# Low-IF High Image-Rejection Mixer

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## Abstract

Mixers are essential part of the RF receivers. In this thesis, different receiver architectures are presented. The Low-IF architecture proves better performance in terms of integratability, image rejection adaptivity, and flexibility for different standards.

Gilbert-Cell and passive switching mixers are selected to be studied in terms of conversion gain, linearity, and noise performance. A complete mathematical model for these characteristics is represented.

Mixers are time-varying circuits and time-varying power series for distortion calculation is considered and noise has a time-varying statistics as well. High-Frequency noise model is accounted for by considering the gate-induced noise dominant at high frequencies.

Double-quadrature down-conversion architecture is designed and implemented in the range of 2.4 GHz. Using Gilbert-Cell mixer in the DQDC architecture proves superior performance in terms of noise and linearity rather than using passive switching mixer.