

## ABSTRACT

Ultra-wideband (UWB) is a wireless technology application that operates on 3.1 GHz – 10.6 GHz frequency and has transmission bandwidth bigger than 500 MHz. Development of this technology has obtained huge attention either from industry or education circle in international. UWB has many advantages such as high data rate, low path loss, simpler and cheaper transceiver, also low power transmit, and low interference.

With the 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 to need addition system so that 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 <sup>[2],[3]</sup>. By using Space Time Coding technique, MIMO gives diversity advantage and escalation towards coding gain.

In this final project is done experiment to know the performance of single-band DS UWB by using MIMO. Mapper that is used as a comparison are BPSK and QPSK mapper, so that can be noticed which mapper gives better performance in DS UWB MIMO system that using indoor channel with Saleh Valenzuela channel modeling.

From the simulation result can be noticed that BPSK mapper gives better performance than QPSK mapper on DS UWB MIMO by giving 3 – 3.2 dB coding gain to reach BER  $10^{-4}$ . And by using MIMO STBC 2x2 on DS UWB system gives coding gain escalation from DS UWB SISO until 3.5 dB on BER  $10^{-4}$ .

Key word: DS UWB, MIMO, Saleh Valenzuela, BPSK, QPSK