ABSTRACT

The process of spreading the signal from the transmitter to the receiver will experience a variety of disorders such as a phenomenon that occurs such as multipath fading that caused by reflection, scattering, or difraction. It caused coherence bandwidth channel becomes narrow when compared with the signal bandwidth so the channel will be frequency selective fading. Multi-carrier modulation techniques is used to overcome this problem with the aim to have a flat fading signal at each subcarrier. Multi-carrier method which has been developed previously is Orthogonal Frequency Division Multiplex (OFDM). However, one of the lack of this system is the value of Peak to Average Power Ratio (PAPR) is high. PAPR is a comparison of peak power with average power signal. Large PAPR values cause the sub-carriers are not orthogonal so that the OFDM performance be lower.

Recently have developed a system as an alternative to multicarrier OFDM system called OWDM (Orthogonal wavelet division multiplex). Basic idea of OWDM is replaced Inverse Discrete Fourier transform (IDFT) with the inverse discrete wavelet transform (IDWT) for generating a subcarrier-subcarrier orthogonal to each other. Like IDFT on OFDM systems, IDWT on OWDM system functions as a modulator. While as a demodulator used DFT (Discrete Fourier Transform) on OFDM and DWT (Discrete Wavelet Transform) on OWDM.

The result comparison of the performance simulation obtained that the system performance OWDM and OFDM systems in multipath Rayleigh fading channels give the same results. In AWGN channel, SNR for BER of 10^{-3} is needed both systems is ± 9,8 dB. While in multipath Rayleigh fading channel where the user speed 0 kmph, the required SNR two systems ± 14,6 dB. Then , the results of comparative simulation Peak to Average Power Ratio (PAPR), OWDM system reaches ± 2 dB less than the OFDM system. Finally, the comparison of the power spectral density (PSD) found that the PSD of OWDM system is similar to OFDM. But the division frequency band of OWDM signal is different for each sub-bands except the sub-band at the same level.

Keywords : OWDM, OFDM, *Multipath fading*, *Peak to Average Power ratio*, *Power Spectral Density*