

ABSTRACT

Highly linear low noise amplifier

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The CDMA standard operating over the wireless environment along with various other wireless standards places stringent specifications on the RF Front end. Due to possible large interference signal tones at the receiver end along with the carrier, the Low Noise Amplifier (LNA) is expected to provide high linearity, thus preventing the intermodulation tones created by the interference signal from corrupting the carrier signal. The research focuses on designing a novel LNA which achieves high linearity without sacrificing any of its specifications of gain and Noise Figure (NF). The novel LNA proposed achieves high linearity by canceling the IM3 tones in the main transistor in both magnitude and phase using the IM3 tones generated by an auxiliary transistor. Extensive Volterra series analysis using the harmonic input method has been performed to prove the concept of third harmonic cancellation and a design methodology has been proposed. The LNA has been designed to operate at 900MHz in TSMC 0.35um CMOS technology. The LNA has been experimentally verified for its functionality. Linearity is usually measured in terms of IIP3 and the LNA has an IIP3 of +21dBm, with a gain of 11 dB, NF of 3.1 dB and power consumption of 22.5 mW.