

## DESIGN ANALYSIS AND COMPARATIVE STUDY OF RF RECEIVER FRONT-ENDS IN 0.18- $\mu$ M CMOS

M. Sumathi<sup>1</sup> and S. Malarvizhi<sup>2</sup>

<sup>1</sup> Research Scholar, Department of ECE, Sathyabama University, Chennai-119, India  
sumana\_gopi@yahoo.co.in

<sup>2</sup> Professor/ Head of the Department, ECE, SRM University, Kattankulathur, India

### ABSTRACT

In this work, design and simulation results of two RF front-ends to be used in direct conversion receiver are presented. The first one uses dual CS differential LNA with folded mixer. The second one uses single-ended LNA with double balanced mixer. Single-ended and fully differential LNA's provide gains of 16.3 dB and 28.75 dB at 2.4GHz, respectively. Noise Figure of these two LNA's are 3.34 dB and 2.7 dB. The differential LNA merged inductor based folded mixer provides a conversion gain of 13dB with a noise figure of 7.9dB at 150MHz IF. Similarly, the single-ended LNA merged double balanced mixer provides a conversion gain of 9dB with a noise figure of 10dB. These results are obtained from 1.8V supply and design evaluations are realized using 0.18- $\mu$ m CMOS technology scale. The design principles, advantages, limitations and performance comparison are highlighted.

**Keywords:** CMOS, Direct Conversion, Front-end, LNA, Mixer, Radio Frequency (RF).