

Abstract

Wireless communication development effects the grow of user needs in service of high-speed real time data transfer, solve the problem of signal quality and improve data rate, and also fix interference -the specific problem of communication system itself. UWB (Ultra-Wideband) is one of solution to fulfill that necessity because UWB communication system has many advantages, like: (a) High data rate (b) Low path loss and more stable from multipath propagation (c) simpler and cheaper transceiver (d) Low power transmit and low interference (e) Transmission security. Federal Communication Commission (FCC) decided that range UWB operation frequency is 3.1 GHz - 10.6 GHz, shown the very wide bandwidth as characteristic of UWB communication system. FCC decided that minimum bandwidth for UWB system is 500 MHz.

The problems occur when the system faced propagation channel. Signal that transmits through the channel will be statistically destroyed with Gaussian Noise (AWGN). More extreme thing in wireless channel is external noise and the interference which has more significant effect than AWGN, where that condition known as multipath fading channel.

Solution needed to solve that problem in order UWB system can fit with fluctuate channel condition, one of the solutions is using adaptive modulation and adaptive coding technique in UWB. Adaptive modulation make the system possible to change modulation scheme base on radio channel fluctuate condition.

Simulation's report showed that adaptive OFDM UWB system gave better performance than non-adaptive OFDM UWB system, both bandwidth and power efficiency. Its shown in simulation's report: (a) For 16-QAM modulation, 7 dB of SNR is needed to get BER 10^{-4} on fix CM condition, its inform that bandwidth efficiency is reached 2.5% (b) On variable CM condition, 5.5 dB of SNR is needed to get BER 10^{-4} , its inform that SNR efficiency is reached 2.05%.

Keyword: OFDM UWB, Adaptive Modulation and Coding, CM.