Abstracts

E- and H-Plane Bends for High-Power Oversized Rectangular Waveguide (Jan. 1965 [T-MTT])

A study is presented of theoretical and experimental results of E- and H-plane bends for high-power oversized rectangular waveguide having cross-section dimensions in the range between 1..5 and 2.5 free space wavelengths. It is expected that waveguides having these dimensions will be able to transmit 50 to 100 kW of average power at X-band without water cooling. The transmission of at least 5.0 MW of peak power at X-band without pressurization is also a design objective. Dimensions for bends having low-mode conversion loss were determined by numerical integration of the coupled transmission line equations. The dominant TE/sub 10//spl square/ mode and four spurious modes were considered in these calculations. The results obtained for both constant curvature and sinusoidally shaped E- and H-plane bends are presented. A compact H-plane constant curvature bend is described for which the ratio of centerline radius to waveguide width is equal to 1.48. The measured mode conversion loss to the TE/sub 20//spl square/, TE/sub 30//spl square/, and TE/sub 40//spl square/ modes for an experimental model having a width equal to 2.25 inches was less than -20 dB in the frequency range from 7.0 to 11.0 Gc/s.

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