

## ABSTRACT

The wireless system is developing in the world, with its voice service, text, and high data rate multimedia. The high data rate communication system will cause high bandwidth allocation, as a consequence it is susceptible concerning multipath fading effects. This result will cause decreasing of performance of wireless communication system. One of techniques to realize the high data rate wireless communication system is OFDM multicarrier modulation, where the channel effect of selective fading frequency will be felt as flat fading by each subcarrier. Using a multiple antenna system which is known as MIMO (Multiple Input Output) with STBC scheme also improves system performance from multipath fading causes. To maximize the performance of antenna array at the receiver side we use the beamforming technique, where this technique is used to catch the desired signal.

This final assignment, the system is simulated using a combination of MIMO, OFDM and beamforming techniques in the Rayleigh distribution channel. In order to real condition, some scatterers are added to the channel. The scatterers can make channel correlation that is influential to system performance. The channel correlation is modeled by GBSB circular that indicates fixed wireless conditions in the open area. This research compares the performance between MIMO OFDM system with MIMO OFDM added adaptive beamforming at the receiver side.

From the simulation result, MIMO with or without *beamforming* has the same performance in a single user. But for the condition of channel correlation, the system performance is decreased because of bad channel conditions if compared with the system of the uncorrelation channel's condition.