Abstracts

Concerning the influence of housing dimensions on the response and design of microstrip filters with parallel-line couplings [HTS circuits]

G.L. Matthaei, J.C. Rautio and B.A. Willemsen. "Concerning the influence of housing dimensions on the response and design of microstrip filters with parallel-line couplings [HTS circuits]." 2000 Transactions on Microwave Theory and Techniques 48.8 (Aug. 2000 [T-MTT]): 1361-1368.

In this paper, measured results obtained from a narrow-band microstrip filter are compared with computed responses obtained using two different classes of software for various assumed housing conditions. (Some results from filters with wider bandwidths are also cited.) Housing modes are found to have a potentially significant affect on the bandwidth of microwave filters that involve microstrip coupled lines, even though the housing resonant frequencies are much above the passband of the filter. When analyzing such filters using full-wave three-dimensional (3-D) or 3-D planar field solver programs, it is found to be necessary to accurately model the housing if high accuracy in the computed response is needed. For carrying out filter design by optimization, it is usually convenient to use faster programs that utilize a full-wave two-dimensional (2-D) field solver to obtain line parameters and then use transmission-line analysis for the third dimension. Such programs can introduce housing-mode errors since 2D full-wave analysis implies an infinitely long housing. Ways for getting around this problem are suggested, Physical explanations for the various effects observed are presented and are supported by computer studies of the natural frequencies of a coupled-line microstrip filter structure in the presence of various housing perturbations.

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