Name: APEREC022V01

Type: Earth station, Receiving

Region(s): 13

Description:

Recommendation ITU-R BO.1900 reference receiving earth station antenna pattern for BSS in the band 21.4-22 GHz in Regions 1 and 3.

Required Input Parameters:

gain

Validation Warnings/Errors:

Type	Message
Error	Gmax () is less than G1 (). Square root of negative value.
Error	Phir () is less than Phim ().
Error	Phi2 () is less than Phi1 ().
Error	0 () is less than S ().
Error	D/lambda () is less than 32 ().

Pattern Information:

Pattern is apllied only for D/lambda > 32.

BR software sets antenna efficiency to 0.7 for technical examination.

Co-Polar Component:

If $D/\lambda \geq 32$:

$G = G_{max} - 2.5 \times 10^{-3} (D/\lambda\ \varphi)^2$ for $0° \leq \varphi < \varphi_m$

$G = G_1$ for $\varphi_m \leq \varphi < \varphi_r$

$G = 29 - 25 \log \varphi$ for $\varphi_r \leq \varphi < \varphi_b$

$G = -5$ for $\varphi_b \leq \varphi < 70°$

$G = 0$ for $70° \leq \varphi \leq 180°$

where:

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

$\varphi_m = 20\ \lambda/D \sqrt{G_{max} - G_1}$.

$\varphi_r = 95\ \lambda/D$.

$G_1 = 29 - 25 \log \varphi_r$.

$$\varphi_b = 10^{\left(\frac{34}{25}\right)}\ .$$

Cross-Polar Component:

$G_x = G_{max} - 17$ for $0° \leq \varphi < \varphi_0$

$$G_x = G_{max} - 17 + S \left|\frac{\varphi - \varphi_0}{\varphi_1 - \varphi_0}\right| \quad \text{for} \quad \varphi_0 \leq \varphi < \varphi_1$$

$G_x = 21 - 25 \log \varphi$ for $\varphi_1 \leq \varphi < \varphi_2$

$G_x = -5$ for $\varphi_2 \leq \varphi < 70°$

$G_x = 0$ for $70° \leq \varphi \leq 180°$

where:

$S = 21 - 25 \log \varphi_1 - (G_{max} - 17)$,

the value of S must be less than 0

for any combination of antenna efficiency (η) and *D*/λ.

$$\varphi_0 = 2\ \lambda/D \sqrt{\frac{3}{0.0025}}\ .$$

$$\varphi_1 = \frac{\varphi_0}{2} \sqrt{10.1875}\ .$$

$$\varphi_2 = 10^{\left(\frac{26}{25}\right)}\ .$$