ABSTRACT

Spatial Multiplexing is one of the MIMO schemes that offers the data rate increment. The basic idea, is that, the transmitter is going to transmit the different signal at it's every own branch simultaneously. During the period in the channel, the signal would be blended and each of antennas at the receiving side will receive this, thus the MIMO detection is required to regain the actual signal sent by the transmitter.To realize the high data rate wireless communication system, it could be achieved by utilizing the OFDM multicarrier modulation technique, due to in OFDM, the selective frequency fading channel will be treat as a flat fading in it's every single subcarrier. For multiple access technique, OFDMA will be employed. In OFDM system only one user is able to transmit at whole subcarrier, meanwhile OFDMA did better which allowed multiple user to transmit simultaneously at the different subcarrier.

In this final project, channel capacity of MIMO OFDMA at the downlink side system will be analyzed, and channel capacity that intent to be analyzed is that BTS channel capacity for 1 cell at the CSIR condition, on the other hand, the receiving side known the channel condition. The standard used is IEEE 802.16e and the channel condition is multipath rayliegh fading and AWGN. The calculation of channel capacity is using SVD technique approach.

The result of simulation shows that at the 5 dB SNR, 8 user of MIMO OFDMA system reach an increasing number of channel capacity about 14.8089 bps/Hz compared to the 4 user MIMO OFDMA. And base on the MIMO technique that used by the system with 4x4 configuration channel capacity achieved about 25.7677 bps/Hz, compared to the MIMO OFDMA 2x2 configuration. Meanwhile, at the time user moving in uncertain and random speed, it has no significant influence in channel capacity. The upgrading of MIMO technique is also making the singular value histogram at channel $\vec{H}$ SVD's will be increased, where the singular value is proportionately straight with the channel capacity.

Keywords : capacity, downlink, MIMO-OFDMA, SVD, CSIR