

Modelling and Performance Analysis of Visible Light Communication System in Industrial Implementations

ABSTRACT

Visible light communication (VLC) has a paramount role in industrial implementations, especially for better energy efficiency, high speed-data rates, and low susceptibility to interference. However, since studies on VLC for industrial implementations are in scarcity, areas concerning illumination optimisation and communication performances demand further investigation. As such, this paper presents a new modelling of light fixture distribution for a warehouse model to provide acceptable illumination and communication performances. The proposed model was evaluated based on various semi-angles at half power (SAAHP) and different height levels for several parameters, including received power, signal to noise ratio (SNR), and bit error rate (BER). The results revealed improvement in terms of received power and SNR with 30 Mbps data rate. Various modulations were studied to improve the link quality, whereby better average BER values of 5.55×10^{-15} and 1.06×10^{-10} had been achieved with 4 PAM and 8 PPM, respectively. The simulation outcomes are indeed viable for the practical warehouse model.