Abstracts

High-Power Hybrid Quasi-Optical Ka-Band Amplifier Design

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We report the first demonstration of a quasi-optical millimeter-wave amplifier. The amplifier unit cell consists of a MMIC driver amplifier chip followed by a two-stage high power amplifier chip. Input as well as output antennas are anti-resonant slots fabricated on a GaAs monolithic antenna array. A 6x6 array is designed for an output power in excess of 8 Watts. The array allows a variety of MMIC amplifier chips to populate any number of cells up to the full array size. An absolute power gain of 6 dB was achieved at 29 GHz. A liquid-cooled test fixture was designed to remove excess heat from the amplifiers. Amplifiers of this type could be used in communication or radar systems to produce high power with reduced size, weight, and lower system cost.

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