

**INVESTIGATING NOISE PERFORMANCE IN DIRECT
CONVERSION RECEIVER SYSTEM USING MATLAB
SIMULINK**

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“In the name of ALLAH S.W.T, The Most Gracious and The Most merciful. Peace is upon the Holy Prophet, Muhammad S.A.W.”

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ABSTRACT

Noise is very crucial problem in communication system for data transmission and reception of original signal. Predicting noise performance of RF system is much more complex than for linear ones. Noise which is generated either within the component of the devices can also cause distortion and interference for the system. This paper investigates about noise performance on Direct Conversion Receiver (DCR) system with injected external noise. Naturally, DCR has internal noise in the system. DCR is architecture of choice in most modern receiver because of high level integration and accommodating multi standard radio platform at lower cost. For DCR system, MATLAB simulation is used and the result was obtained in specification for Industrial, scientific and medical (ISM) band frequency. External noise is injected to the system and simulated using MATLAB simulink. The result was specified using bit error rate (BER), scatter plot and spectrum analyzer signal. The suitable filter is investigated and designed to reduce noise that affects the whole DCR system. The most suitable filter for the reduction external noise in DCR system is Butterworth low pass filter. Moreover, by using this filter the receive signal is recovered back approximately the same with transmitted signal. It was also noted that less data error in BER. However, for the scatter plot, suitable software is to be identified to display the scatter plot of the demodulated data.

TABLE OF CONTENTS

CONTENTS	PAGE
Declaration	
Dedication	ii
Acknowledgement	iii
Abstract	iv
Table of Contents	v
List of Figures	viii
List of Tables	x
List of symbols/Abbreviations	xi
CHAPTER 1: INTRODUCTION	
1.1 Introduction	1
1.2 Background of study	
1.1.1 Direct Conversion Receiver	1
1.1.2 Noise	4
1.1.3 Filter	4
1.1.4 MATLAB simulink	6
1.2 Problem statement	7
1.3 Objective	7
1.4 Scope of study	7
1.6 Thesis overview	8
CHAPTER 2 : LITERATURE REVIEW	
2.1 Direct Conversion Receiver design issues	9
2.1.1 DC offset	10
2.1.2 I/Q mismatch	12
2.1.3 Even order Distortion	13

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter is explaining on background study of the project, the problem statement, objectives, scope of the project and thesis organization.

1.2 BACKGROUND OF STUDY

1.2.1 Direct conversion receiver

The recent surge in applications of radio-frequency (RF) transceivers has been accompanied with aggressive design goals: low cost, low power dissipation, low noise and small form factor [1]. The demand for high performance receiver has produced a rapid increase of communication standard. Thus, the designer need to find the most cost effective and high performance to compatible with multiple standards. Nearly all designed of a radio receiver is based on superheterodyne architecture. In its simplest form, this receiver architecture filters the received radio frequency (RF) signal and converts it to a lower intermediate frequency (IF) by mixing with an offset local-oscillator (LO) as shown in Fig. 1.