

Submillimeter Guided-Wave Experiments with Dielectric Rib Waveguides

M. Tsuji, S. Suhara, H. Shigesawa and K. Takiyama. "Submillimeter Guided-Wave Experiments with Dielectric Rib Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 547-552.

The transmission characteristics of rib waveguides are examined in the submillimeter-wave region at $\lambda/2 = 337 \mu\text{m}$. A number of miniature polyethylene rib waveguides are fabricated by means of a die-cast technique. The mode launching into such a waveguide is performed by focusing a laser beam directly on the end face of the waveguide, while the transmitted power is detected at any point on a waveguide through a movable grating coupler which can couple selectively with one of propagating modes. The measured phase constants show good agreement with the theoretical ones calculated by our analytical method, while the attenuation constants, typically $\alpha_{\lambda/2} = 4.5 \times 10^{-3}$ are found to be about 1.8 times as much as theoretical ones. Finally, the good confinement of fields in the rib portion is proved by means of two simple methods.

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