

TABLE 2M—AGGREGATE EPFD_{down} LIMITS RADIATED BY NON-GSO FSS SYSTEMS AT CERTAIN LATITUDES

00% of the time EPFD _{down} dB(W/(m ² /40 kHz))	Latitude (North or South in degrees)
160.0	$0 \leq \text{Latitude} \leq 57.5.$
$160.0 + 3.4 (57.5 - \text{Latitude})/4$	$57.5 \leq \text{Latitude} \leq 63.75.$
165.3	$63.75 \leq \text{Latitude} .$

NOTE TO PARAGRAPH (m): These limits relate to the equivalent power flux density, which would be obtained under free-space propagation conditions, for all conditions and for all methods of modulation.

(n) The power-flux density at the Earth's surface produced by emissions from a space station in the fixed-sat-

ellite service (space-to-Earth), for all conditions and for all methods of modulation, shall not exceed the limits given in Table N. These limits relate to the power flux-density which would be obtained under assumed free-space conditions.

TABLE N—LIMITS OF POWER-FLUX DENSITY FROM SPACE STATIONS IN THE BAND 6700–7075 MHz

Frequency band	Limit in dB(W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
	0°–5°	5°–25°	25°–90°	
6700–6825 MHz	–137	$-137 + 0.5(\delta - 5)$	–127	1 MHz
6825–7075 MHz	–154	$-154 + 0.5(\delta - 5)$	144	4 kHz
and	and	and	and	1 MHz
	–134	$-134 + 0.5(\delta - 5)$	–124	

(o) In the band 12.2–12.7 GHz, for NGSO FSS space stations, the specified low-angle power flux-density at the Earth's surface produced by emissions from a space station shall not be exceeded into an operational MVDDS receiver:

(1) 158 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 2 degrees above the horizontal plane; and

(2) $158 + 3.33(\delta - 2)$ dB(W/m²) in any 4 kHz band for angles of arrival (δ) (in degrees) between 2 and 5 degrees above the horizontal plane.

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

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§ 25.209 Antenna performance standards.

(a) The gain of any antenna to be employed in transmission from an earth station in the geostationary satellite orbit fixed-satellite service (GSO FSS)

shall lie below the envelope defined as follows:

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$$29-25 \log_{10} (\text{Theta}) \text{ dBi } 1^\circ \leq \text{Theta} \leq 7^\circ + 8 \text{ dBi } 7^\circ < \text{Theta} \leq 9.2^\circ$$

$$32-25 \log_{10} (\text{Theta}) \text{ dBi } 9.2^\circ < \text{Theta} \leq 48^\circ - 10 \text{ dBi } 48^\circ < \text{Theta} \leq 180^\circ$$

where Theta is the angle in degrees from the axis of the main lobe, and dBi refers to dB relative to an isotropic radiator. For the purposes of this section, the peak gain of an individual sidelobe may not exceed the envelope defined above for Theta between 1.0 and 7.0 degrees. For Theta greater than 7.0 degrees, the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the gain envelope given above by more than 3 dB.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

$$32-25 \log_{10} (\Theta) \text{ dBi } 1^\circ \leq \Theta \leq 48^\circ \\ -10 \text{ dBi } 48^\circ < \Theta \leq 180^\circ$$

where Θ and dBi are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the gain envelope given above by more than 6 dB. The region of the main reflector spill-over energy is to be interpreted as a single lobe and shall not exceed the envelope by more than 6 dB.

(b) The off-axis cross-polarization gain of any antenna to be employed in transmission from an earth station to a space station in the domestic fixed-satellite service shall be defined by:

$$19-25 \log_{10} (\Theta) \text{ dBi } 1.8^\circ < \Theta \leq 7^\circ \\ -2 \text{ dBi } 7^\circ < \Theta \leq 9.2^\circ$$

(c) Earth station antennas licensed for reception of radio transmissions from a space station in the fixed-satellite service are protected from radio interference caused by other space stations only to the degree to which harmful interference would not be expected to be caused to an earth station employing an antenna conforming to the referenced patterns defined in paragraphs (a) and (b) of this section, and protected from radio interference caused by terrestrial radio transmitters identified by the frequency coordination process only to the degree to which harmful interference would not be expected to be caused to an earth station conforming to the reference pattern defined in paragraph (a)(2) of this section.

(d) The patterns specified in paragraphs (a) and (b) of this section shall apply to all new earth station antennas initially authorized after February 15, 1985 and shall apply to all earth station antennas after March 11, 1994.

(e) The operations of any earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section shall impose no limitations upon the operation, location or design of any terrestrial station, any

other earth station, or any space station beyond those limitations that would be expected to be imposed by an earth station employing an antenna conforming to the reference patterns defined in paragraphs (a) and (b) of this section.

(f) An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be routinely authorized after February 15, 1985 upon a finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacings. An earth station antenna initially authorized on or before February 15, 1985 will be authorized by the Commission to continue to operate as long as such operations are found not to cause any unacceptable levels of adjacent satellite interference. In either case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations.

(g) The antenna performance standards of small antennas operating in the 12/14 GHz band with diameters as small as 1.2 meters starts at 1.25° instead of 1° as stipulated in paragraph (a) of this section.

(h)(1) The gain of any antennas to be employed in transmission from a gateway earth station antenna operating in the frequency bands 10.7–11.7 GHz, 12.75–13.15 GHz, 13.2125–13.25 GHz, 13.8–14.0 GHz, and 14.4–14.5 GHz and communicating with NGSO FSS satellites shall lie below the envelope defined as follows:

$$29 - 25 \log_{10} (\theta) \text{ dBi} - 10 \text{ dBi} \\ 1^\circ \leq \theta \leq 36^\circ \\ 36^\circ \leq \theta \leq 180^\circ$$

Where: θ is the angle in degrees from the axis of the main lobe, and dBi refers to dB relative to an isotropic radiator.

(2) For the purposes of this section, the peak gain of an individual sidelobe may not exceed the envelope defined in paragraph (h)(1) of this section.

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