

ABSTRACT

The portable wireless technology is one of many technologies developed at this time. The main problem in technology is the need for a high-speed data, and the need for communication systems that have a high efficiency, so that with the limited spectrum bandwidth is able to serve with a good performance. In addition, the characteristic of channel which frequency Selective fading, multipath, and Doppler spread is also a problem that appears in the wireless communication system.

The solution is to use IEEE 802.16e technology. IEEE 802.16e uses techniques multicarrier Orthogonal Frequency Division Multiple Access (OFDMA) to accommodate multiple users simultaneously. But the other side there is a communication technique that can also be used on the IEEE 802.16e technology namely, communication techniques Single Carrier Frequency Division Multiple Access (SC-FDMA) which uses single carrier modulation. In general OFDMA system and SC-FDMA are same, but the difference is SC-FDMA system using additional FFT operation in its transmitter and IFFT operation in its receiver. In this Final Project conducted simulation performance comparison between SC-FDMA and OFDMA In this Final Project will to design a model simulation system of SC-FDMA and OFDMA and analysis system performance of SC-FDMA and OFDMA using Rayleigh channel and AWGN channel. Parameters used in the analysis of performance is the Bit Error Rate (BER).

Simulation is done on the downlink direction, the speed of the user that different, namely: 0 km / hr, 3 km / hr, 50 km / hr, and 120 km / hr. Obtained from the simulation results that in general OFDMA system performance is better when compared with the SC-FDMA system. This is seen in the speed 50 km / hour to reach $Ber 10^{-3}$, OFDMA systems require E_b / N_0 of 13 dB, while the SC-FDMA systems require up to 15.8 dB to reach the same BER target, so that there is a difference between E_b / N_0 of 2.8 dB.

Key Words: IEEE 802.16e, SC-FDMA, OFDMA, *multi carrier*, *single carrier*, FFT, IFFT, *Rayleigh*, AWGN, BER