Abstracts

A Low-Loss Diffraction Grating Frequency Multiplexer

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A quasi-optical frequency multiplexer based on a blazed diffraction grating is studied. Experimental data, supported by semi-quantitative theoretical considerations, show that the multiplexer is an efficient channel-dropping filter well suited to use in the millimeter wave region. A feature of the grating multiplexer which sets it apart from conventional designs is its ability to drop several channels using a single frequency-selective element, namely, a diffraction grating. This economy of hardware results in a simple, compact structure. The channels of the experimental multiplexer have typical bandwidths of ~540 MHz with loss of ~1 dB. The width of the impulse response at half amplitude is ~1.5 ns. Return loss within a channel is typically 15-20 dB. Comparisons with other millimeter wave multiplexer designs are discussed.

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