Abstracts

An Exact Calculation for a T-Junction of Rectangular Waveguides Having Arbitrary Cross Sections

An exact method is developed for the calculation of the electrical performance of the rectangular waveguide T-junction. This method is used to find the equivalent circuit of a rectangular waveguide T-junction in which both cross-sectional dimensions of the side waveguide are different from the cross-sectional dimensions of the through waveguide. The theoretical calculations for a particular T-junction of this type are verified by experimental measurements. In this method the electrical performance is analyzed by using equivalent-circuit concepts applied to waveguide modes to calculate an admittance matrix relating propagating and cutoff waveguide modes to each other. Then the cutoff modes are terminated in their characteristic impedance, and an equivalent admittance matrix of the junction is found relating only the propagating modes in each waveguide to each other. The analysis is valid when any number of modes can propogate in the waveguides forming the junction. The inversion of an infinite matrix is required; however, any desired accuracy can be obtained by considering a matrix of finite but sufficient size or equivalently by considering a sufficient number of cutoff modes.

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