section 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 shall not exceed 1.5 dB or 15% 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% of the time during which the excess is no more than 4.0 dB.

[72 FR 50030, Aug. 29, 2007]

§ 25.224 Protection of receive-only earth stations in the 17/24 GHz BSS.

(a) Notwithstanding § 25.209(c) of this part, receive-only earth stations operating in the 17/24 GHz broadcasting-satellite service can claim no greater protection from interference than they would receive if the equivalent antenna diameter were equal to or greater than 45 cm and the antenna meets the co-polar and cross-polar performance patterns represented by the following set of formulas (adopted in Recommendation ITU–R BO.1213–1, dated November 2005) that are valid for $D/\lambda \geq 11$:

(1) Co-polar pattern:

$$G_{co}(\varphi) = G_{max} - 2.5 \times 10^{-3}\left(\frac{D}{\lambda}\varphi\right)^2 \text{ for } \quad 0 \le \varphi < \varphi_m$$

where:

$$\varphi_m = \frac{\lambda}{D}\sqrt{\frac{G_{max} - G_1}{0.0025}}$$

$$G_{max} = 10\log\left(\eta\left(\frac{\pi D}{\lambda}\right)^2\right)$$

$G_1 = 29 - 25 \log \varphi_r$, and $\varphi_r = 95\frac{\lambda}{D}$

$G_{CO}(\varphi) = G_1$ for $\varphi_m \le \varphi < \varphi_r$

$G_{CO}(\varphi) = 29 - 25 \log \varphi$ for $\varphi_r \le \varphi < \varphi_b$ where $\varphi_b = 10^{(34/25)}$

$G_{CO}(\varphi) = -5$ dBi for $\varphi_b \le \varphi < 70°$

$G_{CO}(\varphi) = 0$ dBi for $70° \le \varphi < 180°$

(2) Cross-polar pattern:

$G_{cross}(\varphi) = G_{max} - 25$ for $0 \le \varphi < 0.25\ \varphi_0$

where:

$$\varphi_0 = 2\frac{\lambda}{D}\sqrt{\frac{3}{0.0025}} = 3 \text{ dB beamwidth}$$

$$G_{cross}(\varphi) = G_{max} - 25 + 8\left(\frac{\varphi - 0.25\ \varphi_0}{0.19\ \varphi_0}\right) \text{ for } 0.25\ \varphi_0 \le \varphi < 0.44\ \varphi_0$$

$G_{cross}(\varphi) = G_{max} - 17$ for $0.44\ \varphi_0 \le \varphi < \varphi_0$

$$G_{cross}(\varphi) = G_{max} - 17 + C\left|\frac{\varphi - \varphi_0}{\varphi_1 - \varphi_0}\right| \text{ for } \varphi_0 \le \varphi < \varphi_1 \text{ where } \varphi_1 = \frac{\varphi_0}{2}\sqrt{10.1875}$$

and $C = 21 - 25 \log(\varphi_1) - (G_{max} - 17)$

$G_{cross}(\varphi) = 21 - 25 \log \varphi$ for $\varphi_1 \le \varphi < \varphi_2$ where $\varphi_2 = 10^{(26/25)}$

$G_{cross}(\varphi) = -5$ dBi for $\varphi_2 \le \varphi < 70°$

$G_{cross}(\varphi) = 0$ dBi for $70° \le \varphi < 180°$

where:

D: equivalent antenna diameter

λ: wavelength expressed in the same unit as the diameter

φ: off-axis angle of the antenna relative to boresight (degrees)

η: antenna efficiency = 0.65

(b) Paragraph (a) of this section does not apply to 17/24 GHz BSS telemetry earth stations. Those earth stations are subject to the antenna performance standards of §25.209(a) and (b) of this part.

[72 FR 50031, Aug. 29, 2007]