Name: APEREC015V01

Type: Earth station, Receiving and Transmitting

Region(s): 123

Description:

Appendix 30B reference Earth station antenna pattern. Recommendation ITU-R S.580-6 reference Earth station antenna pattern.

Required Input Parameters:

gain

Validation Warnings/Errors:

Type	Message
Error	Phib () is less than Phir ().
Error	Gmax () is less than G1 (). Square root of negative value.

Pattern Information:

Appendix 30B Earth station antenna pattern since WRC-03 applicable for D/lambda > 50.
Pattern is extended for D/lambda < 50 as in Appendix 8.
Pattern is extended for angles greater than 20 degrees as in Recommendation ITU-R S.465-5.
Pattern is extended in the main-lobe range as in Appendix 7 to produce continuous curves.
BR software sets antenna efficiency to 0.7 for technical examination.

Co-Polar Component:

If $D/\lambda \geq 50$:

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

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

$G = 29 - 25 \log \varphi$ for $\varphi_r \leq \varphi \leq 19.95°$

$G = \text{Min}\ (-3.5, 32 - 25 \log \varphi)$ for $19.95° < \varphi < \varphi_b$

$G = -10$ for $\varphi_b \leq \varphi \leq 180°$

If $D/\lambda < 50$:

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

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

$G = 52 - 10 \log (D/\lambda) - 25 \log \varphi$ for $\varphi_r \leq \varphi < \varphi_b$

$G = 10 - 10 \log (D/\lambda)$ for $\varphi_b \leq \varphi \leq 180°$

where:

$$D/\lambda = \sqrt{\frac{10^{\left(\frac{G_{max}}{10}\right)}}{\eta\pi^2}}. \qquad \varphi_m = 20\ \lambda/D\ \sqrt{G_{max} - G_1}.$$

$G_1 = 2 + 15 \log (D/\lambda)$ for $D/\lambda < 50$,

$= -21 + 25 \log (D/\lambda)$ for $50 \leq D/\lambda < 100$,

$= -1 + 15 \log (D/\lambda)$ for $100 \leq D/\lambda$.

$\varphi_r = 15.85\ (D/\lambda)^{-0.6}$ for $D/\lambda \geq 100$,

$= 100\ \lambda/D$ for $D/\lambda < 100$.

$$\varphi_b = 10^{\left(\frac{42}{25}\right)}.$$