Abstracts

80-GHz-Band Low-Loss Ring-Type Channel Diplexer Using a Semicircular Electric Mode

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A low-loss ring-type channel diplexer consisting of two deformed ring cavities, three directional couplers, a TE/sub 01/ mode semicircular waveguide for the through channels, and a TE/sub 10/ mode rectangular waveguide for the dropped channel, has been developed as a channel-dropping filter for a millimeter-wave channel multiplexing network. The structure and experimental results of the diplexer are described, the design method is also discussed. Measurements show that insertion losses of the through and dropped (coupled) channels, and VSWR are less than 0.15 dB, 0.68 dB, and 1.12, respectively, for a diplexer centered at 81.91 GHz with 3-dB bandwidth of 800 MHz. Specifically, the through channel loss is reduced by half, as compared with a conventional rectangular waveguide diplexer, owing to the low insertion loss characteristics of the TE/sub 01/mode semicircular waveguide. As a result, an overall loss of a channel multiplexer, in which several channel diplexers are connected in tandem, is remarkably decreased, particularly at higher frequencies covering W-120 GHz.

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