

Abstract

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Bandwidth Extension of an Enhanced SNR with a higher Light Uniformity of a Phosphorescent White LED Based Visible Light Communication System

—This paper increases the bandwidth of a phosphorescent white light emitting diode (LED) employed in an indoor visible light communication (VLC) system. A new distribution pattern for the same number of used LEDs increased the signal to noise ratio (SNR) and enhanced the uniformity of the illumination. The indoor VLC system is modelled using the proposed pattern and the theoretical analysis is presented. Compared to other studied patterns, the average power received was increased from 1.62 dBm to 3.17 dBm, simulations using MATLAB show the improvement in the power received distribution within the room. The maximum bit error rate (BER) at a data rate of 30 Mb/s was also reduced from 3.26×10^{-25} to 1.59×10^{-25} . A proposed design to the equalization circuit at the transmitter end was also presented that was able to extend the VLC link bandwidth from a few Megahertz (MHz) to 325MHz.