

## ABSTRACT

Advancement in communication technologies has made easier, more efficient and reliable for people to access multimedia with high-speed data. One technology that provides this feature is WiMAX (Worldwide Interoperability for Microwave Access). The purpose of this research is to investigate the performance of OFDM (Orthogonal Frequency Division Multiplexing) in WiMAX system by comparing the modulation techniques (BPSK, QPSK, 16-QAM and 64-QAM), which are generated based on the BER with the addition of cyclic prefix. The simulation based method was used to investigate the optimum performance of modulation techniques. The MATLAB 7.4 was used to analyze the optimum performance of OFDM. The performance of modulation schemes (BPSK, QPSK, 16-QAM and 64-QAM) in the OFDM WiMAX system were compared each others. The result of simulations showed BPSK and QPSK modulation schemes give the best estimate of the BER compared to other modulation schemes in term of AWGN channel and Rayleigh fading channels. The effects of EB/No (dB) versus BER in theories (EbNo 0 dB) were obtained the BER value of 0.1465 for BPSK and QPSK, BER value of 0.1976 for 16 QAM, and BER value of 0.2471 for 64 QAM. The probability of error when EbNo 20 dB, Pe value obtained by 1.97 E-09 for BPSK, 2.21 E-05 for QPSK, 0.06825 for 16 QAM, and 0.575964 for 64 QAM.

Key word: WiMAX, OFDM, cyclic prefix.