Abstracts

A 6-W Ka-band power module using MMIC power amplifiers

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This paper presents the development of a 6-W 24% power-added efficiency (PAE) Ka-band power module with an associated power gain of 21.5 dB. The power module consists of a driver amplifier and two power amplifier chips. These monolithic millimeter-wave integrated (MMIC) amplifiers were fabricated with a 2-mil-thick substrate using 0.15-/spl mu/m InGaAs/AlGaAs/GaAs high electron mobility transistor (HEMT) technology. The driver amplifier is a fully matched single-ended design with an output power of 27.5 dBm, a 10.7-dB power gain and 27% PAE. We use a hybrid approach for the output power amplifier, which consists of two partially matched MMIC chips and an eight-way Wilkinson combiner fabricated on alumina substrate. The MMIC power amplifiers delivered a record power of 35.4 dBm (3.5 W) with a PAE of 28% and an associated power gain of 11.5 dB. The eight-way combiner has an insertion loss of 0.6 dB.

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