ABSTRACT

Orthogonal Frequency Division Multiple Access (OFDMA) promises a high data rate. OFDMA technique is a multiple access technique used for multiuser which multiple users accessing the same source.

The challenge in OFDMA system is condition of propagation channel always changing which affects the maximum bit rate reduction. Channel condition always changes because of the movement of the user and user distance differences to BS. Because of the channel condition changes can't be avoided, then the adaptive modulation is expected to provide the optimized maximum bit rate to achieve a value of specific Bit Error Rate (BER). Beside adaptive modulation, in order to achieve the optimal maximum bit rate, Channel Dependent Scheduling (CDS) technique is needed to determines the allocation of radio resources based on channel condition.

In this final project, an OFDMA system designed using two scheduling algorithms namely Maximum C/I and Proportional Fair. User velocity that used are 3 Km/Hour, 15 Km/Hour, 50 Km/Hour, and 120 Km/Hour which modeled through Rayleigh AWGN channel with different distances to the BS where classified into two distances that are 1 to 2.5 Km and 1.5 to 4 Km. The modulations that used in final project are BPSK, QPSK, 16QAM, and adaptive modulation with minimum BER value need to be reached is 10^{-3}.

The resulted bit rate based on modulation ranging from the biggest is 16QAM modulation, adaptive modulation, QPSK, and BPSK. While the value of BER for adaptive modulation, BPSK, QPSK always below 10^{-3}, but the BER value of 16QAM modulation is always above 10^{-3}. For system using Maximum C/I algorithm, it produce the maximum bit rate greater than the Proportional Fair algorithm, but based on the average bit rate of users that achieved by Proportional Fair algorithm, it provides a better fairness. Thefore, the combination of adaptive modulation and CDS is able to keep the trade off between the maximum bit rate to BER and the trade off between the maximum bit rate to fairness.

Keywords : OFDMA, maximum bit rate, BER, fairness, adaptive modulation, Channel Dependent Scheduling, Maximum C/I, Proportional Fair