Abstracts

Flexible Dielectric Waveguides with Powder Cores

W.M. Bruno and W.B. Bridges. "Flexible Dielectric Waveguides with Powder Cores." 1988 Transactions on Microwave Theory and Techniques 36.5 (May 1988 [T-MTT] (Special Issue Commemorating the Centennial of Heinrich Hertz)): 882-890.

Flexible dielectric waveguides have been demonstrated at 10 GHz and 94 GHz using thin-wall polymer tubing filled with low-loss, high-dielectric-constant powders. Absorptive losses of the order of 10 dB/meter were measured at 94 GHz with nickel-aluminum titanate and barium tetratitanate powder in polytetrafluoroethylene (PTFE) lightweight electrical spaghetti. Bending losses at 94 GHz were negligible for curvature radii greater than 4 cm. Kuhn's theory of three-region cylindrical dielectric waveguide was used to calculate dispersion curves for the lower order modes for several combinations of dimensions and dielectric constants. Good agreement was obtained between experimental and theoretical values of guide wavelength. A scheme is proposed for classifying hybrid modes of three-region guides based on |E/sub z//H/sub z/|. For two-region guides, it reduces to Snitzer's familiar scheme.

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