ABSTRACT

As the development of information and communication technology, the type of services also be varied from voice to multimedia services which require high data rate and capacity. One of wireless communication technologies that provides high data rate and capacity is WiMAX. The latest standard of WiMAX is 802.16m which can provide data rate of up to 1 Gbps. However, due to changes in the condition of propagation channel, it is possible that there will be a drop in signal quality at the receiver.

To overcome this problem, in this final project, a combination of adaptive modulation and adaptive rate coding is applied. The working principle of adaptive modulation and adaptive rate coding are by changing the modulation scheme and code rate in accordance with the conditions of the channel so that the throughput can be improved while maintaining BER. SNR threshold for each modulation scheme and code rate will be determined by using ITU *Pedestrian* A and *Vehicular* A channel models. with the total number of users are 2, 4, and 8.

The results show that the combination of adaptive modulation and adaptive rate coding provides better performance than adaptive modulation or fixed modulation. With this combination, the throughput for each user with total of 4 users reached 33.6 Mbps, while the adaptive modulation with code rate of 1/2 reached 22.4 Mbps. Different code rates on adaptive modulation affects BER and throughput, the higher the code rate, the throughput increases but has lower resistance to noise than code rate of 1/2. For code rate of 2/3, throughput increased to 29.87 Mbps. In this final project also analize the effect of the number of users. If the number of users increase, throughput each user will drease. Throughput each user with a total of 2, 4, and 8 users reached 67.2, 33.6, and 16.8 Mbps. Whereas in terms of velocity, while the channel SNR reached 19 dB, each user for a total of 4 users in fixed condition reached 29.85 Mbps. For the same SNR at 3 and 120 km/hour, throughput only reached 11.2 and 7.46 Mbps.

Keywords : **WiMAX**, **Adaptive Modulation, Adaptive Rate Coding, Throughput**