

## ABSTRACT

WiMAX 802.16e standard is broadband wireless access technology which supports user mobility while doing the communication. And to improve the system's ability in transmitting the data, the technology is added MIMO because it can transmit more informations in a given time slots compared to a system with single antenna. One scheme which is used in MIMO is STBC which offers a diversity gain. But, in wireless communication like WiMAX, data at receiver often error because noise from the system and transmission channel.

To solve the problem, channel coding technique is needed. In process, channel coding techniques do the detection and correction the error data when the data is transmitted. LDPC is one type channel coding which is very effective. This final project will analyze the effect regular LDPC on MIMO – OFDM 2x2 systems with STBC scheme in mobile WiMAX technology standard IEEE 802.16e and compare about urban, hilly and rural area. In addition, will be analyzed the effects the speed of user and code rate value.

The simulation results showed, the system with using LDPC code on Rayleigh channel is better than without LDPC. On the system with using LDPC, the Eb/No value for target BER  $10^{-3}$  with code rate  $\frac{1}{2}$  in urban is 11,4 dB. And for system without LDPC, Eb/No is 20 dB. Performance of system using LDPC is better in AWGN channel than Rayleigh Channel, the Eb/No value for target  $10^{-3}$  in AWGN channel in urban is 9,42 dB. The simulation results also showed that with using large value of code rate the performance become worse. It is seen when system using code rate  $\frac{3}{4}$  Eb/No value is 14,2 dB. And for the speed of the user, the simulation showed that the system which is using LDPC has good performance, for the speed user 100 Km/hours BER target is achieved with Eb/No value 13,8 dB for urban area. And performance of system from urban area is the best than hilly and rural area, that because MIMO system has characteristic if system has many reflection so the performance will better.

**Keyword :** WiMAX 802.16e, MIMO, OFDM, LDPC