

Visible light communication (VLC) systems using the indoor lighting system to also provide downlink communications require high-average optical powers to satisfy the illumination needs. This can cause high-amplitude signals common in higher-order modulation schemes to be clipped by the peak power constraint of the light emitting diode (LED) and lead to high-signal distortion. In this paper, we introduce Hadamard coded modulation (HCM) to achieve low error probabilities in LED-based VLC systems needing high-average optical powers. This technique uses a fast Walsh-Hadamard transform (FWHT) to modulate the data as an alternative modulation technique to orthogonal frequency division multiplexing (OFDM). HCM achieves a better performance for high-illumination levels because of its small peak to average power ratio (PAPR). The power efficiency of HCM can be improved by reducing the DC part of the transmitted signals. The resulting so-called DC-reduced HCM (DCR-HCM) is well suited to environments requiring dimmer lighting.