

<sup>1</sup> These frequencies are also available for DEMS stations licensed, in operation, or applied for prior to July 15, 1993.

(n) Point-to-multipoint systems licensed, in operation, or applied for in the 10,550–10,680 MHz band prior to July 15, 1993, are permitted to use the DEMS frequencies noted above if they prior coordinate such usage with the necessary parties including 10 GHz point-

to-point applicants and licensees. DEMS Nodal Stations shall use the band 10,565–10,615 MHz while DEMS User Stations shall use the band 10,630–10,680 MHz.

(o) *10,700 to 11,700 MHz*. 80 MHz authorized bandwidth.

(1) 1.25 MHz bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 11130.625 .....          | 11620.625                |
| 11131.875 .....          | 11621.875                |
| 11133.125 .....          | 11623.125                |
| 11134.375 .....          | 11624.375                |
| 11135.625 .....          | 11625.625                |
| 11136.875 .....          | 11626.875                |
| 11138.125 .....          | 11628.125                |
| 11139.375 .....          | 11629.375                |
| 11140.625 .....          | 11630.625                |
| 11141.875 .....          | 11631.875                |
| 11143.125 .....          | 11633.125                |
| 11144.375 .....          | 11634.375                |
| 11145.625 .....          | 11635.625                |
| 11146.875 .....          | 11636.875                |
| 11148.125 .....          | 11638.125                |
| 11149.375 .....          | 11639.375                |
| 11150.625 .....          | 11640.625                |
| 11151.875 .....          | 11641.875                |
| 11153.125 .....          | 11643.125                |
| 11154.375 .....          | 11644.375                |
| 11155.625 .....          | 11645.625                |
| 11156.875 .....          | 11646.875                |
| 11158.125 .....          | 11648.125                |
| 11159.375 .....          | 11649.375                |
| 11160.625 .....          | 11650.625                |
| 11161.875 .....          | 11651.875                |
| 11163.125 .....          | 11653.125                |
| 11164.375 .....          | 11654.375                |
| 11165.625 .....          | 11655.625                |
| 11166.875 .....          | 11656.875                |
| 11168.125 .....          | 11658.125                |
| 11169.375 .....          | 11659.375                |
| 11170.625 .....          | 11660.625                |
| 11171.875 .....          | 11661.875                |
| 11173.125 .....          | 11663.125                |
| 11174.375 .....          | 11664.375                |
| 11175.625 .....          | 11665.625                |
| 11176.875 .....          | 11666.875                |
| 11178.125 .....          | 11668.125                |
| 11179.375 .....          | 11669.375                |
| 11180.625 .....          | 11680.625                |
| 11181.875 .....          | 11681.875                |
| 11183.125 .....          | 11683.125                |
| 11184.375 .....          | 11684.375                |
| 11185.625 .....          | 11685.625                |
| 11186.875 .....          | 11686.875                |
| 11188.125 .....          | 11688.125                |
| 11189.375 .....          | 11689.375                |
| 11190.625 .....          | 11690.625                |
| 11191.875 .....          | 11691.875                |
| 11193.125 .....          | 11693.125                |
| 11194.375 .....          | 11694.375                |
| 11195.625 .....          | 11695.625                |
| 11196.875 .....          | 11696.875                |
| 11198.125 .....          | 11698.125                |
| 11199.375 .....          | 11699.375                |

(2) 2.5 MHz bandwidth channels:

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| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 11131.25 .....           | 11621.25                 |
| 11133.75 .....           | 11623.75                 |
| 11136.25 .....           | 11626.25                 |
| 11138.75 .....           | 11628.75                 |
| 11141.25 .....           | 11631.25                 |
| 11143.75 .....           | 11633.75                 |
| 11146.25 .....           | 11636.25                 |
| 11148.75 .....           | 11638.75                 |
| 11151.25 .....           | 11641.25                 |
| 11153.75 .....           | 11643.75                 |
| 11156.25 .....           | 11646.25                 |
| 11158.75 .....           | 11648.75                 |
| 11161.25 .....           | 11651.25                 |
| 11163.75 .....           | 11653.75                 |
| 11166.25 .....           | 11656.25                 |
| 11168.75 .....           | 11658.75                 |
| 11171.25 .....           | 11661.25                 |
| 11173.75 .....           | 11663.75                 |
| 11176.25 .....           | 11666.25                 |
| 11178.75 .....           | 11668.75                 |
| 11181.25 .....           | 11681.25                 |
| 11183.75 .....           | 11683.75                 |
| 11186.25 .....           | 11686.25                 |
| 11188.75 .....           | 11688.75                 |
| 11191.25 .....           | 11691.25                 |
| 11193.75 .....           | 11693.75                 |
| 11196.25 .....           | 11696.25                 |
| 11198.75 .....           | 11698.75                 |

**(3) 3.75 MHz bandwidth channels:**

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 11133.125 .....          | 11623.125                |
| 11138.125 .....          | 11628.125                |
| 11143.125 .....          | 11633.125                |
| 11148.125 .....          | 11638.125                |
| 11153.125 .....          | 11643.125                |
| 11158.125 .....          | 11648.125                |
| 11163.125 .....          | 11653.125                |
| 11168.125 .....          | 11658.125                |
| 11173.125 .....          | 11663.125                |
| 11178.125 .....          | 11668.125                |
| 11183.125 .....          | 11683.125                |
| 11188.125 .....          | 11688.125                |
| 11193.125 .....          | 11693.125                |
| 11198.125 .....          | 11698.125                |

**(4) 5 MHz bandwidth channels:**

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 11132.5 .....            | 11622.5                  |
| 11137.5 .....            | 11627.5                  |
| 11142.5 .....            | 11632.5                  |
| 11147.5 .....            | 11637.5                  |
| 11152.5 .....            | 11642.5                  |
| 11157.5 .....            | 11647.5                  |
| 11162.5 .....            | 11652.5                  |
| 11167.5 .....            | 11657.5                  |
| 11172.5 .....            | 11662.5                  |
| 11177.5 .....            | 11667.5                  |
| 11182.5 .....            | 11682.5                  |
| 11187.5 .....            | 11687.5                  |
| 11192.5 .....            | 11692.5                  |
| 11197.5 .....            | 11697.5                  |

**(5) 10 MHz bandwidth channels:**

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 10705 .....              | 11205                    |
| 10715 .....              | 11215                    |
| 10725 <sup>2</sup> ..... | <sup>1</sup> 11675       |
| 10735 .....              | 11225                    |
| 10745 .....              | 11235                    |
| 10755 .....              | 11245                    |
| 10765 .....              | 11255                    |
| 10775 .....              | 11265                    |
| 10785 .....              | 11275                    |
| 10795 .....              | 11285                    |
| 10805 .....              | 11295                    |
| 10815 .....              | 11305                    |
| 10825 .....              | 11315                    |
| 10835 .....              | 11325                    |
| 10845 .....              | 11335                    |
| 10855 .....              | 11345                    |
| 10865 .....              | 11355                    |
| 10875 .....              | 11365                    |
| 10885 .....              | 11375                    |
| 10895 .....              | 11385                    |
| 10905 .....              | 11395                    |
| 10915 .....              | 11405                    |
| 10925 .....              | 11415                    |
| 10935 .....              | 11425                    |
| 10945 .....              | 11435                    |
| 10955 .....              | 11445                    |
| 10965 .....              | 11455                    |
| 10975 .....              | 11465                    |
| 10985 .....              | 11475                    |
| 10995 .....              | 11485                    |
| 11005 .....              | 11495                    |
| 11015 .....              | 11505                    |
| 11025 .....              | 11515                    |
| 11035 .....              | 11525                    |
| 11045 .....              | 11535                    |
| 11055 .....              | 11545                    |
| 11065 .....              | 11555                    |
| 11075 .....              | 11565                    |
| 11085 .....              | 11575                    |
| 11095 .....              | 11585                    |
| 11105 .....              | 11595                    |
| 11115 .....              | 11605                    |
| 11125 .....              | 11615                    |
| 11135 <sup>1</sup> ..... | <sup>1</sup> 11625       |
| 11145 <sup>1</sup> ..... | <sup>1</sup> 11635       |
| 11155 <sup>1</sup> ..... | <sup>1</sup> 11645       |
| 11165 <sup>1</sup> ..... | <sup>1</sup> 11655       |
| 11175 <sup>1</sup> ..... | <sup>1</sup> 11665       |
| 11185 <sup>1</sup> ..... | <sup>1</sup> 11685       |
| 11195 <sup>1</sup> ..... | <sup>1</sup> 11695       |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

<sup>2</sup> These frequencies may be assigned for unpaired use.

**(6) 30 MHz bandwidth channels:**

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 10715 .....              | 11215                    |
| 10755 .....              | 11245                    |
| 10795 .....              | 11285                    |
| 10835 .....              | 11325                    |
| 10875 .....              | 11365                    |
| 10915 .....              | 11405                    |
| 10955 .....              | 11445                    |
| 10995 .....              | 11485                    |
| 11035 .....              | 11525                    |
| 11075 .....              | 11565                    |
| 11115 .....              | 11605                    |
| 11155 <sup>1</sup> ..... | <sup>1</sup> 11645       |

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| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 11185 <sup>1</sup> ..... | <sup>1</sup> 11685       |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

(7) 40 MHz bandwidth channels:<sup>2</sup>

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 10735 .....              | 11225                    |
| 10775 .....              | 11265                    |
| 10815 .....              | 11305                    |
| 10855 .....              | 11345                    |
| 10895 .....              | 11385                    |
| 10935 .....              | 11425                    |
| 10975 .....              | 11465                    |
| 11015 .....              | 11505                    |
| 11055 .....              | 11545                    |
| 11095 .....              | 11585                    |
| 11135 <sup>1</sup> ..... | <sup>1</sup> 11625       |
| 11175 <sup>1</sup> ..... | <sup>1</sup> 11665       |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

<sup>2</sup> In congested areas where 40 MHz channels block most 30 MHz channels, radios authorized for 30 MHz bandwidths may use the 40 MHz channels. In uncongested areas, 30 MHz channels should be used.

(8) 80 MHz bandwidth channels:<sup>1</sup>

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 10755                    | 11245                    |
| 10835                    | 11325                    |
| 10915                    | 11405                    |
| 10995                    | 11485                    |
| 11075                    | 11565                    |
| 11155                    | 11645                    |

(p) 12,200 to 13,150 MHz—(1) 12,000–12,700 MHz. The Commission has allocated the 12.2–12.7 GHz band for use by the Direct Broadcast Satellite Service (DBS), the Multichannel Video Distribution and Data Service (MVDDS), and the Non-Geostationary Satellite Orbit Fixed Satellite Service (NGSO FSS). MVDDS shall be licensed on a non-harmful interference co-primary basis to existing DBS operations and on a co-primary basis with NGSO FSS stations in this band. MVDDS use can be on a common carrier and/or non-common carrier basis and can use channels of any desired bandwidth up to the maximum of 500 MHz provided the EIRP does not exceed 14 dBm per 24 megahertz. Private operational fixed point-to-point microwave stations authorized after September 9, 1983, are licensed on a non-harmful interference basis to DBS and are required to make

any and all adjustments necessary to prevent harmful interference to operating domestic DBS receivers. Incumbent public safety licensees shall be afforded protection from MVDDS and NGSO FSS licensees, however all other private operational fixed licensees shall be secondary to DBS, MVDDS and NGSO FSS licensees. As of May 23, 2002, the Commission no longer accepts applications for new licenses for point-to-point private operational fixed stations in this band, however, incumbent licensees and previously filed applicants may file applications for minor modifications and amendments (as defined in § 1.929 of this chapter) thereto, renewals, transfer of control, or assignment of license. Notwithstanding any other provisions, no private operational fixed point-to-point microwave stations are permitted to cause harmful interference to broadcasting-satellite stations of other countries operating in accordance with the Region 2 plan for the Broadcasting-Satellite Service established at the 1983 WARC.

(2) 12,700 to 13,150 MHz. 50 MHz authorized bandwidth.

(i) 5 MHz channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 12702.5                  | 12927.5                  |
| 12707.5                  | 12932.5                  |
| 12712.5                  | 12937.5                  |
| 12717.5                  | 12942.5                  |
| 12722.5                  | 12947.5                  |
| 12727.5                  | 12952.5                  |
| 12732.5                  | 12957.5                  |
| 12737.5                  | 12962.5                  |
| 12742.5                  | 12967.5                  |
| 12747.5                  | 12972.5                  |
| 12752.5                  | 12977.5                  |
| 12757.5                  | 12982.5                  |
| 12762.5                  | 12987.5                  |
| 12767.5                  | 12992.5                  |
| 12772.5                  | 12997.5                  |
| 12777.5                  | 13002.5                  |
| 12782.5                  | 13007.5                  |
| 12787.5                  | 13012.5                  |
| 12792.5                  | 13017.5                  |
| 12797.5                  | 13022.5                  |
| 12802.5                  | 13027.5                  |
| 12807.5                  | 13032.5                  |
| 12812.5                  | 13037.5                  |
| 12817.5                  | 13042.5                  |
| 12822.5                  | 13047.5                  |
| 12827.5                  | 13052.5                  |
| 12832.5                  | 13057.5                  |
| 12837.5                  | 13062.5                  |
| 12842.5                  | 13067.5                  |
| 12847.5                  | 13072.5                  |
| 12852.5                  | 13077.5                  |
| 12857.5                  | 13082.5                  |
| 12862.5                  | 13087.5                  |

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| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 12867.5                        | 13092.5                        |
| 12872.5                        | 13097.5                        |
| 12877.5                        | 13102.5                        |
| 12882.5                        | 13107.5                        |
| 12887.5                        | 13112.5                        |
| 12892.5                        | 13117.5                        |
| 12897.5                        | 13122.5                        |
| 12902.5                        | 13127.5                        |
| 12907.5                        | 13132.5                        |
| 12912.5                        | 13137.5                        |
| 12917.5                        | 13142.5                        |
| 12922.5                        | 13147.5                        |

(ii) 8.33 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 12704.165                      | 12929.165                      |
| 12712.495                      | 12937.495                      |
| 12720.825                      | 12945.825                      |
| 12729.155                      | 12954.155                      |
| 12737.485                      | 12962.485                      |
| 12745.815                      | 12970.815                      |
| 12754.145                      | 12979.145                      |
| 12762.475                      | 12987.475                      |
| 12770.805                      | 12995.805                      |
| 12779.135                      | 13004.135                      |
| 12787.465                      | 13012.465                      |
| 12795.795                      | 13020.795                      |
| 12804.125                      | 13029.125                      |
| 12812.455                      | 13037.455                      |
| 12820.785                      | 13045.785                      |
| 12829.115                      | 13054.115                      |
| 12837.445                      | 13062.445                      |
| 12845.775                      | 13070.775                      |
| 12854.105                      | 13079.105                      |
| 12862.435                      | 13087.435                      |
| 12870.765                      | 13095.765                      |
| 12879.095                      | 13104.095                      |
| 12887.425                      | 13112.425                      |
| 12895.755                      | 13120.755                      |
| 12904.085                      | 13129.085                      |
| 12912.415                      | 13137.415                      |

(iii) 12.5 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 12706.25                       | 12931.25                       |
| 12718.75                       | 12943.75                       |
| 12731.25                       | 12956.25                       |
| 12743.75                       | 12968.75                       |
| 12756.25                       | 12981.25                       |
| 12768.75                       | 12993.75                       |
| 12781.25                       | 13006.25                       |
| 12793.75                       | 13018.75                       |
| 12806.25                       | 13031.25                       |
| 12818.75                       | 13043.75                       |
| 12831.25                       | 13056.25                       |
| 12843.75                       | 13068.75                       |
| 12856.25                       | 13081.25                       |
| 12868.75                       | 13093.75                       |
| 12881.25                       | 13106.25                       |
| 12893.75                       | 13118.75                       |
| 12906.25                       | 13131.25                       |
| 12918.75                       | 13143.75                       |

(iv) 25 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 12712.5                        | 12937.5                        |
| 12737.5                        | 12962.5                        |
| 12762.5                        | 12987.5                        |
| 12787.5                        | 13012.5                        |
| 12812.5                        | 13037.5                        |
| 12837.5                        | 13062.5                        |
| 12862.5                        | 13087.5                        |
| 12887.5                        | 13112.5                        |
| 12912.5                        | 13137.5                        |

(v) 50 MHz bandwidth channels:

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 12725                          | 12950                          |
| 12775                          | 13000                          |
| 12825                          | 13050                          |
| 12875                          | 13100                          |

(q) Special provisions for incumbent low power, limited coverage systems in the band segments 12.2–12.7 GHz.

(1) As of May 23, 2002, the Commission no longer accepts applications for new stations in this service and incumbent stations may remain in service provided they do not cause harmful interference to any other primary services licensed in this band as described in paragraph (p) of this section. However, incumbent licensees and previously filed applicants may file applications for minor modifications and amendments (as defined in §1.929 of this chapter) thereto, renewals, transfer of control, or assignment of license.

(2) Prior to December 8, 2000, notwithstanding any contrary provisions in this part, the frequency pairs 12.220/12.460 GHz, 12.260/12.500 GHz, 12.300/12.540 GHz and 12.340/12.580 GHz, were authorized for low power, limited coverage systems subject to the following provisions:

(i) Maximum equivalent isotropically radiated power (EIRP) shall be 55 dBm;

(ii) The rated transmitter output power shall not exceed 0.5 watts;

(iii) Frequency tolerance shall be maintained to within 0.01 percent of the assigned frequency;

(iv) Maximum beamwidth shall not exceed 4 degrees. However, the sidelobe suppression criteria contained in §101.115 shall not apply, except that a minimum front-to-back ratio of 38 dB shall apply;

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(v) Upon showing of need, a maximum bandwidth of 12 MHz may be authorized per frequency assigned;

(vi) Radio systems authorized under the provisions of this section shall have no more than three hops in tandem, except upon showing of need, but in any event the maximum tandem length shall not exceed 40 km (25 miles);

(vii) Interfering signals at the receiver antenna terminals of stations authorized under this section shall not exceed –90 dBm and –70 dBm respectively, for co-channel and adjacent channel interfering signals, and

(viii) Stations authorized under the provisions of this section shall provide the protection from interference specified in §101.105 to stations operating in accordance with the provisions of this part.

(r) *17,700 to 19,700 and 24,250 to 25,250 MHz*: Operation of stations using frequencies in these bands is permitted to the extent specified in this paragraph. Until November 19, 2012, stations operating in the band 18.3–18.58 GHz that were licensed or had applications pending before the Commission as of November 19, 2002 shall operate on a shared co-primary basis with other services under parts 21, 25, 74, and 78 of this chapter. Until October 31, 2011, operations in the band 19.26–19.3 GHz and low power systems operating pursuant to paragraph (r)(10) of this section shall operate on a co-primary basis. Until June 8, 2010, stations operating in the band 18.58–18.8 GHz that were licensed or had applications pending before the Commission as of June 8, 2000 may continue those operations on a shared co-primary basis with other services under parts 21, 25, 74, and 78 of this chapter. Until June 8, 2010, stations operating in the band 18.8–19.3 GHz that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations on a shared co-primary basis with other services under parts 21, 25, 74, and 78 of this chapter. After November 19, 2012, stations operating in the band 18.3–18.58 GHz are not entitled to protection from fixed-satellite service operations and must not cause unacceptable interference to fixed-satellite service station operations. After June

8, 2010, operations in the 18.58–19.30 GHz band are not entitled to protection from fixed-satellite service operations and must not cause unacceptable interference to fixed-satellite service station operations. After November 19, 2002, no applications for new stations for 47 CFR part 101 licenses will be accepted in the 18.3–18.58 GHz band. After June 8, 2000, no applications for new stations for 47 CFR part 101 licenses will be accepted in the 18.58–19.3 GHz band. Licensees, except 24 GHz band licensees, may use either a two-way link or one frequency of a frequency pair for a one-way link and must coordinate proposed operations pursuant to the procedures required in §101.103 of this subpart. (Note, however, that stations authorized as of September 9, 1983, to use frequencies in the band 17.7–19.7 GHz may, upon proper application, continue to be authorized for such operations, consistent with the above conditions related to the 18.58–19.3 GHz band.) Applicants for one-way spectrum from 17.7–18.58 GHz for multi-channel video programming distribution are governed by paragraph (r)(6) of this section. Licensees are also allowed to use one-way (unpaired) channels in the 17.7–17.74 GHz sub-band to pair with other channels in the FS portions of the 18 GHz band where, for example, the return pair is already in use and therefore blocked or in TDD systems. Stations used for MVPD operations in the 17.7–17.8 GHz band must coordinate with the Federal Government before operating in the zones specified in §1.924(e) of this chapter.

(1) 1.25 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 17700.625 .....          | NA                       |
| 17701.875 .....          | NA                       |
| 17703.125 .....          | NA                       |
| 17704.375 .....          | NA                       |
| 17705.625 .....          | NA                       |
| 17706.875 .....          | NA                       |
| 17708.125 .....          | NA                       |
| 17709.375 .....          | NA                       |
| 17710.625 .....          | NA                       |
| 17711.875 .....          | NA                       |
| 17713.125 .....          | NA                       |
| 17714.375 .....          | NA                       |
| 17715.625 .....          | NA                       |
| 17716.875 .....          | NA                       |
| 17718.125 .....          | NA                       |
| 17719.375 .....          | NA                       |

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| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 17721.625 .....          | NA                       |
| 17722.875 .....          | NA                       |
| 17723.125 .....          | NA                       |
| 17724.375 .....          | NA                       |
| 17725.625 .....          | NA                       |
| 17726.875 .....          | NA                       |
| 17728.125 .....          | NA                       |
| 17729.375 .....          | NA                       |
| 17730.625 .....          | NA                       |
| 17731.875 .....          | NA                       |
| 17733.125 .....          | NA                       |
| 17734.375 .....          | NA                       |
| 17735.625 .....          | NA                       |
| 17736.875 .....          | NA                       |
| 17738.125 .....          | NA                       |
| 17739.375 .....          | NA                       |
| 18060.625 .....          | 19620.625                |
| 18061.875 .....          | 19621.875                |
| 18063.125 .....          | 19623.125                |
| 18064.375 .....          | 19624.375                |
| 18065.625 .....          | 19625.625                |
| 18066.875 .....          | 19626.875                |
| 18068.125 .....          | 19628.125                |
| 18069.375 .....          | 19629.375                |
| 18070.625 .....          | 19630.625                |
| 18071.875 .....          | 19631.875                |
| 18073.125 .....          | 19633.125                |
| 18074.375 .....          | 19634.375                |
| 18075.625 .....          | 19635.625                |
| 18076.875 .....          | 19636.875                |
| 18078.125 .....          | 19638.125                |
| 18079.375 .....          | 19639.375                |
| 18080.625 .....          | 19640.625                |
| 18081.875 .....          | 19641.875                |
| 18083.125 .....          | 19643.125                |
| 18084.375 .....          | 19644.375                |
| 18085.625 .....          | 19645.625                |
| 18086.875 .....          | 19646.875                |
| 18088.125 .....          | 19648.125                |
| 18089.375 .....          | 19649.375                |
| 18090.625 .....          | 19650.625                |
| 18091.875 .....          | 19651.875                |
| 18093.125 .....          | 19653.125                |
| 18094.375 .....          | 19654.375                |
| 18095.625 .....          | 19655.625                |
| 18096.875 .....          | 19656.875                |
| 18098.125 .....          | 19658.125                |
| 18099.375 .....          | 19659.375                |
| 18100.625 .....          | 19660.625                |
| 18101.875 .....          | 19661.875                |
| 18103.125 .....          | 19663.125                |
| 18104.375 .....          | 19664.375                |
| 18105.625 .....          | 19665.625                |
| 18106.875 .....          | 19666.875                |
| 18108.125 .....          | 19668.125                |
| 18109.375 .....          | 19669.375                |
| 18110.625 .....          | 19670.625                |
| 18111.875 .....          | 19671.875                |
| 18113.125 .....          | 19673.125                |
| 18114.375 .....          | 19674.375                |
| 18115.625 .....          | 19675.625                |
| 18116.875 .....          | 19676.875                |
| 18118.125 .....          | 19678.125                |
| 18119.375 .....          | 19679.375                |
| 18120.625 .....          | 19680.625                |
| 18121.875 .....          | 19681.875                |
| 18123.125 .....          | 19683.125                |
| 18124.375 .....          | 19684.375                |
| 18125.625 .....          | 19685.625                |
| 18126.875 .....          | 19686.875                |
| 18128.125 .....          | 19688.125                |
| 18129.375 .....          | 19689.375                |

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 18130.625 .....          | 19690.625                |
| 18131.875 .....          | 19691.875                |
| 18133.125 .....          | 19693.125                |
| 18134.375 .....          | 19694.375                |
| 18135.625 .....          | 19695.625                |
| 18136.875 .....          | 19696.875                |
| 18138.125 .....          | 19698.125                |
| 18139.375 .....          | 19699.375                |

(2) 2 Megahertz maximum authorized bandwidth channel:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 18141.0 .....            | N/A                      |

(3) 2.5 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 17701.25 .....           | N/A                      |
| 17703.75 .....           | N/A                      |
| 17706.25 .....           | N/A                      |
| 17708.75 .....           | N/A                      |
| 17711.25 .....           | N/A                      |
| 17713.75 .....           | N/A                      |
| 17716.25 .....           | N/A                      |
| 17718.75 .....           | N/A                      |
| 17721.25 .....           | N/A                      |
| 17723.75 .....           | N/A                      |
| 17726.25 .....           | N/A                      |
| 17728.75 .....           | N/A                      |
| 17731.25 .....           | N/A                      |
| 17733.75 .....           | N/A                      |
| 17736.25 .....           | N/A                      |
| 17738.75 .....           | N/A                      |
| 18061.25 .....           | 19621.25                 |
| 18063.75 .....           | 19623.75                 |
| 18066.25 .....           | 19626.25                 |
| 18068.75 .....           | 19628.75                 |
| 18071.25 .....           | 19631.25                 |
| 18073.75 .....           | 19633.75                 |
| 18076.25 .....           | 19636.25                 |
| 18078.75 .....           | 19638.75                 |
| 18081.25 .....           | 19641.25                 |
| 18083.75 .....           | 19643.75                 |
| 18086.25 .....           | 19646.25                 |
| 18088.75 .....           | 19648.75                 |
| 18091.25 .....           | 19651.25                 |
| 18093.75 .....           | 19653.75                 |
| 18096.25 .....           | 19656.25                 |
| 18098.75 .....           | 19658.75                 |
| 18101.25 .....           | 19661.25                 |
| 18103.75 .....           | 19663.75                 |
| 18106.25 .....           | 19666.25                 |
| 18108.75 .....           | 19668.75                 |
| 18111.25 .....           | 19671.25                 |
| 18113.75 .....           | 19673.75                 |
| 18116.25 .....           | 19676.25                 |
| 18118.75 .....           | 19678.75                 |
| 18121.25 .....           | 19681.25                 |
| 18123.75 .....           | 19683.75                 |
| 18126.25 .....           | 19686.25                 |
| 18128.75 .....           | 19688.75                 |
| 18131.25 .....           | 19691.25                 |
| 18133.75 .....           | 19693.75                 |
| 18136.25 .....           | 19696.25                 |

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| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 18138.75 .....           | 19698.75                 |

(4) 5 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)                                                                | Receive (transmit) (MHz) |
|-----------------------------------------------------------------------------------------|--------------------------|
| <b>340 Megahertz Separation (* channels are no longer available on a primary basis)</b> |                          |
| 18762.5* .....                                                                          | 19102.5*                 |
| 18767.5* .....                                                                          | 19107.5*                 |
| 18772.5* .....                                                                          | 19112.5*                 |
| 18777.5* .....                                                                          | 19117.5*                 |
| 18782.5* .....                                                                          | 19122.5*                 |
| 18787.5* .....                                                                          | 19127.5*                 |
| 18792.5* .....                                                                          | 19132.5*                 |
| 18797.5* .....                                                                          | 19137.5*                 |
| 18802.5* .....                                                                          | 19142.5*                 |
| 18807.5* .....                                                                          | 19147.5*                 |
| 18812.5* .....                                                                          | 19152.5*                 |
| 18817.5* .....                                                                          | 19157.5*                 |

(5) 5 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)         | Receive (transmit) (MHz) |
|----------------------------------|--------------------------|
| <b>1560 Megahertz Separation</b> |                          |
| 17702.5 .....                    | N/A                      |
| 17707.5 .....                    | N/A                      |
| 17712.5 .....                    | N/A                      |
| 17717.5 .....                    | N/A                      |
| 17722.5 .....                    | N/A                      |
| 17727.5 .....                    | N/A                      |
| 17732.5 .....                    | N/A                      |
| 17737.5 .....                    | N/A                      |
| 18062.5 .....                    | 19622.5                  |
| 18067.5 .....                    | 19627.5                  |
| 18072.5 .....                    | 19632.5                  |
| 18077.5 .....                    | 19637.5                  |
| 18082.5 .....                    | 19642.5                  |
| 18087.5 .....                    | 19647.5                  |
| 18092.5 .....                    | 19652.5                  |
| 18097.5 .....                    | 19657.5                  |
| 18102.5 .....                    | 19662.5                  |
| 18107.5 .....                    | 19667.5                  |
| 18112.5 .....                    | 19672.5                  |
| 18117.5 .....                    | 19677.5                  |
| 18122.5 .....                    | 19682.5                  |
| 18127.5 .....                    | 19687.5                  |
| 18132.5 .....                    | 19692.5                  |
| 18137.5 .....                    | 19697.5                  |

(6) MVPD use: Multichannel video programming distributors (MVPDs) can use any size channels for one-way operations in the 17.7–18.58 GHz band for any permissible communications specified for this band in §101.603 provided that they have coordinated the appropriate emission designators and power, but must request contiguous spectrum (minus spectrum that is al-

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ready licensed or prior coordinated in the area and thus blocked). MVPD systems must meet the efficiency requirements of §101.141. Spectrum at 18.3–18.58 GHz is only available for grandfathered stations. See §101.85.

(7) 10 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)                                                                 | Receive (transmit) (MHz) |
|------------------------------------------------------------------------------------------|--------------------------|
| <b>1560 Megahertz Separation (* channels are no longer available on a primary basis)</b> |                          |
| 17705.0 .....                                                                            | 19265.0*                 |
| 17715.0 .....                                                                            | 19275.0*                 |
| 17725.0 .....                                                                            | 19285.0*                 |
| 17735.0 .....                                                                            | 19295.0*                 |
| 17745.0 .....                                                                            | 19305.0                  |
| 17755.0 .....                                                                            | 19315.0                  |
| 17765.0 .....                                                                            | 19325.0                  |
| 17775.0 .....                                                                            | 19335.0                  |
| 17785.0 .....                                                                            | 19345.0                  |
| 17795.0 .....                                                                            | 19355.0                  |
| 17805.0 .....                                                                            | 19365.0                  |
| 17815.0 .....                                                                            | 19375.0                  |
| 17825.0 .....                                                                            | 19385.0                  |
| 17835.0 .....                                                                            | 19395.0                  |
| 17845.0 .....                                                                            | 19405.0                  |
| 17855.0 .....                                                                            | 19415.0                  |
| 17865.0 .....                                                                            | 19425.0                  |
| 17875.0 .....                                                                            | 19435.0                  |
| 17885.0 .....                                                                            | 19445.0                  |
| 17895.0 .....                                                                            | 19455.0                  |
| 17905.0 .....                                                                            | 19465.0                  |
| 17915.0 .....                                                                            | 19475.0                  |
| 17925.0 .....                                                                            | 19485.0                  |
| 17935.0 .....                                                                            | 19495.0                  |
| 17945.0 .....                                                                            | 19505.0                  |
| 17955.0 .....                                                                            | 19515.0                  |
| 17965.0 .....                                                                            | 19525.0                  |
| 17975.0 .....                                                                            | 19535.0                  |
| 17985.0 .....                                                                            | 19545.0                  |
| 17995.0 .....                                                                            | 19555.0                  |
| 18005.0 .....                                                                            | 19565.0                  |
| 18015.0 .....                                                                            | 19575.0                  |
| 18025.0 .....                                                                            | 19585.0                  |
| 18035.0 .....                                                                            | 19595.0                  |
| 18045.0 .....                                                                            | 19605.0                  |
| 18055.0 .....                                                                            | 19615.0                  |
| 18065.0 .....                                                                            | 19625.0                  |
| 18075.0 .....                                                                            | 19635.0                  |
| 18085.0 .....                                                                            | 19645.0                  |
| 18095.0 .....                                                                            | 19655.0                  |
| 18105.0 .....                                                                            | 19665.0                  |
| 18115.0 .....                                                                            | 19675.0                  |
| 18125.0 .....                                                                            | 19685.0                  |
| 18135.0 .....                                                                            | 19695.0                  |

|                                 |          |
|---------------------------------|----------|
| <b>340 Megahertz Separation</b> |          |
| 18585.0* .....                  | 18925.0* |
| 18595.0* .....                  | 18935.0* |
| 18605.0* .....                  | 18945.0* |
| 18615.0* .....                  | 18955.0* |
| 18625.0* .....                  | 18965.0* |
| 18635.0* .....                  | 18975.0* |
| 18645.0* .....                  | 18985.0* |
| 18655.0* .....                  | 18995.0* |
| 18665.0* .....                  | 19005.0* |
| 18675.0* .....                  | 19015.0* |
| 18685.0* .....                  | 19025.0* |
| 18695.0* .....                  | 19035.0* |

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| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 18705.0* .....           | 19045.0*                 |
| 18715.0* .....           | 19055.0*                 |
| 18725.0* .....           | 19065.0*                 |
| 18735.0* .....           | 19075.0*                 |
| 18745.0* .....           | 19085.0*                 |
| 18755.0* .....           | 19095.0*                 |
| 18765.0* .....           | 19105.0*                 |
| 18775.0* .....           | 19115.0*                 |
| 18785.0* .....           | 19125.0*                 |
| 18795.0* .....           | 19135.0*                 |
| 18805.0* .....           | 19145.0*                 |
| 18815.0* .....           | 19155.0*                 |

(8) 20 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)                                                                 | Receive (transmit) (MHz) |
|------------------------------------------------------------------------------------------|--------------------------|
| <b>1560 Megahertz Separation (* channels are no longer available on a primary basis)</b> |                          |
| 17710.0 .....                                                                            | 19270.0*                 |
| 17730.0 .....                                                                            | 19290.0*                 |
| 17750.0 .....                                                                            | 19310.0                  |
| 17770.0 .....                                                                            | 19330.0                  |
| 17790.0 .....                                                                            | 19350.0                  |
| 17810.0 .....                                                                            | 19370.0                  |
| 17830.0 .....                                                                            | 19390.0                  |
| 17850.0 .....                                                                            | 19410.0                  |
| 17870.0 .....                                                                            | 19430.0                  |
| 17890.0 .....                                                                            | 19450.0                  |
| 17910.0 .....                                                                            | 19470.0                  |
| 17930.0 .....                                                                            | 19490.0                  |
| 17950.0 .....                                                                            | 19510.0                  |
| 17970.0 .....                                                                            | 19530.0                  |
| 17990.0 .....                                                                            | 19550.0                  |
| 18010.0 .....                                                                            | 19570.0                  |
| 18030.0 .....                                                                            | 19590.0                  |
| 18050.0 .....                                                                            | 19610.0                  |
| 18070.0 .....                                                                            | 19630.0                  |
| 18090.0 .....                                                                            | 19650.0                  |
| 18110.0 .....                                                                            | 19670.0                  |
| 18130.0 .....                                                                            | 19690.0                  |

**340 Megahertz Separation**

|                |          |
|----------------|----------|
| 18590.0* ..... | 18930.0* |
| 18610.0* ..... | 18950.0* |
| 18630.0* ..... | 18970.0* |
| 18650.0* ..... | 18990.0* |
| 18670.0* ..... | 19010.0* |
| 18690.0* ..... | 19030.0* |
| 18710.0* ..... | 19050.0* |
| 18730.0* ..... | 19070.0* |
| 18750.0* ..... | 19090.0* |
| 18770.0* ..... | 19110.0* |
| 18790.0* ..... | 19130.0* |
| 18810.0* ..... | 19150.0* |

(9) 30 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)         | Receive (transmit) (MHz) |
|----------------------------------|--------------------------|
| <b>1560 Megahertz Separation</b> |                          |
| 17715.0 .....                    | N/A                      |
| 17755.0 .....                    | 19315.0                  |

| Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------|--------------------------|
| 17785.0 .....            | 19345.0                  |
| 17815.0 .....            | 19375.0                  |
| 17845.0 .....            | 19405.0                  |
| 17875.0 .....            | 19435.0                  |
| 17905.0 .....            | 19465.0                  |
| 17935.0 .....            | 19495.0                  |
| 17965.0 .....            | 19525.0                  |
| 17995.0 .....            | 19555.0                  |
| 18025.0 .....            | 19585.0                  |
| 18055.0 .....            | 19615.0                  |
| 18085.0 .....            | 19645.0                  |
| 18115.0 .....            | 19675.0                  |

(10) 40 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)                                                                 | Receive (transmit) (MHz) |
|------------------------------------------------------------------------------------------|--------------------------|
| <b>1560 Megahertz Separation (* channels are no longer available on a primary basis)</b> |                          |
| 17720.0 .....                                                                            | 19280.0*                 |
| 17760.0 .....                                                                            | 19320.0                  |
| 17800.0 .....                                                                            | 19360.0                  |
| 17840.0 .....                                                                            | 19400.0                  |
| 17880.0 .....                                                                            | 19440.0                  |
| 17920.0 .....                                                                            | 19480.0                  |
| 17960.0 .....                                                                            | 19520.0                  |
| 18000.0 .....                                                                            | 19560.0                  |
| 18040.0 .....                                                                            | 19600.0                  |
| 18080.0 .....                                                                            | 19640.0                  |
| 18120.0 .....                                                                            | 19680.0                  |

(11) 50 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)         | Receive (transmit) (MHz) |
|----------------------------------|--------------------------|
| <b>1560 Megahertz Separation</b> |                          |
| 17765.0 .....                    | 19325.0                  |
| 17815.0 .....                    | 19375.0                  |
| 17865.0 .....                    | 19425.0                  |
| 17915.0 .....                    | 19475.0                  |
| 17965.0 .....                    | 19525.0                  |
| 18015.0 .....                    | 19575.0                  |
| 18065.0 .....                    | 19625.0                  |
| 18115.0 .....                    | 19675.0                  |

(12) 80 Megahertz maximum authorized bandwidth channels:

| Transmit (receive) (MHz)                                                                 | Receive (transmit) (MHz) |
|------------------------------------------------------------------------------------------|--------------------------|
| <b>1560 Megahertz Separation (* channels are no longer available on a primary basis)</b> |                          |
| 17740.0 .....                                                                            | 19300.0*                 |
| 17820.0 .....                                                                            | 19380.0                  |
| 17900.0 .....                                                                            | 19460.0                  |
| 17980.0 .....                                                                            | 19540.0                  |
| 18060.0 .....                                                                            | 19620.0                  |

(13) The following frequencies on channels 35–39 are available for point-

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to-multipoint systems and are available by geographic area licensing in the 24 GHz Service to be used as the licensee desires. The 24 GHz spectrum can be aggregated or disaggregated and does not have to be used in the transmit/receive manner shown except to comply with international agreements along the U.S. borders. Channels 35 through 39 are licensed in the 24 GHz Service by Economic Areas for any digital fixed service. Channels may be used at either nodal or subscriber station locations for transmit or receive but must be coordinated with adjacent channel and adjacent area users in accordance with the provisions of § 101.509 of this subpart. Stations also must comply with international coordination agreements.

| Channel No.                                             | Nodal station frequency band (MHz) limits | User station frequency band (MHz) limits |
|---------------------------------------------------------|-------------------------------------------|------------------------------------------|
| (* channels are no longer available on a primary basis) |                                           |                                          |
| 25 .....                                                | 18,820–18,830                             | 19,160–19,170*                           |
| 26 .....                                                | 18,830–18,840                             | 19,170–19,180*                           |
| 27 .....                                                | 18,840–18,850                             | 19,180–19,190*                           |
| 28 .....                                                | 18,850–18,860                             | 19,190–19,200*                           |
| 29 .....                                                | 18,860–18,870                             | 19,200–19,210*                           |
| 30 .....                                                | 18,870–18,880                             | 19,210–19,220*                           |
| 31 .....                                                | 18,880–18,890                             | 19,220–19,230*                           |
| 32 .....                                                | 18,890–18,900                             | 19,230–19,240*                           |
| 33 .....                                                | 18,900–18,910                             | 19,240–19,250*                           |
| 34 .....                                                | 18,910–18,920                             | 19,250–19,260*                           |
| 35 .....                                                | 24,250–24,290                             | 25,050–25,090                            |
| 36 .....                                                | 24,290–24,330                             | 25,090–25,130                            |
| 37 .....                                                | 24,330–24,370                             | 25,130–25,170                            |
| 38 .....                                                | 24,370–24,410                             | 25,170–25,210                            |
| 39 .....                                                | 24,410–24,450                             | 25,210–25,250                            |

(14) *Special provision for low power systems in the 17,700–19,700 MHz band:* Notwithstanding other provisions in 47 CFR part 101 and except for specified areas around Washington, DC, and Denver, Colorado, licensees of point-to-multipoint channel pairs 25–29 identified in paragraph (r)(13) of this section may continue to operate in accordance with the requirements of § 101.85 and may operate multiple low power transmitting devices within a defined service area. Operations are prohibited within 55 km when used outdoor and within 20 km when used indoor of the coordinates 38 deg.48' N/76 deg.52' W (Washington, DC area) and 39 deg.43' N/104 deg.46' W (Denver, Colorado area). The service area will be a 28 kilometer omni directional radius originating from specified center reference coordinates. The specified center coordinates

must be no closer than 56 kilometers from any co-channel nodal station or the specified center coordinates of another co-channel system. Applicants/licensees do not need to specify the location of each individual transmitting device operating within their defined service areas. Such operations are subject to the following requirements on the low power transmitting devices:

(i) Power must not exceed one watt EIRP and 100 milliwatts transmitter output power;

(ii) A frequency tolerance of 0.001% must be maintained; and

(iii) The mean power of emissions shall be attenuated in accordance with the following schedule:

(A) In any 4 kHz band, the center frequency of which is removed from the center frequency of the assigned channel by more than 50 percent of the channel bandwidth and is within the bands 18,820–18,870 MHz or 19,160–19,210 MHz:

$$A = 35 + .003 (F - 0.5B) \text{ dB}$$

or,

80 dB (whichever is the lesser attenuation).

Where:

A = Attenuation (in decibels) below output power level contained within the channel for a given polarization.

B = Bandwidth of channel in kHz.

F = Absolute value of the difference between the center frequency of the 4 kHz band measured at the center frequency of the channel in kHz.

(B) In any 4 kHz band the center frequency of which is outside the bands 18,820–18,870 GHz: At least  $43 + 10 \log P$  (mean output power in watts) decibels.

(iv) Low power stations authorized in the band 18.8–19.3 GHz after June 8, 2000, are restricted to indoor use only. No new licenses will be authorized for applications received after April 1, 2002.

(s) *21,200 to 23,600 MHz:* 50 MHz authorized bandwidth.

| Transmit (receive) (MHz)        | Receive (transmit) (MHz) |
|---------------------------------|--------------------------|
| (1) 2.5 MHz bandwidth channels: |                          |
| 21601.25 .....                  | 22801.25                 |
| 21603.75 .....                  | 22803.75                 |
| 21606.25 .....                  | 22806.25                 |
| 21608.75 .....                  | 22808.75                 |
| 21611.25 .....                  | 22811.25                 |

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| Transmit (receive) (MHz) | Receive<br>(transmit)<br>(MHz) | Transmit (receive) (MHz)      | Receive<br>(transmit)<br>(MHz) |
|--------------------------|--------------------------------|-------------------------------|--------------------------------|
| 21613.75 .....           | 22813.75                       | 21793.75 .....                | 22993.75                       |
| 21616.25 .....           | 22816.25                       | 21796.25 .....                | 22996.25                       |
| 21618.75 .....           | 22818.75                       | 21798.75 .....                | 22998.75                       |
| 21621.25 .....           | 22821.25                       | 22301.25 .....                | 23501.25                       |
| 21623.75 .....           | 22823.75                       | 22303.75 .....                | 23503.75                       |
| 21626.25 .....           | 22826.25                       | 22306.25 .....                | 23506.25                       |
| 21628.75 .....           | 22828.75                       | 22308.75 .....                | 23508.75                       |
| 21631.25 .....           | 22831.25                       | 22311.25 .....                | 23511.25                       |
| 21633.75 .....           | 22833.75                       | 22313.75 .....                | 23513.75                       |
| 21636.25 .....           | 22836.25                       | 22316.25 .....                | 23516.25                       |
| 21638.75 .....           | 22838.75                       | 22318.75 .....                | 23518.75                       |
| 21641.25 .....           | 22841.25                       | 22321.25 .....                | 23521.25                       |
| 21643.75 .....           | 22843.75                       | 22323.75 .....                | 23523.75                       |
| 21646.25 .....           | 22846.25                       | 22326.25 .....                | 23526.25                       |
| 21648.75 .....           | 22848.75                       | 22328.75 .....                | 23528.75                       |
| 21651.25 .....           | 22851.25                       | 22331.25 .....                | 23531.25                       |
| 21653.75 .....           | 22853.75                       | 22333.75 .....                | 23533.75                       |
| 21656.25 .....           | 22856.25                       | 22336.25 .....                | 23536.25                       |
| 21658.75 .....           | 22858.75                       | 22338.75 .....                | 23538.75                       |
| 21661.25 .....           | 22861.25                       | 22341.25 .....                | 23541.25                       |
| 21663.75 .....           | 22863.75                       | 22343.75 .....                | 23543.75                       |
| 21666.25 .....           | 22866.25                       | 22346.25 .....                | 23546.25                       |
| 21668.75 .....           | 22868.75                       | 22348.75 .....                | 23548.75                       |
| 21671.25 .....           | 22871.25                       | 22351.25 .....                | 23551.25                       |
| 21673.75 .....           | 22873.75                       | 22353.75 .....                | 23553.75                       |
| 21676.25 .....           | 22876.25                       | 22356.25 .....                | 23556.25                       |
| 21678.75 .....           | 22878.75                       | 22358.75 .....                | 23558.75                       |
| 21681.25 .....           | 22881.25                       | 22361.25 .....                | 23561.25                       |
| 21683.75 .....           | 22883.75                       | 22363.75 .....                | 23563.75                       |
| 21686.25 .....           | 22886.25                       | 22366.25 .....                | 23566.25                       |
| 21688.75 .....           | 22888.75                       | 22368.75 .....                | 23568.75                       |
| 21691.25 .....           | 22891.25                       | 22371.25 .....                | 23571.25                       |
| 21693.75 .....           | 22893.75                       | 22373.75 .....                | 23573.75                       |
| 21696.25 .....           | 22896.25                       | 22376.25 .....                | 23576.25                       |
| 21698.75 .....           | 22898.75                       | 22378.75 .....                | 23578.75                       |
| 21701.25 .....           | 22901.25                       | 22381.25 .....                | 23581.25                       |
| 21703.75 .....           | 22903.75                       | 22383.75 .....                | 23583.75                       |
| 21706.25 .....           | 22906.25                       | 22386.25 .....                | 23586.25                       |
| 21708.75 .....           | 22908.75                       | 22388.75 .....                | 23588.75                       |
| 21711.25 .....           | 22911.25                       | 22391.25 .....                | 23591.25                       |
| 21713.75 .....           | 22913.75                       | 22393.75 .....                | 23593.75                       |
| 21716.25 .....           | 22916.25                       | 22396.25 .....                | 23596.25                       |
| 21718.75 .....           | 22918.75                       | 22398.75 .....                | 23598.75                       |
| 21721.25 .....           | 22921.25                       | (2) 5 MHz bandwidth channels: |                                |
| 21723.75 .....           | 22923.75                       | 21602.5 .....                 | 22802.5                        |
| 21726.25 .....           | 22926.25                       | 21607.5 .....                 | 22807.5                        |
| 21728.75 .....           | 22928.75                       | 21612.5 .....                 | 22812.5                        |
| 21731.25 .....           | 22931.25                       | 21617.5 .....                 | 22817.5                        |
| 21733.75 .....           | 22933.75                       | 21622.5 .....                 | 22822.5                        |
| 21736.25 .....           | 22936.25                       | 21627.5 .....                 | 22827.5                        |
| 21738.75 .....           | 22938.75                       | 21632.5 .....                 | 22832.5                        |
| 21741.25 .....           | 22941.25                       | 21637.5 .....                 | 22837.5                        |
| 21743.75 .....           | 22943.75                       | 21642.5 .....                 | 22842.5                        |
| 21746.25 .....           | 22946.25                       | 21647.5 .....                 | 22847.5                        |
| 21748.75 .....           | 22948.75                       | 21652.5 .....                 | 22852.5                        |
| 21751.25 .....           | 22951.25                       | 21657.5 .....                 | 22857.5                        |
| 21753.75 .....           | 22953.75                       | 21662.5 .....                 | 22862.5                        |
| 21756.25 .....           | 22956.25                       | 21667.5 .....                 | 22867.5                        |
| 21758.75 .....           | 22958.75                       | 21672.5 .....                 | 22872.5                        |
| 21761.25 .....           | 22961.25                       | 21677.5 .....                 | 22877.5                        |
| 21763.75 .....           | 22963.75                       | 21682.5 .....                 | 22882.5                        |
| 21766.25 .....           | 22966.25                       | 21687.5 .....                 | 22887.5                        |
| 21768.75 .....           | 22968.75                       | 21692.5 .....                 | 22892.5                        |
| 21771.25 .....           | 22971.25                       | 21697.5 .....                 | 22897.5                        |
| 21773.75 .....           | 22973.75                       | 21702.5 .....                 | 22902.5                        |
| 21776.25 .....           | 22976.25                       | 21707.5 .....                 | 22907.5                        |
| 21778.75 .....           | 22978.75                       | 21712.5 .....                 | 22912.5                        |
| 21781.25 .....           | 22981.25                       | 21717.5 .....                 | 22917.5                        |
| 21783.75 .....           | 22983.75                       | 21722.5 .....                 | 22922.5                        |
| 21786.25 .....           | 22986.25                       | 21727.5 .....                 | 22927.5                        |
| 21788.75 .....           | 22988.75                       | 21732.5 .....                 | 22932.5                        |
| 21791.25 .....           | 22991.25                       | 21737.5 .....                 | 22937.5                        |

| Transmit (receive) (MHz)       | Receive (transmit) (MHz) | Transmit (receive) (MHz) | Receive (transmit) (MHz) |
|--------------------------------|--------------------------|--------------------------|--------------------------|
| 21742.5 .....                  | 22942.5 .....            | 21595 .....              | 22795 .....              |
| 21747.5 .....                  | 22947.5 .....            | 21605 <sup>1</sup> ..... | <sup>1</sup> 22805 ..... |
| 21752.5 .....                  | 22952.5 .....            | 21615 <sup>1</sup> ..... | <sup>1</sup> 22815 ..... |
| 21757.5 .....                  | 22957.5 .....            | 21625 <sup>1</sup> ..... | <sup>1</sup> 22825 ..... |
| 21762.5 .....                  | 22962.5 .....            | 21635 <sup>1</sup> ..... | <sup>1</sup> 22835 ..... |
| 21767.5 .....                  | 22967.5 .....            | 21645 <sup>1</sup> ..... | <sup>1</sup> 22845 ..... |
| 21772.5 .....                  | 22972.5 .....            | 21655 <sup>1</sup> ..... | <sup>1</sup> 22855 ..... |
| 21777.5 .....                  | 22977.5 .....            | 21665 <sup>1</sup> ..... | <sup>1</sup> 22865 ..... |
| 21782.5 .....                  | 22982.5 .....            | 21675 <sup>1</sup> ..... | <sup>1</sup> 22875 ..... |
| 21787.5 .....                  | 22987.5 .....            | 21685 <sup>1</sup> ..... | <sup>1</sup> 22885 ..... |
| 21792.5 .....                  | 22992.5 .....            | 21695 <sup>1</sup> ..... | <sup>1</sup> 22895 ..... |
| 21797.5 .....                  | 22997.5 .....            | 21705 <sup>1</sup> ..... | <sup>1</sup> 22905 ..... |
| 22302.5 .....                  | 23502.5 .....            | 21715 <sup>1</sup> ..... | <sup>1</sup> 22915 ..... |
| 22307.5 .....                  | 23507.5 .....            | 21725 <sup>1</sup> ..... | <sup>1</sup> 22925 ..... |
| 22312.5 .....                  | 23512.5 .....            | 21735 <sup>1</sup> ..... | <sup>1</sup> 22935 ..... |
| 22317.5 .....                  | 23517.5 .....            | 21745 <sup>1</sup> ..... | <sup>1</sup> 22945 ..... |
| 22322.5 .....                  | 23522.5 .....            | 21755 <sup>1</sup> ..... | <sup>1</sup> 22955 ..... |
| 22327.5 .....                  | 23527.5 .....            | 21765 <sup>1</sup> ..... | <sup>1</sup> 22965 ..... |
| 22332.5 .....                  | 23532.5 .....            | 21775 <sup>1</sup> ..... | <sup>1</sup> 22975 ..... |
| 22337.5 .....                  | 23537.5 .....            | 21785 <sup>1</sup> ..... | <sup>1</sup> 22985 ..... |
| 22342.5 .....                  | 23542.5 .....            | 21795 <sup>1</sup> ..... | <sup>1</sup> 22995 ..... |
| 22347.5 .....                  | 23547.5 .....            | 21805 <sup>2</sup> ..... | <sup>2</sup> 23005 ..... |
| 22352.5 .....                  | 23552.5 .....            | 21815 <sup>2</sup> ..... | <sup>2</sup> 23015 ..... |
| 22357.5 .....                  | 23557.5 .....            | 21825 <sup>2</sup> ..... | <sup>2</sup> 23025 ..... |
| 22362.5 .....                  | 23562.5 .....            | 21835 <sup>2</sup> ..... | <sup>2</sup> 23035 ..... |
| 22367.5 .....                  | 23567.5 .....            | 21845 <sup>2</sup> ..... | <sup>2</sup> 23045 ..... |
| 22372.5 .....                  | 23572.5 .....            | 21855 <sup>2</sup> ..... | <sup>2</sup> 23055 ..... |
| 22377.5 .....                  | 23577.5 .....            | 21865 <sup>2</sup> ..... | <sup>2</sup> 23065 ..... |
| 22382.5 .....                  | 23582.5 .....            | 21875 <sup>2</sup> ..... | <sup>2</sup> 23075 ..... |
| 22387.5 .....                  | 23587.5 .....            | 21885 <sup>2</sup> ..... | <sup>2</sup> 23085 ..... |
| 22392.5 .....                  | 23592.5 .....            | 21895 <sup>2</sup> ..... | <sup>2</sup> 23095 ..... |
| 22397.5 .....                  | 23597.5 .....            | 21905 <sup>2</sup> ..... | <sup>2</sup> 23105 ..... |
| (3) 10 MHz bandwidth channels: |                          | 21915 <sup>2</sup> ..... | <sup>2</sup> 23115 ..... |
| 21205 .....                    | 22405 .....              | 21925 <sup>2</sup> ..... | <sup>2</sup> 23125 ..... |
| 21215 .....                    | 22415 .....              | 21935 <sup>2</sup> ..... | <sup>2</sup> 23135 ..... |
| 21225 .....                    | 22425 .....              | 21945 <sup>2</sup> ..... | <sup>2</sup> 23145 ..... |
| 21235 .....                    | 22435 .....              | 21955 <sup>2</sup> ..... | <sup>2</sup> 23155 ..... |
| 21245 .....                    | 22445 .....              | 21965 <sup>2</sup> ..... | <sup>2</sup> 23165 ..... |
| 21255 .....                    | 22455 .....              | 21975 <sup>2</sup> ..... | <sup>2</sup> 23175 ..... |
| 21265 .....                    | 22465 .....              | 21985 <sup>2</sup> ..... | <sup>2</sup> 23185 ..... |
| 21275 .....                    | 22475 .....              | 21995 <sup>2</sup> ..... | <sup>2</sup> 23195 ..... |
| 21285 .....                    | 22485 .....              | 22005 .....              | 23205 .....              |
| 21295 .....                    | 22495 .....              | 22015 .....              | 23215 .....              |
| 21305 .....                    | 22505 .....              | 22025 <sup>2</sup> ..... | 23225 <sup>2</sup> ..... |
| 21315 .....                    | 22515 .....              | 22035 .....              | 23235 .....              |
| 21325 .....                    | 22525 .....              | 22045 .....              | 23245 .....              |
| 21335 .....                    | 22535 .....              | 22055 .....              | 23255 .....              |
| 21345 .....                    | 22545 .....              | 22065 .....              | 23265 .....              |
| 21355 .....                    | 22555 .....              | 22075 <sup>2</sup> ..... | 23275 <sup>2</sup> ..... |
| 21365 .....                    | 22565 .....              | 22085 .....              | 23285 .....              |
| 21375 .....                    | 22575 .....              | 22095 .....              | 23295 .....              |
| 21385 .....                    | 22585 .....              | 22105 .....              | 23305 .....              |
| 21395 .....                    | 22595 .....              | 22115 .....              | 23315 .....              |
| 21405 .....                    | 22605 .....              | 22125 .....              | 23325 .....              |
| 21415 .....                    | 22615 .....              | 22135 .....              | 23335 .....              |
| 21425 .....                    | 22625 .....              | 22145 .....              | 23345 .....              |
| 21435 .....                    | 22635 .....              | 22155 .....              | 23355 .....              |
| 21445 .....                    | 22645 .....              | 22165 .....              | 23365 .....              |
| 21455 .....                    | 22655 .....              | 22175 .....              | 23375 .....              |
| 21465 .....                    | 22665 .....              | 22185 .....              | 23385 .....              |
| 21475 .....                    | 22675 .....              | 22195 .....              | 23395 .....              |
| 21485 .....                    | 22685 .....              | 22205 .....              | 23405 .....              |
| 21495 .....                    | 22695 .....              | 22215 .....              | 23415 .....              |
| 21505 .....                    | 22705 .....              | 22225 .....              | 23425 .....              |
| 21515 .....                    | 22715 .....              | 22235 .....              | 23435 .....              |
| 21525 .....                    | 22725 .....              | 22245 .....              | 23445 .....              |
| 21535 .....                    | 22735 .....              | 22255 .....              | 23455 .....              |
| 21545 .....                    | 22745 .....              | 22265 .....              | 23465 .....              |
| 21555 .....                    | 22755 .....              | 22275 .....              | 23475 .....              |
| 21565 .....                    | 22765 .....              | 22285 .....              | 23485 .....              |
| 21575 .....                    | 22775 .....              | 22295 .....              | 23495 .....              |
| 21585 .....                    | 22785 .....              | 22305 <sup>1</sup> ..... | <sup>1</sup> 23505 ..... |

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| Transmit (receive) (MHz)       | Receive (transmit) (MHz) | Transmit (receive) (MHz)       | Receive (transmit) (MHz) |
|--------------------------------|--------------------------|--------------------------------|--------------------------|
| 22315 <sup>1</sup> .....       | <sup>1</sup> 23515       | 21885 <sup>2</sup> .....       | <sup>2</sup> 23085       |
| 22325 <sup>1</sup> .....       | <sup>1</sup> 23525       | 21935 <sup>2</sup> .....       | <sup>2</sup> 23135       |
| 22335 <sup>1</sup> .....       | <sup>1</sup> 23535       | 21985 <sup>2</sup> .....       | <sup>2</sup> 23185       |
| 22345 <sup>1</sup> .....       | <sup>1</sup> 23545       | 22035 .....                    | 23235                    |
| 22355 <sup>1</sup> .....       | <sup>1</sup> 23555       | 22085 .....                    | 23285                    |
| 22365 <sup>1</sup> .....       | <sup>1</sup> 23565       | 22135 .....                    | 23335                    |
| 22375 <sup>1</sup> .....       | <sup>1</sup> 23575       | 22185 .....                    | 23385                    |
| 22385 <sup>1</sup> .....       | <sup>1</sup> 23585       | 22235 .....                    | 23435                    |
| 22395 <sup>1</sup> .....       | <sup>1</sup> 23595       | 22285 .....                    | 23485                    |
| (4) 20 MHz bandwidth channels: |                          | 22335 <sup>1</sup> .....       | <sup>1</sup> 23535       |
| 21210 .....                    | 22410                    | 22385 <sup>1</sup> .....       | <sup>1</sup> 23585       |
| 21230 .....                    | 22430                    | (6) 40 MHz bandwidth channels: |                          |
| 21260 .....                    | 22460                    | 21220 .....                    | 22420                    |
| 21280 .....                    | 22480                    | 21270 .....                    | 22470                    |
| 21310 .....                    | 22510                    | 21320 .....                    | 22520                    |
| 21330 .....                    | 22530                    | 21370 .....                    | 22570                    |
| 21360 .....                    | 22560                    | 21420 .....                    | 22620                    |
| 21380 .....                    | 22580                    | 21470 .....                    | 22670                    |
| 21410 .....                    | 22610                    | 21520 .....                    | 22720                    |
| 21430 .....                    | 22630                    | 21570 .....                    | 22770                    |
| 21460 .....                    | 22660                    | 21620 <sup>1</sup> .....       | <sup>1</sup> 22820       |
| 21480 .....                    | 22680                    | 21670 <sup>1</sup> .....       | <sup>1</sup> 22870       |
| 21510 .....                    | 22710                    | 21720 <sup>1</sup> .....       | <sup>1</sup> 22920       |
| 21530 .....                    | 22730                    | 21770 <sup>1</sup> .....       | <sup>1</sup> 22970       |
| 21560 .....                    | 22760                    | 21820 <sup>2</sup> .....       | <sup>2</sup> 23020       |
| 21580 .....                    | 22780                    | 21870 <sup>2</sup> .....       | <sup>2</sup> 23070       |
| 21610 <sup>1</sup> .....       | <sup>1</sup> 22810       | 21920 <sup>2</sup> .....       | <sup>2</sup> 23120       |
| 21630 <sup>1</sup> .....       | <sup>1</sup> 22830       | 21970 <sup>2</sup> .....       | <sup>2</sup> 23170       |
| 21660 <sup>1</sup> .....       | <sup>1</sup> 22860       | 22020 .....                    | 23220                    |
| 21680 <sup>1</sup> .....       | <sup>1</sup> 22880       | 22070 .....                    | 23270                    |
| 21710 <sup>1</sup> .....       | <sup>1</sup> 22910       | 22120 .....                    | 23320                    |
| 21730 <sup>1</sup> .....       | <sup>1</sup> 22930       | 22170 .....                    | 23370                    |
| 21760 <sup>1</sup> .....       | <sup>1</sup> 22960       | 22220 .....                    | 23420                    |
| 21780 <sup>1</sup> .....       | <sup>1</sup> 22980       | 22270 .....                    | 23470                    |
| 21810 <sup>2</sup> .....       | <sup>2</sup> 23010       | 22320 <sup>1</sup> .....       | <sup>1</sup> 23520       |
| 21830 <sup>2</sup> .....       | <sup>2</sup> 23030       | 22370 <sup>1</sup> .....       | <sup>1</sup> 23570       |
| 21860 <sup>2</sup> .....       | <sup>2</sup> 23060       | (7) 50 MHz bandwidth channels: |                          |
| 21880 <sup>2</sup> .....       | <sup>2</sup> 23080       | 21225 .....                    | 22425                    |
| 21910 <sup>2</sup> .....       | <sup>2</sup> 23110       | 21275 .....                    | 22475                    |
| 21930 <sup>2</sup> .....       | <sup>2</sup> 23130       | 21325 .....                    | 22525                    |
| 21960 <sup>2</sup> .....       | <sup>2</sup> 23160       | 21375 .....                    | 22575                    |
| 21980 <sup>2</sup> .....       | <sup>2</sup> 23180       | 21425 .....                    | 22625                    |
| 22010 .....                    | 23210                    | 21475 .....                    | 22675                    |
| 22030 .....                    | 23230                    | 21525 .....                    | 22725                    |
| 22060 .....                    | 23260                    | 21575 .....                    | 22775                    |
| 22080 .....                    | 23280                    | 21625 <sup>1</sup> .....       | <sup>1</sup> 22825       |
| 22110 .....                    | 23310                    | 21675 <sup>1</sup> .....       | <sup>1</sup> 22875       |
| 22130 .....                    | 23330                    | 21725 <sup>1</sup> .....       | <sup>1</sup> 22925       |
| 22160 .....                    | 23360                    | 21775 <sup>1</sup> .....       | <sup>1</sup> 22975       |
| 22180 .....                    | 23380                    | 21825 <sup>2</sup> .....       | <sup>2</sup> 23025       |
| 22210 .....                    | 23410                    | 21875 <sup>2</sup> .....       | <sup>2</sup> 23075       |
| 22230 .....                    | 23430                    | 21925 <sup>2</sup> .....       | <sup>2</sup> 23125       |
| 22260 .....                    | 23460                    | 21975 <sup>2</sup> .....       | <sup>2</sup> 23175       |
| 22280 .....                    | 23480                    | 22025 <sup>2</sup> .....       | 23225 <sup>2</sup>       |
| 22310 <sup>1</sup> .....       | <sup>1</sup> 23510       | 22075 <sup>2</sup> .....       | 23275 <sup>2</sup>       |
| 22330 <sup>1</sup> .....       | <sup>1</sup> 23530       | 22125 .....                    | 23325                    |
| 22360 <sup>1</sup> .....       | <sup>1</sup> 23560       | 22175 .....                    | 23375                    |
| 22380 <sup>1</sup> .....       | <sup>1</sup> 23580       | 22225 .....                    | 23425                    |
| (5) 30 MHz bandwidth channels: |                          | 22275 .....                    | 23475                    |
| 21235 .....                    | 22435                    | 22325 <sup>1</sup> .....       | <sup>1</sup> 23525       |
| 21285 .....                    | 22485                    | 22375 <sup>1</sup> .....       | <sup>1</sup> 23575       |
| 21335 .....                    | 22535                    |                                |                          |
| 21385 .....                    | 22585                    |                                |                          |
| 21435 .....                    | 22635                    |                                |                          |
| 21485 .....                    | 22685                    |                                |                          |
| 21535 .....                    | 22735                    |                                |                          |
| 21585 .....                    | 22785                    |                                |                          |
| 21635 <sup>1</sup> .....       | <sup>1</sup> 22835       |                                |                          |
| 21685 <sup>1</sup> .....       | <sup>1</sup> 22885       |                                |                          |
| 21735 <sup>1</sup> .....       | <sup>1</sup> 22935       |                                |                          |
| 21785 <sup>1</sup> .....       | <sup>1</sup> 22985       |                                |                          |
| 21835 <sup>2</sup> .....       | <sup>2</sup> 23035       |                                |                          |

<sup>1</sup> Alternate channels. These channels are set aside for narrow bandwidth systems and should be used only if all other channels are blocked.

<sup>2</sup> These frequencies may be assigned to low power systems, as defined in paragraph (8) of this section.

(8) *Special provisions for low power, limited coverage systems in the 21.8–22.0 GHz and 23.0–23.2 GHz band segments.* Notwithstanding any contrary provisions in this part, the frequency band

segment 21.8–22.0 GHz paired with the frequency band segment 23.0–23.2 GHz may be authorized for low power, limited coverage systems subject to the following provisions:

(i) The maximum EIRP shall be 55 dBm and the rated transmitter output power shall not exceed 0.100 Watts;

(ii) In the band segments from 21.8–22.0 GHz and 23.0–23.2 GHz, the frequency tolerance for stations authorized on or before April 1, 2005 is 0.05%. Existing licensees and pending applicants on that date may continue to operate after that date with a frequency tolerance of 0.05%, provided that it does not cause harmful interference to the operation of any other licensee. The frequency tolerance of §101.107(a) shall apply to stations applied for after April 1, 2005;

(iii) The maximum beamwidth shall not exceed 4 degrees;

(iv) The sidelobe suppression criteria contained in §101.115 of this part shall not apply, except that a minimum front-to-back ratio of 38 dB shall apply;

(v) Upon showing of need, a maximum bandwidth of 50 MHz may be authorized per frequency assigned;

(vi) Radio systems authorized under the provisions of this section shall have no more than five hops in tandem, except upon showing of need, but in any event the maximum tandem length shall not exceed 40 km (25 miles);

(vii) Interfering signals at the antenna terminals of station authorized under this section shall not exceed –90 dBm and –70 dBm respectively, for co-channel and adjacent channel interfering signals; and

(viii) Stations authorized under the provisions of this section shall provide the protection from interference specified in §101.105 to stations operating in accordance with the provisions of this part.

(t) 29,100–29,250; 31,000–31,300 MHz. These frequencies are available for LMDS systems. Each assignment will be made on a BTA service area basis, and the assigned spectrum may be subdivided as desired by the licensee.

(u) 31,000–31,300 MHz. Stations licensed in this band prior to March 11, 1997, may continue their authorized operations, subject to license renewal, on the condition that harmful inter-

ference will not be caused to LMDS operations licensed in this band after June 30, 1997. Non-LMDS stations licensed after March 11, 1997, based on applications refiled no later than June 26, 1998 are unprotected and subject to harmful interference from each other and from stations licensed prior to March 11, 1997, and are licensed on a secondary basis to LMDS. In the sub-bands 31,000–31,075 MHz and 31,225–31,300 MHz, stations initially licensed prior to March 11, 1997, except in LTTS, and LMDS operations authorized after June 30, 1997, are equally protected against harmful interference from each other in accordance with the provisions of §101.103(b). For stations, except in LTTS, permitted to relocate to these sub-bands, the following paired frequencies are available:

| Transmit (receive) (MHz)                 | Receive (transmit) (MHz) |
|------------------------------------------|--------------------------|
| (1) 25 MHz Authorized Bandwidth Channels |                          |
| 31,012.5 .....                           | 31,237.5                 |
| 31,037.5 .....                           | 31,262.5                 |
| 31,062.5 .....                           | 31,287.5                 |
| (2) 75 MHz Authorized Bandwidth Channel  |                          |
| 31,037.5 .....                           | 31,275.0                 |

NOTE TO (u): These channels are assigned for use within a rectangular service area to be described in the application by the maximum and minimum latitudes and longitudes. Such service area must be as small as practical consistent with the local service requirements of the carrier. These frequency plans may be subdivided as desired by the licensee and used within the service area as desired without further authorization subject to the terms and conditions set forth in §101.149. These frequencies may be assigned only where it is shown that the applicant will have reasonable projected requirements for a multiplicity of service points or transmission paths within the area.

(v) [Reserved]

(w) Fixed systems licensed, in operation, or applied for in the 3,700–4,200, 5925–6425, 6,525–6,875, 10,550–10,680, and 10,700–11,700 MHz bands prior to July 15, 1993, are permitted to use channel plans in effect prior to that date, including adding channels under those plans.

(x) Operations on other than the listed frequencies may be authorized where it is shown that the objectives or requirements of the interference criteria prescribed in §101.105 could not

otherwise be met to resolve the interference problems.

(y) *Special requirements for operations in the band 29.1–29.25 GHz.* (1)(i) LMDS receive stations operating on frequencies in the 29.1–29.25 GHz band within a radius of 75 nautical miles of the geographic coordinates provided by a non-GSO MSS licensee pursuant to paragraphs (c)(2) or (c)(3)(i) of this section (the “feeder link earth station complex protection zone”) shall accept any interference caused to them by such earth station complexes and shall not claim protection from such earth station complexes.

(ii) LMDS licensees operating on frequencies in the 29.1–29.25 GHz band outside a feeder link earth station complex protection zone shall cooperate fully and make reasonable efforts to resolve technical problems with the non-GSO MSS licensee to the extent that transmissions from the non-GSO MSS operator’s feeder link earth station complex interfere with an LMDS receive station.

(2) No more than 15 days after the release of a public notice announcing the commencement of LMDS auctions, feeder link earth station complexes to be licensed pursuant to Section 25.257 shall be specified by a set of geographic coordinates in accordance with the following requirements: no feeder link earth station complex may be located in the top eight (8) metropolitan statistical areas (“MSAs”), ranked by population, as defined by the Office of Management and Budget as of June 1993, using estimated populations as of December 1992; two (2) complexes may be located in MSAs 9 through 25, one of which must be Phoenix, AZ (for a complex at Chandler, AZ); two (2) complexes may be located in MSAs 26 to 50; three (3) complexes may be located in MSAs 51 to 100, one of which must be Honolulu, Hawaii (for a complex at Waimea); and the three (3) remaining complexes must be located at least 75 nautical miles from the borders of the 100 largest MSAs or in any MSA not included in the 100 largest MSAs. Any location allotted for one range of MSAs may be taken from an MSA below that range.

(3)(i) Any non-GSO MSS licensee may at any time specify sets of geographic

coordinates for feeder link earth station complexes with each earth station contained therein to be located at least 75 nautical miles from the borders of the 100 largest MSAs.

(ii) For purposes of paragraph (c)(3)(i) of this section, non-GSO MSS feeder link earth station complexes shall be entitled to accommodation only if the affected non-GSO MSS licensee preapplies to the Commission for a feeder link earth station complex or certifies to the Commission within sixty days of receiving a copy of an LMDS application that it intends to file an application for a feeder link earth station complex within six months of the date of receipt of the LMDS application.

(iii) If said non-GSO MSS licensee application is filed later than six months after certification to the Commission, the LMDS and non-GSO MSS entities shall still cooperate fully and make reasonable efforts to resolve technical problems, but the LMDS licensee shall not be obligated to re-engineer its proposal or make changes to its system.

(4) LMDS licensees or applicants proposing to operate hub stations on frequencies in the 29.1–29.25 GHz band at locations outside of the 100 largest MSAs or within a distance of 150 nautical miles from a set of geographic coordinates specified under paragraph (c)(2) or (c)(3)(i) of this section shall serve copies of their applications on all non-GSO MSS applicants, permittees or licensees meeting the criteria specified in § 25.257(a). Non-GSO MSS licensees or applicants shall serve copies of their feeder link earth station applications, after the LMDS auction, on any LMDS applicant or licensee within a distance of 150 nautical miles from the geographic coordinates that it specified under paragraph (c)(2) or (c)(3)(i) of this section. Any necessary coordination shall commence upon notification by the party receiving an application to the party who filed the application. The results of any such coordination shall be reported to the Commission within sixty days. The non-GSO MSS earth station licensee shall also provide all such LMDS licensees with a copy of its channel plan.

(z) 71,000–76,000 MHz; 81,000–86,000 MHz; 92,000–94,000 MHz; 94,100–95,000

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*MHz.* (1) Those applicants who are approved in accordance with FCC Form 601 will each be granted a single, non-exclusive nationwide license. Site-by-site registration is on a first-come, first-served basis. Registration will be in the Universal Licensing System until the Wireless Telecommunications Bureau announces by public notice, the implementation of a third-party database. *See* 47 CFR 101.1523. Links may not operate until NTIA approval is received. Licensees may use these bands for any point-to-point non-broadcast service.

(2) Prior links shall be protected using the interference protection criteria set forth in section 101.105. For transmitters employing digital modulation techniques and operating in the 71,000–76,000 MHz or 81,000–86,000 MHz bands, the licensee must construct a system that meets a minimum bit rate of 0.125 bits per second per Hertz of bandwidth. For transmitters that operate in the 92,000–94,000 MHz or 94,100–95,000 MHz bands, licensees must construct a system that meets a minimum bit rate of 1.0 bit per second per Hertz of bandwidth. If it is determined that a licensee has not met these loading requirements, then the database will be modified to limit coordination rights to the spectrum that is loaded and the licensee will lose protection rights on spectrum that has not been loaded.

(3) The following channel plans apply to the 71,000–76,000 MHz and 81,000–86,000 MHz bands:

(i) *250 MHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71250 .....                    | 81250                          |
| 71500 .....                    | 81500                          |
| 71750 .....                    | 81750                          |
| 72000 .....                    | 82000                          |
| 72250 .....                    | 82250                          |
| 72500 .....                    | 82500                          |
| 72750 .....                    | 82750                          |
| 73000 .....                    | 83000                          |
| 73250 .....                    | 83250                          |
| 73500 .....                    | 83500                          |
| 73750 .....                    | 83750                          |
| 74000 .....                    | 84000                          |
| 74250 .....                    | 84250                          |
| 74500 .....                    | 84500                          |
| 74750 .....                    | 84750                          |
| 75000 .....                    | 85000                          |
| 75250 .....                    | 85250                          |
| 75500 .....                    | 85500                          |
| 75750 .....                    | 85750                          |

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(ii) *500 MHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71375 .....                    | 81375                          |
| 71875 .....                    | 81875                          |
| 72375 .....                    | 82375                          |
| 72875 .....                    | 82875                          |
| 73375 .....                    | 83375                          |
| 73875 .....                    | 83875                          |
| 74375 .....                    | 84375                          |
| 74875 .....                    | 84875                          |
| 75375 .....                    | 85375                          |

(iii) *750 MHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71500 .....                    | 81500                          |
| 72250 .....                    | 82250                          |
| 73000 .....                    | 83000                          |
| 73750 .....                    | 83750                          |
| 74500 .....                    | 84500                          |
| 75250 .....                    | 85250                          |

(iv) *1 GHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71625 .....                    | 81625                          |
| 72625 .....                    | 82625                          |
| 74125 .....                    | 84125                          |
| 75125 .....                    | 85125                          |

(v) *1.25 GHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71750 .....                    | 81750                          |
| 73000 .....                    | 83000                          |
| 74250 .....                    | 84250                          |

(vi) *1.5 GHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 71875 .....                    | 81875                          |
| 74375 .....                    | 84375                          |

(vii) *1.75 GHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72000 .....                    | 82000                          |
| 74500 .....                    | 84500                          |

(viii) *2.0 GHz authorized bandwidth.*

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72125 .....                    | 82125                          |

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| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 74625 .....                    | 84625                          |

(ix) 2.25 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72250 .....                    | 82250                          |
| 74750 .....                    | 84750                          |

(x) 2.5 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72375 .....                    | 82375                          |

(xi) 2.75 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72500 .....                    | 82500                          |

(xii) 3 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72625 .....                    | 82625                          |

(xiii) 3.25 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72750 .....                    | 82750                          |

(xiv) 3.5 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 72875 .....                    | 82875                          |

(xv) 3.75 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 73000 .....                    | 83000                          |

(xvi) 4 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 73125 .....                    | 83125                          |

(xvii) 4.25 GHz authorized bandwidth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 73250 .....                    | 83250                          |

(xviii) 4.5 GHz auth.

| Transmit<br>(receive)<br>(MHz) | Receive<br>(transmit)<br>(MHz) |
|--------------------------------|--------------------------------|
| 73375 .....                    | 83375                          |

[61 FR 26677, May 28, 1996]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 101.147, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

## § 101.149 [Reserved]

## § 101.151 Use of signal boosters.

Private operational-fixed licensees authorized to operate multiple address systems in the 928–929/952–960 MHz and 932–932.5/941–941.5 MHz bands may employ signal boosters at fixed locations in accordance with the following criteria:

(a) The amplified signal is retransmitted only on the exact frequency(ies) of the originating base, fixed, mobile, or portable station(s). The booster will fill in only weak signal areas and cannot extend the system's normal signal coverage area.

(b) Class A narrowband signal boosters must be equipped with automatic gain control circuitry which will limit the total effective radiated power (ERP) of the unit to a maximum of 5 watts under all conditions. Class B broadband signal boosters are limited to 5 watts ERP for each authorized frequency that the booster is designed to amplify.

(c) Class A narrowband boosters must meet the out-of-band emission limits of § 101.111 for each narrowband channel that the booster is designed to amplify. Class B broadband signal boosters must meet the emission limits of § 101.111 for frequencies outside of the booster's design passband.

(d) Class B broadband signal boosters are permitted to be used only in confined or indoor areas such as buildings, tunnels, underground areas, etc., or remote areas, *i.e.*, areas where there is

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little or no risk of interference to other users.

(e) The licensee is given authority to operate signal boosters without separate authorization from the Commission. Certificated equipment must be employed and the licensee must ensure that all applicable rule requirements are met.

(f) Licensees employing either Class A narrowband or Class B broadband signal boosters as defined in §101.3 are responsible for correcting any harmful interference that the equipment may cause to other systems.

[61 FR 31052, June 19, 1996, as amended at 63 FR 36611, July 7, 1998]

### **Subpart D—Operational Requirements**

#### **§ 101.201 Station inspection.**

The licensee of each station authorized in the radio services included in this part must make the station available for inspection by representatives of the Commission at any reasonable hour.

#### **§ 101.203 Communications concerning safety of life and property.**

(a) Handling and transmission of messages concerning the safety of life or property which is in imminent danger must be afforded priority over other messages.

(b) No person may knowingly cause to be transmitted any false or fraudulent message concerning the safety of life or property, or refuse upon demand immediately to relinquish the use of a radio circuit to enable the transmission of messages concerning the safety of life or property which is in imminent danger, or knowingly interfere or otherwise obstruct the transmission of such messages.

#### **§ 101.205 Operation during emergency.**

The licensee of any station in these services 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 a manner other than that specified in the instrument of authorization: Provided:

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(a) That as soon as possible after the beginning of such emergency use, notice be sent to the Commission stating the nature of the emergency and the use to which the station is being put;

(b) That the emergency use of the station must be discontinued as soon as substantially normal communication facilities are again available;

(c) That the Commission must be notified immediately when such special use of the station is terminated;

(d) That, in no event, will 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

(e) That the Commission may, at any time, order the discontinuance of any such emergency communication.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68983, Dec. 14, 1998]

#### **§ 101.207 Suspension of transmission.**

Transmission must be suspended immediately upon detection by the station or operator licensee or upon notification by the Commission of a deviation from the technical requirements of the station authorization and must remain suspended until such deviation is corrected, except for transmission concerning the immediate safety of life or property, in which case transmission must be suspended immediately after the emergency is terminated.

#### **§ 101.209 Operation of stations at temporary fixed locations for communication between the United States and Canada or Mexico.**

Stations authorized to operate at temporary fixed locations may not be used for transmissions between the United States and Canada, or the United States and Mexico, without prior specific notification to, and authorization from, the Commission. Notification of such intended usage of the facilities should include a detailed showing of the operation proposed, including the parties involved, the nature of the communications to be handled, the terms and conditions of such operations, the time and place of operation, such other matters as the applicant deems relevant, and a showing as

to how the public interest, convenience and necessity would be served by the proposed operation. Such notification should be given sufficiently in advance of the proposed date of operation to permit any appropriate correlation with the respective foreign government involved (see §§101.31, 101.811, 101.813, and 101.815).

**§ 101.211 Operator requirements.**

(a) Any person, with the consent or authorization of the licensee, may employ stations in this service for the purpose of telecommunications in accordance with the conditions and limitations set forth in § 101.135.

(b) The station licensee is responsible for the proper operation of the station at all times and is expected to provide for observations, servicing and maintenance as often as may be necessary to ensure proper operation.

(c) The provisions of paragraph (a) of this section may not be construed to change or diminish in any respect the responsibility of station licensees to have and to maintain control over the stations licensed to them (including all transmitter units thereof), or for the proper functioning and operation of those stations (including all transmitter units thereof) in accordance with the terms of the licenses of those stations.

**§ 101.213 Station identification.**

Stations in these services are exempt from the requirement to identify transmissions by call sign or any other station identifier.

**§ 101.215 Posting of station authorization and transmitter identification cards, plates, or signs.**

(a) Each licensee shall post at the station the name, address and telephone number of the custodian of the station license or other authorization if such license or authorization is not maintained at the station.

(b) The requirements in paragraph (a) of this section do not apply to remote stations using frequencies listed in § 101.147(b).

**§ 101.217 Station records.**

Each licensee of a station subject to this part shall maintain records in accordance with the following:

(a) For all stations, the results and dates of transmitter measurements and the name of the person or persons making the measurements;

(b) For all stations, when service or maintenance duties are performed, which may affect their proper operation, the responsible operator shall sign and date an entry in the station record concerned, giving:

(1) Pertinent details of all transmitter adjustments performed by him or under his supervision; and

(2) His name and address, provided that this information, so long as it remains unchanged, is not required to be repeated in the case of a person who is regularly employed as operator on a full-time basis at the station.

(c) The records shall be kept in an orderly manner, and in such detail that the data required are readily available. Key letters or abbreviations may be used if proper meaning or explanation is set forth in the record.

(d) Each entry in the records of each station shall be signed by a person qualified to do so, having actual knowledge of the facts to be recorded.

(e) No record or portion thereof shall be erased, obliterated, or willfully destroyed within the required retention period. Any necessary correction may be made only by the person originating the entry, who shall strike out the erroneous portion, initial the correction made and indicate the date of correction.

(f) Records required by this part shall be retained by the licensee for a period of at least one year.

**Subpart E—Miscellaneous  
Common Carrier Provisions**

**§ 101.301 National defense; free service.**

Any common carrier authorized under the rules of this part 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 must make and

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file, in duplicate, with the Commission, on or before the 31st 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 of June and the 31st of December, respectively, next prior to said dates. These reports must 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 such communications had been collected at the published tariff rates.

### § 101.303 Answers to notices of violation.

Any person receiving official notice of a violation of the terms of the Communications Act of 1934, as amended, any other Federal statute or Executive Order pertaining to radio or wire communications or any international radio or wire communications treaty or convention, or regulations annexed thereto to which the United States is a party, or the rules and regulations of the Federal Communications Commission, must, within 10 days from such receipt, send a written answer to the office of the Commission originating the official notice. If an answer cannot be sent or an acknowledgment made within such 10-day period by reason of illness or other unavoidable circumstances, acknowledgment and answer must be made at the earliest practicable date with a satisfactory explanation of the delay. The answer to each notice must be complete in itself and may not be abbreviated by reference to other communications or answers to other notices. If the notice relates to some violation that may be due to the physical or electrical characteristics of transmitting apparatus, the answer must state fully what steps have been taken to prevent future violations, and, if any new apparatus is to be installed, the date such apparatus was ordered, the name of the manufacturer, and promised date of delivery. If the installation of such apparatus requires a construction permit, the file number of the application must be given or, if a file number has not been assigned by

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the Commission, such identification as will permit ready reference thereto. If the notice of violation relates to inadequate maintenance resulting in improper operation of the transmitter, the name and license number of the operator performing the maintenance must be given. If the notice of violation relates to some lack of attention to, or improper operation of, the transmitter by other employees, the reply must enumerate the steps taken to prevent a recurrence of such lack of attention or improper operation.

### § 101.305 Discontinuance, reduction or impairment of service.

(a) If the public communication service provided by a station in the Common Carrier Radio Services, the Local Multipoint Distribution Service or 24 GHz Service is involuntarily discontinued, reduced or impaired for a period exceeding 48 hours, the station licensee must promptly notify the Commission. In every such case, the licensee must furnish full particulars as to the reasons for such discontinuance, reduction or impairment of service, including a statement as to when normal service is expected to be resumed. When normal service is resumed, prompt notification thereof must be given Commission.

(b) No station licensee subject to title II of the Communications Act of 1934, as amended, may voluntarily discontinue, reduce or impair public communication service to a community or part of a community without obtaining prior authorization from the Commission pursuant to the procedures set forth in part 63 of this chapter. In the event that permanent discontinuance of service is authorized by the Commission, the station license is terminated; except that station licenses in the Local Multipoint Distribution Service and 24 GHz Service are not terminated if the discontinuance is a result of a change of status by the licensee from common carrier to non-common carrier pursuant to § 1.929 of this chapter.

(c) Any licensee not subject to title II of the Communications Act of 1934, as amended, who voluntarily discontinues, reduces or impairs public communication service to a community or a part of a community must notify the

Commission within 7 days thereof. In the event of permanent discontinuance of service, the station license is automatically terminated; except that station licenses in the Local Multipoint Distribution Service and 24 GHz Service are not terminated if the discontinuance is a result of a change of status by the licensee from non-common carrier to common carrier pursuant to §1.929 of this chapter.

(d) If any common carrier radio frequency should not be used to render any service as authorized during a consecutive period of twelve months at any time after construction is completed under circumstances that do not fall within the provisions of paragraph (a), (b), or (c) of this section, or, if removal of equipment or facilities has rendered the station not operational, the licensee must, within thirty days of the end of such period of nonuse:

(1) Cancel the station license (or licenses); or

(2) File an application for modification of the license (or licenses) to delete the unused frequency (or frequencies); or

(3) Request waiver of this rule and demonstrate either that the frequency will be used (as evidenced by appropriate requests for service, etc.) within six months of the end of the initial period of nonuse, or that the frequency will be converted to allow rendition of other authorized public services within one year of the end of the initial period of nonuse by the filing of appropriate applications within six months of the end of the period of nonuse.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23168, Apr. 29, 1997; 63 FR 68983, Dec. 14, 1998; 65 FR 59359, Oct. 5, 2000]

**§ 101.307 Tariffs, reports, and other material required to be submitted to the Commission.**

Sections 1.771 through 1.815 of this chapter contain summaries of certain materials and reports, including schedule of charges and accounting and financial reports, which, when applicable, must be filed with the Commission.

**§ 101.309 Requirement that licensees respond to official communications.**

All licensees in these services are required to respond to official commu-

nications from the Commission with reasonable dispatch and according to the tenor of such communications. Failure to do so will be given appropriate consideration in connection with any subsequent applications which the offending party may file and may result in the designation of such applications for hearing, or in appropriate cases, the institution of proceedings looking to the modification or revocation of the pertinent authorizations.

**§ 101.311 Equal employment opportunities.**

Equal opportunities in employment must be afforded by all common carrier licensees and all Local Multipoint Distribution Service and 24 GHz Service licensees in accordance with the provisions of §21.307 of this chapter.

[65 FR 59359, Oct. 5, 2000]

**Subpart F [Reserved]**

**Subpart G—24 GHz Service and Digital Electronic Message Service**

**§ 101.501 Eligibility.**

See §101.147(n) for licensing of DEMS facilities in the 10.6 GHz band. Applications for new facilities using the 18 GHz band are no longer being accepted. Any entity, other than one precluded by §101.7, is eligible for authorization to provide 24 GHz Service under this subpart.

[65 FR 59359, Oct. 5, 2000]

**§ 101.503 Digital Electronic Message Service Nodal Stations.**

10.6 GHz DEMS Nodal Stations may be authorized only as a part of an integrated communication system wherein 10.6 GHz DEMS User Stations associated therewith also are licensed to the 10.6 GHz DEMS Nodal Station licensee. Applications for 10.6 GHz DEMS Nodal Station licenses should specify the maximum number of 10.6 GHz DEMS User Stations to be served by that nodal station. Any increase in that number must be applied for pursuant to §1.913 of this chapter.

[65 FR 59359, Oct. 5, 2000]

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### § 101.505 Frequencies.

Frequencies, and the conditions on which they are available, for DEMS operations are contained in this subpart as well as in § 101.147(m), (n), and (r)(9).

[65 FR 59359, Oct. 5, 2000]

### § 101.507 Frequency stability.

The frequency stability in the 10,550–10,680 MHz band must be  $\pm 0.0001\%$  for each DEMS Nodal Station transmitter and  $\pm 0.0003\%$  for each DEMS User Station transmitter. The frequency stability in the 24,250–25,250 MHz bands must be  $\pm 0.001\%$  for each Nodal Station transmitter and  $\pm 0.003\%$  for each User Station transmitter.

[68 FR 4961, Jan. 31, 2003]

### § 101.509 Interference protection criteria.

(a) As a condition for use of frequencies in this service each licensee is required to:

(1) Engineer the system to be reasonably compatible with adjacent and co-channel operations in the same or adjacent areas on all frequencies; and

(2) Cooperate fully and in good faith to resolve whatever potential interference and transmission security problems may be present in adjacent and co-channel operations.

(b) All harmful interference to other users of co-channel and adjacent channel use in the same or adjacent geographical area are prohibited. In areas where Economic Areas are in close proximity, careful consideration should be given to minimum power requirements and to the location, height, and radiation pattern of the transmitting and receiving antennas. Licensees are expected to cooperate fully in attempting to resolve problems of potential interference before bringing the matter to the attention of the Commission.

(c) Licensee shall coordinate their facilities whenever the facilities have optical line-of-sight into other licensees' areas or are within the same geographic area. Licensees are encouraged to develop operational agreements with relevant licensees in the same or adjacent areas. Incumbent SMSA licensee(s) shall retain exclusive rights

to its channel(s) within its SMSA and must be protected.

(d) Licensees shall comply with the appropriate coordination agreements between the United States and Canada and the United States and Mexico concerning cross-border sharing and use of the 24 GHz bands which may require using channels pairs in accordance with the table in § 101.147(r)(9).

(e) The Commission recommends that coordination is not necessary if the power flux density (pfd) at the boundary of the relevant adjacent area is lower than  $-114$  dBW/m<sup>2</sup> in any 1 MHz. This value can be changed and agreed upon by both coordinating parties. Licensees should be able to deploy with a pfd up to  $-94$  dBW/m<sup>2</sup> in any 1 MHz at the boundary of the relevant adjacent area without negatively affecting the successful operations of the adjacent area licensee.

[65 FR 59360, Oct. 5, 2000]

### § 101.511 Permissible services.

(a) Authorizations for stations in the 24 GHz Service will be granted to provide services on a common carrier basis or a non-common carrier basis or on both a common carrier and non-common carrier basis in a single authorization.

(b) Stations may render any kind of digital communications service consistent with the Commission's rules and the regulatory status of the station to provide services on a common carrier or non-common carrier basis.

(c) An applicant or licensee may submit a petition at any time requesting clarification of the regulatory status required to provide a specific communications service.

[65 FR 59360, Oct. 5, 2000]

### § 101.513 Transmitter power.

The transmitter power will be governed by § 101.113. Further, each application must contain an analysis demonstrating compliance with § 101.113(a).

### § 101.515 Emissions and bandwidth.

Different types of emissions may be authorized if the applicant describes fully the modulation and bandwidth desired, and demonstrates that the bandwidth desired is no wider than needed

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to provide the intended service. In no event, however, may the necessary or occupied bandwidth exceed the specified channel width of the assigned pair.

### § 101.517 Antennas.

(a) Transmitting antennas may be omnidirectional or directional, consistent with coverage and interference requirements.

(b) The use of horizontal or vertical plane wave polarization, or right hand or left hand rotating elliptical polarization must be used to minimize harmful interference between stations.

(c) Directive antennas must be used at all DEMS User Stations and may be elevated no higher than necessary to assure adequate service. Antenna structures requiring FAA notification under part 17 of this chapter must be registered with the Commission. The structure owner is responsible for registering, painting, and lighting the structure if applicable. Requests for such authorization must show the inclusive dates of the proposed operation.

### § 101.519 Interconnection.

(a) All DEMS licensees must make available to the public all information necessary to allow the manufacture of user equipment that will be compatible with the licensee's network.

(b) All DEMS licensees must make available to the public all information necessary to allow interconnection of DEMS networks.

### § 101.521 Spectrum utilization.

All applicants for DEMS frequencies in the 10.6 GHz band must submit as part of the original application a detailed plan indicating how the bandwidth requested will be utilized. In particular the application must contain detailed descriptions of the modulation method, the channel time sharing method, any error detecting and/or correcting codes, any spatial frequency reuse system and the total data throughput capacity in each of the links in the system. Further, the application must include a separate analysis of the spectral efficiency including both information bits per unit band-

width and the total bits per unit bandwidth.

[65 FR 59360, Oct. 5, 2000]

### § 101.523 Service areas.

(a) The service areas for 24 GHz are Economic Areas (EAs) as defined in this paragraph (a). The Bureau of Economic Analysis, U.S. Department of Commerce, organized the 50 States and the District of Columbia into 172 EAs. See 60 FR 13114 (March 10, 1995). Additionally, there are four FCC-created EA-like areas:

(1) Guam and Northern Mariana Islands;

(2) Puerto Rico and the U.S. Virgin Islands;

(3) American Samoa, and

(4) *The Gulf of Mexico*. The Gulf of Mexico EA extends from 12 nautical miles off the U.S. Gulf coast outward into the Gulf. See 62 FR 9636 (March 3, 1997), in which the Commission created an additional four economic area-like areas for a total of 176 EA service areas. Maps of the EAs and the FEDERAL REGISTER Notice that established the 172 Economic Areas (EAs) are available for public inspection through the Federal Communications Commission's Reference Information Center. These maps and data are also available on the FCC website at [www.fcc.gov/oet/info/maps/areas/](http://www.fcc.gov/oet/info/maps/areas/). These maps and data are also available on the FCC Web site at [www.fcc.gov/oet/info/maps/areas/](http://www.fcc.gov/oet/info/maps/areas/).

(b) Where an incumbent SMSA license area in the 24 GHz band occupies only a portion of an EA available for application under the competitive bidding rules, the SMSA portion will be excluded from auction and the incumbent licensee will retain the exclusive right to those channels within the SMSA.

[65 FR 59360, Oct. 5, 2000, as amended at 69 FR 44608, July 27, 2004; 85 FR 64411, Oct. 13, 2020; 88 FR 21451, Apr. 10, 2023]

### § 101.525 24 GHz system operations.

(a) A licensee using the 24 GHz band may construct and operate any number of fixed stations anywhere within the area authorized to serve without prior authorization, except as follows:

(1) A station would be required to be individually licensed if:

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(i) International agreements require coordination;

(ii) Submission of an Environmental Assessment is required under § 1.1307 of this chapter;

(iii) The station would affect areas identified in § 1.924 of this chapter.

(2) Any antenna structure that requires notification to the Federal Aviation Administration (FAA) must be registered with the Commission prior to construction under § 17.4 of this chapter.

(b) Whenever a licensee constructs or makes system changes as described in paragraph (a)(1) of this section, the licensee is required to notify the Commission within 30 days of the change under § 1.947 of this chapter and include a statement of the technical parameters of the changed station.

[65 FR 59360, Oct. 5, 2000, as amended at 69 FR 17959, Apr. 6, 2004]

### § 101.526 License term.

The license term for stations licensed under this subpart is ten years from the date of license grant or license renewal for incumbent licensees.

[65 FR 59360, Oct. 5, 2000]

### § 101.527 Construction requirements for 24 GHz operations.

(a) Each licensee must make a showing of “substantial service” within ten years of its license grant. “Substantial service” is a service which is sound, favorable, and substantially above a level of mediocre service which just might minimally warrant renewal during its past license term. Until January 1, 2023, “substantial service” assessment will be made at renewal pursuant to the provisions and procedures set forth in § 1.949 of this chapter.

(b) Until January 1, 2023, each licensee must, at a minimum file:

(1) A report, maps and other supporting documents describing its current service in terms of geographic coverage and population served to the Commission. The report must also contain a description of the licensees’ investments in its operations. The report must be labeled as an attachment to the renewal application; and

(2) Copies of all FCC orders finding the licensee to have violated the Com-

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munications Act or any FCC rule or policy; and a list of any pending proceedings that relate to any matter described in this paragraph (b)(2).

(c) Failure to demonstrate that substantial service is being provided in the service area will result in forfeiture of the license, and the licensee will be unable to regain it.

(d) The frequencies associated with incumbent authorizations, licensed on a SMSA basis, that have cancelled automatically or otherwise been recovered by the Commission will automatically revert to the applicable EA licensee.

[65 FR 59360, Oct. 5, 2000, as amended at 82 FR 41549, Sept. 1, 2017]

### § 101.531 [Reserved]

### § 101.533 Regulatory status.

(a) *Initial applications.* An applicant for a 24 GHz license must specify on FCC Form 601 if it is requesting authorization to provide services on a common carrier basis, a non-common carrier basis, or on both a common carrier and non-common carrier basis.

(b) *Amendment of pending applications.* Any pending application may be amended to:

(1) Change the carrier status requested; or

(2) Add to the pending request in order to obtain both common carrier and non-common carrier status in a single license.

(c) *Modification of license.* A licensee may modify a license to:

(1) Change the carrier status authorized; or

(2) Add to the status authorized in order to obtain both common carrier and non-common carrier status in a single license.

[65 FR 59361, Oct. 5, 2000]

### § 101.535 Geographic partitioning and spectrum aggregation/disaggregation.

(a) *Eligibility.* (1) 24 GHz licensees may apply to the Commission to partition their licensed geographic service areas to eligible entities and are free to determine the portion of their service areas to be partitioned. 24 GHz licensees may aggregate or disaggregate

their licensed spectrum at any time following the grant of a license.

(2) Any existing frequency coordination agreements shall convey with the assignment of the geographic area or spectrum, and shall remain in effect unless new agreements are reached.

(b) *Technical standards*—(1) *Aggregation*. There is no limitation on the amount of spectrum that a 24 GHz licensee may aggregate.

(2) *Partitioning*. In the case of partitioning, applicants and licensees must file FCC Form 603 pursuant to § 1.948 of this chapter and list the partitioned service area on a schedule to the application. The geographic coordinates must be specified in degrees, minutes, and seconds to the nearest second of latitude and longitude and must be based upon the 1983 North American Datum (NAD83).

(3) *Disaggregation*. Spectrum may be disaggregated in any amount. A licensee need not retain a minimum amount of spectrum.

(4) *Combined partitioning and disaggregation*. The Commission will consider requests for partial assignment of licenses that propose combinations of partitioning and disaggregation.

(c) *License term*. The license term for a partitioned license area and for disaggregated spectrum shall be the remainder of the original licensee's license term as provided for in § 101.526.

[65 FR 59361, Oct. 5, 2000, as amended at 67 FR 46379, July 9, 2002; 82 FR 41549, Sept. 1, 2017]

#### **§ 101.537 24 GHz band subject to competitive bidding.**

Mutually exclusive initial applications for 24 GHz band licenses are subject to competitive bidding. The general competitive bidding procedures set forth in part 1, subpart Q of this chapter will apply unless otherwise provided in this subpart.

[67 FR 46379, July 9, 2002]

#### **§ 101.538 Designated entities.**

(a) *Eligibility for small business provisions*. (1) A very small business is an entity that, together with its controlling interests and affiliates, has average gross revenues not exceeding \$3 million for the preceding three years.

(2) A small business is an entity that, together with its controlling interests and affiliates, has average gross revenues not exceeding \$15 million for the preceding three years.

(3) An entrepreneur is an entity that, together with its controlling interests and affiliates, has average gross revenues not exceeding \$40 million for the preceding three years.

(b) *Bidding credits*. A winning bidder that qualifies as a very small business, as defined in this section, or a consortium of very small businesses may use the bidding credit specified in § 1.2110(f)(2)(i) of this chapter. A winning bidder that qualifies as a small business, as defined in this section, or a consortium of small businesses may use the bidding credit specified in § 1.2110(f)(2)(ii) of this chapter. A winning bidder that qualifies as an entrepreneur, as defined in this section, or a consortium of entrepreneurs may use the bidding credit specified in § 1.2110(f)(2)(iii) of this chapter.

[65 FR 59361, Oct. 5, 2000, as amended at 67 FR 46379, July 9, 2002; 68 FR 43002, July 21, 2003]

### **Subpart H—Private Operational Fixed Point-to-Point Microwave Service**

#### **§ 101.601 Eligibility.**

Any person, or any governmental entity or agency, eligible for licensing in a radio service or pool under part 80, 87, or 90 of this chapter or any person proposing to provide communications service to such persons, governmental entities or agencies is eligible to hold a license under this subpart. This subpart shall not apply to stations offering MVDDS in the 12.2–12.7 GHz band.

[62 FR 18936, Apr. 17, 1997, as amended at 67 FR 43040, June 26, 2002]

#### **§ 101.603 Permissible communications.**

(a) Except as provided in paragraph (b) of this section, stations in this radio service may transmit communications as follows:

(1) On frequencies below 21,200 MHz, licensees may transmit their own communications, including the transmission of their products and information services, to their customers except

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that the distribution of video entertainment material to customers is permitted only as indicated in §101.101 and paragraph (a)(2) of this section.

(2) In the frequency bands 6425–6525 MHz, 17,700–18,580 MHz, and on frequencies above 21,200 MHz, licensees may deliver any of their own products and services to any receiving location;

(3) Licensees may transmit the communications of their parent corporation, or of another subsidiary of the same parent, or their own subsidiary where the party to be served is regularly engaged in any of the activities that constitute the basis for eligibility to use the frequencies assigned;

(4) Licensees may transmit the communications of other parties in accordance with §101.135;

(5) Licensees may transmit emergency communications unrelated to their activities in accordance with §101.205;

(6) Licensees may transmit communications on a commercial basis to eligible users, among different premises of a single eligible user, or from one eligible user to another as part of transmissions by Digital Electronic Message Service systems on the frequencies provided for this purpose;

(7) Licensees may transmit program material from one location to another;

(b) Stations licensed in this radio service shall not:

(1) Render a common carrier service of any kind. However, licensees are allowed to lease excess capacity to common carriers. In addition, Specialized Mobile Radio (SMR) licensees reclassified by the Commission as Commercial Mobile Radio Services (CMRS), that were formerly private land mobile radio service providers, may continue to utilize private operational fixed microwave systems licensed prior to April 1, 2003 for their land mobile connecting facilities.

(2) Transmit program material for use in connection with broadcasting, except as provided in paragraphs (a)(2), and (a)(7) of this section; and/or

(3) Be used to provide the final RF link in the chain of transmission of program material to multichannel video programming distributors, except in the frequency bands 6425–6525

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MHz and 17,700–18,580 MHz and on frequencies above 21,200 MHz.

[61 FR 26677, May 28, 1996, as amended at 68 FR 4961, Jan. 31, 2003; 71 FR 69052, Nov. 29, 2006; 76 FR 59574, Sept. 27, 2011]

### Subpart I—Common Carrier Fixed Point-to-Point Microwave Service

#### § 101.701 Eligibility.

(a) Authorizations for stations in this service will be issued to existing and proposed common carriers. Applications will be granted only in cases in which it is shown that:

(1) The applicant is legally, technically, financially and otherwise qualified to render the proposed service;

(2) There are frequencies available to enable the applicant to render a satisfactory service; and

(3) The public interest, convenience, and necessity would be served by a grant thereof.

(b) If the content is originated, selected, controlled, or otherwise substantively influenced by the applicant, licensee, or a closely affiliated entity, no station or radio frequency in this service will be authorized, or may be utilized, to transmit any closed circuit television signals or television signals other than broadcast television signals, unless:

(1) Such service is otherwise permitted for a specific length of time by grant of an acceptable petition for waiver of this rule; or

(2) Such service is otherwise permitted by a condition in the applicable instrument of authorization; or

(3) Such service is provided pursuant to applicable FCC tariff and is temporary and occasional intra-company television communication for management, network supervision, or other internal carrier functions. For purposes of this paragraph, an entity will be considered to be “closely affiliated” with an applicant if it is in a parent-subsidiary relationship, or both are commonly controlled, or they have any common officers or management employees.

(c) Applications for stations or frequencies that will be used primarily to relay broadcast television signals must include a certification that at least

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fifty percent of the customers (or points of service) on the microwave system involved, including those served through an interconnecting carrier(s), receiving applicant's service, will not be related or affiliated in any degree with the applicant, and that the proposed usage by such customers, in terms of hours of use and channels delivered, must constitute at least fifty percent of the usage of the applicant's microwave service. Applications that do not contain these certifications will be returned as unacceptable for filing.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68983, Dec. 14, 1998]

### § 101.703 Permissible communications.

Stations in this service are authorized to render any kind of communication service provided for in the legally applicable tariffs of the carrier, unless otherwise directed in the applicable instrument of authorization or limited by § 101.147 or §§ 101.111 and 101.113.

### § 101.705 Special showing for renewal of common carrier station facilities using frequency diversity.

Any application for renewal of license, for a term commencing January 1, 1975, or after, involving facilities utilizing frequency diversity must contain a statement showing compliance with § 101.103(c) or the exceptions recognized in paragraph 141 of the *First Report and Order* in Docket No. 18920 (29 FCC 2d 870). This document is available at the library of the Federal Communications Commission, located at the address of the FCC's main office indicated in 47 CFR 0.401(a). If not in compliance, a complete statement with the reasons therefore must be submitted.

[64 FR 53242, Oct. 1, 1999, as amended at 85 FR 64411, Oct. 13, 2020]

## Subpart J—Local Television Transmission Service

### § 101.801 Eligibility.

Authorizations for stations in this service will be granted to existing and proposed communication common carriers. Applications will be granted only in cases where it is shown that:

(a) The applicant is legally, financially, technically and otherwise qualified to render the proposed service;

(b) There are frequencies available to enable the applicant to render a satisfactory service; and

(c) The public interest, convenience or necessity would be served by a grant thereof.

### § 101.803 Frequencies.

(a) Frequencies in the following bands are available for assignment to television pickup and television non-broadcast pickup stations in this service:

- 6,425 to 6,525 MHz. (6)
- 11,700 to 12,200 MHz. (3)
- 13,200 to 13,250 MHz. (1)
- 14,200 to 14,400 MHz. (8)
- 21,200 to 22,000 MHz. (1), (2), (4), (5)
- 22,000 to 23,600 MHz. (1), (2), (5)
- 31,000 to 31,300 MHz. (7)

#### Notes

(1) This frequency band is shared with fixed and mobile stations licensed under this and other parts of the Commission's Rules.

(2) This frequency band is shared with Government stations.

(3) This frequency band is shared, on a secondary basis, with stations in the broadcasting-satellite and fixed-satellite services. As of March 1, 2005, no new LTTS operators will be licensed in the 11.7–12.2 GHz band. LTTS operators authorized prior to March 1, 2005 may continue to operate in 11.7–12.2 GHz band until their license expires; no existing LTTS licenses will be renewed in the 11.7–12.2 GHz band.

(4) This frequency band is shared with stations in the earth-exploration satellite service.

(5) This frequency band is shared with the common carrier and private-operational fixed point-to-point microwave services.

(6) This band is co-equally shared with mobile stations licensed pursuant to parts 74 and 78 of this chapter, and subpart H of this part.

(7) As of June 30, 1997, frequencies in this band only are available for assignment to LMDS radio stations, except for non-LMDS radio stations authorized pursuant to applications refiled no later than June 26, 1998. Stations authorized prior to June 30, 1997, may continue to operate within the existing terms of the outstanding licenses, subject to renewal. Non-LMDS stations authorized pursuant to applications refiled no later than June 26, 1998 shall operate on an unprotected basis and subject to harmful interference from similarly licensed stations or stations

licensed prior to June 30, 1997, and on a secondary basis to LMDS radio stations.

(8) The maximum power for the local television transmission service in the 14.2–14.4 GHz band is + 45 dBW except that operations are not permitted within 1.5 degrees of the geostationary orbit. As of March 1, 2005, no new LTTS operators will be licensed in the 14.2–14.4 GHz band. LTTS operators authorized prior to March 1, 2005 may continue to operate in 14.2–14.4 GHz band until their license expires; no existing LTTS licenses will be renewed in the 11.7–12.2 GHz band.

(b) Communications common carriers in the Local Television Transmission Service may be assigned frequencies listed in §§ 74.602(a), 78.18(a)(6), and 78.18(a)(7) of this chapter to provide service to television broadcast stations, television broadcast network-entities, cable system operators, and cable network-entities. Frequency availability is subject to the provisions of § 74.604 of this chapter and the use of the facility is limited to the permissible uses described in §§ 74.631 and 78.11 of this chapter. Operations on these frequencies are subject to the technical provisions of part 74, subpart F, and part 78, subpart D of this chapter.

(c) [Reserved]

(d) Frequencies in the following bands are available for assignment to television STL stations in this service:

- 3,700 to 4,200 MHz (1)
- 5,925 to 6,425 MHz (1),(5)
- 10,700 to 11,700 MHz (1),(6)
- 11,700 to 12,100 MHz (3)
- 13,200 to 13,250 MHz (2)
- 21,200 to 22,000 MHz (2),(4),(7),(8)
- 22,000 to 23,600 MHz (2),(6),(8)
- 31,000 to 31,300 MHz (9)

Notes

(1) This frequency band is shared with stations in the Point to Point Microwave Radio Service and, in United States Possessions in the Caribbean area, with stations in the International Fixed Radiocommunications Services. For 3,700–4,200 MHz frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. In the contiguous United States, licensees of existing licenses, as of April 19, 2018, for permanent point-to-point Fixed Service links have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band.

(2) This frequency band is shared with fixed and mobile stations licensed under this and other parts of the Commission's rules.

(3) This frequency band is shared with space stations (space to earth) in the fixed-satellite service. As of March 1, 2005, no new LTTS operators will be licensed in the 11.7–12.2 GHz band. LTTS operators authorized prior to March 1, 2005 may continue to operate in 11.7–12.2 GHz band until their license expires; no existing LTTS licenses will be renewed in the 11.7–12.2 GHz band.

(4) This frequency band is shared with Government stations.

(5) This frequency band is shared with earth stations (earth to space) in the fixed-satellite services.

(6) The band segments 10.95–11.2 and 11.45–11.7 GHz are shared with space stations (space to earth) in the fixed-satellite service.

(7) This frequency band is shared with space stations (space to earth) in the earth exploration satellite service.

(8) This frequency band is shared with the common carrier and private-operational fixed point-to-point microwave services.

(9) As of June 30, 1997, frequencies in this band only are available for assignment to LMDS radio stations, except for non-LMDS stations authorized pursuant to applications refiled no later than June 26, 1998. Stations authorized prior to June 30, 1997, may continue to operate within the existing terms of the outstanding licenses, subject to renewal. Non-LMDS stations authorized pursuant to applications refiled no later than June 26, 1998 shall operate on an unprotected basis and subject to harmful interference from each other or stations licensed prior to June 30, 1997, and on a secondary basis to LMDS radio stations.

(e) *6425 to 6525 MHz—Mobile Only.* Paired and un-paired operations permitted. Use of this spectrum for direct delivery of video programs to the general public or for multi-channel cable distribution is not permitted. This band is co-equally shared with mobile stations licensed pursuant to parts 74 and 78 of this chapter. The following channel plans apply.

(1) 1 MHz maximum authorized bandwidth channels.

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6425.5 .....                | 6475.5                      |
| 6450.5 .....                | 6500.5                      |

(2) 8 MHz maximum authorized bandwidth channels.

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| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6430.0 .....                | 6480.0                      |
| 6438.0 .....                | 6488.0                      |
| 6446.0 .....                | 6496.0                      |
| 6455.0 .....                | 6505.0                      |
| 6463.0 .....                | 6513.0                      |
| 6471.0 .....                | 6521.0                      |

(3) 25 MHz maximum authorized bandwidth channels.

| Transmit (or receive) (MHz) | Receive (or transmit) (MHz) |
|-----------------------------|-----------------------------|
| 6437.5 .....                | 6487.5                      |
| 6462.5 .....                | 6512.5                      |

(f) The frequency 27.255 MHz in the 27.23–27.28 MHz band is allocated for assignment to microwave auxiliary stations in this service on a shared basis with other radio services. Assignments to stations on this frequency will not be protected from such interference as may be experienced from the emissions of industrial, scientific and medical equipment operating on 27.12 MHz in accordance with §2.106 of this chapter.

[61 FR 26677, May 28, 1996, as amended at 62 FR 23168, Apr. 29, 1997; 63 FR 9448, Feb. 25, 1998; 63 FR 14039, Mar. 24, 1998; 65 FR 38332, June 20, 2000; 68 FR 4961, Jan. 31, 2003; 68 FR 12777, Mar. 17, 2003; 70 FR 4788, Jan. 31, 2005; 84 FR 63812, Nov. 19, 2019; 85 FR 22890, Apr. 23, 2020]

## § 101.805 Assignment of frequencies to mobile stations.

The assignment of frequencies to mobile stations in this service will not be limited to a single licensee within any area. However, geographical limits within which mobile units may operate may be imposed by the Commission.

## § 101.807 Transmitter power.

Stations in this service will not be authorized to use transmitters having a rated power output in excess of the limits set forth in §101.113(b) and a standby transmitter having a rated power output in excess of that of the main transmitter with which it is associated will not be authorized. As an exception, operations on frequencies listed in §§74.602(a), 78.18(a)(6), and 78.18(a)(7) of this chapter are subject to

the power limitations of §§74.636 and 78.101(a).

[68 FR 12777, Mar. 17, 2003]

## § 101.809 Bandwidth and emission limitations.

(a) Stations in this service operating on frequencies in the 27.23–27.28 MHz band will be authorized to employ only amplitude modulated or frequency modulated emission for radiotelephony. The authorization to use such emissions will be construed to include authority to employ unmodulated emission only for temporary or short periods necessary for equipment testing incident to the construction and maintenance of the station.

(b) Stations in the service operating on frequencies above 940 MHz may be authorized to use amplitude modulated, frequency modulated or pulse type of emission for radiotelephony and television. In addition, the use of unmodulated emission may be authorized in appropriate cases.

(c) The maximum bandwidths which will normally be authorized for single channel operation on frequencies below 500 MHz in this service must not exceed the limits set forth below:

| Type of emission   | Authorized bandwidth (kHz) |
|--------------------|----------------------------|
| A3E .....          | 8                          |
| F3E or (G3E) ..... | 40                         |

(d) Maximum bandwidths in the following frequency bands must not exceed the limits set forth below:

| MAXIMUM AUTHORIZED     |                   |
|------------------------|-------------------|
| Frequency band (MHz)   | Bandwidth (MHz)   |
| 3,700 to 4,200 .....   | <sup>1</sup> 20   |
| 5,925 to 6,425 .....   | <sup>1</sup> 30   |
| 6,425 to 6,525 .....   | 25                |
| 10,700 to 12,200 ..... | <sup>1 2</sup> 40 |
| 13,200 to 13,250 ..... | 25                |
| 21,200 to 23,600 ..... | <sup>1</sup> 50   |

<sup>1</sup>The maximum bandwidth that will be authorized for each particular frequency in this band is detailed in the appropriate frequency table in §101.147.

<sup>2</sup>As of March 1, 2005, no new LTTS operators will be licensed in the 11.7–12.2 GHz band. LTTS operators authorized prior to March 1, 2005 may continue to operate in 11.7–12.2 GHz band until their license expires; no existing LTTS licensees will be renewed in the 11.7–12.2 GHz band.

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(e) The bandwidths authorized on frequencies above 500 MHz must be appropriate to the type of operation in any particular case. An application requesting such authorization must fully describe the modulation, emission, and bandwidth desired and must specify the bandwidth to be occupied.

[61 FR 26677, May 28, 1996, as amended at 68 FR 4961, Jan. 31, 2003; 70 FR 4788, Jan. 31, 2005]

### § 101.811 Modulation requirements.

(a) The use of modulating frequencies higher than 3000 hertz for single channel radiotelephony or tone signaling on frequencies below 500 MHz is not authorized.

(b) When amplitude modulation is used, the modulation percentage must be sufficient to provide efficient communication and must normally be maintained above 70 percent on positive peaks, but may not exceed 100 percent on negative peaks.

(c) When phase or frequency modulation is used for single channel radiotelephony on frequencies below 500 MHz, the deviation arising from modulation may not exceed plus or minus 15 kHz from the unmodulated carrier.

(d) Each unmultiplexed radiotelephone transmitter having more than 3 watts plate power input to the final radio frequency stage and initially installed at the station in this service after September 4, 1956, must be provided with a device that will automatically prevent modulation in excess of that specified in paragraphs (b) and (c) of this section which may be caused by greater than normal audio level.

### § 101.813 Remote control operation of mobile television pickup stations.

(a) Mobile television pickup stations (including nonbroadcast) may be operated by remote control from the fixed locations for periods not to exceed 6 months.

(b) The Commission may, upon adequate showing by the licensee as to why the television pickup operations should not be conducted under a fixed station authorization, renew the authority granted under the provisions of paragraph (a) of this section.

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(c) Reference should be made to § 101.125 concerning mobile station antenna height restrictions and to paragraphs (c) and (f) of § 101.131 concerning control points.

### § 101.815 Stations at temporary fixed locations.

(a) Authorizations may be issued upon proper application for the use of frequencies listed in § 101.803 by stations in the Local Television Transmission Service for rendition of temporary service to subscribers under the following conditions:

(1) When a fixed station is to remain at a single location for less than 6 months, the location is considered to be temporary.

(2) When a fixed station authorized to operate at temporary locations is installed and it subsequently becomes necessary for the station to operate from such location for more than six months, an application for a station authorization to specify the permanent location must be filed at least thirty days prior to the expiration of the six month period.

(3) The station must be used only for rendition of communication service at a remote point where the provision of wire facilities is not practicable.

(4) The antenna structure height employed at any location may not exceed the criteria set forth in § 17.7 of this chapter unless, in each instance, authorization for use of a specific maximum antenna structure height for each location has been obtained from the Commission prior to erection of the antenna. See § 101.125.

(5) Applications for such stations must comply with the provisions of § 101.21(f).

(b) Applications for authorizations to operate stations at temporary locations under the provisions of this section may be made upon FCC Form 601. Blanket applications may be submitted for the required number of transmitters.

(c) Prior coordination of mobile assignments will be in accordance with the procedures in § 101.103(d) except that the prior coordination process for mobile (temporary fixed) assignments

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may be completed orally and the period allowed for response to a coordination notification may be less than 30 days if the parties agree.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68984, Dec. 14, 1998; 65 FR 38332, June 20, 2000; 68 FR 4961, Jan. 31, 2003]

### § 101.817 Notification of station operation at temporary locations.

(a) The licensee of stations authorized pursuant to § 101.813 must notify the Commission prior to each period of operation. This notification must include:

(1) The call sign, manufacturer's name, type or model number, output power and specific location of the transmitter(s);

(2) The maintenance location for the transmitter;

(3) The location of the transmitting or receiving station with which it will communicate and the identity of the correspondent operating such facilities;

(4) The exact frequency or frequencies to be used;

(5) The public interest, convenience and necessity to be served by operation of the proposed installation;

(6) The commencement and anticipated termination dates of operation from each location. In the event the actual termination date differs from the previous notification, written notice thereof promptly must be given to the Commission;

(7) Where the notification contemplates initially a service that is to be rendered for a period longer than 90 days, the notification must contain a showing as to why application should not be made for regular authorization; and

(8) A notification must include compliance with the provisions of § 101.813(c).

(b) A copy of the notification must be kept with the station license.

[61 FR 26677, May 28, 1996, as amended at 63 FR 68984 Dec. 14, 1998]

### § 101.819 Stations affected by coordination contour procedures.

In frequency bands shared with the communication-satellite service, applicants must also comply with the requirements of § 101.21.

## Subpart K [Reserved]

## Subpart L—Local Multipoint Distribution Service

SOURCE: 62 FR 23168, Apr. 29, 1997, unless otherwise noted.

### § 101.1001 Eligibility.

Any entity, other than one precluded by § 101.7 and by § 101.1003, is eligible for authorization to provide Local Multipoint Distribution Service (LMDS) under this subpart. Authorization will be granted upon proper application filed under the rules in this part.

### § 101.1005 Frequencies available.

(a) The following frequencies are available for assignment to LMDS in two license blocks:

Block A of 300 MHz  
29,100–29,250 MHz  
31,075–31,225 MHz  
Block B of 150 MHz  
31,000–31,075 MHz  
31,225–31,300 MHz

(b) In Block A licenses, the frequencies are authorized as follows:

(1) 29,100–29,250 MHz is shared on a co-primary basis with feeder links for non-geostationary orbit Mobile Satellite Service (NGSO/MSS) systems in the band and is limited to LMDS hub-to-subscriber transmissions, as provided in §§ 25.257 and 101.103(h) of this chapter.

(2) 31,075–31,225 MHz is authorized on a primary protected basis and is shared with private microwave point-to-point systems licensed prior to March 11, 1997, as provided in § 101.103(b).

(c) In Block B licenses, the frequencies are authorized as follows:

(1) On a primary protected basis if LMDS shares the frequencies with systems licensed as Local Television Transmission Service (LTTTS) licensed prior to March 11, 1997, as provided in § 101.103(b).

(2) On a co-equal basis with systems not licensed as LTTTS prior to March 11, 1997, as provided in § 101.103(g).

[62 FR 23168, Apr. 29, 1997, as amended at 81 FR 79945, Nov. 14, 2016]

## § 101.1007

### § 101.1007 Geographic service areas and number of licenses.

LMDS service areas are Basic Trading Areas (BTAs) as defined in the Rand McNally 1992 Commercial Atlas & Marketing Guide, 123rd Edition, at pages 38–39, that identifies 487 BTAs based on the 50 States and as defined to include the BTA-like areas of the United States Virgin Islands, American Samoa, Guam, Mayaguez/Aguadilla-Ponce, Puerto Rico, San Juan, Puerto Rico, and the Commonwealth of Northern Marinas, for a total of 493 BTAs.

### § 101.1009 System operations.

(a) The licensee may construct and operate any number of fixed stations anywhere within the area authorized by the license without prior authorization, except as follows:

(1) A station would be required to be individually licensed if:

(i) International agreements require coordination;

(ii) Submission of an Environmental Assessment is required under § 1.1307 of this chapter.

(iii) The station would affect areas identified in § 1.924 of this chapter.

(2) Any antenna structure that requires notification to the Federal Aviation Administration (FAA) must be registered with the Commission prior to construction under § 17.4 of this chapter.

(b) Whenever a licensee constructs or makes system changes as described in paragraph (a) of this section, the licensee is required to notify the Commission within 30 days of the change under § 1.947 of this chapter and include a statement of the technical parameters of the changed station.

[62 FR 23168, Apr. 29, 1997, as amended at 63 FR 68984, Dec. 14, 1998; 69 FR 17959, Apr. 6, 2004]

### § 101.1011 Construction requirements.

LMDS licensees must make a showing of “substantial service” in their license area within ten years of being licensed. “Substantial” service is defined as service which is sound, favorable, and substantially above a level of mediocre service which might minimally warrant renewal. Failure by any licensee to meet this requirement will

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result in forfeiture of the license and the licensee will be ineligible to regain it.

[82 FR 41549, Sept. 1, 2017]

### § 101.1013 Permissible communications services.

(a) Authorizations for stations in the Local Multipoint Distribution Service will be granted to provide services on a common carrier basis or a non-common carrier basis or on both a common carrier and non-common carrier basis in a single authorization.

(b) Stations may render any kind of communications service consistent with the Commission’s rules and the regulatory status of the station to provide services on a common carrier or non-common carrier basis.

(c) An applicant or licensee may submit a petition at any time requesting clarification of the regulatory status required to provide a specific communications service.

### § 101.1017 Requesting regulatory status.

(a) *Initial applications.* An applicant will specify on FCC Form 601 if it is requesting authorization to provide services on a common carrier basis, a non-common carrier basis, or on both a common carrier and non-common carrier basis.

(b) *Amendment of pending applications.*

(1) Any pending application may be amended to:

(i) Change the carrier status requested, or

(ii) Add to the pending request in order to obtain both common carrier and non-common carrier status in a single license.

(2) Amendments to change, or add to, the carrier status in a pending application are minor amendments pursuant to § 1.927 of this chapter.

(c) *Modification of license.* (1) A licensee may modify a license to:

(i) Change the carrier status authorized, or

(ii) Add to the status authorized in order to obtain both common carrier and non-common carrier status in a single license.

(2) Applications to change, or add to, the carrier status in a license are modifications not requiring prior Commission authorization filed under § 1.927 of this chapter. If the change results in the discontinuance, reduction, or impairment of an existing service, the licensee is also governed by § 101.305(b) or (c) and submits the application under § 1.927 of this chapter in conformance with the time frames and requirements of §§ 101.305 (b) or (c).

[62 FR 23168, Apr. 29, 1997, as amended at 63 FR 68984, Dec. 14, 1998]

### Subpart M—Competitive Bidding Procedures for LMDS

SOURCE: 62 FR 23172, Apr. 29, 1997, unless otherwise noted.

#### § 101.1101 LMDS service subject to competitive bidding.

Mutually exclusive initial applications for LMDS licenses are subject to competitive bidding procedures. The general competitive bidding procedures set forth in part 1, subpart Q of this chapter will apply unless otherwise provided in this subpart.

[67 FR 46379, July 9, 2002]

#### §§ 101.1102–101.1105 [Reserved]

#### § 101.1107 Bidding credits for very small businesses, small businesses and entrepreneurs.

(a) A winning bidder that qualifies as a very small business, as defined in § 101.1112, or a consortium of very small businesses may use a bidding credit of 45 percent to lower the cost of its winning bid.

(b) A winning bidder that qualifies as a small business, as defined in § 101.1112, or a consortium of small businesses may use a bidding credit of 35 percent to lower the cost of its winning bid.

(c) A winning bidder that qualifies as an entrepreneur, as defined in § 101.1112, or a consortium of entrepreneurs may use a bidding credit of 25 percent to lower the cost of its winning bid.

(d) The bidding credits referenced in paragraphs (a), (b) and (c) of this section are not cumulative.

[68 FR 43002, July 21, 2003]

#### § 101.1109 Records maintenance.

All winning bidders qualifying as very small businesses, small businesses or entrepreneurs shall maintain at their principal place of business an updated file of ownership, revenue, and asset information, including any document necessary to establish eligibility as a very small business, small business or entrepreneur. Licensees (and their successors-in-interest) shall maintain such files for the term of the license. Applicants that do not obtain the license(s) for which they applied shall maintain such files until the grant of such license(s) is final, or one year from the date of the filing of their short-form application (FCC Form 175), whichever is earlier.

[68 FR 43002, July 21, 2003]

#### § 101.1111 Partitioning and disaggregation.

(a) *Definitions. Disaggregation.* The assignment of discrete portions or “blocks” of spectrum licensed to a geographic licensee or qualifying entity.

*Partitioning.* The assignment of geographic portions of a licensee’s authorized service area along geopolitical or other boundaries.

(b) *Eligibility.* (1) Parties seeking approval for partitioning and disaggregation shall request an authorization for partial assignment of a license pursuant to § 101.53. Parties shall submit the forms set forth in § 101.15(e).

(2) Licensees may apply to partition their licensed geographic service area or disaggregate their licensed spectrum at any time following the grant of their licenses.

(c) *Technical standards—*(1) *Partitioning.* In the case of partitioning, requests for authorization for partial assignment of a license must include, as an attachment, a description of the partitioned service area. The partitioned service area shall be defined by coordinate points at every 3 degrees along the partitioned service area unless an FCC recognized service area is utilized (*i.e.*, Major Trading Area, Basic Trading Area, Metropolitan Service Area, Rural Service Area or Economic Area) or county lines are followed. The geographic coordinates must be specified in degrees, minutes, and seconds to

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the nearest second of latitude and longitude and must be based upon the 1983 North American Datum (NAD83). In the case where an FCC recognized service area or county lines are utilized, applicants need only list the specific area(s) (through use of FCC designations or county names) that constitute the partitioned area. In such partitioning cases where an unjust enrichment payment is owed the Commission, the request for authorization for partial assignment of a license must include, as an attachment, a calculation of the population of the partitioned service area and the licensed geographic service area.

(2) *Disaggregation.* Spectrum may be disaggregated in any amount.

(3) *Combined partitioning and disaggregation.* The Commission will consider requests for partial assignment of licenses that propose combinations of partitioning and disaggregation.

(d) *License term.* The license term for a partitioned license area and for disaggregated spectrum shall be the remainder of the original licensee's license term as provided for in §101.67 of this chapter.

[63 FR 26507, May 13, 1998, as amended at 82 FR 41549, Sept. 1, 2017]

## § 101.1112 Definitions.

(a) *Scope.* The definitions in this section apply to §§101.1101 through 101.1112, unless otherwise specified in those sections.

(b) *Very small business.* A very small business is an entity that, together with its affiliates and controlling interests, has average gross revenues for the three preceding years of not more than \$15 million.

(c) *Small business.* A small business is an entity that, together with its affiliates and controlling interests, has average gross revenues for the three preceding years of more than \$15 million but not more than \$40 million.

(d) *Entrepreneur.* An entrepreneur is an entity that, together with its affiliates and controlling interests, has average gross revenues for the three pre-

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ceding years of more than \$40 million but not more than \$75 million.

[67 FR 46380, July 9, 2002, as amended at 68 FR 43002, July 21, 2003]

## Subpart N [Reserved]

## Subpart O—Multiple Address Systems

SOURCE: 65 FR 17450, Apr. 3, 2000, unless otherwise noted.

### GENERAL PROVISIONS

#### § 101.1301 Scope.

This subpart sets out the regulations governing the licensing and operation of Multiple Address Systems (MAS). The rules in this subpart are to be used in conjunction with applicable requirements contained elsewhere in the Commission's rules, such as those requirements contained in parts 1 and 22 of this chapter.

#### § 101.1303 Eligibility.

Authorizations for stations in this service will be granted in cases where it is shown that:

(a) The applicant is legally, financially, technically and otherwise qualified to render the proposed service;

(b) There are frequencies available to enable the applicant to render a satisfactory service; and

(c) The public interest, convenience or necessity would be served by a grant thereof.

#### § 101.1305 Private internal service.

A private internal service is a service where entities utilize frequencies purely for internal business purposes or public safety communications and not on a for-hire or for-profit basis.

#### § 101.1307 Permissible communications.

MAS users may engage in terrestrial point-to-point and point-to-multi-point fixed and limited mobile operations.

[66 FR 35111, July 3, 2001]

#### § 101.1309 Regulatory status.

(a) The Commission will rely on each applicant to specify on FCC Form 601

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the type of service or services it intends to provide. Each application for authorization in the bands designated for private internal use must include a certification stating why the application satisfies the definition of private internal use.

(b) Any interested party may challenge the regulatory status granted an MAS licensee.

### SYSTEM LICENSE REQUIREMENTS

#### § 101.1311 Initial EA license authorization.

(a) Winning bidders must file an application (FCC Form 601) for an initial authorization in each market and frequency block.

(b) Blanket licenses are granted for each market and frequency block. Applications for individual sites are not required and will not be accepted, except as specified in § 101.1329.

#### § 101.1313 License term.

The license term for stations authorized under this subpart is ten years from the date of original issuance or renewal.

#### § 101.1315 Service areas.

In the frequency bands not licensed on a site-by-site basis, the geographic service areas for MAS are Economic Areas (EAs) which are defined by the Department of Commerce's Bureau of Economic Analysis, as modified by the Commission. The EAs will consist of 176 areas, which includes Guam and the Northern Marianas Islands, Puerto Rico and the United States Virgin Islands, American Samoa, and the Gulf of Mexico.

[66 FR 35111, July 3, 2001]

#### § 101.1317 Competitive bidding procedures for mutually exclusive MAS EA applications.

Mutually exclusive initial applications for licenses in the portions of the MAS bands licensed on a geographic area basis are subject to competitive bidding procedures. The general competitive bidding procedures set forth in part 1, subpart Q of this chapter will

apply unless otherwise provided in this subpart.

[67 FR 46380, July 9, 2002]

#### § 101.1319 Competitive bidding provisions.

For the purpose of establishing eligibility requirements and bidding credits for competitive bidding for MAS licenses, pursuant to § 1.2110 of this chapter, the following definitions apply:

(a) *Eligibility for small business provisions.* (1) A small business is an entity that, together with its affiliates and persons or entities that hold interests in such entity and their affiliates, has average gross revenues for the preceding three years not to exceed \$15 million, as determined pursuant to § 1.2110 of this chapter.

(2) A very small business is an entity that, together with its affiliates and persons or entities that hold interests in such entity and their affiliates, has average gross revenues for the preceding three years not to exceed \$3 million, as determined pursuant to § 1.2110 of this chapter.

(b) *Bidding credits.* A winning bidder that qualifies as a small business, as defined in this section, or a consortium of small businesses, may use the bidding credit specified in § 1.2110(f)(2)(ii) of this chapter. A winning bidder that qualifies as a very small business, as defined in this section, or a consortium of very small businesses, may use the bidding credit specified in § 1.2110(f)(2)(i) of this chapter.

[65 FR 17450, Apr. 3, 2000, as amended at 67 FR 46380, July 9, 2002]

#### § 101.1321 License transfers.

(a) An MAS system license acquired through competitive bidding procedures (including licenses obtained in cases of no mutual exclusivity), together with all appurtenances may be transferred, assigned, sold, or given away only in accordance with the provisions and procedures set forth in § 1.2111 of this chapter.

(b) An MAS system license obtained through site-based licensing procedures, together with all appurtenances may be transferred, assigned, sold, or

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given away, to any other entity in accordance with the provisions and procedures set forth in §1.948 of this chapter.

### § 101.1323 Spectrum aggregation, disaggregation, and partitioning.

(a) *Eligibility.* (1) Parties seeking approval for partitioning and disaggregation shall request from the Commission an authorization for partial assignment of license. Geographic area licensees may participate in aggregation, disaggregation, and partitioning within the bands licensed on a geographic area basis. Site-based licensees may aggregate spectrum in any MAS bands, but may not disaggregate their licensed spectrum or partition their licensed sites.

(2) Eligible MAS licensees may apply to the Commission to partition their licensed geographic service areas to eligible entities and are free to determine the portion of their service areas to be partitioned. Eligible MAS licensees may aggregate or disaggregate their licensed spectrum at any time following the grant of a license.

(b) *Technical standards*—(1) *Aggregation.* (i) There is no limitation on the amount of spectrum that an MAS licensee may aggregate.

(ii) Spectrum licensed to MAS licensees does not count toward the CMRS spectrum cap discussed in §20.6 of this chapter.

(2) *Disaggregation.* Spectrum may be disaggregated in any amount. A licensee need not retain a minimum amount of spectrum.

(3) *Partitioning.* In the case of partitioning, applicants and licensees must file FCC Form 603 pursuant to §1.948 of this chapter and list the partitioned service area on a schedule to the application. The geographic coordinates must be specified in degrees, minutes, and seconds to the nearest second of latitude and longitude, and must be based upon the 1983 North American Datum (NAD83).

(4) *Combined partitioning and disaggregation.* The Commission will consider requests from geographic area licensees for partial assignment of licenses that propose combinations of partitioning and disaggregation.

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(c) *Construction requirements.* Responsible parties must submit supporting documents showing compliance with the respective construction requirements within the appropriate construction benchmarks set forth in §101.1325.

(d) *License term.* The license term for a partitioned license area and for disaggregated spectrum shall be the remainder of the original licensee's license term as provided for in §101.1313.

[65 FR 17450, Apr. 3, 2000, as amended at 67 FR 45380, July 9, 2002; 82 FR 41549, Sept. 1, 2017]

### SYSTEM REQUIREMENTS

#### § 101.1325 Construction requirements.

(a) Incumbent and site-based licenses are subject to the construction requirements set forth in §101.63.

(b) Each MAS EA licensee must provide service to at least one-fifth of the population in its service area or “substantial service” within five years of the license grant. In addition, MAS EA licensees must make a showing of continued “substantial service” within ten years of the license grant. Licensees must file maps and other supporting documents showing compliance with the respective construction requirements within the appropriate five- and ten-year benchmarks of the date of their initial licenses.

(c) Failure by any licensee to meet these requirements will result in forfeiture or non-renewal of the initial license, and the licensee will be ineligible to regain it.

[65 FR 17450, Apr. 3, 2000, as amended at 68 FR 4961, Jan. 31, 2003]

#### § 101.1329 EA Station license, location, modifications.

EA licensees may construct master and remote stations anywhere inside the area authorized in their licenses, without prior approval, so long as the Commission's technical and other Rules are complied with, except that individual licenses are required for any master station that:

(a) Requires the submission of an environmental assessment under §1.1307 of this chapter;

(b) Requires international coordination; or

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(c) The station would affect areas identified in § 1.924 of this chapter.

[65 FR 17450, Apr. 3, 2000, as amended at 69 FR 17959, Apr. 6, 2004]

### § 101.1331 Treatment of incumbents.

(a) Any MAS station licensed by the Commission prior to July 1, 1999 in the 928.0–928.85 MHz/952.0–952.85 MHz/956.25–956.45 MHz and 928.85–929.0 MHz/959.85–960.0 MHz bands, as well as assignments or transfers of such stations approved by the Commission and consummated as of January 19, 2000, shall be considered incumbent.

(b) Incumbent operators in the 928.0–928.85 MHz/952.0–952.85 MHz/956.25–956.45 MHz bands are grandfathered as of January 19, 2000, and may continue to operate and expand their systems pursuant to the interference protection and co-channel spacing criteria contained in § 101.105.

(1) MAS operators are prohibited from acquiring additional frequencies in the 928.0–928.85 MHz/952.0–952.85 MHz/956.25–956.45 MHz bands and the 932.25625–932.49375 MHz/941.25625–941.49375 MHz bands for the purpose of expanding private carrier service and from changing the use of their frequencies in any manner that is inconsistent with this part. Refer to § 101.147 for designated uses.

(2) Incumbent operators in the 928.0–928.85 MHz/952.0–952.85 MHz/956.25–956.45 MHz bands will include incumbents as defined in § 101.1331(a), as well as, their transferees and/or assignees and the successors of the transferees and/or assignees and retain their grandfathered status, provided that the use of the MAS frequencies remains unchanged from that of the transferor and/or assignor of the license.

(c) Incumbent operators in the 928.85–929.0/959.85–960.0 MHz bands are grandfathered as of January 19, 2000, and may expand their systems provided that the signal level of the additional transmitter(s) does not increase the composite contour that occurs at a 40.2 kilometer (25-mile) radius from the center of each master station transmitter site. Incumbent operators and geographic area licensees may negotiate alternative criteria.

(d) The frequencies associated with incumbent authorizations in the 928/959

MHz bands that have cancelled automatically or otherwise been recovered by the Commission will automatically revert to the applicable EA licensee.

(e) The frequencies associated with incumbent authorizations in the 928/952/956 MHz bands that have cancelled automatically will revert to the Commission.

[65 FR 17450, Apr. 3, 2000, as amended at 66 FR 35111, July 3, 2001]

### § 101.1333 Interference protection criteria.

(a) *Frequency coordination.* All EA licensees are required to coordinate their frequency usage with co-channel adjacent area licensees and all other affected parties.

(b) EA licensees are prohibited from exceeding a signal strength of 40 dBuV/m at their service area boundaries, unless a higher signal strength is agreed to by all affected co-channel, adjacent area licensees.

(c) EA licensees are prohibited from exceeding a signal strength of 40 dBuV/m at incumbent licensees' 40.2 kilometer (25-mile) radius composite contour specified in § 101.1331(c).

(d) In general, licensees shall comply with the appropriate coordination agreements between the United States and Canada and the United States and Mexico concerning cross-border sharing and use of the applicable MAS frequencies.

(1) *Canada—932.0–932.25 MHz and 941.0–941.25 MHz.* (i) Within Lines A, B, C, and D, as defined in § 1.928(e) of this chapter, along the U.S./Canada border, U.S. stations operating in the 932.0–932.25 MHz and 941.0–941.25 MHz bands are on a secondary basis and may operate provided that they shall not transmit a power flux density (PFD) at the border greater than  $-100$  dBW/m<sup>2</sup> nor  $-94$  dBW/m<sup>2</sup>, respectively. The U.S. has full use of the frequencies in these regions up to the border in the bands 932.25–932.50 MHz and 941.25–941.50 MHz, and Canadian stations may operate on a secondary basis provided they do not exceed the respective PFDs shown above. PFD can be determined using the following formula:  $PFD \text{ (dBW/m}^2\text{)} = 10 \log [EIRP/4\pi(D^2)]$ , where EIRP is in watts, D is in meters, and the power is relative to an isotropic radiator. The

technical parameters are also limited by tables 1 and 2:

TABLE 1—MAXIMUM RADIATED POWER

| Class of station           | Band MHz    | Maximum EIRP |     | Maximum ERP <sup>1</sup> |      |
|----------------------------|-------------|--------------|-----|--------------------------|------|
|                            |             | Watts        | dBW | Watts                    | dBW  |
| Master .....               | 941.0–941.5 | 1000         | 30  | 600                      | 27.8 |
| Fixed Remote and Master .. | 932.0–932.5 | 50           | 17  | 30                       | 14.8 |

<sup>1</sup> Where ERP = EIRP/1.64.≤

(ii) Maximum antenna height above average terrain for master stations operating at a maximum power shall not exceed 150 meters. Above 150 meters, the power of master stations shall be in accordance with following table:

TABLE 2—ANTENNA HEIGHT—POWER REDUCTION TABLE

| Antenna height above average terrain (meters) | EIRP  |     | ERP   |      |
|-----------------------------------------------|-------|-----|-------|------|
|                                               | Watts | dBW | Watts | dBW  |
| Above 305 .....                               | 200   | 23  | 120   | 20.8 |
| Above 275 to 305 .....                        | 250   | 24  | 150   | 21.8 |
| Above 245 to 275 .....                        | 315   | 25  | 190   | 22.8 |
| Above 215 to 245 .....                        | 400   | 26  | 240   | 23.8 |
| Above 180 to 215 .....                        | 500   | 27  | 300   | 24.8 |
| Above 150 to 180 .....                        | 630   | 28  | 380   | 25.8 |

NOTE TO TABLE 2: This information is from the *Arrangement between the Federal Communications Commission and the National Telecommunications and Information Administration of the United States of America, and Industry Canada concerning the use of the bands 932 to 935 MHz and 941 to 944 MHz along the United States-Canada border* signed in 1994. This agreement also lists grandfathered stations that must be protected.

(2) *Canada—928–929 MHz and 952–960 MHz.* Between Lines A and B and between Lines C and D, as defined in § 1.928(e) of this chapter, along the U.S./Canada border, U.S. stations operating in the 928.50–928.75 MHz and 952.50–952.75 MHz bands are on an unprotected basis and may operate provided that they shall not transmit a power flux density (PFD) at or beyond the border greater than  $-100$  dBW/m<sup>2</sup>. The U.S. has full use of the frequencies in these regions up to the border in the bands 928.25–928.50 MHz and 952.25–952.50 MHz, and Canadian stations may operate on an unprotected basis provided they do not exceed the PFD above. Frequencies in the bands 928.00–928.25 MHz, 928.75–929.00 MHz, 952.00–952.25 MHz, and 952.75–952.85 MHz are available for use

on a coordinated, first-in-time, shared basis subject to protecting grandfathered stations. New stations must provide a minimum of 145 km (90 miles) separation or alternatively limit the actual PFD of the proposed station to  $-100$  dBW/m<sup>2</sup>, at the existing co-channel master stations of the other country, or as mutually agreed upon on a case-by-case basis. Coordination is not required if the PFD at the border is lower than  $-100$  dBW/m<sup>2</sup>. The technical criteria are also limited by the following:

Maximum EIRP for master stations in the MHz band: 1000 watts (30 dBW) 952–953

Maximum EIRP for fixed remote stations or stations in the 928–929 MHz band: 50 watts (17 dBW) master

Maximum EIRP for mobile master stations: 25 watts (14 dBW)

Maximum antenna height above average master or control stations: 152 m at 1000 watts terrain for EIRP, power derated in accordance with the following table:

| Antenna height above average terrain (m) | EIRP  |     |
|------------------------------------------|-------|-----|
|                                          | Watts | dBm |
| Above 305 .....                          | 200   | 53  |
| Above 275 to 305 .....                   | 250   | 54  |
| Above 244 to 274 .....                   | 315   | 55  |
| Above 214 to 243 .....                   | 400   | 56  |
| Above 183 to 213 .....                   | 500   | 57  |
| Above 153 to 182 .....                   | 630   | 58  |
| Below 152 .....                          | 1000  | 60  |

NOTE TO TABLE IN PARAGRAPH (d)(2): This information is from the *Arrangement between the Department of Communications of Canada and the Federal Communications Commission of the United States of America Concerning the Use of the Bands 928 to 929 MHz and 952 to 953 MHz along the United States-Canada Border* signed in 1991. This agreement also lists grandfathered stations that must be protected.

(3) *Mexico.* Within 113 kilometers of the U.S./Mexico border, U.S. stations operating in the 932.0–932.25 MHz and 941.0–941.25 MHz bands are on a secondary basis (non-interference to Mexican primary licensees) and may operate provided that they shall not transmit a power flux density (PFD) at or beyond the border greater than  $-100$  dBW/m<sup>2</sup>. Upon notification from the Commission, U.S. licensees must take proper measures to eliminate any

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harmful interference caused to Mexican primary assignments. The U.S. has full use of the frequencies in these regions up to the border in the bands 932.25–932.50 MHz and 941.25–941.50 MHz, and Mexican stations may operate on a secondary basis (non-interference to U.S. primary licensees) provided they do not exceed the PFD shown above. Stations using the 932–932.5 MHz band shall be limited to the maximum effective isotropic radiated power of 50 watts (17 dBW). Stations using the 941–941.5 MHz band shall meet the limits in the following table:

| Antenna height above average mean sea level (meters) | EIRP  |     |
|------------------------------------------------------|-------|-----|
|                                                      | Watts | dBW |
| Above 305 .....                                      | 200   | 23  |
| Above 274 to 305 .....                               | 250   | 24  |
| Above 243 to 274 .....                               | 315   | 25  |
| Above 213 to 243 .....                               | 400   | 26  |
| Above 182 to 213 .....                               | 500   | 27  |
| Above 152 to 182 .....                               | 630   | 28  |
| Up to 152 .....                                      | 1000  | 30  |

NOTE TO TABLE IN PARAGRAPH (d)(3): This information is from the *Agreement between the Government of the United States of America and the Government of the United Mexican States Concerning the Allocation and Use of Frequency Bands by Terrestrial Non-Broadcasting Radiocommunication Services Along the Common Border, Protocol #6 Concerning the Allotment and Use of Channels in the 932–932.5 and 941–941.5 MHz Bands for Fixed Point-to-Multipoint Services Along the Common Border* signed in 1994.

[65 FR 17450, Apr. 3, 2000, as amended at 68 FR 4961, Jan. 31, 2003]

### Subpart P—Multichannel Video Distribution and Data Service Rules for the 12.2–12.7 GHz Band

SOURCE: 69 FR 31746, June 7, 2004, unless otherwise noted.

#### § 101.1401 Service areas.

Multichannel Video Distribution and Data Service (MVDDS) is licensed on the basis of Designated Market Areas (DMAs). The 214 DMA service areas are based on the 210 Designated Market Areas delineated by Nielsen Media Research and published in its publication entitled U.S. Television Household Estimates, September 2002, plus four FCC-defined DMA-like service areas.

(a) Alaska—Balance of State (all geographic areas of Alaska not included in Nielsen's three DMAs for the state: Anchorage, Fairbanks, and Juneau);

(b) Guam and the Northern Mariana Islands;

(c) Puerto Rico and the United States Virgin Islands; and

(d) American Samoa.

#### § 101.1403 Broadcast carriage requirements.

MVDDS licensees are not required to provide all local television channels to subscribers within its area and thus are not required to comply with the must-carry rules, nor the local signal carriage requirements of the *Rural Local Broadcast Signal Act*. See Multichannel Video and Cable Television Service Rules, Subpart D (Carriage of Television Broadcast Signals), 47 CFR 76.51–76.70. If an MVDDS licensee meets the statutory definition of Multiple Video Programming Distributor (MVPD), the retransmission consent requirement of section 325(b)(1) of the Communications Act of 1934, as amended (47 U.S.C. 325(b)(1)) shall apply to that MVDDS licensee. Any MVDDS licensee that is an MVPD must obtain the prior express authority of a broadcast station before retransmitting that station's signal, subject to the exceptions contained in section 325(b)(2) of the Communications Act of 1934, as amended (47 U.S.C. 325(b)(2)). Network nonduplication, syndicated exclusivity, sports blackout, and leased access rules shall not be imposed on MVDDS licensees.

#### § 101.1405 Channeling plan.

Each license shall have one spectrum block of 500 megahertz per geographic area that can be divided into any size channels. Disaggregation is not allowed.

#### § 101.1407 Permissible operations for MVDDS.

MVDDS licensees must use spectrum in the 12.2–12.7 GHz band for any digital fixed non-broadcast service (broadcast services are intended for reception of the general public and not on a subscribership basis) including one-way direct-to-home/office wireless service. Mobile and aeronautical services are not authorized. Two-way services may

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be provided by using other spectrum or media for the return or upstream path.

### § 101.1409 Treatment of incumbent licensees.

Terrestrial private operational fixed point-to-point licensees in the 12.2–12.7 GHz band which were licensed prior to MVDDS or NGSO FSS satellite stations are incumbent point-to-point stations and are not entitled to protection from harmful interference caused by later MVDDS or NGSO FSS entrants in the 12.2–12.7 GHz band, except for public safety stations which must be protected. MVDDS and NGSO FSS operators have the responsibility of resolving any harmful interference problems that their operations may cause to these public safety incumbent point-to-point operations in the 12.2–12.7 GHz band. Incumbent public safety terrestrial point-to-point licensees may only make minor changes to their stations without losing this protection. This does not relieve current point-to-point licensees of their obligation to protect BSS operations in the subject frequency band. All point-to-point applications, including low-power operations, for new licenses, major amendments to pending applications, or major modifications to existing licenses for the 12.2–12.7 GHz band are no longer accepted except for renewals and changes in ownership. See § 1.929 of this chapter for definitions of major and minor changes.

### § 101.1411 Regulatory status and eligibility.

(a) MVDDS licensees are permitted to provide one-way video programming and data services on a non-common carrier and/or on a common carrier basis. MVDDS is not required to be treated as a common carrier service unless it is providing non-Internet voice and data services through the public switched network.

(b) MVDDS licensees in the 12.2–12.7 GHz band are subject to the requirements set forth in § 101.7.

(c) Any entity, other than one precluded by §§ 101.7 and 101.1412, is eligible for authorization to provide MVDDS under this part. Authorization will be granted upon proper application filing

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in accordance with the Commission's rules.

### § 101.1412 MVDDS eligibility restrictions for cable operators.

(a) Eligibility for MVDDS license. No cable operator, nor any entity owning an attributable interest in a cable operator, shall have an attributable interest in an MVDDS license if such cable operator's service area significantly overlaps the MVDDS license area, as "significantly overlaps" is defined in paragraph (e) of this section.

(b) Definition of cable operator. For the purposes of paragraph (a) of this section, the term "cable operator" means a company that is franchised to provide cable service, as defined in 47 CFR 76.5(ff) of this chapter, in all or part of the MVDDS license area.

(c) For the purpose of this section, the term "MVPD household" refers to a household that subscribes to one or more Multichannel Video Program Distributors (MVPDs), as defined in 47 CFR 76.1000(e) of this chapter.

(d) Waiver of restriction. Upon completion of the initial award of an MVDDS license, a cable operator may petition for a waiver of the restriction on eligibility based upon a showing that changed circumstances or new evidence indicate that no significant likelihood of substantial competitive harm will result from the operator retaining an attributable interest in the MVDDS license.

(e) Significant overlap with service area. For purposes of paragraph (a) of this section, significant overlap occurs when a cable operator's subscribers in the MVDDS license area make up thirty-five percent or more of the MVPD households in that MVDDS license area.

(f) Definition of attributable interest. For purposes of paragraph (a) of this section, an entity shall be considered to have an attributable interest in a cable operator or MVDDS licensee pursuant to the following criteria:

(1) A controlling interest shall constitute an attributable interest. Controlling interest means majority voting equity ownership, any general partnership interest, or any means of actual working control (including negative control) over the operation of the entity, in whatever manner exercised.

(2) Any general partnership interest in a partnership;

(3) Partnership and similar ownership interests (including limited partnership interests) amounting to 20 percent or more of the total partnership interests, calculated according to both the percentage of equity paid in and the percentage of distribution of profits and losses;

(4) Any stock interest amounting to 20 percent or more of the outstanding voting stock of an entity;

(5) Any voting or non-voting stock interest, amounting to 20 percent or more of the total outstanding stock of an entity;

(6) Stock interests held in trust that exceed the limit set forth in paragraph (f) of this section shall constitute an attributable interest of any person who holds or shares the power to vote such stock, of any person who has the sole power to sell such stock, and, in the case of stock held in trust, of any person who has the right to revoke the trust at will or to replace the trustee at will. If the trustee has a familial, personal, or extra-trust business relationship to the grantor or the beneficiary, the stock interests held in trust shall constitute an attributable interest of such grantor or beneficiary, as appropriate.

(7) Debt and interests such as warrants and convertible debentures, options, or other interests (except non-voting stock) with rights of conversion to voting interests shall not constitute attributable interests unless and until conversion is effected.

(8) An interest in a Limited Liability Company (LLC) or Registered Limited Liability Partnership (RLLP) amounting to 20 percent or more, shall constitute an attributable interest of each such limited partner.

(9) Officers and directors of a cable operator, an MVDDS licensee, or an entity that controls such cable operator or MVDDS licensee, shall be considered

to have an attributable interest in such cable operator or MVDDS licensee.

(10) Ownership interests that are held indirectly by any party through one or more intervening corporations or other entities shall be determined by successive multiplication of the ownership percentages for each link in the vertical ownership chain and application of the relevant attribution benchmark to the resulting product, except that, if the ownership for any interest in any link in the chain exceeds 50 percent or represents actual control, it shall be treated as if it were a 100 percent interest.

(11) Any person who manages the operations of a cable operator or an MVDDS licensee pursuant to a management agreement shall be considered to have an attributable interest in such cable operator or MVDDS licensee, if such person or its affiliate has authority to make decisions or otherwise engage in practices or activities that determine, or significantly influence:

(i) The nature or types of services offered by such entity;

(ii) The terms upon which such services are offered; or

(iii) The prices charged for such services.

(12) Any person or its affiliate who enters into a joint marketing arrangement with a cable operator, an MVDDS licensee, or an affiliate of such entity, shall be considered to have an attributable interest in such cable operator, MVDDS licensee, or affiliate, if such person or its affiliate has authority to make decisions or otherwise engage in practices or activities that determine:

(i) The nature or types of services offered by such entity;

(ii) The terms upon which such services are offered; or

(iii) The prices charged for such services.

(g) *Divestiture.* Any cable operator, or any entity owning an attributable interest in a cable operator, that would otherwise be barred from acquiring an attributable interest in an MVDDS license by the eligibility restriction in paragraph (a) of this section, may be a party to an MVDDS application (*i.e.*, have an attributable interest in the applicant), and such applicant will be eligible for an MVDDS license, pursuant

to the divestiture procedures set forth in paragraphs (g)(1) through (g)(6) of this section.

(1) Divestiture shall be limited to the following prescribed means:

(i) An MVDDS applicant holding an attributable interest in a cable operator may divest such interest in the cable company.

(ii) Other MVDDS applicants disqualified under paragraph (a) of this section, will be permitted to:

(A) Partition and divest that portion of the existing service area that causes it to exceed the overlap restriction in paragraph (a) of this section, subject to applicable regulations of state and local governments; or

(B) Partition and divest that portion of the MVDDS geographic service area that exceeds the overlap restriction in paragraph (a) of this section.

(iii) Divestiture may be to an interim trustee if a buyer has not been secured in the required period of time, as long as the MVDDS applicant has no interest in or control of the trustee and the trustee may dispose of the license as it sees fit.

(2) The MVDDS applicant shall certify as an exhibit to its short form application that it and all parties to the application will come into compliance with paragraph (a) of this section.

(3) If such MVDDS applicant is a successful bidder in an auction, it must submit with its long-form application a signed statement describing its efforts to date and future plans to come into compliance with the eligibility restrictions in paragraph (a) of this section.

(4) If such an MVDDS applicant is otherwise qualified, its application will be granted subject to a condition that the applicant shall come into compliance with the eligibility restrictions in paragraph (a) within ninety (90) days of final grant of such MVDDS license.

(5) An MVDDS applicant will be considered to have come into compliance with paragraph (a) of this section if:

(i) In the case of the divestiture of a portion of an MVDDS license service area, it has successfully completed the assignment or transfer of control of the requisite portion of the MVDDS geographic service area.

(ii) In all other cases, it has submitted to the Commission a signed cer-

tification that it has come into compliance with paragraph (a) of this section by the following means, identified in such certification:

(A) By divestiture of a disqualifying interest in a cable operator, identified in terms of the interest owned, the owner of such interest (and, if such owner is not the applicant itself, the relationship of the owner to the applicant), the name of the party to whom such interest has been divested, and the date such divestiture was executed; or

(B) By divestiture of the requisite portion of the cable operator's existing service area, identified in terms of the name of the party to whom such interest has been divested, the date such divestiture was executed, the name of any regulatory agency that must approve such divestiture, and the date on which an application was filed for this purpose with the regulatory agency.

(6) If no such certification or application is tendered to the Commission within ninety (90) days of final grant of the initial license, the Commission may cancel or rescind the license automatically, shall retain all monies paid to the Commission, and, based on the facts presented, shall take any other action it may deem appropriate.

NOTE TO §101.1412: Waivers of §101.1412(f) may be granted upon an affirmative showing:

(a) That the interest holder has less than a fifty percent voting interest in the licensee and there is an unaffiliated single holder of a fifty percent or greater voting interest;

(b) That the interest holder is not likely to affect the local market in an anticompetitive manner;

(c) That the interest holder is not involved in the operations of the licensee and does not have the ability to influence the licensee on a regular basis; and

(d) That grant of a waiver is in the public interest because the benefits to the public of common ownership outweigh any potential anticompetitive harm to the market.

[69 FR 31746, June 7, 2004, as amended at 69 FR 59146, Oct. 4, 2004]

**§ 101.1413 License term and construction requirements.**

(a) The MVDDS license term is ten years, beginning on the date of the initial authorization grant.

(b) As a construction requirement, MVDDS licensees must make a showing of substantial service at the end of five years into the license period and ten years into the license period. The substantial service requirement is defined as a service that is sound, favorable, and substantially above a level of mediocre service which might minimally warrant renewal. At the end of five years into the license term and ten years into the license period, the Commission will consider factors such as:

(1) Whether the licensee's operations service niche markets or focus on serving populations outside of areas serviced by other MVDDS licensees;

(2) Whether the licensee's operations serve populations with limited access to telecommunications services; and

(3) A demonstration of service to a significant portion of the population or land area of the licensed area.

(c) The renewal application of an MVDDS licensee is governed by § 1.949 of this chapter.

[69 FR 31746, June 7, 2004, as amended at 82 FR 41549, Sept. 1, 2017]

#### **§ 101.1415 Partitioning and disaggregation.**

(a) MVDDS licensees are permitted to partition licensed geographic areas along county borders (Parishes in Louisiana or Territories in Alaska). Disaggregation will not be permitted by MVDDS licensees in the 12.2–12.7 GHz band. "Partitioning" is the assignment of geographic portions of a license along geopolitical or other boundaries. "Disaggregation" is the assignment of discrete portions or "blocks" of spectrum licensed to a geographic licensee or qualifying entity.

(b) *Eligibility.* (1) Parties seeking approval for partitioning shall request from the Commission an authorization for partial assignment of a license pursuant to § 1.948 of this chapter.

(2) MVDDS licensees may apply to the Commission to partition their licensed geographic service areas to eligible entities and are free to partition their licensed spectrum at any time following the grant of a license.

(3) Any existing frequency coordination agreements shall convey with the assignment of the geographic area or spectrum, and shall remain in effect for

the term of the agreement unless new agreements are reached.

(c) *Technical standards.* (1) Partitioning. In the case of partitioning, applicants and licensees must file FCC Form 603 pursuant to § 1.948 of this chapter and list the partitioned service area on a schedule to the application.

(2) The geographic coordinates must be specified in degrees, minutes, and seconds to the nearest second of latitude and longitude and must be based upon the 1983 North American Datum (NAD83).

(d) *Unjust enrichment.* 12 GHz licensees that received a bidding credit and partition their licenses to entities not meeting the eligibility standards for such a bidding credit, will be subject to the provisions concerning unjust enrichment as set forth in § 1.2111 of this chapter.

(e) *License term.* The MVDDS license term is ten years, beginning on the date of the initial authorization grant. The license term for a partitioned license area shall be the remainder of the original licensee's license term as provided for in § 101.1413.

[69 FR 31746, June 7, 2004, as amended at 82 FR 41549, Sept. 1, 2017]

#### **§ 101.1417 Annual report.**

Each MVDDS licensee shall file with the Broadband Division of the Wireless Telecommunications Bureau of the Commission two copies of a report by March 1 of each year for the preceding calendar year. This report must include the following:

(a) Name and address of licensee;

(b) Station(s) call letters and primary geographic service area(s); and

(c) The following statistical information for the licensee's station (and each channel thereof):

(1) The total number of separate subscribers served during the calendar year;

(2) The total hours of transmission service rendered during the calendar year to all subscribers;

(3) The total hours of transmission service rendered during the calendar year involving the transmission of local broadcast signals; and

(4) A list of each period of time during the calendar year in which the station rendered no service as authorized,

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if the time period was a consecutive period longer than 48 hours.

### § 101.1421 Coordination of adjacent area MVDDS stations.

(a) MVDDS licensees in the 12.2–12.7 GHz band are required to develop sharing and protection agreements based on the design and architecture of their systems, in order to ensure that no harmful interference occurs between adjacent geographical area licensees. MVDDS licensees shall:

(1) Engineer systems to be reasonably compatible with adjacent and co-channel operations in the adjacent areas on all its frequencies; and

(2) Cooperate fully and in good faith to resolve interference and transmission problems that are present on adjacent and co-channel operations in adjacent areas.

(b) Harmful interference to public safety stations, co-channel MVDDS stations operating in adjacent geographic areas, and stations operating on adjacent channels to MVDDS stations is prohibited. In areas where the DMAs are in close proximity, careful consideration should be given to power requirements and to the location, height, and radiation pattern of the transmitting and receiving antennas. Licensees are expected to cooperate fully in attempting to resolve problems of potential interference before bringing the matter to the attention of the Commission.

(c) Licensees shall coordinate their facilities whenever the facilities have optical line-of-sight into other licensees' areas or are within the same geographic area. Licensees are encouraged to develop operational agreements with relevant licensees in the adjacent geographic areas. Incumbent public safety POFs licensee(s) shall retain exclusive rights to its channel(s) within the relevant geographical areas and must be protected in accordance with the procedures in § 101.103. A list of public safety incumbents is attached as Appendix I to the Memorandum Opinion and Order and Second Report and Order, Docket 98–206, released May 23, 2002. Please check with the Commission for any updates to that list.

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### § 101.1423 Canadian and Mexican coordination.

Pursuant to § 2.301 of this chapter, MVDDS systems in the United States within 56 km (35 miles) of the Canadian and Mexican border will be granted conditional licenses, until final international agreements are approved. These systems may not cause harmful interference to stations in Canada or Mexico. MVDDS stations must comply with the procedures outlined under §§ 101.147(p) and 1.928(f)(1) and (f)(2) of this chapter until final international agreements concerning MVDDS are signed. Section 1.928(f) of this chapter states that transmitting antennas can be located as close as five miles (eight kilometers) of the border if they point within a sector of 160 degrees away from the border, and as close as thirty-five miles (fifty-six km) of the border if they point within a sector of 200 degrees toward the border without coordination with Canada. MVDDS licensees shall apply this method near the Canadian and Mexican borders. No stations are allowed within 5 miles of the borders.

### § 101.1425 RF exposure.

MVDDS stations in the 12.2–12.7 GHz frequency band shall ensure compliance with the Commission's radio frequency exposure requirements in § 1.1307(b) of this chapter. An Environmental Assessment may be required if RF radiation from the proposed facilities would, in combination with radiation from other sources, cause RF power density or field strength in an accessible area to exceed the applicable limits specified in § 1.1310 of this chapter.

[85 FR 18151, Apr. 1, 2020]

### § 101.1427 MVDDS licenses subject to competitive bidding.

Mutually exclusive initial applications for MVDDS licenses in the 12.2–12.7 GHz band are subject to competitive bidding. The general competitive bidding procedures set forth in part 1, subpart Q of this chapter will apply unless otherwise provided in this subpart.

**§ 101.1429 Designated entities.**

(a) *Eligibility for small business provisions.* (1) A very small business is an entity that, together with its controlling interests and affiliates, has average annual gross revenues not exceeding \$3 million for the preceding three years.

(2) A small business is an entity that, together with its controlling interests and affiliates, has average annual gross revenues not exceeding \$15 million for the preceding three years.

(3) An entrepreneur is an entity that, together with its controlling interests and affiliates, has average annual gross revenues not exceeding \$40 million for the preceding three years.

(b) *Bidding credits.* A winning bidder that qualifies as a very small business, as defined in this section, or a consortium of very small businesses may use the bidding credit specified in § 1.2110(f)(2)(i) of this chapter. A winning bidder that qualifies as a small business, as defined in this section, or a consortium of small businesses may use the bidding credit specified in § 1.2110(f)(2)(ii) of this chapter. A winning bidder that qualifies as an entrepreneur, as defined in this section, or a consortium of entrepreneurs may use the bidding credit specified in § 1.2110(f)(2)(iii) of this chapter.

**§ 101.1440 MVDDS protection of DBS.**

(a) An MVDDS licensee shall not begin operation unless it can ensure that the EPFD from its transmitting antenna at all DBS customers of record locations is below the values listed for the appropriate region in § 101.105(a)(4)(ii). Alternatively, MVDDS licensees may obtain a signed written agreement from DBS customers of record stating that they are aware of and agree to their DBS system receiving MVDDS signal levels in excess of the appropriate EPFD limits specified in § 101.105(a)(4)(ii). DBS customers of record are those who had their DBS receive antennas installed prior to or within the 30 day period after notification to the DBS operator by the MVDDS licensee of the proposed MVDDS transmitting antenna site.

(b) MVDDS licensees are required to conduct a survey of the area around its proposed transmitting antenna site to

determine the location of all DBS customers of record that may potentially be affected by the introduction of its MVDDS service. The MVDDS licensee must assess whether the signal levels from its system, under its deployment plans, would exceed the appropriate EPFD levels in § 101.105(a)(4)(ii) at any DBS customer of record location. Using EPFD calculations, terrain and building structure characteristics, and the survey results, an MVDDS licensee must make a determination of whether its signal level(s) will exceed the EPFD limit at any DBS customer of record sites. To assist in making this determination, the MVDDS provider can use the EPFD contour model developed by the Commission and described in Appendix J of the Memorandum Opinion and Order and Second Report and Order, ET Docket 98-206 or on the OET website at <http://www.fcc.gov/oet/dockets/et98-206>.

(c) If the MVDDS licensee determines that its signal level will exceed the EPFD limit at any DBS customer site, it shall take whatever steps are necessary, up to and including finding a new transmit site, to ensure that the EPFD limit will not be exceeded at any DBS customer location.

(d) *Coordination between MVDDS and DBS licensees.* (1) At least 90 days prior to the planned date of MVDDS commencement of operations, the MVDDS licensee shall provide the following information to the DBS licensee(s):

(i) Geographic location (including NAD 83 coordinates) of its proposed station location;

(ii) Maximum EIRP of each transmitting antenna system;

(iii) Height above ground level for each transmitting antenna;

(iv) Antenna type along with main beam azimuth and altitude orientation information, and description of the antenna radiation pattern;

(v) Description of the proposed service area; and

(vi) Survey results along with a technical description of how it determined compliance with the appropriate EPFD level at all DBS subscriber locations.

(2) No later than forty-five days after receipt of the MVDDS system information in paragraph (d)(1) of this section, the DBS licensee(s) shall provide the

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MVDDS licensee with a list of only those new DBS customer locations that have been installed in the 30-day period following the MVDDS notification and that the DBS licensee believes may receive harmful interference or where the prescribed EPFD limits may be exceeded. In addition, the DBS licensee(s) could indicate agreement with the MVDDS licensee's technical assessment, or identify DBS customer locations that the MVDDS licensee failed to consider or DBS customer locations where they believe the MVDDS licensee erred in its analysis and could exceed the prescribed EPFD limit.

(3) Prior to commencement of operation, the MVDDS licensee must take into account any new DBS customers or other relevant information provided by DBS licensees in response to the notification in paragraph (d)(1) of this section.

(e) Beginning thirty days after the DBS licensees are notified of a potential MVDDS site in paragraph (d)(1) of this section, the DBS licensees are responsible for providing information they deem necessary for those entities who install all future DBS receive antennas on its system to take into account the presence of MVDDS operations so that these DBS receive antennas can be located in such a way as to avoid the MVDDS signal. These later installed DBS receive antennas shall have no further rights of complaint against the notified MVDDS transmitting antenna(s).

(f) In the event of either an increase in the EPFD contour in any direction or a major modification as defined in § 1.929 of this chapter, such as the addition of an antenna, to an MVDDS station, the procedures of paragraphs (d) and (e) of this section and rights of complaint begin anew. Exceptions to this are renewal, transfer of control, and assignment of license applications.

(g) *Interference complaints.* The MVDDS licensee must satisfy all complaints of interference to DBS customers of record which are received during a one year period after commencement of operation of the transmitting facility. Specifically, the MVDDS licensee must correct interference caused to a DBS customer of record or cease operation if it is dem-

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onstrated that the DBS customer is receiving harmful interference from the MVDDS system or that the MVDDS signal exceeds the permitted EPFD level at the DBS customer location.

### Subpart Q—Service and Technical Rules for the 70/80/90 GHz Bands

SOURCE: 69 FR 3267, Jan. 23, 2004, unless otherwise noted.

#### § 101.1501 Service areas.

The 70/80/90 GHz bands are licensed on the basis of non-exclusive nationwide licenses. There is no limit to the number of non-exclusive nationwide licenses that may be granted for these bands, and these licenses will serve as a prerequisite for registering individual point-to-point links. In the 71–76 GHz and 81–86 GHz bands, nationwide non-exclusive licenses also serve as a blanket license for air-to-air and ship-to-ship operations, and as a prerequisite to register ground-to-air (GTA) stations and to operate associated GTA and air-to-ground (ATG) transmissions; and as a prerequisite to register shore stations and aerostat relay stations and to operate associated ship-to-shore, shore-to-ship, shore-to-aerostat, aerostat-to-ship, and aerostat-to-shore transmissions.

[89 FR 33261, Apr. 29, 2024]

#### § 101.1505 Segmentation plan.

(a) An entity may request any portion of the 71–76 GHz and 81–86 GHz bands, up to 5 gigahertz in each segment for a total of 10 gigahertz. Licensees are also permitted to register smaller segments.

(b) The 92–95 GHz band is divided into three segments: 92.0–94.0 GHz and 94.1–95.0 GHz for non-government and government users, and 94.0–94.1 GHz for Federal Government use. Pairing is allowed and segments may be aggregated without limit. The bands in paragraph (a) of this section can be included for a possible 12.9 gigahertz maximum aggregation. Licensees are also permitted to register smaller segments than provided here.

[70 FR 29998, May 25, 2005]

**§ 101.1507 Permissible operations.**

Licensees may use the 70 GHz, 80 GHz, and 90 GHz bands for any point-to-point, non-broadcast service. Licensees may use the 70 GHz and 80 GHz bands for aeronautical and maritime service as set forth in § 101.1528. The segments may be unpaired or paired, but pairing will be permitted only in a standardized manner (e.g., 71–72.25 GHz may be paired only with 81–82.25 GHz, and so on). The segments may be aggregated without limit.

[89 FR 33262, Apr. 29, 2024]

**§ 101.1511 Regulatory status and eligibility.**

(a) Licensees are permitted to provide services on a non-common carrier and/or on a common carrier basis.

(b) Licensees are subject to the requirements set forth in § 101.7.

(c) Any entity, other than one precluded by § 101.7, is eligible for authorization to provide service under this part. Authorization will be granted upon proper application filing and link coordination in accordance with the Commission's rules.

**§ 101.1513 License term.**

The license term is ten years, beginning on the date of the initial authorization (nationwide license) grant. Registering links will not change the overall renewal period of the license.

[70 FR 29998, May 25, 2005]

**§ 101.1523 Sharing and coordination among non-government licensees and between non-government and government services.**

(a) Registration of each link in the 71–76 GHz, 81–86 GHz, and 92–95 GHz bands will be in the Universal Licensing System until the Wireless Telecommunications Bureau announces by public notice the implementation of a third-party database.

(b) The licensee or applicant shall:

(1) Complete coordination with Federal Government links according to the coordination standards and procedures adopted in Report and Order, FCC 03–248, and as further detailed in subsequent implementation public notices issued consistent with that order;

(2) Provide an electronic copy of an interference analysis to the third-party database manager which demonstrates that the potential for harmful interference to or from all previously registered non-government links has been analyzed according to the standards of section 101.105 and generally accepted good engineering practice, and that the proposed non-government link will neither cause harmful interference to, nor receive harmful interference from, any previously registered non-government link; and

(3) Provide upon request any information related to the interference analysis and the corresponding link. The third-party database managers shall receive and retain the interference analyses electronically and make them available to the public. Protection of individual links against harmful interference from other links shall be granted to first-in-time registered links. Successful completion of coordination via the NTIA automated mechanism shall constitute successful non-Federal Government to Federal Government coordination for that individual link.

(c) In addition, the following types of non-Federal Government links require the filing with the Commission an FCC Form 601 for each link for the purpose of coordination and registration, in addition to registering each link in the third-party database:

(1) Facilities requiring the submission of an Environmental Assessment,

(2) Facilities requiring international coordination, and

(3) Operation in quiet zones.

(d) The Commission believes the licensee is in the best position to determine the nature of its operations and whether those operations impact these settings, and is required to submit to a database manager, as part of the registration package, documentation that an FCC Form 601 has been filed.

[69 FR 3267, Jan. 23, 2004, as amended at 70 FR 29998, May 25, 2005]

EFFECTIVE DATE NOTE: At 89 FR 33262, Apr. 29, 2024, § 101.1523 was amended, and the effective date was delayed indefinitely.

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### § 101.1525 RF safety.

Licensees in the 70–80–90 GHz bands are subject to the exposure requirements found in §§ 1.1307(b), 2.1091 and 2.1093 of this chapter, and will use the parameters found therein.

### § 101.1527 Canadian and Mexican coordination.

(a) A licensee of bands 71.0–76.0, 81.0–86.0, 92–94 GHz and 94.1–95 GHz must comply with § 1.928(f) of this chapter, which pertains to coordination with Canada.

(b) A licensee of bands 71.0–76.0, 81.0–86.0, 92–94 GHz and 94.1–95 GHz must coordinate with Mexico in the following situations:

(1) For a station the antenna of which looks within the 200 deg. sector toward the Mexico-United States borders, that area in each country within 35 miles of the borders; and

(2) For a station the antenna of which looks within the 160 deg. sector away from the Canada-United States borders, that area in each country within 5 miles of the borders.

### § 101.1528 Requirements for aeronautical and maritime links to, from, or between endpoints in motion.

(a) *Requirements for aeronautical ground stations and endpoints in motion.*

(1) Air-to-ground transmissions are permitted only in the 71–76 GHz band.

(2) Ground-to-air transmissions are permitted only in the 81–86 GHz band.

(3) Air-to-air transmissions are permitted only between aircraft that are

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separated by a minimum slant path distance of 50 km.

(4) Transmissions are only permitted to and from aircraft at altitudes between 10,000 ft and 50,000 ft.

(5) Ground stations must operate with a minimum elevation angle of 5 degrees and a maximum elevation angle of 45 degrees.

(6) Ground stations must be located at least 10 km from any existing Non-Federal FSS earth station or Federal facility listed in table 4 to paragraph (c)(2) of this section, absent a coordination agreement with the FSS operator.

(7) Ground stations must be located at least 150 km from the specific Federal facilities and not within the areas listed in table 3 to paragraph (c)(1) of this section, absent a coordination agreement with the Federal operator.

(8) Ground stations must be located at least 10 km from any existing Federal or non-Federal fixed station receiver, absent a coordination agreement with the fixed station operator.

(9) Air-to-air transmissions are permitted in 81–86 GHz subject to the following limitations;

(i) EIRP signal levels radiated along a line between the airborne transmitter and the latitude and longitude of the observatories in table 3 to paragraph (c)(1) of this section, which must be maintained as the airborne transmitter moves, cannot exceed the levels shown in table 1 to this paragraph (a)(9)(i). Within the range of 150 km and 375 km, the maximum allowable EIRP levels for horizontal distances not listed in table below may be approximated by linear interpolation.

TABLE 1 TO PARAGRAPH (a)(9)(i)—LIST OF MAXIMUM ALLOWABLE EIRP LEVELS, IN dBW

| Frequency<br>(GHz) | Horizontal distance (km) |      |      |      |      |      |     |     |     |      |
|--------------------|--------------------------|------|------|------|------|------|-----|-----|-----|------|
|                    | 150                      | 175  | 200  | 225  | 250  | 275  | 300 | 325 | 350 | 375  |
| 81 .....           | -11.2                    | -8.8 | -6.5 | -4.2 | -1.5 | 1.1  | 3.9 | 6.7 | 10  | 13.5 |
| 82 .....           | -11.5                    | -9.2 | -6.9 | -4.6 | -2   | 0.5  | 3.2 | 6   | 9.2 | 12.6 |
| 83 .....           | -11.7                    | -9.5 | -7.3 | -5   | -2.4 | 0    | 2.7 | 5.4 | 8.6 | 11.9 |
| 84 .....           | -11.9                    | -9.7 | -7.5 | -5.3 | -2.8 | -0.4 | 2.3 | 4.9 | 8   | 11.3 |
| 85 .....           | -12.1                    | -9.9 | -7.8 | -5.5 | -3   | -0.7 | 1.9 | 4.5 | 7.6 | 10.8 |
| 86 .....           | -12.2                    | -10  | -7.9 | -5.7 | -3.3 | -0.9 | 1.7 | 4.2 | 7.3 | 10.5 |

(ii) A licensee of aeronautical end points in motion must have a capability to target specific areas which can be added to a “block list” as part of a dynamic link management system. If air-to-air transmission within the main beam of the radio astronomy receiver cannot be avoided, air-to-air transmissions within the radio horizon of the radio astronomy site (as specified in table 2 to this paragraph (a)(9)(ii)) should not occur.

TABLE 2 TO PARAGRAPH (a)(9)(ii)—APPROXIMATE RADIO HORIZON, IN HORIZONTAL DISTANCE

| [km]            |                                                                  |
|-----------------|------------------------------------------------------------------|
| Altitude<br>(m) | Approximate radio<br>horizon<br>(km)<br>(horizontal<br>distance) |
| 10,360 .....    | 375                                                              |
| 8,000 .....     | 315                                                              |
| 6,000 .....     | 260                                                              |
| 5,000 .....     | 220                                                              |
| 4,000 .....     | 180                                                              |
| 3,000 .....     | 125                                                              |

(iii) The list of radio astronomy sites may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and NSF, in which case the coordination agreement will specify the technical restrictions.

(10) Air-to-air transmissions in the 71–76 GHz band are subject to the following restrictions:

(i) EIRP signal levels shall be limited to 20 dBW/1000 MHz towards each military installation listed in table 4 to paragraph (c)(2) that is within 375 km of the airborne transmitter. This 20 dBW/1000 MHz EIRP applies to the power radiated along a line between the airborne transmitter and the latitude and longitude of the military installations in table 4 to paragraph (c)(2) of this section and must be maintained as the airborne transmitter moves. An EIRP of 57 dBW/1000 MHz is allowed in other directions. The list of military installations in table 4 to paragraph (c)(2) of this section may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and the Department of Defense (DoD), in which case the coordination agreement will specify the tech-

nical restrictions and allow the licensee and DoD to update the list of protected installations in the agreement. The locations of all aeronautical end-point-in-motion ground stations will be provided to NTIA and DoD as part of the coordination process.

(ii) A licensee of aeronautical end points in motion must have a capability to target specific areas which can be added to a “block list” as part of a dynamic link management system. If air-to-air transmission within the main beam of the radio astronomy receivers associated with the observatories in table 3 to paragraph (c)(1) of this section cannot be avoided, air-to-air transmissions within the radio horizon of the radio astronomy site (as specified in table 2 to paragraph (a)(9)(ii) of this section) should not occur.

(iii) The list of radio astronomy sites may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and NSF, in which case the coordination agreement will specify the technical restrictions.

(b) *Requirements for maritime shore stations, aerostats, and endpoints in motion.*

(1) Ship-to-shore transmissions are only permitted in the 81–86 GHz band.

(2) Shore-to-ship transmissions are only permitted in the 71–76 GHz band.

(3) Shore-to-aerostat transmissions are only permitted in the 71–76 GHz band.

(4) Aerostat-to-ship transmissions are only permitted in the 71–76GHz band.

(5) Aerostat-to-shore transmissions are only permitted in the 81–86GHz band.

(6) Aerostat must not operate above an altitude limit of 1000 ft.

(7) Ship-to-ship communications are limited to ships located more than 30 km offshore, or closer only where the main beam of the transmit antenna is oriented at least 15 degrees away from any point on the shore.

(8) Ship stations and aerostat stations must only operate when there is a minimum separation of 150 km to the

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specific Federal facilities and not within the areas listed in table 3 to paragraph (c)(1) of this section, absent a coordination agreement with the Federal operator.

(9) Shore-to-ship and ship-to-shore transmission must only occur between

stations that are located at least 10 km from the Federal military installations listed in table 4 to paragraph (c)(2) of this section, absent a coordination agreement with the Federal operator.

(c) *Protected Federal sites.* (1) RAS and VLBA sites:

TABLE 3 TO PARAGRAPH (c)(1)

| RAS station name                                                         | North latitude                                                                                                 | West longitude |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------|
| Arizona Radio Observatory (ARO) 12-meter .....                           | 31°57'11.9"                                                                                                    | 111°36'53.6"   |
| Green Bank Observatory .....                                             | 38°25'59"                                                                                                      | 79°50'23"      |
| Very Large Array (VLA), Socorro, NM .....                                | 34°04'44"                                                                                                      | 107°37'06"     |
| Owens Valley Radio Observatory (OVRO), Big Pine, CA .....                | 37°14'02"                                                                                                      | 118°16'55"     |
| Haystack Observatory, Westford, MA .....                                 | 42°37'24"                                                                                                      | 071°29'18"     |
| National Radio Astronomy Observatory, Very Long Baseline Array Stations: |                                                                                                                |                |
| 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"      |
| National Radio Quiet Zone .....                                          | Rectangular area between latitudes 37°30' N and 39°15' N, and longitudes 78°30' W and 80°30' W.                |                |
| Next-generation Very Large Array (ngVLA) .....                           | Rectangular area between latitudes 31°22'1.9" N and 34°23'10" N, and longitudes 109°1'53.4" W and 103°4'39" W. |                |

(2) Military installations:

TABLE 4 TO PARAGRAPH (c)(2)

| Military installation                                              | Latitude    | Longitude    |
|--------------------------------------------------------------------|-------------|--------------|
| Redstone Arsenal, AL .....                                         | 34°41'42" N | 086°39'04" W |
| Fort Huachuca, AZ .....                                            | 31°33'18" N | 110°20'59" W |
| Yuma Proving Ground, AZ .....                                      | 33°01'02" N | 114°15'05" W |
| Beale AFB, CA .....                                                | 39°06'41" N | 121°21'36" W |
| Camp Parks Reserve Forces Training Area, CA .....                  | 34°43'00" N | 121°54'08" W |
| China Lake Naval Air Weapons Station, CA .....                     | 35°41'05" N | 117°41'19" W |
| Edwards AFB, CA .....                                              | 34°54'58" N | 117°56'07" W |
| Fort Irwin, CA .....                                               | 35°16'22" N | 116°41'05" W |
| Marine Corps Air Ground Combat Center, CA .....                    | 34°13'54" N | 116°03'42" W |
| Buckley AFB, CO .....                                              | 39°42'36" N | 104°45'29" W |
| Schriever AFB, CO .....                                            | 38°48'12" N | 104°31'32" W |
| Fort Gordon, GA .....                                              | 33°25'14" N | 082°09'09" W |
| Naval Satellite Operations Center, GU .....                        | 13°34'55" N | 144°50'50" E |
| Naval Computer and Telecomm Area Master Station, Pacific, HI ..... | 21°31'16" N | 157°59'57" W |
| Fort Detrick, MD .....                                             | 39°26'08" N | 077°25'38" W |
| Nellis AFB, NV .....                                               | 36°14'29" N | 115°03'03" W |
| Nevada Test Site, NV .....                                         | 38°33'41" N | 116°42'30" W |
| Tonapah Test Range Airfield, NV .....                              | 37°47'56" N | 116°46'51" W |
| Cannon AFB, NM .....                                               | 34°23'23" N | 103°19'06" W |
| White Sands Missile Range, NM .....                                | 32°56'38" N | 106°25'11" W |
| Dyess AFB, TX .....                                                | 31°10'10" N | 099°41'01" W |
| Fort Bliss, TX .....                                               | 31°48'45" N | 106°25'17" W |
| Fort Sam Houston, TX .....                                         | 29°26'34" N | 098°26'33" W |
| Goodfellow AFB, TX .....                                           | 31°26'05" N | 100°24'11" W |
| Kelly AFB, TX .....                                                | 29°22'51" N | 098°34'40" W |
| Utah Test and Training Range, UT .....                             | 40°12'00" N | 112°54'00" W |
| Fort Belvoir, VA .....                                             | 38°43'08" N | 077°09'15" W |

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TABLE 4 TO PARAGRAPH (c)(2)—Continued

| Military installation                       | Latitude    | Longitude    |
|---------------------------------------------|-------------|--------------|
| Naval Satellite Operations Center, VA ..... | 36°34'00" N | 076°14'00" W |

[89 FR 33262, Apr. 29, 2024]

**PARTS 102–199 [RESERVED]**

EFFECTIVE DATE NOTE: At 89 FR 33264, Apr. 29, 2024, § 101.1528 was amended, and the effective date was delayed indefinitely.