SIMULATION AND PERFORMANCE OF 4-QAM, 8-PSK AND 1024-QAM BY USING REED SOLOMON CODES IN WCDMA ENVIRONMENT

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ABSTRACT

This project illustrates the simulation and performance of 4-QAM, 8-PSK and 1024-QAM in WCDMA environment through Additive White Gaussian Noise (AWGN) channel and Rayleigh fading effect. These models consist of transmitter, transmission channel and receiver. This simulation is dealing with three channels. Channel 1 is using 4-QAM meanwhile channel 2 is using 8-PSK and channel 3 is using 1024-QAM.

Reed Solomon Codes is use to encode and decode the signal of this three channels before modulation process and after demodulation process. The main objective of this project is to identify and compare which channel perform better by analyzing the performance of this three channel in term of bit error rate (BER) and signal energy to noise power density ratio (E_b/N_o).

During this project, all the simulation processes that presented the performances of both the QAM and PSK is done by using software that is known as MATLAB version 7.6.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

WCDMA is an enhancement of CDMA, which will produce more benefits. Since WCDMA can cover large area, absorption and attenuation may become a major factor which can affect the performance of several modulation types in WCDMA. Besides, the other factor that can be is the environment. This project is going to be done to determine whether 4-QAM, 8-PSK or 1024-QAM modulation type can perform well in WCDMA. Since WCDMA is 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.

In digital communication, one of the most important technical issues that might be occurred which are synchronization problem and the forward error correction used in this project which are Reed Solomon code has a unique advantage that are suited to modify this problem. This is because this Reed Solomon code has the ability to recover the synchronization problem since this code is self-synchronizable [6]. Owing to this reason, the Reed Solomon code has been choose in order to study the performance of each modulation technique apply in WCDMA.

Since the project is study the performance of modulation technique in WCDMA, it is necessary to find the most suitable channel that use to propagate the signal. Basically, channel is fall into three types, which are fading channels, channel in which the noise stems from the others and AWGN channel. As we compared the entire all the three type of channels, the best suite channel for WCDMA is AWGN channel and fading channel. This is because in the practical world is that AWGN