Abstracts

Impedance in a Matrix of an Antenna Array in a Quasi-Optical Resonator

P.L. Heron, G.P. Monahan, J.W. Mink, F.K. Schwering and M.B. Steer. "Impedance in a Matrix of an Antenna Array in a Quasi-Optical Resonator." 1993 Transactions on Microwave Theory and Techniques 41.9 (Oct. 1993 [T-MTT] (Special Issue on Quasi-Optical Techniques)): 1816-1826.

The power from numerous millimeter wave solid-state sources can be efficiently combined using quasi-optical techniques. One such technique is to place an array of active radiating sources within a quasi-optical resonator. The driving point impedance of each antenna is strongly affected by the presence of all other active antennas as well as by the mode structure and Q of the resonator. In this paper the impedance matrix for an array of antennas radiating into a piano-concave open resonator is determined through use of the Lorentz integral. The resulting expressions include the effect of diffraction loss and are valid for arbitrary reflector spacing, source frequency, array location and geometry. The result can be used to impedance match each active source to its antenna and thus facilitate design of an efficient power combining system. Simulations rising the impedance matrix in conjunction with an antenna impedance model are compared with two-port measurements.

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