

# FCC EARTH STATION ANTENNA STANDARDS

## ¶25.209 Antenna Performance Standards

**A** The gain of any antenna to be employed in transmission from an earth station in the fixed-satellite service shall lie below the envelope defined below:

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

$$\begin{array}{ll} 29 - 25 \log_{10} \theta \text{ dBi} & 1^\circ \leq \theta \leq 7^\circ \\ + 8 \text{ dBi} & 7^\circ < \theta \leq 9.2^\circ \\ 32 - 25 \log_{10} \theta \text{ dBi} & 9.2^\circ < \theta \leq 48^\circ \\ - 10 \text{ dBi} & 48^\circ < \theta \leq 180^\circ \end{array}$$

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  $1^\circ$  and  $7^\circ$ . For  $\theta$  greater than  $7^\circ$ , the envelope may be exceeded by 10% of the sidelobes, but no individual sidelobe may exceed the envelope by more than 3 dB.

(2) In all other directions:

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

$$\begin{array}{ll} 32 - 25 \log_{10} \theta \text{ dBi} & 1^\circ \leq \theta \leq 48^\circ \\ - 10 \text{ dBi} & 48^\circ < \theta \leq 180^\circ \end{array}$$

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 be reduced by averaging its peak level with the peaks of the nearest sidelobes on either side, or with the peaks of two nearest sidelobes on either side, provided that the level of no individual sidelobe exceeds the gain envelope given above by more than 6 dB.

**B** The off-axis cross-polarization isolation of any antenna to be employed in transmission at frequencies between 5925 and 6425 MHz from an earth station to a space station in the domestic fixed-satellite service shall be defined by:

$$\begin{array}{ll} 19 - 25 \log_{10} \theta \text{ dBi} & 1.8^\circ < \theta \leq 7^\circ \\ - 2 \text{ dBi} & 7^\circ < \theta \leq 9.2^\circ \end{array}$$

**C** Any 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 standards defined in paragraphs (a) and (b) above, 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 defined in paragraph a(2) of this section.

From the *Code of Federal Regulations* - Title 47, Parts 20-39, Revised October 1, 1989.

See also ¶25.133.