ABSTRACT

High demand for cellular demands a communication system that provides high data services with a supported rate of low Bit Error Rate (BER). The author proposed a Low Density Signature-Orthogonal Frequency Division Multiplexing (LDS-OFDM) system with an overloading factor of more than 100% to obtain a low Bit Error Rate (BER) value.

This final project simulates the LDS-OFDM system on the uplink side. The system analyzed in this final project uses Quadrature Phase Shift Keying (QPSK) modulation. The number of simulated users is 4 users for small case studies and the reduction of Multiple Access Interference (MAI) on LDS-OFDM using Multi User Detection (MUD) based on Message Passing Algorithm (MPA). The simulated overloading factor at LDS-OFDM is 100%, 133%, and 200%. The percentage of overloading factor is obtained by calculating the parameters of the number of users, data flow, and subcarriers that will be simulated in this final project.

The performance of the LDS-OFDM system is analyzed through the BER work curve to the Bit Energy / Noise Ratio (Eb / N0). The system is analyzed to see the effect of subcarrier mapping and load factor capacity. The simulation results in this final project to achieve the BER value of 10^{-4}, the LDS-OFDM system with an overloading factor of 100% requires Eb / N0 of 10 dB. While the LDS-OFDM system with 133% and 200% overloading factors requires Eb / N0> 20 dB to reach BER 10^{-4}. The simulation results show that the performance of the LDS-OFDM system with an overloading factor of 100% is best due to the effectiveness of the distribution of the symbol to a subcarrier.

Keywords: *LDS-OFDM, OFDMA,MUD, MPA.*