

ABSTRACT

Orthogonal Frequency Division Multiplexing (OFDM) is a modulation technique that uses a large number of carriers are orthogonal to each other. The concept of OFDM is to split a high speed serial data into parallel data at a lower speed, then the parallel data are carried by mutually orthogonal subcarriers. The drawback of OFDM system is the high value of Peak to Average Power Ratio (PAPR) in which the value of the maximum power OFDM signal will be far greater than the average power, thus causing the efficiency of High Power Amplifier (HPA) is reduced. Therefore, it takes a few techniques that can reduce PAPR value.

The technique proposed in this thesis is the use of a combination of selective mapping technique (SLM) and clipping. SLM takes advantage of the properties of an OFDM signal is very sensitive to the phase shift data in the frequency domain by multiplying a phase factor row with rows of data information, then choose the multiplication result with the lowest PAPR for transmission. While clipping technique is simplest technique of reducing the PAPR, way is to limit the amplitude of the signal at a certain threshold or limit value. There are two schemes are applied in this thesis, namely the combination of serial SLM-clipping and a combination of serial clipping-SLM. The use of these combinations will be compared with SLM and clipping techniques in terms of PAPR reduction and BER performance is applied to the OFDM system. Simulation parameters using the standard Mobile WiMAX at uplink direction.

Simulation results in this thesis suggests that the target of CCDF 10^{-3} , combination of serial SLM-clipping techniques with $U = 32$ and $CR = 3$ dB has better PAPR reduction capability 0.2862 dB, 2.7181 dB and 2.7405 dB compared the clipping technique with $CR = 3$ dB, combination of serial clipping-SLM techniques with $CR = 3$ dB and $U = 32$, and the SLM technique with $U = 32$. While on the target BER 10^{-5} , combination of serial clipping-SLM techniques with $CR = 3$ dB and $U = 32$ requires EbNo of 13.6642 dB, 0.7358 dB better, 1.4777 dB, and 3.4536 dB compared the SLM technique with $U = 32$, combination of serial SLM-clipping techniques with $U = 32$ and $CR = 3$ dB, and clipping techniques with $CR = 3$ dB. Based on the trade-off between PAPR and BER, the performance of a combination of serial clipping-SLM techniques is better than other PAPR reduction were tested.

Keywords: OFDM, PAPR, SLM, *clipping*, BER.