Abstracts

A 16 Element Quasi-Optical FET Oscillator Power Combining Array with External Injection Locking

J. Birkeland and T. Itoh. "A 16 Element Quasi-Optical FET Oscillator Power Combining Array with External Injection Locking." 1992 Transactions on Microwave Theory and Techniques 40.3 (Mar. 1992 [T-MTT]): 475-481.

In this paper we present analysis, design and experimental results of a 16 element planar oscillator array for quasi-optical power combining. Each element in the array consists of a single FET oscillator with an input port for injection of the locking signal, and an output port which is connected to a patch radiator. The array is synchronized using a 16 way power dividing network which distributes the locking signal to the oscillating elements. The array is constructed using a two-sided microstrip configuration, with the oscillators and feed network on one side of a ground plane, and the patch radiators on the opposite side. An effective radiated power (ERP) of 28.2 W CW with an isotropic conversion gain (G/sub iso/) of 9.9 dB was measured at 6 GHz. For an injected power of 10.3 dBm, a locking range of 453 MHz at a center frequency of 6.014 GHz was obtained; a bandwidth of 7.5%. Because of the simple nature of the individual oscillator elements, this approach is well suited to MMIC implementation.

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