ABSTRACT

Inter-Carrier Interference (ICI) as the cause of destroyed orthogonality between subcarrier at Orthogonal Frequency Division Multiplexing (OFDM) system, can be reduced by implementing FFT *Factorization* scheme as method of ICI Self Cancellation. Effect of frequency shifting (Doppler shift) is very sensitive related to orthogonality between subcarriers because it can cause imperfect synchronization at OFDM symbol detection process. Because of that, the subcarriers which contain information at the OFDM system can disturb each other. Besides, this scheme can ensure better bandwidth efficiency than other ICI self cancellation methods. This can happen because the cause of inefficient bandwidth at ICI self cancellation methods is redundancy bits usage at another subcarrier are no longer used.

At this research, FFT *Factorization* scheme implements Radix-2 Decimation In Frequency algorithm which is known as Cooley-Turkey *Factorization* that uses Butterfly algorithm at OFDM system. Consecutively at OFDM system, DIF Radix-2 FFT scheme is done by partitioning output of DFT computation that becomes even and odd part. This part will be processed with input computed at shorter DFT before modulation and demodulation process. As the result, ICI coefficient at OFDM system reduces significantly. However, by adding FFT *Factorization* scheme, the system complexity at receiver and transmitter is increased.

The Result of simulation shows that better OFDM performance with FFT *Factorization* scheme at conventional OFDM system. At OFDM system with 256 subcarriers, QPSK mapper, normalized offset frequency 0.2 and velocity at 5 kilometer per hour, FFT *Factorization* scheme with Eb/No 14 dB can ensure BER = 10^{-6} and BER = 10^{-3} at conventional OFDM system. It means that the experiment can result 999 bits information-recovery at every generated 10^6 bit by FFT *Factorization* scheme at OFDM system with same Eb/No. Besides, FFT *Factorization* scheme ensures better recovery performance at OFDM system with different mapper and velocity.

Keywords : OFDM, ICI, FFT *Factorization* as ICI Self Cancellation, BER.