A Fully-Integrated 900-MHz CMOS Wireless Receiver with On-Chip RF and IF Filters and 79-dB Image Rejection

Chunbing Guo, Chi-Wa Lo, Yu-Wing Choi, Issac Hsu, Toby Kan, David Leung, Alan Chan, and Howard C. Luong

Department of Electrical and Electronic Engineering
Hong Kong University of Science and Technology
Clear Water Bay, Kowloon, Hong Kong

Abstract

A truly-monolithic 900-MHz CMOS wireless receiver with on-chip RF and IF filters and a fully-integrated fractional-N synthesizer is presented. Implemented in standard 0.5-µm CMOS process and without any off-chip component, the receiver measures an image rejection of 79dB, sensitivity of -90dBm, IIP3 of -24dBm and NF of 22dB with power of 227mW and a chip area of 5.7mm². The synthesizer achieves a phase noise of -118dBc/Hz at 600kHz offset and settling time of less than 150µs.