

**§ 25.204**

**§ 25.204 Power limits for earth stations.**

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

- + 40 dBW in any 4 kHz band for  $\theta \leq 0^\circ$
- + 40 + 3 $\theta$  dBW in any 4 kHz band for  $0^\circ < \theta \leq 5^\circ$

where  $\theta$  is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

(b) In bands shared coequally with terrestrial radiocommunication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands above 15 GHz shall not exceed the following limits except as provided for in paragraph (c) of this section:

- + 64 dBW in any 1 MHz band for  $\theta \leq 0^\circ$
- + 64 + 3  $\theta$  dBW in any 1 MHz band for  $0^\circ < \theta \leq 5^\circ$

where  $\theta$  is as defined in paragraph (a) of this section.

(c) For angles of elevation of the horizon greater than  $5^\circ$  there shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.

(d) Notwithstanding the e.i.r.p. and e.i.r.p. density limits specified in the station authorization, each earth station transmission shall be conducted at the lowest power level that will provide the required signal quality as indicated in the application and further amended by coordination agreements.

(e) To the extent specified in paragraphs (e)(1) through (e)(3) of this section, earth stations in the Fixed-Satellite Service may employ uplink adaptive power control or other methods of fade compensation to facilitate transmission of uplinks at power levels required for desired link performance

while minimizing interference between networks.

(1) Except when paragraphs (e)(2) through (e)(3) of this section apply, transmissions from FSS earth stations in frequencies above 10 GHz may exceed the uplink EIRP and EIRP density limits specified in the station authorization under conditions of uplink fading due to precipitation by an amount not to exceed 1 dB above the actual amount of monitored excess attenuation over clear sky propagation conditions. EIRP levels must be returned to normal as soon as the attenuating weather pattern subsides.

(2) An FSS earth station transmitting to a geostationary space station in the 13.77–13.78 GHz band must not generate more than 71 dBW EIRP in any 6 MHz band. An FSS earth station transmitting to a non-geostationary space station in the 13.77–13.78 GHz band must not generate more than 51 dBW EIRP in any 6 MHz band. Automatic power control may be used to increase the EIRP density in a 6 MHz uplink band in this frequency range to compensate for rain fade, provided that the power flux-density at the space station does not exceed the value that would result when transmitting with an EIRP of 71 dBW or 51 dBW, as appropriate, in that 6 MHz band in clear-sky conditions.

(3) FSS earth stations transmitting to geostationary space stations in the 28.35–28.6 GHz and/or 29.25–30.0 GHz bands may employ uplink adaptive power control or other methods of fade compensation. For stations employing uplink power control, the values in § 25.218(i)(1), (2), and (4) may be exceeded by up to 20 dB under conditions of uplink fading due to precipitation. The amount of such increase in excess of the actual amount of monitored excess attenuation over clear sky propagation conditions must not exceed 1.5 dB or 15 percent of the actual amount of monitored excess attenuation in dB, whichever is larger, with a confidence level of 90 percent except over transient periods accounting for no more than 0.5 percent of the time during which the excess is no more than 4.0 dB.

(f) An earth station in the Fixed-Satellite Service transmitting in the 13.75–

14 GHz band must have a minimum antenna diameter of 4.5 m, and the EIRP of any emission in that band should be at least 68 dBW and should not exceed 85 dBW.

(g) [Reserved]

[48 FR 40255, Sept. 6, 1983, as amended at 58 FR 13420, Mar. 11, 1993; 61 FR 52307, Oct. 7, 1996; 62 FR 61457, Nov. 18, 1997; 66 FR 10623, Feb. 16, 2001; 70 FR 4784, Jan. 31, 2005; 70 FR 32255, June 2, 2005; 72 FR 50029, Aug. 29, 2007; 74 FR 57098, Nov. 4, 2009; 78 FR 8427, Feb. 6, 2013; 78 FR 14927, Mar. 8, 2013; 79 FR 8322, Feb. 12, 2004; 81 FR 55336, Aug. 18, 2016; 83 FR 34491, July 20, 2018; 84 FR 53655, Oct. 8, 2019]

#### § 25.205 Minimum antenna elevation angle.

(a) Earth station antennas must not transmit at elevation angles less than five degrees, measured from the horizontal plane to the direction of maximum radiation, in a frequency band shared with terrestrial radio services or in a frequency band with an allocation to space services operating in both the Earth-to-space and space-to-Earth directions. In other bands, earth station antennas must not transmit at elevation angles less than three degrees. In some instances, it may be necessary to specify greater minimum elevation angles because of interference considerations.

(b) ESAs in aircraft on the ground must not transmit at elevation angles less than three degrees. There is no minimum angle of antenna elevation for ESAs while airborne.

[81 FR 55336, Aug. 18, 2016]

#### § 25.206 Station identification.

The requirement to transmit station identification is waived for all radio stations licensed under this part with the exception of earth stations subject to the requirements of § 25.281.

[79 FR 8322, Feb. 12, 2014]

#### § 25.207 Cessation of emissions.

Space stations shall be made capable of ceasing radio emissions by the use of appropriate devices (battery life, timing devices, ground command, etc.) that will ensure definite cessation of emissions.

#### § 25.208 Power flux-density limits.

(a) In the band 3650–4200 MHz, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

- 152 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- 152 + (δ–5)/2 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- 142 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane

These limits relate to the power flux density which would be obtained under assumed free-space propagation conditions.

(b) In the bands 10.95–11.2 and 11.45–11.7 GHz for GSO FSS space stations and 10.7–11.7 GHz for NGSO FSS space stations, the power flux-density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the lower of the following values:

- (1) –150 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane; –150 + (δ–5)/2 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival (δ) (in degrees) between 5 and 25 degrees above the horizontal plane; and –140 dB(W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane; or
- (2) –126 dB(W/m<sup>2</sup>) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane; –126 + (δ–5)/2 dB(W/m<sup>2</sup>) in any 1 MHz band for angles of arrival (δ) (in degrees) between 5 and 25 degrees above the horizontal plane; and –116 dB(W/m<sup>2</sup>) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

(c) For a GSO space station in the 17.7–19.7 GHz, 22.55–23.55 GHz, or 24.45–24.75 GHz bands, or for an NGSO space station in the 22.55–23.55 GHz or 24.45–

NOTE TO PARAGRAPH (b): These limits relate to the power flux density, which would be obtained under assumed free-space propagation conditions.

(c) For a GSO space station in the 17.7–19.7 GHz, 22.55–23.55 GHz, or 24.45–24.75 GHz bands, or for an NGSO space station in the 22.55–23.55 GHz or 24.45–