ABSTRACT

The needs of data communication with high rate is the main purpose for four generation (4G) system. It will implies the needs of wide bandwidth. *Multi Carrier-Code Division Multiple Access* (MC-CDMA) is a modulation scheme and a *multiple access* technique to overcome the bandwidth efficiency problem and *selective fading* frequency that commonly happen in high data rate modulation scheme.

The problem in MC-CDMA system is the user quantity is been restricted by signal quality. *Multiple Input Multiple Output* (MIMO) system is a technique to fix the signal quality and increase throughput, as we know that the used of MIMO has been believed to increase the system performances. However, conventional MIMO is still cannot overcome interferences between users. That can be fixed with beamforming technique in transmitter antennas. Beamforming is a beam-form process towards specific user and also suppresses signal to the other way. This technique uses *zero forcing* algorithm and *eigen beamforming* in transmitter antennas and without *beamforming* in receiver antennas.

This final project analyze the performance of MC-CDMA with MIMO Eigen beamforming, MC-CDMA with non-beamforming MIMO, and also MC-CDMA with SISO. The comparison between BER to SNR system will be analyzed to know the performances systems.

From the simulation, it shows that MC-CDMA with MIMO non-beamforming almost has the same BER to SNR comparison as MC-CDMA with MIMO Eigen beamforming and MC-CDMA SISO has the worst performances among others.

Keywords : MC-CDMA, MIMO, SISO, Zero Forcing, Eigen beamforming