Abstracts

The Efficiency of Excitation of a Surface Wave on a Dielectric Cylinder

This paper presents a theoretical and experimental study of the excitation of the lowest order TM surface wave on an infinite dielectric cylinder. The source is a circular filament of magnetic current within the dielectric rod. The integral solution for the field is evaluated as a contour integral by applying Cauchy's theorem. The far zone radiation field is obtained by means of a saddle pointintegration. Curves are presented which show excitation efficiency as a function of k/sub 0/a, the normalized circumferential length of the filament. A filament 0.83 wavelength in diameter will launch the TM mode with an efficiency of 95 per cent. A narrow annular slot in a large metal sheet was used to approximate the magnetic current filament and efficiency was measured using Deschamps' method for a two-port junction. The experimental measurements verify the theoretical analysis. In addition, it was found that the slot launching efficiency was essentially independent of the ground plane dimensions.

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