Name: APELUX203V01

Type: Earth station, Receiving

Description:

Receiving earth station antenna pattern submitted by LUX for individual reception for analyses under Appendix 30.

Required Input Parameters:

gain,ant_diam

Validation Warnings/Errors:

Type	Message
Error	Gmax () is less than G1 (). Square root of negative value.
Warning	Phir () is less than Phim ().
Error	Gmax () is less than 22 (). Cross-polar pattern does not intersect with co-polar pattern. Cross-polar gain is negative. Gm
Error	Phi3 () is less than Phi x ().

Pattern Information:

Frequency is fixed to 12109.5 MHz.

The pattern requires input parameter antenna diameter.

Co-Polar Component:

$G = G_{max} - 2.95 \times 10^{-3} (D/\lambda\ \varphi)^2$ for $0° \le \varphi < \varphi_m$

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

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

$G = -5$ for $\varphi_b \le \varphi \le 70°$

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

where:

λ is the wavelength (0.02476 m) corresponding to the fixed frequency of 12 109.5 MHz.

$\varphi_r = 85\ \lambda/D$.

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

$\varphi_m = \lambda/D \sqrt{\frac{G_{max} - G_1}{0.00295}}$.

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

Cross-Polar Component:

$G_x = G_{max} - 22$ for $0° \le \varphi < \varphi_1$

$G_x = G_{max} - 22 + 5\left(\frac{\varphi - 0.25\varphi_0}{0.19\varphi_0}\right)$ for $\varphi_1 \le \varphi < \varphi_2$

$G_x = G_{max} - 17$ for $\varphi_2 \le \varphi < \varphi_o$

$G_x = G_{max} - 17 - 40\left(\frac{\varphi}{\varphi_0} - 1\right)$ for $\varphi_o \le \varphi < \varphi_3$

$G_x = G_{max} - 27$ for $\varphi_3 \le \varphi < \varphi_x$

$G_x = G$ for $\varphi_x \le \varphi < 180°$

where:

$\varphi_0 = 2\ \lambda/D \sqrt{\frac{3.0}{0.00295}}$.

$\varphi_1 = 0.25\ \varphi_0$.

$\varphi_2 = 0.44\ \varphi_0$.

$\varphi_3 = 1.25\ \varphi_0$.

$\varphi_x = 10^{\left(\frac{56 - G_{max}}{25}\right)}$.