

ABSTRACT

Recently, the development of wireless technologies is increasing and wireless technologies can be found in variety of user equipments. In wireless communication system, to send data from transmitter to receiver often experience a multipath fading. In addition, the demand for higher data rates continue to rise is needed at this time. At this time the method that has been developed is Orthogonal Frequency Division Multiplexing (OFDM). OFDM system divides the high rate of data to low rate, which transmitted simultaneously at multiple subcarriers are orthogonal . OFDM system is wasted on bandwidth. It caused by the use of Cyclic Prefix (CP). OFDM system begin to be developed and modified with other technologies to improve the efficiency and improvement of the system.

The solution that offered is OFDM system using Dual Tree Complex Wavelet Transform (DTCWT) as a comparison of the conventional OFDM system. In this scheme, the DTCWT is used to refer Fast Fourier Transform (FFT) in OFDM system. In DTCWT OFDM system to avoid waste of bandwidth due to the implementation does not require Cyclic Prefix. This system divides the frequency into the subbands of mutually orthogonal frequency. The system uses a pair of lowpass filter and highpass filter in the frequency distribution of the subbands. This scheme will compare the performance of the value of Bit Error Rate (BER) and Peak to Average Power Ratio (PAPR). Simulations performed on Rayleigh Fading channel with additional noise Additive White Gaussian noise (AWGN).

Simulation results showed that DTCWT OFDM systems have better BER performance than FFT OFDM system, it can be seen from simulation result where DTCWT OFDM systems deliver performance improvement of 1.8 dB at BER 10^{-5} . At user mobility variation, DTCWT OFDM system provides an average improvement of 1.5 to 2 dB. At variation mapper, DTCWT OFDM system provides an average improvement of 0.5 to 1 dB. So, DTCWT OFDM systems can be considered in designing a new communications system that is more reliable and produce better performance and efficient than the previous communication system.

Keyword: Wireless, OFDM, DTCWT, FFT, Cyclic Prefix, BER, PAPR, Rayleigh Fading, AWGN