Abstracts

Leakage of the Dominant Mode on Stripline with a Small Air Gap

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In addition to the expected bound (proper) dominant mode, an independent leaky (improper) dominant mode has been found to exist on a conventional stripline that has a small air gap above the conducting strip. Such an air gap often occurs during the fabrication process, and has in the past been suspected as the cause of spurious performance. This newly discovered leaky dominant mode leaks into the fundamental TM/sub 0/ parallel-plate mode of the background structure, which is a parallel-plate guide with an air gap. Furthermore, it is found that the leaky dominant mode, not the bound dominant mode, is the continuation of the stripline TEM mode that exists with no air gap. Hence, it is the leaky mode that is excited predominantly by a conventional feed for the small air-gap structure. The general properties of both the bound and leaky dominant modes are obtained by using a full-wave spectral-domain approach. The primary purposes of this paper are to discuss the nature of the leaky dominant mode, and to show that its presence is indeed responsible for spurious transmission-line performance, such as unexpected loss and crosstalk, and interference between the bound and leaky dominant modes. These conclusions are verified experimentally.

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