



Modelling and Simulation in Engineering

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Research Article

A New-Trend Model-Based to Solve the Peak Power Problems in OFDM Systems

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Abstract

The high peak to average power ration (PAR) levels of orthogonal frequency division multiplexing (OFDM) signals attract the attention of many researchers during the past decade. Existing approaches that attack this PAR issue are abundant, but no systematic framework or comparison between them exists to date. They sometimes even differ in the problem definition itself and consequently in the basic approach to follow. In this paper, we propose a new trend in mitigating the peak power problem in OFDM system based on modeling the effects of clipping and amplifier nonlinearities in an OFDM system. We showed that the distortion due to these effects is highly related to the dynamic range itself rather than the clipping level or the saturation level of the nonlinear amplifier, and thus we propose two criteria to reduce the dynamic range of the OFDM, namely, the use of MSK modulation and the use of Hadamard transform. Computer simulations of the OFDM system using Matlab are completely matched with the deduced model in terms of OFDM signal quality metrics such as BER, ACPR, and EVM. Also simulation results show that even the reduction of PAR using the two proposed criteria is not significant, and the reduction in the amount of distortion due to HPA is truly delightful.

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