

## ABSTRACT

Ultra-wideband (UWB) is a wireless technology application that operates on 3,1 – 10,6 GHz frequency and has transmission bandwidth bigger than 500 MHz. In 2002, *Orthogonal Frequency Division Multiplexing* (OFDM) is purposed by 802.15.3a as the IEEE standard for physical layer on UWB communication. OFDM method in UWB is able to overcome *selective fading* that can damage information. UWB has many advantages such as high data rates, low path loss, low power transmit, and low interference.

With low power transmit, UWB system is more appropriate to use in indoor channel. Indoor channel condition that has more multi-path component causing the UWB system needs addition system so it can robust more towards the multi-path channel condition. Multiple Input Multiple Output (MIMO) had already proven can increase the system performance in multi-path channel condition.

In this final project is done experiment to know the effect of MIMO application on OFDM UWB system in Saleh-Valenzuela channel. In this research, the variation number of transceiver is used and comparing the performance of two detectors, Zero Forcing (ZF) and V-BLAST.

From the simulation result can be noticed that by using MIMO gives better performance than without MIMO on OFDM UWB by giving 4,5 - 6 dB on BER  $10^{-4}$ . And by using MIMO 2x4 can gives performance improvement than MIMO 2x2 by giving 3 – 3,5 dB diversity gain to reach BER  $10^{-4}$ . And about the comparison of two detectors, V-BLAST has better performance than ZF that around 3,1 – 3,6 dB for BER  $10^{-3}$ .

Key word : MIMO, OFDM UWB, Saleh-Valenzuela, V-BLAST, ZF.