

**Name:** APEREC015V01**Description:****Type:** Earth station, Receiving and Transmitting

Appendix 30B reference Earth station antenna pattern.

**Region(s):** 123

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  $D/\lambda \geq 50$ :

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

$$G = G_1 \quad \text{for} \quad \varphi_m \leq \varphi < \varphi_r$$

$$G = 29 - 25 \log \varphi \quad \text{for} \quad \varphi_r \leq \varphi \leq 19.95^\circ$$

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

$$G = -10 \quad \text{for} \quad \varphi_b \leq \varphi \leq 180^\circ$$

If  $D/\lambda < 50$ :

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

$$G = G_1 \quad \text{for} \quad \varphi_m \leq \varphi < \varphi_r$$

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

$$G = 10 - 10 \log (D/\lambda) \quad \text{for} \quad \varphi_b \leq \varphi \leq 180^\circ$$

where:

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

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

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

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

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

$$= 100 \lambda/D \quad \text{for} \quad D/\lambda < 100.$$

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