

# Abstract

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## **Bandwidth and BER Improvement Employing a Pre-Equalization Circuit with White LED Arrays in a MISO VLC System**

This paper aims to extend the limited bandwidth of phosphorescent white LEDs for a multiple-input single-output (MISO) visible light communication (VLC) system. A proposed LED arrangement model is presented, resulting in improved results as compared to those previously discussed in the literature. In this paper, the impact of the receiver field of view (FOV) angle, the LED transmission angle, and the number of LED arrays used on the transmission are studied at different speeds. The system performance is measured by the signal to noise ratio (SNR) and the corresponding bit error rate (BER) at different data rates. The obtained results show that the proposed model is able to improve the illumination uniformity across the room with a higher SNR using the same number of LEDs in the investigated indoor environment. The paper also introduces a pre-equalization circuit in the transmitter end in order to extend the limited bandwidth of the used white LEDs. This bandwidth extension using the proposed circuit results in an increased data rate with the aid of a blue filter. A number of experiments are executed to optimize the key parameters for maximum bandwidth enhancement. The proposed circuit offers 28% bandwidth enhancement over the most recent study in this area while eradicating the BER at 200 Mb/s when compared to un-equalized LED circuits.