Abstracts

Efficient description of impedance and radiation features in printed-circuit leaky-wave structures-an unconventional scattering-matrix approach

P. Burghignoli, C. Di Nallo, F. Frezza, A. Galli and P. Lampariello. "Efficient description of impedance and radiation features in printed-circuit leaky-wave structures-an unconventional scattering-matrix approach." 2000 Transactions on Microwave Theory and Techniques 48.10 (Oct. 2000 [T-MTT]): 1661-1672.

This paper presents an original circuit model that furnishes an efficient description of the impedance and of the radiation performance for typical printed-circuit leaky-wave structures. In particular, referring to a junction between slot-coupled feeding and radiating microstrips, we have developed an unconventional equivalent transmission-line formulation, involving the propagation of the dominant mode for the feeding line and of the first higher mode for the radiating line, which is leaky. The quantification of the relevant scattering matrix, achieved with spectral-domain techniques, suitably summarizes the coupling effects and, consequently, the radiative features. Various antenna configurations have been tested, and the relevant results have been validated through comparisons with heavier full-wave numerical approaches. In addition to substantial computational advantages, this innovative approach gives the possibility of treating printed leaky-wave structures in a convenient fashion by means of a network formalism similar to that used in standard microwave circuits.

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