

Chapter 1

INTRODUCTION

Low noise amplifier also known as LNA is a special type of electronic that widely used in wireless communication system. A LNA can be found in RF transmitter and receiver for the basic building block in communication system. Hereby, LNA is a very important part of the receiver because it is placed at the front of the receiver and act as an amplifier to amplify the received signals as an electronic amplifier in order to get the level that required with the minimum produced their own additional noise.

In past time amplifiers play very important role for the signal amplification in communication systems and in the receiver design but as the demand of accuracy, timing increasing the demand of a amplifier increasing which may perform multiple operations at a single time this is possible by the Low noise amplifier such as amplification of weak signal, reduction of noise, reduce noise figure, increased gain and power level high stability, improve voice and data quality and eliminate channel interference, an additional feature of LNA is to amplify the signal and reduce the noise in the signal at the same time.

In the communication market the demand of LNA is increasing with increasing the market of Cell Phones, GPS, and Bluetooth etc, which is used in day to day life. A Low Noise Amplifier is the basic building block of any communication system. It is placed at the front end of a radio receiver and works as an electronic amplifier to amplify the received signals to acceptable levels with minimum self generated additional noise while radio receiver composed of amplifier, mixer and filter. The first part is an LNA which is the most important part of the receiver. The main function of LNA is to amplify extremely low signals without adding noise thus preserving required signal to noise ratio at extremely low power level and large signal levels and provides first level of the amplification that can be received by the receiver is the receiver's sensitivity also. It amplifies the received signal without introducing any distortions hence eliminating channel interference. The dynamic range of the receiver which is the difference between the largest possible received signal and the small possible received signal is defining the quality of receiver chain.

The largest signal that can be received by the receiver establishes an upper power level limit that can be handled by the system while preserving voice or data quality. The reasons behind using LNA are signal coming from the antenna is very small, amplification of the signal is needed, reasonable or minimum power consuming gain, noise figure, non linearity and impedance matching are the most important parameters in LNA design. An LNA is a design that minimizes the noise figure of the system by matching the device to its noise matching impedance.

1.1 PROBLEM STATEMENT

Noise is one of the major concerns when designing a wireless communication system. Until recently, gain improvement and noise reduction are necessary to reduce the channel interference. This work **“DESIGN AND ANALYSIS OF LOW NOISE AMPLIFIER”** addresses new approaches for low noise for Very Large Scale Integration (VLSI) logic.

1.2 Objectives of the Project

On the demand of accuracy, timing increasing the demand of an amplifier increasing which may perform multiple operations at a single time and this is possible by the Low noise amplifier such as

1. Amplification of weak signal
2. Reduction of noise
3. Reduce noise figure
4. Increased gain
5. Improve voice and data quality and eliminate channel interference.