Abstracts

A Low-Cost 20-22 GHz MIC Active Receiver/Radiometer

S. Mollenkopf, L.P.B. Katehi and G.M. Rebeiz. "A Low-Cost 20-22 GHz MIC Active Receiver/Radiometer." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part II [T-MTT] (Special Issue on Space Terahertz Technology)): 989-993.

A microwave integrated circuit active receiver is built and tested at 19-25 GHz. The receiver consists of a planar CPW-fed double folded-slot antenna coupled to a six-stage MESFET amplifier and followed by a planar Schottky-diode detector. The folded-slot antenna on a GaAs half-space results in a wide frequency bandwidth suitable for MMIC amplifiers. The measured system performance show a video responsivity close to 1 GV/W at 20 GHz with a 3-dB bandwidth of 1500 MHz. A novel method which uses the planar video detector after the amplifier stages as an RF mixer is used to measure the noise-figure of the direct detection radiometer. The system noise figure is 4.8 dB at 22 GHz. The radiometer sensitivity to a hot/cold load is 3.8 µV/K. The measured antenna patterns show a 90% Gaussicity at 20-22 GHz. The active MIC receiver can be integrated monolithically for low-cost applications and is well suited for millimeter-wave linear imaging arrays.

❑ Return to main document.