Abstracts

A Novel Active Antenna with Self-Mixing and Wideband Varactor-Tuning Capabilities for Communication and Vehicle Identification Applications

C.M. Montiel, L. Fan and K. Chang. "A Novel Active Antenna with Self-Mixing and Wideband Varactor-Tuning Capabilities for Communication and Vehicle Identification Applications." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part II [T-MTT] (1996 Symposium Issue)): 2421-2430.

A cavity-backed, Gunn-diode-driven, self-mixing active inverted stripline circular patch antenna has been developed. The antenna provides good radiation performance with cross-polarization levels 18 dB below copolarization at boresight. The self-mixing performance shows that the circuit has a 2dB conversion gain, for IF's up to 450 MHz and a single-sideband noise figure of 12 dB at 200 MHz. The self-mixing antenna is also capable to mix signals with its second-harmonic, providing a conversion loss of 3.7 dB, Also, a varactor diode has been incorporated with a inverted stripline circular patch active antenna to allow for electronic tuning. A 1370 tuning bandwidth with a power variation of ±1.0 dB was achieved. A simple equivalent circuit his been used to model the active antenna, and the calculated results agree well with the experimental results. The circuit should have many commercial applications in wireless communications, radar, and sensors, but is particularly suitable for use as a transceiver for short communications links or as a microwave identification transceiver.

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