Abstracts

Simulation and measurement of quasi-optical multipliers

M. Cryan, S. Helbing, F. Alimenti, P. Mezzanotte, L. Roselli and R. Sorrentino. "Simulation and measurement of quasi-optical multipliers." 2001 Transactions on Microwave Theory and Techniques 49.3 (Mar. 2001 [T-MTT]): 451-464.

The lumped-element finite-difference time-domain method is used to analyze quasi-optical multipliers based on diode loaded slot antennas. The method is validated firstly for a passive microstrip-fed structure then for the diode loaded case in both small- and large-signal regimes. The diode model is separately validated using a series diode mounted on a microstrip line. Input return loss and radiation patterns show good agreement with measurements and the concept of effective conversion loss is introduced and results show reasonable agreement between measurement and simulation. A new diode arrangement is introduced where dual offset diodes are placed in the slot instead of the conventional central diode. The diode position can then act as an extra design parameter. The performance of the two structures has been compared; currently best performance is still obtained for the central-diode structure. Finally, a fully quasi-optical structure is simulated with plane-wave excitation. Central and dual-diode structures are again compared and the diode position and input plane-wave field strengths are optimized. Slot voltage distributions, radiation patterns, and effective quasi-optical conversion losses are presented.

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