SIMULATION AND ANALYSIS PERFORMANCE OF 4-QAM AND 8-PSK BY USING REED SOLOMON CODES IN WCDMA ENVIRONMENT.

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ABSTRACT

This project illustrates the simulation and performance of 4-QAM and 8-PSK in WCDMA. This model consists of transmission channel, transmitter and receiver. This simulation is dealing with two channels. Channel one is using 4-QAM and channel two is using 8-PSK. Reed Solomon codes is use to encode and decode the signal of the two channels before modulation and after demodulation process. The main objective of this project is to compare and identify which channel is better by analyzing the performance of both channels in term of bit error rate (BER). This project is simulated by using Matlab Version 7.6.

Keywords – Additive White Gaussian Noise (AWGN), Rayleigh fading, Wideband Code Division Multiple Access (WCDMA), 4 Quadrature Amplitude Modulation (4-QAM), 8 Phase Shift Keying (8-PSK).

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Early on this century, Code Division Multiple Access (CDMA) is widely used in digital communication system. At that time, CDMA was the most excellent multiple access compared to other. However, people nowadays are moving towards high speed data transferred. As the time goes by, WCDMA is implemented. WCDMA is an enhancement of CDMA which will produce much more benefits. Since WCDMA can cover a large area (wireless), absorption and attenuation may become a major factor which can affect the performance of several modulation types in WCDMA. Besides, the other factor can be the environment. Previously, a project on simulating the performance of two modulations type which was BPSK and 8-PSK in CDMA had been done. From the simulation, 8-PSK gives better performance. It is because, 8-PSK signal can still remain its integrity and can undergo almost $\pm22.5°$ phase shift during transmission [1]. This project is going to be done to determine whether 4-QAM or 8-PSK modulation type can perform well in WCDMA. Since WCDMA is the enhancement for CDMA, a better performance could be predicted. However, several problems regarding WCDMA cannot be easily eliminated. In digital communication system, the objective at the receiver is to correctly select the transmitted message symbol out of a finite set. The presence of channel noise complicates the task and cause bit errors [2]. In this project, some noise is inserted while doing the simulation. AWGN channel and Rayleigh fading are chosen to be the noise for this simulation. Using Matlab 7.6, the performance between 8-PSK and 4-QAM can be simulated.