Abstracts

Analysis and Design of Quadruple-Ridged Waveguides

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In a previous paper, a unified approach has been proposed for the analysis and design of single- and double-ridged waveguides by a magnetic field integral equation (MFIE) formulation. This paper presents a continuing work with emphasis on the design of quadruple-ridged waveguides. The characteristics of square, circular and diagonal quadruple-ridged waveguides, including cutoff frequencies, attenuation, impedance and modal field distributions, are first time systematically analyzed and reported. Distinct to being in a single- or double-ridged waveguide, the fundamental-mode in a quadruple-ridged waveguide has a cutoff frequency very close to that of the second-lowest mode, thus the natural single mode bandwidth is very small. However, when the second-lowest mode is effectively suppressed or not excited, a very wide bandwidth (6:1) can be achieved. This unique property, plus the capabilities of dual-polarization, high power, and low impedance, makes the quadruple-ridged waveguides well-suited to many antenna and microwave applications.

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