

## ABSTRACT

Mobile WiMAX is an IEEE standard that allows 802.16e WiMAX system is applied to portable and mobile applications as well as fixed and nomadic. In OFDMA mobile WiMAX technology was introduced (Orthogonal Frequency Division Multiple Access) which is a multicarrier transmission technique development of OFDM as downlink multiple access side. OFDM can overcome the effects of multipath fading. Multipath fading can cause Intersymbol Interference (ISI). To overcome these problem, added guard interval (*cyclic prefix*) in OFDM before signal is transmitted.

In this final project, simulated the effect of *cyclic prefix* length in mobile WiMAX multipath channel. ITU-R M.1225 is used to model multipath fading channel. There are 2 scenarios in this final project. Firstly, simulated every type of *cyclic prefix* in ITU vehicular and pedestrian channel. Secondly, simulated modified *cyclic prefix* in same channel conditions in the first scenario (in ITU vehicular and pedestrian channel). Parameters are used to see performance of system are BER and  $E_b / N_0$  which generated from the Matlab simulation.

Simulation results show that the use of *cyclic prefix* 1/4 shows the value of  $E_b / N_0$  achieve the best BER of  $10^{-3}$  on the target channel conditions ITU pedestrian and vehicular ie 10.73 dB and 14.4 dB for QPSK modulation and at 18.12 dB and 21.64 dB for 16QAM modulation. Enhancing  $E_b / N_0$  for BER target of  $10^{-3}$  can be obtained by using *cyclic prefix* duration is longer, for example the modified long *cyclic prefix*. Using a modified long *cyclic prefix* (1/2) for pedestrian conditions demonstrate the value of  $E_b / N_0$  is better than *cyclic prefix* 1/4. There are difference value 8.513 dB in term of  $E_b/N_0$ .

Keywords : mobile WiMAX, OFDM, OFDMA, *cyclic prefix*, ISI, BER,  $E_b/N_0$ .