

§ 25.173 Results of in-orbit testing.

(a) Space station operators must measure the co-polarized and cross-polarized performance of space station antennas through in-orbit testing and submit the measurement data to the Commission upon request.

(b) Within 15 days after completing in-orbit testing of a space station licensed under this part, the operator must notify the Commission that such testing has been completed and certify that the space station's measured performance is consistent with the station authorization and that the space station is capable of using its assigned frequencies or inform the Commission of any discrepancy. The licensee must also indicate in the filing whether the space station has been placed in the assigned geostationary orbital location or non-geostationary orbit. If the licensee files a certification pursuant to this paragraph before the space station has been placed in its assigned orbit or orbital location, the licensee must separately notify the Commission that the space station has been placed in such orbit or orbital location within 3 days after such placement and that the station's measured performance is consistent with the station authorization.

[79 FR 8321, Feb. 12, 2014]

Subpart C—Technical Standards

SOURCE: 30 FR 7176, May 28, 1965; 36 FR 2562, Feb. 6, 1971, unless otherwise noted.

§ 25.201 [Reserved]**§ 25.202 Frequencies, frequency tolerance, and emission limits.**

(a)(1) *Frequency band.* The following frequencies are available for use by the Fixed-Satellite Service. Precise frequencies and bandwidths of emission shall be assigned on a case-by-case basis. Refer to the U.S. Table of Frequency Allocations, 47 CFR 2.106, including relevant footnotes, for band-specific use restrictions and coordination requirements. Restrictions and coordination conditions not mentioned in the Table of Frequency Allocations are set forth in the annotations to the following list:

Space-to-Earth (GHz)	Earth-to-space (GHz)
3.6–3.65	⁶ 5.091–5.25
3.65–3.7	5.85–5.925
3.7–4.2	5.925–6.425
4.5–4.8	6.425–6.525
6.7–7.025 ⁶	6.525–6.7
7.025–7.075	6.7–7.025
10.7–11.7 ⁶	7.025–7.075
11.7–12.2	12.7–12.75
12.2–12.7	⁶ 12.75–13.25
18.3–18.58	13.75–14
18.58–18.8	14–14.2
18.8–19.3	14.2–14.5
19.3–19.7	⁶ 15.43–15.63
19.7–20.2	17.3–17.8
37.5–40 ¹	24.75–25.05
40–42	25.05–25.25
	⁷ 27.5–28.35
	² 28.35–28.6
	³ 28.6–29.1
	⁴ 29.1–29.25
	⁵ 29.25–29.5
	² 29.5–30.0
	47.2–50.2

¹Use of this band by the FSS is limited to gateway earth station operations, provided the licensee under this Part obtains a license under part 101 of this chapter or an agreement from a part 101 licensee for the area in which an earth station is to be located. Satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers.

²This band is primary for GSO FSS and secondary for NGSO FSS.

³This band is primary for NGSO FSS and secondary for GSO FSS.

⁴This band is primary for NGSO MSS feeder links and LMDS hub-to-subscriber transmission.

⁵This band is primary for NGSO MSS feeder links and GSO FSS.

⁶Use of this band by NGSO FSS systems is limited to transmissions to or from gateway earth stations.

⁷FSS is secondary to LMDS in this band.

(2) [Reserved]

(3) The following frequencies are available for use by the non-voice, non-geostationary mobile-satellite service:

137–138 MHz: Space-to-Earth
 148–150.05 MHz: Earth-to-space
 399.9–400.05 MHz: Earth-to-space
 400.15–401 MHz: Space-to-Earth

(4)(i) The following frequencies are available for use by the 1.6/2.4 GHz Mobile-Satellite Service:

1610–1626.5 MHz: User-to-Satellite Link
 1613.8–1626.5 MHz: Satellite-to-User Link (secondary)
 2483.5–2500 MHz: Satellite-to-User Link

(ii) The following frequencies are available for use by the 2 GHz Mobile-Satellite Service: 2000–2020 MHz: User-to-Satellite Link; 2180–2200 MHz: Satellite-to-User Link.

(iii)(A) The following frequencies are available for use by the 1.5/1.6 GHz Mobile-Satellite Service:

1525–1559 MHz: space-to-Earth
 1626.5–1660.5 MHz: Earth-to-space

§ 25.202

47 CFR Ch. I (10–1–16 Edition)

(B) The use of the frequencies 1544–1545 MHz and 1645.5–1646.5 MHz is limited to distress and safety communications.

(5) The following frequencies are available for use by the inter-satellite service:

22.55–23.00 GHz
23.00–23.55 GHz
24.45–24.65 GHz
24.65–24.75 GHz
54.25–56.90 GHz
57.00–58.20 GHz
65.00–71.00 GHz

(6) The following frequencies are available for use by the Satellite Digital Audio Radio Service (SDARS), and for any associated terrestrial repeaters: 2320–2345 MHz (space-to-Earth)

(7) The following frequencies are available for use by the Direct Broadcast Satellite service:

12.2–12.7 GHz: Space-to-Earth.
12.2–12.7 GHz: Space-to-Earth.

(8) The following frequencies are available for use by ESVs:

3700–4200 MHz (space-to-Earth)
5925–6425 MHz (Earth-to-space)
10.95–11.2 GHz (space-to-Earth)
11.45–11.7 GHz (space-to-Earth)
11.7–12.2 GHz (space-to-Earth)
14.0–14.5 GHz (Earth-to-space)

ESVs shall be authorized and coordinated as set forth in §§ 25.221 and 25.222. ESV operators, collectively, may coordinate up to 180 megahertz of spectrum in the 5925–6425 MHz (Earth-to-space) band for all ESV operations at any given location subject to coordination.

(9) The following frequencies are available for use by the Broadcasting-Satellite Service after 1 April 2007:

17.3–17.7 GHz (space-to-Earth)
17.7–17.8 GHz (space-to-Earth)

NOTE 1 TO PARAGRAPH (a)(9): Use of the 17.3–17.7 GHz band by the broadcasting-satellite service is limited to geostationary satellite orbit systems.

NOTE 2 TO PARAGRAPH (a)(9): Use of the 17.7–17.8 GHz band (space-to-Earth) by the broadcasting-satellite service is limited to transmissions from geostationary satellite orbit systems to receiving earth stations located outside of the United States and its Possessions. In the United States and its Possessions, the 17.7–17.8 GHz band is allocated on a primary basis to the Fixed Service.

(10)(i) The following frequencies are available for use by Vehicle-Mounted Earth Stations (VMESs):

10.95–11.2GHz (space-to-Earth)
11.45–11.7GHz (space-to-Earth)
11.7–12.2GHz (space-to-Earth)
14.0–14.5GHz (Earth-to-space)

(ii) VMESs shall be authorized as set forth in § 25.226.

(11)(i) The following frequencies are available for use by Earth Stations Aboard Aircraft (ESAA):

10.95–11.2 GHz (space-to-Earth)
11.45–11.7 GHz (space-to-Earth)
11.7–12.2 GHz (space-to-Earth)
14.0–14.5 GHz (Earth-to-space)

(ii) ESAAs shall be authorized as set forth in § 25.227.

(b) Other frequencies and associated bandwidths of emission may be assigned on a case-by-case basis to space systems under this part in conformance with § 2.106 of this chapter and the Commission's rules and policies.

(c) [Reserved]

(d) *Frequency tolerance, Earth stations.* The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

(e) *Frequency tolerance, space stations.* The carrier frequency of each space station transmitter authorized in these services shall be maintained within 0.002 percent of the reference frequency.

(f) *Emission limitations.* Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

(1) 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 100 percent of the authorized bandwidth: 25 dB;

(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

(4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

(g)(1) Telemetry, tracking, and command signals may be transmitted in frequencies within the assigned bands that are not at a band edge only if the transmissions cause no greater interference and require no greater protection from harmful interference than the communications traffic on the satellite network or have been coordinated with operators of authorized co-frequency space stations at orbital locations within six degrees of the assigned orbital location.

(2) Frequencies, polarization, and coding of telemetry, tracking, and command transmissions must be selected to minimize interference into other satellite networks.

(h) *Out-of-band emission limitations for SDARS terrestrial repeaters.* (1) Any SDARS terrestrial repeater operating at a power level greater than 2-watt average EIRP is required to attenuate its out-of-band emissions below the transmitter power P by a factor of not less than $90 + 10 \log (P)$ dB in a 1-megahertz bandwidth outside the 2320–2345 MHz band, where P is average transmitter output power in watts.

(2) Any SDARS terrestrial repeater operating at a power level equal to or less than 2-watt average EIRP is required to attenuate its out-of-band emissions below the transmitter power P by a factor of not less than $75 + 10 \log (P)$ dB in a 1-megahertz bandwidth outside the 2320–2345 MHz band, where P is average transmitter output power in watts.

(3) SDARS repeaters are permitted to attenuate out-of-band emissions less than the levels specified in paragraphs (h)(1) and (h)(2), of this section unless a potentially affected WCS licensee provides written notice that it intends to

commence commercial service within the following 365 days. Starting 180 days after receipt of such written notice, SDARS repeaters within the area notified by the potentially affected WCS licensee must attenuate out-of-band emissions to the levels specified in paragraphs (h)(1) and (h)(2) of this section.

(4) For the purpose of this section, a WCS licensee is potentially affected if it is authorized to operate a base station in the 2305–2315 MHz or 2350–2360 MHz bands within 25 kilometers of a repeater seeking to operate with an out of band emission attenuation factor less than those prescribed in paragraphs (h)(1) or (2) of this section.

(i) The WCS licensee is authorized to operate a base station in the 2305–2315 MHz or 2350–2360 MHz bands in the same Major Economic Area (MEA) as that in which a SDARS terrestrial repeater is located.

(ii) The WCS licensee is authorized to operate a base station in the 2315–2320 MHz or 2345–2350 MHz bands in the same Regional Economic Area Grouping (REAG) as that in which a SDARS terrestrial repeater is located.

(iii) A SDARS terrestrial repeater is located within 5 kilometers of the boundary of an MEA or REAG in which the WCS licensee is authorized to operate a WCS base station.

(i) The following unwanted emissions power limits for non-geostationary satellites operating in the inter-satellite service that transmit in the 22.55–23.55 GHz band shall apply in any 200 MHz of the 23.6–24 GHz passive band, based on the date that complete advance publication information is received by the ITU's Radiocommunication Bureau:

(1) For information received before January 1, 2020: –36 dBW.

(2) For information received on or after January 1, 2020: –46 dBW.

(j) For earth stations in the Fixed-Satellite Service (Earth-to-space) that transmit in the 49.7–50.2 GHz and 50.4–50.9 GHz bands, the unwanted emission power in the 50.2–50.4 GHz band shall not exceed –20 dBW/200 MHz (measured at the input of the antenna), except that the maximum unwanted emission power may be increased to –10 dBW/200 MHz for earth stations having an antenna gain greater than or equal to 57

§ 25.203

dBi. These limits apply under clear-sky conditions. During fading conditions, the limits may be exceeded by earth stations when using uplink power control.

[30 FR 7176, May 28, 1965]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 25.202, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.

§ 25.203 Choice of sites and frequencies.

(a) Sites and frequencies for earth stations, other than ESVs, operating in frequency bands shared with equal rights between terrestrial and space services, shall be selected, to the extent practicable, in areas where the surrounding terrain and existing frequency usage are such as to minimize the possibility of harmful interference between the sharing services.

(b) An applicant for an earth station authorization, other than an ESV, in a frequency band shared with equal rights with terrestrial microwave services shall compute the great circle coordination distance contour(s) for the proposed station in accordance with the procedures set forth in § 25.251. The applicant shall submit with the application a map or maps drawn to appropriate scale and in a form suitable for reproduction indicating the location of the proposed station and these contours. These maps, together with the pertinent data on which the computation of these contours is based, including all relevant transmitting and/or receiving parameters of the proposed station that is necessary in assessing the likelihood of interference, an appropriately scaled plot of the elevation of the local horizon as a function of azimuth, and the electrical characteristics of the earth station antenna(s), shall be submitted by the applicant in a single exhibit to the application. The coordination distance contour plot(s), horizon elevation plot, and antenna horizon gain plot(s) required by this section may also be submitted in tabular numerical format at 5° azimuthal increments instead of graphical format. At a minimum, this exhibit shall include the information listed in paragraph (c)(2) of this section. An earth

47 CFR Ch. I (10–1–16 Edition)

station applicant shall also include in the application relevant technical details (both theoretical calculations and/or actual measurements) of any special techniques, such as the use of artificial site shielding, or operating procedures or restrictions at the proposed earth station which are to be employed to reduce the likelihood of interference, or of any particular characteristics of the earth station site which could have an effect on the calculation of the coordination distance.

(c) Prior to the filing of its application, an applicant for operation of an earth station, other than an ESV, VMES or ESAA, shall coordinate the proposed frequency usage with existing terrestrial users and with applicants for terrestrial station authorizations with previously filed applications in accordance with the following procedure:

(1) An applicant for an earth station authorization shall perform an interference analysis in accordance with the procedures set forth in § 25.251 for each terrestrial station, for which a license or construction permit has been granted or for which an application has been accepted for filing, which is or is to be operated in a shared frequency band to be used by the proposed earth station and which is located within the great circle coordination distance contour(s) of the proposed earth station.

(2) The earth station applicant shall provide each such terrestrial station licensee, permittee, and prior filed applicant with the technical details of the proposed earth station and the relevant interference analyses that were made. At a minimum, the earth station applicant shall provide the terrestrial user with the following technical information:

- (i) The geographical coordinates of the proposed earth station antenna(s),
- (ii) Proposed operating frequency band(s) and emission(s),
- (iii) Antenna center height above ground and ground elevation above mean sea level,
- (iv) Antenna gain pattern(s) in the plane of the main beam,
- (v) Longitude range of geostationary satellite orbit (GSO) satellites at