Abstracts

Full-Wave Analysis of an Infinitely Long Magnetic Surface Wave Transducer

E.-B. El-Sharawy and R.W. Jackson. "Full-Wave Analysis of an Infinitely Long Magnetic Surface Wave Transducer." 1990 Transactions on Microwave Theory and Techniques 38.6 (Jun. 1990 [T-MTT]): 730-738.

This paper presents a rigorous analysis of an infinitely long microstrip line embedded in a multilayer structure which includes a ferrite layer. In certain frequency ranges, such a line launches magnetic surface waves in the ferrite and thus becomes a surface wave transducer. The analysis described herein is a self-consistent full-wave solution which rigorously includes the effect of radiating magnetic waves. By expanding the transducer currents in terms of both even and odd functions, it is shown that the principal current is not symmetrically distributed across the transducer width. The propagation constant of the transducer mode is complex and shows a large imagination part (attenuation) tied to the excitation of magnetostatic surface waves. In addition, the propagation constant remains complex even for frequencies above the magnetostatic surface wave bandwidth. This has been found to be due to the excitation of magnetic surface waves having complex propagation constants. Measurements of the insertion loss of a multilayer microstrip transducer are presented and are in reasonable agreement with the calculated attenuation.

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