ABSTRACT

WiMAX is a broadband wireless access technologies that have high speed access to a wide range. Mobile WiMAX has two standards, namely IEEE 802.16e standard and the IEEE 802.16m standard. Although there are different in application systems and standards, it can use both standard to support each service, the system is called Joint Base Station. Transmitter and receiver must be able to support both IEEE 802.16e and IEEE 802.16m. As a result of user mobility, can changing channel conditions, so that the transceiver be able to adapt to changing channel. Adaptive modulation techniques and adaptive MIMO techniques can cope with changes useing channel. To applying it, threshold need to determine the limits of MIMO and modulation standard used.

Based on the above issues, the final project is simulated and analyzed of the implementation of the Joint Base Station system uses a combination of modulation techniques and adaptive MIMO Switch (AMS). This simulation aims to get the threshold of each WiMAX standard. Adaptive modulation and AMS techniques are used to adapt the IEEE 802.16e and IEEE 802.16m in accordance with changing channel and get optimal speed. Environments used in this simulation is pedestrian and vehicular environments with low to moderate delay spread.

The combination of adaptive modulation techniques and adaptive MIMO in WiMAX joint base station's system is able to get the best performance in terms of data rate and BER with various channel conditions. WiMAX 802.16m standard displacement occurs in EbNo of 26.56 dB for the pedestrian environment with a low delay spread, 32.41 dB for the pedestrian environment with a avarage delay sprea, vehicular 33.21 dB with a low delay spread, and 45 dB for the vehicular environment with avarage delay spread. This means that will achieve the specified BER for different Eb/No in all conditions.

Keywords: **WiMAX**, **adaptive modulation, MIMO, *Adaptive MIMO Switch* (AMS), BER, Eb/No**