

**CODE DIVISION MULTIPLE ACCESS USING DIRECT
SEQUENCES SPREAD SPECTRUM TECHNIQUE.**

**This report is presented in partial fulfillment for the award of the Bachelor of
Electrical Engineering (Hons)
(UNIVERSITI TEKNOLOGI MARA)**



**REDZWAN BIN ROSLI
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITY TEKNOLOGI MARA
40450 SHAH ALAM SELANGOR**

ACKNOWLEDGEMENT

All praise is to Allah S.W.T, The Most Gracious and Most Merciful who has given me the strength, ability and patience to complete this project and thesis.

I would like to convey my deepest gratitude and appreciation to my project supervisor, Associate Professor Ruhani bt Ab Rahman for her invaluable suggestion, guidance and advice for the completion of this project.

Last but no least, my special thanks to all my colleagues, for this valuable help and motivation given in completing this project.

Finally, a thousand and loves of appreciation to my beloved parent, my brothers and sister for their encouragement and for being so understanding.

ABSTRACT

The purpose of this project is to investigate the Code Division Multiple Access (CDMA) communications using Direct Sequence Spread Spectrum (DS-SS). Spread Spectrum Communication techniques have been widely accepted in mobile and wireless communications especially in Code Division Multiple Access (CDMA).

CDMA has very beneficial and tempting features, like Anti jam, security, and Multiple Access. It is the purpose of this paper to describe the features of Spread Spectrum systems. The emphasis will be on the Direct Sequence Spread Spectrum (DS-SS) scheme, Pseudo Noise signals (PN), Modulators and Demodulators, and finally a MATLAB simulation is used to illustrate some of the DS-SS system features. The result that were obtained through these analysis showed that the precise and accurate of any system can be achieved by simulation software, therefore MATLAB is chosen in designing, simulating, testing and analyzing the system.

Focus will be given to Pseudo noise (PN) signal. Pseudo Noise (PN) signals are the key factor in DS-SS systems. They are the ones responsible for the spreading and de-spreading of the base band signal.

Keywords: Code Division Multiple Access (CDMA), Direct Sequence Spread Spectrum, Pseudo Noise (PN) Signal, Modulator, Demodulator, Spread, Dispread, and Pseudo Noise (PN) signal.

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CHAPTER 1

INTRODUCTION

1.1 Background

Wireless cellular telephony has been growing at a faster rate than wired-line telephone networks. The main factor driving this tremendous growth in wireless coverage is that it does not need the setting up of expensive infrastructure like copper or fiber optic cable. This growth has also been fueled by the recent improvements in the capacity of wireless links due to the use of multiple access techniques (which allow many users to share the same channel for transmission) in association with advanced signal processing algorithms.[8]

Code Division Multiple Access (CDMA) is becoming a popular technology for cellular communications.[3] Unlike other multiple access techniques such as Frequency Division Multiple Access (FDMA) and Time-Division Multiple Access (TDMA), which are limited in frequency band and time duration respectively, CDMA uses all of the available time-frequency space.

One form of CDMA called Direct Sequence CDMA (DS-CDMA) uses a set of unique signature sequence or spreading codes to modulate the data bits of different users. With the knowledge of these spreading codes, the receiver can isolate the data corresponding to each user by the process of channel estimation and detection.[4] This process spreads the bandwidth of the underlying data signal; hence CDMA is called a spread spectrum technique. Standards such as IS-95 and the proposed W-CDMA are based on CDMA technology.[10]