Name: APELUX204V01

Type: Earth station, Receiving and Transmitting

Description:
Earth station antenna pattern submitted by LUX administration for both uplinks and downlinks for analyses under Appendix 30B.

Required Input Parameters:
gain

Validation Warnings/Errors:

<table>
<thead>
<tr>
<th>Type</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>D/lambda () is less than 100 ().</td>
</tr>
<tr>
<td>Error</td>
<td>Gmax () is less than G1 (). Square root of negative value.</td>
</tr>
</tbody>
</table>

Pattern Information:
The algorithm has been expanded to describe a complete pattern using the same pattern as Appendix 30B (with coefA=29) in the undefined areas.

Pattern is valid only for D/lambda > 100.
BR software sets antenna efficiency to 0.7 for technical examination.

Co-Polar Component:

\[
G = \begin{cases} 
G_{\text{max}} - 2.5 \times 10^{-3} \left( \frac{D}{\lambda} \varphi \right)^2 & \text{for } 0^\circ \leq \varphi < \varphi_m \\
G_1 & \text{for } \varphi_m \leq \varphi < \varphi_r \\
29 - 25 \log \varphi & \text{for } \varphi_r \leq \varphi < 20^\circ \\
32 - 25 \log \varphi & \text{for } 20^\circ \leq \varphi < \varphi_b \\
-10 & \text{for } \varphi_b \leq \varphi \leq 180^\circ 
\end{cases}
\]

where:

\[
\frac{D}{\lambda} = \sqrt{\frac{10^{G_{\text{max}}/10}}{\eta \pi^2}}.
\]

\[
G_1 = -1 + 15 \log (D/\lambda).
\]

\[
\varphi_r = 15.85 (D/\lambda)^{-0.6}.
\]

\[
\varphi_m = \frac{20 \lambda}{D} \sqrt{G_{\text{max}} - G_1}.
\]

\[
\varphi_b = 48^\circ.
\]