Abstracts

Measurement of Guide Wavelength in Rectangular Dielectric Waveguide

H. Jacobs, G. Novick, C.M. LoCascio and M.M. Chrepta. "Measurement of Guide Wavelength in Rectangular Dielectric Waveguide." 1976 Transactions on Microwave Theory and Techniques 24.11 (Nov. 1976 [T-MTT] (Special Issue on Millimeter Waves: Circuits, Components, and Systems)): 815-820.

Oscillators in the microwave and millimeter-wave region were constructed wherein the resonators consisted of sections of rectangular dielectric waveguide. While adding thin blocks of dielectric to increase the mechanical length of the resonator, the power output and frequency were measured. Using this technique, the experimental value of the wavelength in the longitudinal direction, lambda/sub g/, was determined. These experimental data were then compared with calculations predicted by optical theory. Good agreement was found where the bulk wavelength was small compared with the cross-sectional dimensions of the dielectric. If the half-wavelength in the dielectric was comparable with the dielectric dimensions, the values of lambda/sub g/ were greater than the theoretical values. In the process of carrying out these experiments, a new type of oscillator is described which provides a power ontput comparable with diodes in metal-walled cavities. In addition, the new dielectric cavities are simple in construction and are compatible with dielectric waveguide, image line, or microstrip systems.

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