

# ABSTRACT

Communication system with higher data rate and mobility is needed along with the development of information and communication technology. However, communication system that provides high data rate and high mobility can causes some adverse things such as frequency selective fading and fast fading, the influence of environment changing is also greatly affect the quality of the signal. In several studies have discussed some techniques to overcome those problems in communication systems with high data rates and high mobility. One of those technique are Robust Modulation by applying modulation and coding techniques.

In this thesis will be proposed a transceiver in MIMO system scheme to overcome the influence of communication system in high mobility condition. Where the transceiver system is an integration between modulation and transmit diversity techniques. Modulation technique that used in this thesis are MC-CDMA and Quasi-Orthogonal Space-Time Block Codes is used as transmitt diversity technique. Quasi-Orthogonal code is used in order to achived code rate in orthogonal codes. MC-CDMA is applied in each antenna arm of MIMO.

The proposed integration system between multicarrier CDMA technique and Quarsi-Orthogonal Space-Time Block Codes (QOSTBC) in MIMO system is to achieved a better performance and high data rate in communication system which is robust to overcome the issue of frequency selective fading without adding the complexity of the transceiver system.

The simulation result of proposed system shows that the proposed system have a better performance compared to OFDM with QOSTBC, QOSTBC, MC-CDMA system with significant differences gain in high mobility condition. The used of maximum spreading gain is also investigated in this thesis. The spreading gain used for proposed system achieved the optimum condition with the number of spreading gain is 8x.

Keyword— frequency selective fading, robust modulation, MC-CDMA, QOSTBC, OFDM.