



**Recommendation WG 4.88.014**

**RFI TEST METHODS**  
**REVERSE PATH CALCULATIONS**

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## RECOMMENDATION

**Subject Area:** RFI Testing

**Title:** Reverse Path Calculations

### *Background*

Reverse path calculations take advantage of the accepted and well-documented principle that signal propagation between antennas is reciprocal.

Measurements made of a path in one direction can be readily applied to the reverse direction. However, full reciprocity applies only when exactly the same parameters apply to both path directions, including such factors as frequency, antennas and line loss. Any difference in these factors should be quantified before reverse path calculations can be considered valid.

In addition to these factors, losses calculated using reverse path techniques may also be dependent on mechanisms such as single knife-edge diffraction, double knife-edge diffraction, tropospheric scatter propagation, and nulls which may be present in an antenna pattern at a particular frequency.

### *Recommendation*

Because of the frequency-dependent factors involved in reverse path calculations, it is recommended that measurement of path loss be based on the full range of frequencies in use at the source station at the time of measurements. It should be noted that while the differences in frequency-dependent factors within any particular frequency band (e.g., 4, 6, 11 GHz) are likely only a few decibels, the frequency-dependent differences are of significant importance when the measured path loss is in a different frequency band from -the reverse path to which the results will be applied. Additionally, such measurements do not take into account any nulls which may be present in the antenna patterns involved.

When applying any measured engineering data to "similar" cases, care must be taken to ensure greatest confidence factor possible. The closer the reverse paths are to being identical, the more confident one can be applying the measured result. However, it is clear that the reverse path technique can provide significant information regarding path loss. As with any field measurement data, care must be taken by the parties analyzing such data to recognize potential differences and to apply good engineering judgment in the analysis.

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