

A low complexity selected mapping scheme for peak to average power ratio reduction with digital predistortion in OFDM systems

ABSTRACT

One of the effective methods used for reducing peak-to-average power ratio (PAPR) in orthogonal frequency division multiplexing (OFDM) systems is selected mapping (SLM). In this paper, a new SLM scheme called DSI-SLM, which is a combination of dummy sequence insertion (DSI) and conventional selected mapping (C-SLM) is proposed. Previous techniques have had some drawbacks. In DSI, increasing the number of dummy sequences to have better PAPR degrades transmission efficiency, and in C-SLM, the complexity rises dramatically when the number of sub-blocks increases. The proposed DSI-SLM scheme significantly reduces the complexity because of the reduction in the number of sub-blocks compared with the C-SLM technique while its PAPR performance is even better. To enhance the efficiency of the OFDM system and suppress the out-of-band distortion from the power amplifier nonlinearity, a digital predistortion technique is applied to the DSI-SLM scheme. Simulations are carried out with the actual power amplifier model and the OFDM signal based on the worldwide interoperability for microwave access standard and quadrature phase-shift keying modulation. The simulation results show improvement in PAPR reduction and complexity, whereas the BER performance is slightly worse.

Keyword: Digital predistortion; Dummy sequence insertion; OFDM; PAPR; Selected map