Name: APSRR_402V01

Description:
Appendix 30, Appendix 30A, Appendix 30B and Resolution 553 (WRC-12) fast roll-off reference space station antenna pattern.

Type: Space station, Receiving and Transmitting

Region(s): 123

Required Input Parameters:
gain,beamlet,maj_axis,min_axis,orient

Validation Warnings/Errors:

Type	Message
Warning	Phi0 () is less than Bmin ().
Warning	Gmax () is less than 30 (). Cx pattern is zero. Gmax is too low.

Pattern Information:
1) Appendix 30 fast roll-off reference transmitting space station antenna pattern for Regions 1, 2 and 3 used for BSS planning when it was necessary to reduce interference.
A minimum value of 0.6 degrees for the half-power beamwidth has been adopted for planning for Regions 1 and 3, and 0.8 degrees for Region 2. An antenna efficiency of 0.55 was assumed. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe assuming a "beamlet" of 0.6 degrees for Regions 1 and 3 and 0.8 degrees for Region 2.

2) Appendix 30A fast roll-off reference receiving space station antenna pattern for Regions 1 and 3 used for BSS planning when it was necessary to reduce co-polar interference.
A minimum value of 0.6 degrees for the half-power beamwidth has been adopted for planning for Regions 1 and 3. An antenna efficiency of 0.55 was assumed. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe assuming a "beamlet" of 0.6 degrees for Regions 1 and 3. For planning purposes at WRC-97 an antenna diameter of 5 m for the band 17.3-18.1 GHz and 6 m for the band 14.5-14.8 GHz were assumed. The on-axis gain was taken as 57 dBi.

3) Appendix 30A fast roll-off reference receiving space station antenna pattern for Region 2 used for BSS planning where it was necessary to reduce interference.
A minimum value of 0.6 degrees for the half-power beamwidth has been agreed on for planning. An antenna efficiency of 0.55 was assumed. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe assuming a beamlet of 0.6 degrees for Region 2.

4) Appendix 30B space station antenna co-polar pattern for receiving and transmitting fast roll-off antennas for all Regions. Used for the determination of coordination requirements and interference assessment in FSS Plan when so specified by administrations. The Allotment Plan is based on the use of space station antennas with beams of elliptical or circular cross-section.
Antenna efficiency is assumed 0.55. The minimum half-power beamwidth is 1.6 degrees for the 6/4 GHz band and 0.8 degrees for the 13/10-11 GHz band. The beamlet value of 1.6 degrees for the 6/4 GHz band and 0.8 degrees for the 13/10-11 GHz bands are assumed.

5) Resolution 553 (WRC-12) reference pattern for transmitting satellite antennas in BSS networks in the band 21.4-22 GHz in Regions 1 and 3. The beamlet value is 0.6 degrees. Only co-polar part of the pattern is applied for cases of Resolution 553.

Co-Polar Component:

Cross-Polar Component:

$G = G_{max} - 12\ (\varphi/\varphi_0)^2$ for $0 \leq (\varphi/\varphi_0) \leq 0.5$

$G = G_{max} - 12 \left(\frac{\frac{\varphi}{\varphi_0} - x}{\frac{B_{min}}{\varphi_0}} \right)^2$ for $0.5 < (\varphi/\varphi_0) \leq (\frac{1.45}{\varphi_0} B_{min} + x)$

$G = G_{max} - 25.23$ for $(\frac{1.45}{\varphi_0} B_{min} + x) < (\varphi/\varphi_0) \leq 1.45$

$G = G_{max} - 22 - 20 \log (\varphi/\varphi_0)$ for $1.45 < (\varphi/\varphi_0)$

where:

$x = 0.5\ (1 - B_{min} / \varphi_0)$

$G_x = G_{max} - 30$

If $G_x > G$: $G_x = G$