SUMMARY

Muhamad Fatkul Mujib, Department of Electrical Engineering, Faculty of Engineering, University of Brawijaya, February 2016, The Impact Analysis of Modulation Techniques on Mobile WiMAX for Voice Over Internet Protocol (VoIP) Service, Academic Supervisor : Endah Budi Purnomowati and Rusmi Ambarwati.

Voice Over Internet Protocol (VoIP) is a technology which capable to transmit a voice packet through Internet Protocol network. The IP network is a data communication network which based on packet-switch. Adaptive modulation is a transmission scheme on digital communication where the transmitter is adapting the transmission mode with channel condition. This method can effectively regulate the balance of bandwidth and the quality of connection (link quality) or normally measured with a Signal to Noise Ratio (SNR).

This research is done to determine the impact of modulation types on mobile WiMAX for VoIP service using network simulator OPNET Modeler v.14.5. The observed parameters are SNR, BER, throughput, and packet loss. The types of modulations are QPSK, 16-QAM, and 64-QAM with coding. Furthermore, the scenario continued with the addition of the number of users using 64-QAM modulation.

The simulation results show the use of different modulation techniques on mobile WiMAX for VoIP service, the QPSK ½ modulation has the lowest throughput with 23.54 Mbps (94.442%) while the 64-QAM ¾ has the highest throughput with 30.67 Mbps (98.113%). For packet loss probability, QPSK ½ modulation is the highest with 0.0729 while 64-QAM is the lowest with 0.0017. The higher-order modulation, the smaller result of delay which on 64-QAM with 33.205 ms delay while on the lowest-order modulation which is QPSK ½ with 150.058 ms delay. The addition of users who make calls resulting in increased value of SNR, delay, and packet loss probability. While the BER and throughput efficiency decreased as the number of users multiplying which reduce the network quality of WiMAX network for VoIP service.

Keyword: VoIP, Modulation, SNR, BER, throughput, delay, and packet loss