Abstract

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Exploring the effect of LED nonlinearity on the performance of layered ACO-OFDM

Visible light communication (VLC) depends on light emitting diodes (LEDs) for data transmission. This is one of the strengths of VLC motivated by high optical efficiency and low cost. However, LEDs impose nonlinear effects on the transmitted signal and limit overall system performance, especially in the case of multicarrier modulation systems. This paper extends to the layered asymmetrically clipped optical, orthogonal frequency division multiplexing (LACO-OFDM) and investigates the impact of LED nonlinearity on system performance. The effect of the second order nonlinear distortion in addition to the clipping noise is presented and analyzed at different power values assuming different strengths of nonlinearity. With a variable number of layers, the system performance is explored considering a nonlinear LED model. Finally, the impact of nonlinearity is investigated in the case of ACO-OFDM for the sake of comparison, bearing in mind that ACO-OFDM represents the first layer of LACO-OFDM.