Abstracts

A Frequency Agile X-Band Homodyne GaAs MMIC Transceiver with a Synthesized Phase Locked Source for Automotive Collision Avoidance Radar

C. Woo, R. Ramachandran, L. Burns, K. Marasco and D. Fisher. "A Frequency Agile X-Band Homodyne GaAs MMIC Transceiver with a Synthesized Phase Locked Source for Automotive Collision Avoidance Radar." 1994 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 94.1 (1994 [MCS]): 129-132.

A frequency agile X-band homodyne transceiver system with a synthesized phase locked source has been developed as a cost effective solution for volume automotive and communications systems applications. A GaAs X-band MMIC transceiver chip and divide-by-four prescaler chip have been designed, fabricated, and tested. The GaAs prescaler converts the X-band oscillator to S-band, where low cost silicon prescaler and phase/frequency detector chips have been used to phase lock the VCO to a 19.660 MHz crystal reference. Transmitted output power is +14.5 dBm with a -60 dBc/Hz phase noise @ 100 kHz offset. On-chip filtering rejects spurious emissions below FCC limits. The receiver noise figure is less than 9 dB with a 2 dB conversion loss and an IF bandwidth of 2 GHz. The entire system fits into a 0.9"x 2.0" x 0.4" form factor utilizing a duroid on glass epoxy (FR-4) board for the interconnect substrate. While the GaAs MMIC transceiver chip was designed for an automotive application, the phase locked frequency source and system are also applicable to next generation data communications systems.

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