ABSTRACT

A future wireless communication system demands for high quality Internet and multimedia services with mobility. Researchers and designers face a great challenge to use the limited bandwidth spectrum more efficiently. Multiple Input Multiple Output (MIMO) system uses multiple antennas to increase capacity for the same bandwidth. In MIMO system, Space Time Block Code (STBC) improves the Bit Error Rate (BER) even in bad channel condition and Spatial Multiplexing (SM) improves data rate.

In the present research work, a hybrid scheme is designed which combines Space Time Block Codes (STBC) and Spatial Multiplexing (SM) with Orthogonal Frequency Division Multiplexing (OFDM) to achieve high data rates with low error rate. Hybrid Multiple Input Multiple Output-Orthogonal Frequency Division Multiplexing (MIMO-OFDM) is the effective solution to achieve reliability and spectral efficiency.

In this thesis, STBC, SM and hybrid MIMO model with OFDM are designed for Rayleigh channel. Our main focus of research is on performance improvement of MIMO system in terms of spectral efficiency and reliability by reducing Bit Error Rate (BER).

A Forward Error Correction (FEC) code or channel coding is included in the system to reduce the BER. The performances of the above mentioned models with different
modulations such as Quadrature Phase Shift Keying (QPSK), M-array Quadrature Amplitude Modulation (M-QAM) and channel coding are investigated.

The performances are measured with respect to BER, throughput, distance coverage and output image quality. The results indicate that Hybrid MIMO-OFDM provides high throughput and less error. Thus in wireless communication, proposed hybrid model improves the data rate and link reliability.