

Abstract:

The study of nonlinear effects on orthogonal frequency division multiplexing (OFDM) signals can be made taking advantage of their Gaussian characteristics. This is relatively simple and straightforward for smooth, polynomial nonlinear characteristics, since the required number of intermodulation products (IMPs) can easily be obtained. However, the situation is more complex for clipping characteristics, since they are not differentiable and their polynomial approximation is a function of the clipping level. In this paper we consider the effects of clipping on sampled OFDM signals and we define an equivalent nonlinear characteristic that is polynomial, with small degree, whose output has the same spectral characteristics of a clipping operation. Our results show that we can use this equivalent nonlinear characteristic for studying the impact of the effects of clipping on sampled OFDM signals, allowing very accurate estimates of the power spectral density (PSD) of the output signals, as well as the corresponding signal-to-interference ratio (SIR). It can also be employed to obtain the performance of optimum receivers for clipped OFDM.

Published in: [Vehicular Technology Conference \(VTC Fall\), 2015 IEEE 82nd](#)