



Recommendation WG3.20.001

Requirements for RPEs used in PTP Microwave Interference Analysis

Subject Area: Antenna Radiation Pattern Envelopes (RPEs)

1. Background

Azimuth RPEs consist of four sets of data points representing the parallel and cross-polar response for both horizontal and vertical polarizations.

HH – Response of a horizontally polarized port to a horizontally polarized signal

VV – Response of a vertically polarized port to a vertically polarized signal

HV – Response of a horizontally polarized port to a vertically polarized signal

VH – Response of a vertically polarized port to a horizontally polarized signal

2. Development of Radiation Pattern Envelopes

RPEs are created by first measuring the response of the antenna over the full 360 degrees of azimuthal rotation. For symmetrical antennas, measurements can be taken from zero to 180 degrees and then mirrored for the other 180 degrees. The difference in dB between the co-pole measurement on beam and the values at the other angles represents the antenna discrimination at each angle. These values are plotted on an XY coordinate graph with the X axis representing the angle in degrees and the Y axis representing the antenna discrimination at that angle. This plot creates an “antenna pattern” for a particular frequency and polar response.

A full set of antenna patterns comprises twelve measurements. These cover the four sets of responses (HH, VV, HV, VH) for each of three frequencies (bottom, middle, and top) of the band range of the antenna. The four RPE plots (HH, VV, HV, VH) are created by superimposing the patterns for the three frequencies and drawing an envelope of straight lines to encompass all the peaks.

3. Requirements for Interference Analysis

RPEs used for interference analysis in Part 101 Point-to-Point Microwave bands should be created in the manner listed above. This is a conservative estimate of interference potential and has been accepted

4. Antennas without an RPE

Parabolic Antennas without a valid RPE should still be allowed to be coordinated if they meet the minimum beamwidth and minimum suppression FCC requirements. Coordinators and protection agents should use the

following default antenna RPE in these situations developed from the FCC radiation suppression requirement listed in CFR 47 Part 101.115.

Co-Pol – Category B, B1 or B2 requirements per band

Cross-Pole – Category B, B1 or B2 requirement per band with a minimum discrimination of 20 dB

5. Disputed RPEs

If an RPE is disputed by a coordinator then the coordinator can use the standard default RPE until the dispute is resolved. If the default RPE is used it must be used for all analysis. Disputes can be resolved by a certification from the manufacturer that the RPE was developed in the manner described in this document.

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