ABSTRACT

Demand for the Wireless Broadband Multimedia Communication Systems (WBMCS) is growing year by year. To make broadband multimedia mobile communication system, it require high bit rate transmission, until megabits per second. Wireless radio channel have the characteristic such like multipath, where the signal that receive consist of not only Line of Sight radio wave but also the other spread wave from the propagation that affect the received signal.

It make the distortion through the signal transmission. One of the general case about signal transmission process that are fluctuation of power received by receiver, called fading. To mitigate multipath fading with the low complexity and to get standard of WBMCS, Orthogonal Frequency Division Multiplexing (OFDM) was proposed.

OFDM is the technique that allowed information to be sent on one single stream, where the information is divided into parallel sub-stream called sub-carrier. But there are Inter-Carrier Interference (ICI) that affect the OFDM. This interference can be mitigated by Frequency-Domain Equalizer (FEQ) with conventional Minimum Mean Square Error (MMSE) and M-taps MMSE. There are a lot of implementation of OFDM, one of them is WiMAX Mobile technology with IEEE 802.16e standard.

From the simulation, there are obtained BER value related to Eb/No graphics with three different modulation schemes, there are QPSK, 16 QAM, and 64 QAM. Analysis of the graphics showed that using maximal tested Eb/No, 25 dB, FEQ using conventional MMSE dan M-taps MMSE, both of them can increases OFDM system performance that contain ICI with QPSK and 16 QAM. But, this method is not appropriate in OFDM system that contain ICI if the modulation scheme which is used is 64 QAM.

In case of time complexity of G invers matrix, it is obtained that using *7-taps* MMSE method is 98.04459 % more efficient than using conventional MMSE method, meanwhile using *33-taps* MMSE method is 91.08564 % more efficient that conventional MMSE method.

Keywords: *Orthogonal Frequency Division Multiplexing (OFDM), Frequency-Domain Equalizer (FEQ), Minimum Mean Square Error (MMSE), M-taps Minimum Mean Square Error (MMSE)*