

or earth stations except under, and in accordance with, an appropriate authorization granted by the Federal Communications Commission.

(b) Protection from impermissible levels of interference to the reception of signals by earth stations in the Fixed-Satellite Service from terrestrial stations in a co-equally shared band is provided through the authorizations granted under this part.

[56 FR 24016, May 28, 1991]

### § 25.103 Definitions.

Terms with definitions including the “(RR)” designation are defined in the same way in § 2.1 of this chapter and in the Radio Regulations of the International Telecommunication Union.

*1.5/1.6 GHz Mobile-Satellite Service.* Mobile-Satellite Service provided in any portion of the 1525–1559 MHz space-to-Earth band and the 1626.5–1660.5 MHz Earth-to-space band, which are referred to in this rule part as the “1.5/1.6 GHz MSS bands.”

*1.6/2.4 GHz Mobile-Satellite Service.* A Mobile-Satellite Service that operates in the 1610–1626.5 MHz and 2483.5–2500 MHz bands, or in any portion thereof.

*2 GHz Mobile-Satellite Service.* A Mobile-Satellite Service that operates in the 2000–2020 MHz and 2180–2200 MHz bands, or in any portion thereof.

*17/24 GHz Broadcasting-Satellite Service (17/24 GHz BSS).* A radiocommunication service involving transmission from one or more feeder-link earth stations to other earth stations via geostationary satellites, in the 17.3–17.7 GHz (space-to-Earth) (domestic allocation), 17.3–17.8 GHz (space-to-Earth) (international allocation) and 24.75–25.25 GHz (Earth-to-space) bands. For purposes of the application processing provisions of this part, the 17/24 GHz BSS is a GSO-like service. Unless specifically stated otherwise, 17/24 GHz BSS systems are subject to the rules in this part applicable to FSS.

*Ancillary Terrestrial Component (ATC).* A terrestrial communications network used in conjunction with a qualifying satellite network system authorized pursuant to these rules and the conditions established in the Orders issued in IB Docket No. 01–185, *Flexibility for Delivery of Communications by Mobile-Satellite Service Providers in the 2 GHz*

*Band, the L-Band, and the 1.6/2.4 GHz Band.*

*Ancillary Terrestrial Component (ATC) base station.* A terrestrial fixed facility used to transmit communications to or receive communications from one or more ancillary terrestrial component mobile terminals.

*Ancillary Terrestrial Component (ATC) mobile terminal.* A terrestrial mobile facility used to transmit communications to or receive communications from an ancillary terrestrial component base station or a space station.

*Blanket license.* A license for:

(1) Multiple earth stations in the FSS or MSS, or for SDARS terrestrial repeaters, that may be operated anywhere within a geographic area specified in the license; or

(2) For multiple space stations in non-geostationary-orbit.

*Contiguous United States (CONUS).* For purposes of subparts B and C of this part, 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. 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). See § 27.6(m) of this chapter.

*Conventional C-band.* The 3700–4200 MHz (space-to-Earth) and 5925–6425 MHz (Earth-to-space) FSS frequency bands.

*Conventional Ka-band.* The 18.3–18.8 GHz (space-to-Earth), 19.7–20.2 GHz (space-to-Earth), 28.35–28.6 GHz (Earth-to-space), and 29.25–30.0 GHz (Earth-to-space) frequency bands, which the Commission has designated as primary for GSO FSS operation.

*Conventional Ku-band.* The 11.7–12.2 GHz (space-to-Earth) and 14.0–14.5 GHz (Earth-to-space) FSS frequency bands.

*Coordination distance.* When determining the need for coordination, the distance on a given azimuth from an earth station sharing the same frequency band with terrestrial stations, or from a transmitting earth station

sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

*Direct Broadcast Satellite (DBS) Service.* A radiocommunication service in which signals transmitted or retransmitted by Broadcasting-Satellite Service space stations in the 12.2–12.7 GHz band are intended for direct reception by subscribers or the general public. For the purposes of this definition, the term direct reception includes individual reception and community reception.

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

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

*Earth Station Aboard Aircraft (ESAA).* An earth station operating aboard an aircraft that receives from and transmits to Fixed-Satellite Service space stations.

*Earth Station in Motion (ESIM).* A term that collectively designates ESV, VMES and ESAA earth stations, as defined in this section.

*Earth Station on Vessel (ESV).* An earth station onboard a craft designed for traveling on water, receiving from and transmitting to Fixed-Satellite Service space stations.

*Equivalent diameter.* When circular aperture reflector antennas are employed, the size of the antenna is generally expressed as the diameter of the antenna's main reflector. When non-reflector or non-circular-aperture antennas are employed, the equivalent diameter is the diameter of a hypothetical circular-aperture antenna with the same aperture area as the actual antenna. For example, an elliptical aperture antenna with major axis  $a$  and minor axis  $b$  will have an equivalent diameter of  $[a \times b]^{1/2}$ . A rectangular aperture antenna with length  $l$  and width  $w$  will have an equivalent diameter of  $[4(l \times w)\pi]^{1/2}$ .

*Equivalent Power Flux Density (EPFD).* The sum of the power flux densities produced at a geostationary-orbit receive earth or space station on the Earth's surface or in the geostationary orbit, as appropriate, by all the transmit stations within a non-geostationary-orbit Fixed-Satellite Service system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing in its nominal direction. The equivalent power flux density, in dB(W/m<sup>2</sup>) in the reference bandwidth, is calculated using the following formula:

$$10 \log_{10} \left[ \sum_{n=1}^{N_a} 10^{\frac{P_i}{10}} \frac{G_t(\theta_i)}{4\pi d_i^2} \cdot \frac{G_r(\phi_i)}{G_{r,max}} \right]$$

Where:

- $N_a$  is the number of transmit stations in the non-geostationary orbit system that are visible from the GSO receive station considered on the Earth's surface or in the geostationary orbit, as appropriate;
- $i$  is the index of the transmit station considered in the non-geostationary orbit system;
- $P_i$  is the RF power at the input of the antenna of the transmit station, considered in the non-geostationary orbit system in dBW in the reference bandwidth;

- $\theta_i$  is the off-axis angle between the boresight of the transmit station considered in the non-geostationary orbit system and the direction of the GSO receive station;
- $G_t(\theta_i)$  is the transmit antenna gain (as a ratio) of the station considered in the non-geostationary orbit system in the direction of the GSO receive station;
- $d_i$  is the distance in meters between the transmit station considered in the non-geostationary orbit system and the GSO receive station;
- $\phi_i$  is the off-axis angle between the boresight of the antenna of the GSO receive station

and the direction of the  $i$ th transmit station considered in the non-geostationary orbit system;

$G_r(\theta_i)$  is the receive antenna gain (as a ratio) of the GSO receive station in the direction of the  $i$ th transmit station considered in the non-geostationary orbit system;

$G_{r,\max}$  is the maximum gain (as a ratio) of the antenna of the GSO receive station.

**Extended C-band.** The 3600–3700 MHz (space-to-Earth), 5850–5925 MHz (Earth-to-space), and 6425–6725 MHz (Earth-to-space) FSS frequency bands.

**Extended Ku-band.** The 10.95–11.2 GHz (space-to-Earth), 11.45–11.7 GHz (space-to-Earth), and 13.75–14.0 GHz bands (Earth-to-space) FSS frequency bands.

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

**Fixed earth station.** An earth station intended to be used at a fixed position. The position may be a specified fixed point or any fixed point within a specified area.

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

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

**Inter-Satellite Service.** A radiocommunication service providing links between artificial earth satellites.

**Ku band.** In this rule part, the terms “Ku band” and “conventional Ku band” refer to the 11.7–12.2 GHz (space-

to-Earth) and 14.0–14.5 GHz (Earth-to-space) bands. These paired bands are allocated to the Fixed-Satellite Service and are also referred to as the 12/14 GHz bands.

**Land earth station.** An earth station in the Fixed-Satellite Service or, in some cases, in the Mobile-Satellite Service, located at a specified fixed point or within a specified area on land to provide a feeder link for the Mobile-Satellite Service. (RR)

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

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

**Mobile-Satellite Service (MSS).** (1) A radiocommunication service:

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

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

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

**Network Control and Monitoring Center (NCMC).** An NCMC, as used in Part 25, is a facility that has the capability to remotely control earth stations operating as part of a satellite network or system.

**NGSO.** Non-geostationary orbit.

**NGSO FSS gateway earth station.** An earth station or complex of multiple earth station antennas that supports the routing and switching functions of an NGSO FSS system and that does not originate or terminate communication traffic. An NGSO FSS gateway earth station may also be used for telemetry, tracking, and command transmissions and is not for the exclusive use of any customer.

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

*Permitted Space Station List.* A list of all U.S.-licensed geostationary-orbit space stations providing Fixed-Satellite Service in the conventional C band, the conventional Ku band, or the 18.3–18.8 GHz, 19.7–20.2 GHz, 28.35–28.6 GHz, and 29.25–30.0 GHz bands, as well as non-U.S.-licensed geostationary-orbit space stations approved for U.S. market access to provide Fixed-Satellite Service in the conventional C band, conventional Ku band, or 18.3–18.8 GHz, 19.7–20.2 GHz, 28.35–28.6 GHz, and 29.25–30.0 GHz bands.

*Plane perpendicular to the GSO arc.* The plane that is perpendicular to the “plane tangent to the GSO arc,” as defined below, and includes a line between the earth station in question and the GSO space station that it is communicating with.

*Plane tangent to the GSO arc.* The plane defined by the location of an earth station’s transmitting antenna and a line in the equatorial plane that is tangent to the GSO arc at the location of the GSO space station that the earth station is communicating with.

*Power flux density (PFD).* The amount of power flow through a unit area within a unit bandwidth. The units of power flux density are those of power spectral density per unit area, namely watts per hertz per square meter. These units are generally expressed in decibel form as dB(W/Hz/m<sup>2</sup>), dB(W/m<sup>2</sup>) in a 4 kHz band, or dB(W/m<sup>2</sup>) in a 1 MHz band.

*Power Spectral Density (PSD).* The amount of an emission’s transmitted carrier power applied at the antenna input falling within the stated bandwidth. The units of power spectral density are watts per hertz and are generally expressed in decibel form as dB(W/Hz) when measured in a 1 Hz bandwidth, dB(W/4kHz) when measured in a 4 kHz bandwidth, or dB(W/MHz) when measured in a 1 MHz bandwidth.

*Protection areas.* The geographic regions where U.S. Department of Defense meteorological satellite systems or National Oceanic and Atmospheric Administration meteorological satellite systems, or both such systems, receive signals from low earth orbiting satellites. Also, areas around NGSO MSS feeder-link earth stations in the 1.6/2.4 GHz Mobile-Satellite Service de-

termined in the manner specified in § 25.203(j).

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

*Routine processing or licensing.* Expedited processing of unopposed applications for earth stations in the FSS communicating with GSO space stations that satisfy the criteria in § 25.211(d), § 25.212(c) through (f), or § 25.218, include all required information, are consistent with all Commission rules, and do not raise any policy issues. Some, but not all, routine earth station applications are eligible for an autogrant procedure under § 25.115(a)(3).

*Satellite Digital Audio Radio Service (SDARS).* A radiocommunication service in which audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary repeating terrestrial transmitters and telemetry, tracking and command facilities.

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

*Selected assignment.* A spectrum assignment voluntarily identified by a 2 GHz MSS licensee at the time that the licensee’s first 2 GHz Mobile-Satellite Service satellite reaches its intended orbit.

*Shapeable antenna beam.* A satellite transmit or receive antenna beam, the gain pattern of which can be modified at any time without physically repositioning a satellite antenna reflector.

*Skew angle.* The angle between the minor axis of an axially asymmetric antenna beam and the plane tangent to the GSO arc.

*Small satellite.* An NGSO space station eligible for authorization under the application process described in § 25.122.

*Small spacecraft.* An NGSO space station operating beyond Earth’s orbit that is eligible for authorization under the application process described in § 25.123.

*Space radiocommunication.* Any radiocommunication involving the use of one or more space stations or the

use of one or more reflecting satellites or other objects in space.

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

*Space system.* Any group of cooperating earth stations and/or space stations employing space radiocommunication for specific purposes. (RR)

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

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

*Terrestrial station.* A station effecting terrestrial radiocommunication.

*Two-degree-compliant space station.* A GSO FSS space station operating in the conventional or extended C-bands, the conventional or extended Ku-bands, or the conventional Ka-band within the limits on downlink EIRP density or PFD specified in § 25.140(a)(3) and communicating only with earth stations operating in conformance with routine uplink parameters specified in § 25.211(d), § 25.212(c), (d), (e), or (f), or § 25.218.

*Vehicle-Mounted Earth Station (VMES).* An earth station, operating from a motorized vehicle that travels primarily on land, that receives from and transmits to Fixed-Satellite Service space stations and operates within the United States.

[79 FR 8311, Feb. 12, 2014, as amended at 79 FR 26868, May 12, 2014; 81 FR 55324, Aug. 18, 2016; 83 FR 34489, July 20, 2018; 84 FR 53651, Oct. 8, 2019; 84 FR 66779, Dec. 5, 2019; 85 FR 22864, Apr. 23, 2020; 85 FR 44786, July 24, 2020; 85 FR 43733, July 20, 2020]

**§ 25.104 Preemption of local zoning of earth stations.**

(a) Any state or local zoning, land-use, building, or similar regulation that materially limits transmission or reception by satellite earth station antennas, or imposes more than minimal costs on users of such antennas, is preempted unless the promulgating authority can demonstrate that such regulation is reasonable, except that non-

federal regulation of radio frequency emissions is not preempted by this section. For purposes of this paragraph (a), reasonable means that the local regulation:

(1) Has a clearly defined health, safety, or aesthetic objective that is stated in the text of the regulation itself; and

(2) Furthers the stated health, safety or aesthetic objective without unnecessarily burdening the federal interests in ensuring access to satellite services and in promoting fair and effective competition among competing communications service providers.

(b)(1) Any state or local zoning, land-use, building, or similar regulation that affects the installation, maintenance, or use of a satellite earth station antenna that is two meters or less in diameter and is located or proposed to be located in any area where commercial or industrial uses are generally permitted by non-federal land-use regulation shall be presumed unreasonable and is therefore preempted subject to paragraph (b)(2) of this section. No civil, criminal, administrative, or other legal action of any kind shall be taken to enforce any regulation covered by this presumption unless the promulgating authority has obtained a waiver from the Commission pursuant to paragraph (e) of this section, or a final declaration from the Commission or a court of competent jurisdiction that the presumption has been rebutted pursuant to paragraph (b)(2) of this section.

(2) Any presumption arising from paragraph (b)(1) of this section may be rebutted upon a showing that the regulation in question:

(i) Is necessary to accomplish a clearly defined health or safety objective that is stated in the text of the regulation itself;

(ii) Is no more burdensome to satellite users than is necessary to achieve the health or safety objective; and

(iii) Is specifically applicable on its face to antennas of the class described in paragraph (b)(1) of this section.

(c) Any person aggrieved by the application or potential application of a state or local zoning or other regulation in violation of paragraph (a) of this section may, after exhausting all