Abstracts

Analysis of a Wide Compound Slot-Coupled Parallel Waveguide Coupler and Radiator

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An analysis of a parallel waveguide coupler coupled through a wide compound slot, offset from center line and inclined with respect to the longitudinal axis of a rectangular waveguide, is presented. The Galerkin method of moments with sinusoidal basis functions is used to solve the slot aperture electric field integral equations, taking into account finite wall thickness. The highly complicated moment matrices are analytically evaluated using a modified geometry of the slot. Compound slot parallel coupler characteristics are then deduced, including resonant length, dominant mode scattering, and the equivalent network. The theoretical results of both the magnitude and phase of the S parameters are compared with the experimental results. The analysis is extended to study a compound slot radiator, and the results are compared with the results available in the literature. Quantitative data on the aperture electric field phase variability of 360° with slot offset and tilt are given for a compound slot radiator. The equivalent circuit of a compound slot radiator, which turns out to be an antisymmetric T network, is also found.

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