

INTERFACING ELECTRONIC FOR MEASUREMENT,  
SIGNAL PROCESSING AND WIRELESS  
COMMUNICATION



Edited by

Sheroz Khan, International Islamic University Malaysia

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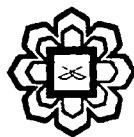
# **INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION**

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## Chapter 28

# NOISE MODULATED CRYPTOGRAPHIC GENERATION FOR USE IN UWB WIRELESS COMMUNICATION

SITI HAZWANIYAACOB, SIGIT PUSPITO WIGATI JAROT, SHEROZ KHAN

Existing UWB modulation techniques based on generation keys for cryptographic purposes have been developed. Ultra-wide-band (UWB) noise modulated keys using various modulation schemes and algorithm for secure wireless data communication have been reported. However, a disadvantage of existing secure wireless communications system is the low strength of security and integrity of the communication. This chapter proposes a secret key generation by using noise to be injected into UWB channel and an algorithm to validate the key agreement. The Code Spectral Modulation is responsible for producing secret key with time delay is considered as an important parameter. The performance of this method is presented in BER with variation of SNR values and CDF of key agreement error.

### 28.1. INTRODUCTION

The highest level of privacy of data transmission has been a desirable accomplishment over the years and becoming more important these days. A challenge for the engineers in UWB wireless system area is to develop reliable methods for data integrity and security.

Ultra Wideband (UWB) technology has been widely applied for wireless networking system since the Federal Communication Commission (FCC) has released the commercial use of UWB signal in unlicensed frequency band 3.1 GHz to 10.6 GHz since 2002 (Aiello & Rogerson, 2003). However, this chapter is presenting work in wireless noise communication system operating over a bandwidth ranging from 3.1 GHz to 4.1 GHz. Ultra Wideband (UWB) wireless communication systems are being preferable for indoor and short range communication as such systems allow high data rate transmission at low power densities.

The process of cryptography deals with the techniques used for conveying information more securely. The goal is to allow the intended recipients of information to receive the information properly while preventing eavesdroppers from intrusion (Eskicioglu & Litwin). In order to achieve the goal, a secret key must be generated and should be only known by sender and recipient. Most of the cryptography communication system use mathematical process that is either implemented through hardware implementation or using software algorithm. However, in UWB communication system, several of modulation schemes also become necessary in favor of producing digital codes to support secure communication. Various modulation scheme such as on-off keying (OOK), Pulse