Abstracts

A circuital approach to evaluating the electromagnetic field on rectangular apertures backed by rectangular cavities

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In this paper, the problem of evaluating the electromagnetic field on rectangular apertures backed by rectangular cavities is investigated. The electromagnetic-field distribution is derived by using a circuital model of an aperture and suitable forcing terms introduced into the equations related to the aperture model. The effects of a rectangular cavity on the aperture-field distribution are assessed by considering the rectangular cavity as a load impedance. The impedance value is obtained by modeling the rectangular cavity as a length of rectangular waveguide back-ended by a short. The distribution of the electromagnetic field on the aperture is used as an exciting source to evaluate, through a modal expansion, the electromagnetic field inside the cavity. Numerical simulations are in a good agreement with both other theoretical models and experimental data.

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