



**RESEARCH ARTICLE**

# Simulation of WiMAX System Based on OFDM Model with Difference Adaptive Modulation Techniques

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**Abstract**— *This paper presents the simulation of Worldwide Interoperability for Microwave Access (WiMAX) system based on Orthogonal Frequency Division Multiplexing (OFDM) with different adaptive modulation techniques. WiMAX is the next generation broadband wireless technology which offers greater range and bandwidth compared to the other available broadband wireless access technologies such as Wireless Fidelity (WiFi) and Ultra Wideband (UWB) family of standards. The simulation is based on the WiMAX physical layer which adopted an OFDM model in the transmitter and receiver. The Matlab software is used to develop the OFDM model and analysis the performance of WiMAX system. Hence the investigation of the performance of OFDM physical layer in WiMAX system by using different adaptive modulation techniques like Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK), Quadrature Amplitude Modulation (QAM) for modulator and demodulator. The performance of system was compared between the model with cyclic prefix and without cyclic prefix. The cyclic prefix is added additional bits at the transmitter end. The signal is transmitted through the channel and it is received at the receiver end. Then the receiver removes these additional bits. The purpose of the cyclic prefix is to minimize the inter symbol interference and to improve the bit error rate. The analysis is based on the Bit Error Rate (BER), Signal to Noise Ratio (SNR) and probability error. At the end, the modulation BPSK and QPSK have the lower bit error rate while the 64 QAM has the higher bit error rate at low SNR. For the probability of error, the lower order modulation scheme also has the lower BER at low SNR.*

**Keywords**— *WiMAX, OFDM; Cyclic Prefix; Adaptive Modulation Techniques; BER*

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