Abstracts

A transmit/receive IF chip set for WCDMA mobiles in 0.35 /spl mu/m CMOS

U. Dasgupta, Wooi Gan Yeoh, Chun Geik Tan, Sheng Jau Wong, H. Mori, R. Singh and M. Itoh. "A transmit/receive IF chip set for WCDMA mobiles in 0.35 /spl mu/m CMOS." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2443-2452.

An implementation of the IF section of WCDMA mobile transceivers with a set of two chips fabricated in an inexpensive 0.35-/spl mu/m two-poly three-metal CMOS process is presented. The transmit/receive chip set integrates quadrature modulators and demodulators, wide dynamic range automatic gain control (AGC) amplifiers, with linear-in-decibel gain control, and associated circuitry. This paper describes the problems encountered and the solutions envisaged to meet stringent specifications, with process and temperature variations, thus overcoming the limitations of CMOS devices, while operating at frequencies in the range of 100 MHz-1 GHz. Detailed measurement results corroborating successful application of the new techniques are reported. A receive AGC dynamic range of 73 dB with linearity error of less than /spl plusmn/2 dB and spread of less than 5 dB for a temperature range of -30/spl deg/C to +85/spl deg/C in the gain control characteristic has been measured. The modulator measurement shows a carrier suppression of 35 dB and sideband/third harmonic suppression of over 46 dB. The core die area of each chip is 1.5 mm/sup 2/.

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