Abstracts

Maximum and Minimum Return Losses from a Passive Two-Port Network Terminated with a Mismatched Load

T.Y. Otoshi. "Maximum and Minimum Return Losses from a Passive Two-Port Network Terminated with a Mismatched Load." 1994 Transactions on Microwave Theory and Techniques 42.5 (May 1994 [T-MTT]): 787-792.

An analytical expression is derived for determining load-reflection coefficient phase-angle values that will lead to maximum and minimum return losses from a terminated two-port network. The expression is derived in terms of two-port network S-parameters and a load whose reflection-coefficient magnitude is a constant but can be any value greater than zero and less than or equal to unity. The equation is useful for cases where it is desirable to know how to position a load (1) to obtain maximum return loss for network-matching purposes or (2) to obtain minimum return loss for some types of reflector antenna applications. Two examples are given: One shows that for some types of reflector antennas with a mesh-type surface that is backed by another reflecting surface, a resonance phenomenon can occur and cause unexpectedly large dissipative losses (>30 dB) to occur. The other example shows that when a particular type of reflector antenna with a dielectric layer becomes wet from rain or condensation, large (>10 dB) signal losses can occur. For both examples, equations presented in this article were used to calculate the exact load-reflection coefficient phase values that led to worst-case return loss values. In practical situations, once the phenomenon is understood and predictable, steps can be taken to avoid these resonance regions.

❑ Return to main document.