Reflection and Transmission Characteristics of an Uncoincidental Junction on Rectangular Dielectric Waveguides

A novel approach to the analysis of an uncoincidental junction in rectangular dielectric waveguide (RDWG) is presented. The boundary condition equations on the junction plane are presented through the tangential components of guided modes and radiation modes which are excited at the discontinuity. To obtain the reflection and transmission coefficients at the discontinuity, the equations are transformed into the spectral domain by the two-dimensional Fourier transformation. In the spectral domain, the orthogonal relationship between the guided and radiation modes is used to determine the reflection and transmission coefficients approximately. The parameters corresponding to the phase constant of the radiation fields in the spectral domain are defined by using an iterative calculation. The reflection and transmission coefficients are determined exactly. These coefficients are compared with 10 GHz band experiments. Our analysis is found to be in good agreement with experimental results.

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