ABSTRACT

WiMAX (Worldwide Interoperability for Microwave Access) is one of broadband technology that capable of providing services wirelessly with high data rate and great capacity. Mobile WiMAX IEEE 802.16m is one of mobile WiMAX standard that capable of serving users with high mobility. Users movement will affect the mobile WiMAX service performance. It is because users movement can produce Doppler shift that can degrade signal information quality. In addition, mobile WiMAX is also applied to different terrain and environmental conditions. The differences environmental conditions can also affect the quality of mobile WiMAX service because of the differences of the parameters of a transmission channel and the line of sight signal componen (LOS).

In this final project, the research about the effect of user mobility and different environment condition toward WiMAX IEEE 802.16m system performance on downlink stream. The user mobility is tested in velocity difference and angle of arrival (θ) difference. The user velocities that are tested are 0 km/h (stationary), 30 km/h (vehicular), and 200 km/h (high speed vehicular). The angle of arrivals (θ) that are tested are 0^0, 30^0, and 60^0. The environment conditions that are tested are the urban environment that is modeled with the SUI-6 Channel, suburban environment with the SUI-3 channel, and rural environment with the SUI-1 channel. Differences in the velocity and angle of arrival (θ) are also tested on each environmental condition.

The results showed that the performance of WiMAX systems are best found in the rural environment to the needs of 5.04 dB SNR, then followed with the suburban environment with the needs of 6.42 dB SNR, and worst of all is the urban environment with the needs of 7.99 SNR dB. The higher the user velocity then the quality of information signal is getting worse. For each environment conditions, the WiMAX system performance is best when the user isn't moving, then followed with the velocity of 30 km/h, and at its worst when the velocity of 200 km/h. The testing result of angle of arrival (θ) difference shows that the best WiMAX system performance occurs when the angle of arrival (θ) is 60^0, followed by $\theta = 30^0$, and the worst when the angle of arrival (θ) is 0^0.

Keywords : **WiMAX, SUI, Doppler *shift***