Abstracts

A waveguide-based aperture-coupled patch amplifier array-full-wave system analysis and experimental validation

A.B. Yakovlev, S. Ortiz, M. Ozkar, A. Mortazawi and M.B. Steer. "A waveguide-based aperture-coupled patch amplifier array-full-wave system analysis and experimental validation." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2692-2699.

In this paper, the full-wave analysis and experimental verification of a waveguide-based aperture-coupled patch amplifier array are presented. The spatial power-combining amplifier array is modeled by the decomposition of the entire system into several electromagnetically coupled modules. This includes a method of moments integral equation formulation of the generalized scattering matrix (GSM) for an N-port waveguide-based patch-to-slot transition; a mode-matching analysis of the GSM for the receiving and transmitting rectangular waveguide tapers; and a finite-element analysis of the waveguide-to-microstrip line junctions. An overall response of the system is obtained by cascading GSMs of electromagnetic structures and the S-parameters of amplifier networks. Numerical and experimental results are presented for the single unit cell and 2/spl times/3 amplifier array operating at X-band. The results are shown for the rectangular aperture-coupled patch array, although the analysis is applicable to structures with arbitrarily shaped planar electric and magnetic surfaces.

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