ANALYSIS AND TREATMENT OF THE HPA NONLINEAR EFFECTS ON THE OFDM SYSTEM

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Abstract

Orthogonal frequency division multiplexing (OFDM) technique has been recently under intensive investigation for its application on high speed wireless multiple access communication systems. Due to the large dynamic range of OFDM signals, the performance of the OFDM system is severely affected by the nonlinearity of the high power amplifiers (HPAs) at the transmitting end.

In this paper, the performance of the M-ary phase shift keying/M-ary quadrature amplitude modulation (M-PSK/M-QAM) OFDM systems are investigated in the presence of HPA nonlinearity. Traveling-wave tube amplifier (TWTA) and solid-state power amplifier (SSPA) are the two HPAs considered. A great degradation has been observed in the system performance due to the nonlinear distortions of the HPA used in the system. A nonlinear distortion compensation technique is proposed to treat the HPA nonlinearity and improve the system performance.

Keywords: OFDM, HPA, TWTA, SSPA, Nonlinearity.


References