

Abstracts

A Novel Quasi-Optical Frequency Multiplier Design for Millimeter and Submillimeter Wavelengths

J.W. Archer. "A Novel Quasi-Optical Frequency Multiplier Design for Millimeter and Submillimeter Wavelengths." 1984 Transactions on Microwave Theory and Techniques 32.4 (Apr. 1984 [T-MTT]): 421-427.

This paper describes a novel design for millimeter and sub-millimeter wavelength varactor frequency triplers and quadruplers. The varactor diode is coupled to the pump source via waveguide and stripline impedance matching and filtering structures. Output power at the various harmonics of the pump frequency is fed to quasi-optical filtering and tuning elements. The low-loss quasi-optical structures enable near-optimum control of the impedances seen by the varactor diode at the idler and output frequencies, resulting in efficient high-order harmonic conversion. A minimum efficiency of 4 percent with 30-mW input power has been obtained for a tripler operating between 200 and 280 GHz, with a peak efficiency of 8 percent between 250 and 280 GHz. Another tripler, designed for the 260-350-GHz band, gave a minimum conversion efficiency of 3 percent with 30-mW input power, with a peak efficiency of 5 percent at 340 GHz.

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