Abstracts

Phase Shift by Periodic Loading of Waveguide and Its Application to Broad-Band Circular Polarization

A.J. Simmons. "Phase Shift by Periodic Loading of Waveguide and Its Application to Broad-Band Circular Polarization." 1955 Transactions on Microwave Theory and Techniques 3.6 (Dec. 1955 [T-MTT]): 18-21.

A rectangular or square waveguide may be loaded periodically by thin capacitive or inductive irises in order to produce phase delay or phase advance, respectively. The amount of phase shift may be calculated with accuracy by making use of available theoretical values of iris susceptance and of transmission line theory. The phase shifting sections maybe designed for low voltage standing-wave ratio (vswr) over a considerable bandwidth. When a square waveguide capable of supporting two fundamental modes is loaded periodically, the irises act inductively for one mode and capacitively for the other, thus introducing a differential phase shift. This differential phase shift may be made equal to 90°, in order to convert linear to circular polarization. Furthermore such a device may be made, by proper choice of parameters, to yield near-circular polarization over a bandwidth of 1.65:1, because the variation in phase delay for one mode and phase advance for the other tend to compensate each other as the frequency is varied. Several of these circular polarizers have been built and tested at X band and the measured results of ellipticity and vswr, as well as broad-band performance check with theoretical values quite closely.

❑ Return to main document.