

Impact of Hard Limited Clipping Crest Factor Reduction Technique on Bit Error Rate in OFDM Based Systems

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Abstract : In wireless communications, 3GPP LTE is one of the solutions to meet the greater transmission data rate demand. One issue inherent to this technology is the PAPR (Peak-to-Average Power Ratio) of OFDM (Orthogonal Frequency Division Multiplexing) modulation. This high PAPR affects the efficiency of power amplifiers. One approach to mitigate this effect is the Crest Factor Reduction (CFR) technique. In this work, we simulate the impact of Hard Limited Clipping Crest Factor Reduction technique on BER (Bit Error Rate) in OFDM based Systems. In general, the results showed that CFR has more effects on higher digital modulation schemes, as expected. More importantly, we show the worst-case degradation due to CFR on QPSK, 16QAM, and 64QAM signals in a linear system. For example, hard clipping of 9 dB results in a 2 dB increase in signal to noise energy at a 1% BER for 64-QAM modulation.

Keywords : bit error rate, crest factor reduction, OFDM, physical layer simulation

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