

Conservation of Complex Power Technique for Waveguide Junctions with Finite Wall Conductivity

J.D. Wade and R.H. MacPhie. "Conservation of Complex Power Technique for Waveguide Junctions with Finite Wall Conductivity." 1990 Transactions on Microwave Theory and Techniques 38.4 (Apr. 1990 [T-MTT]): 373-378.

Scattering at the junction of two waveguides with finite wall conductivity is rigorously treated using E-field mode matching and the conservation of complex power technique. At the transverse junction discontinuity between the two waveguides the complex power absorbed by the junction wall is taken into account along with the usual transfer of complex power from one guide to the other. This leads to a generalized form of the scattering matrix $[S]$ of the lossy junction which incorporates the surface impedance Z_{m} , of the transverse metallic wall, assumed to be a good conductor. The specific case of a copper transverse diaphragm with centered circular iris in X-band guide is considered and the equivalent TE_{10} shunt admittance is computed. Numerical results are also given for lossy X-band cavity resonators with circular coupling holes.

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