Abstracts

Optimized E-Plane T-Junction Series Power Dividers

A rigorous design theory for compact rectangrdar waveguide power dividers with unsymmetrical series E-plane T-junctions of suitably optimized different waveguide heights and distances is described. The method is based on field expansion in normalized eigenmodes which yield directly the modal S-matrix of two appropriate key building blocks. The immediate modal S-matrix combination of the individual structures includes the effects of all step discontinuities and their mutual higher order mode interaction. Computer-optimized -3.01 dB, -4.77 dB, and -6.02 dB power divider examples achieve about ±0.25 dB coupling deviation at the output ports, together with about 30 dB return loss at the input port, for the chosen design frequencies of 12 GHz, 31.6 GHz, and 15.5 GHz. The -4.77 dB power divider provides a bandwidth of about 8 percent. The theory is verified by measurements.

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