Direct Conversion Receiver RF front end for Third Generation W-CDMA

A direct conversion receiver (from duplexer to base band part) for use in 3G WCDMA receivers has been reported here. Employing the even harmonic structure caused to achieve high dynamic range and selectivity because of suppression of even order distortion by diode pair of the mixer. The receiver employs a very low noise LNA with noise figure of 6.0 dB to provide the best sensitivity. The receiver RF front-end has been designed to meet characteristics calculated based on 3GPP UMTS definitions. It includes various parts such as 90 degree coupler, power divider, even harmonic mixer, local oscillator, two stage low noise amplifier, and filters. Input third order intercept point of -21 dBm, noise figure of 6.3 dB, and gain of 6.41 dB has been achieved which are appropriate for using in 3G mobile receivers. Additionally, novel methods have been employed in design and analysis of these parts to improve their performances and shapes.

Keywords: LNA, Mixer, Local oscillator

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