Abstracts

Analytical Solution to a Waveguide Leaky-Wave Filter Structure

E.G. Cristal. "Analytical Solution to a Waveguide Leaky-Wave Filter Structure." 1963 Transactions on Microwave Theory and Techniques 11.3 (May 1963 [T-MTT]): 182-190.

Leaky-wave absorption filters have been found advantageous for the suppression of spurious energy of high-power transmitters. However, although there are experimental data of the properties of several specially constructed leaky-wave filters, there are apparently little data relating the effect upon the attenuation of the filters of varying one or more of the possible parameters of their design. In this paper a waveguide leaky-wave filter structure that retains the basic geometry of waveguide leaky-wave filters is analyzed theoretically over a finite frequency range. The complex propagation constant for the least-attenuated leaky-wave mode is obtained by reducing the fundamental integral equation to a transverse resonance equation and solving the reduced equation. The attenuation constant of the least-attenuated mode is obtained for values of 2a/lambda (i.e., the ratio of waveguide width to one half the freespace wavelength) ranging from 0 to 2. Its dependence on various design parameters of leaky-wave filters, such as main waveguide height, spacing of the coupling slots, width of coupling slots and height of the absorbing waveguides is presented. Good correspondence between theoretically computed curves and experimental data was obtained.

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