Abstracts

Broadband Linearly Polarized Beat-Wave TE/sub m1/TE/sub 11/ Mode Converters

D.B. McDermott, J. Pretterebner, C.K. Chong, C.F. Kinney, M.M. Razeghi and N.C. Luhmann, Jr.. "Broadband Linearly Polarized Beat-Wave TE/sub m1/TE/sub 11/ Mode Converters." 1996 Transactions on Microwave Theory and Techniques 44.2 (Feb. 1996 [T-MTT]): 311-317.

Broadband linearly polarized waveguide mode converters have been developed to transform the high-order cylindrical TE/sub m1/ output wave from harmonic gyrotron amplifiers into the more useful TE/sub11/ fundamental waveguide mode. The converter's corrugation period is equal to the beat between the two waves and the bandwidth is predicted to be inversely proportional to the number of periods. Four-period TE/sub 31/TE/sub 11/ and TE/sub 41/TE/sub 11/ converters with an azimuthal perturbation of m/sub c/ = 4 and m/sub c/= 5, respectively, have yielded a peak conversion efficiency of 98% with a bandwidth greater than 3% and a one-period beat-wave converter has been designed to yield 12% bandwidth. However, it has been observed in measurements that the strong coupling in a short converter can lead to a shift of the center-frequency with an accompanying reduction of the efficiency and bandwidth. A two-period TE/sub 41/TE/sub 11/ converter with 5% bandwidth displayed a 5% frequency shift and a conversion efficiency of only 86%.

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