Abstracts

A SiGe transceiver chipset for 100 Mbps/1 Gbps digital communication over cable system

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In this paper we present the design and performance of transmit and receive SiGe RFICs that offer a complete RF transceiver solution to broadband digital communications over CATV cable system. The transceiver design is based on 16 QAM with direct modulation/demodulation approach, and which supports data speeds of 100 Mbps and 1 Gbps, using the frequency bandwidth of 900 MHz to 2.45 GHz. The Tx chip integrates DAC, Clock, LO, IQ modulator and RF transmitter, which offers linear output power of 7 dBm and 1 dBm at 1 GHz and 2 GHz, respectively. An output noise floor of -115 dBm/Hz is also achieved. The Rx chips consist gain-switching LNA, RF VGA, RF slope equalizer, IQ demodulator, as well as clock, RF LOs, carrier recovery, AGC, clock recovery and ADC. With maximum gain setting, the entire Rx chain has a 20 dB noise figure, which is critical in providing necessary dynamic range for such broadband communication. The VCO circuit on Tx/Rx chips is capable of switching between 4 separated frequencies with phase noise of -110 dBc/Hz at 100 kHz offset-carrier frequency. The chip-set has been successfully integrated into Narad Broadband Access Network (NBAN) system, which is currently under system test.

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