Abstracts

A Waveguide Impedance Meter for the Automatic Display of Complex Reflection Coefficient

H.L. Bachman. "A Waveguide Impedance Meter for the Automatic Display of Complex Reflection Coefficient." 1955 Transactions on Microwave Theory and Techniques 3.1 (Jan. 1955 [T-MTT]): 22-30.

A waveguide impedance meter has been developed, comprising some specially designed components and some components previously designed for other applications. When this circuit is used in conjunction with the X-band rapid sweep oscillator and suitable display and control circuits, the impedance focus of a waveguide component is automatically and rapidly measured and oscillographically displayed in the reflection coefficient plane. A waveguide component having a 1¼-inch X 5/8-inch (large X-band) waveguide input port can be continuously measured throughout the frequency range extending from 8.5 to 9.6 kmc (12 per cent X-band). The bandwidth of the system is limited by the design bandwidth of the waveguide components. The plane of the impedance measurement may be referred to a plane internal to or external to the input port of the component under test. An expanded portion of the reflection coefficient plane may be displayed on the crt when small reflections are measured. The measurements of several representative impedances by the waveguide circuit were compared with slotted line measurements of these same components. For measurements of large reflections, standard /spl infin/ db swr full scale display, the maximum observed errors of the magnitude and phase of the reflection coefficient as measured by the waveguide circuit were 10 per cent and 5 degrees respectively. These maximum errors occurred for measurements performed at the ends of the 12 per cent frequency band. The average errors of the magnitude and phase of the reflection coefficient were 2.5 per cent and 2 degrees respectively. For measurements of small reflections, with the crt display of the reflection coefficient plane expanded to 6 db swr full scale, the maximum observed deviation of the waveguide circuit measurements from slotted line measurements was 0.5 db swr, and the average deviation was 0.2 db swr. The maximum errors again occurred at the ends of the 12 per cent frequency band.

❑ Return to main document.