

Abstract

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Improved Light Uniformity and SNR Employing LED Distribution Pattern for Indoor Applications in VLC system

In this paper, a new LED arrangement design using 16 LED array in an indoor VLC system is introduced. The performance of the proposed design is investigated and compared with other different (previously introduced) designs using the same number of LED arrays. Our aim is to increase light uniformity and decrease power and SNR fluctuations across the room without increasing number of LED arrays. The received power and SNR were calculated to evaluate the system performance, while the root mean square delay spread was calculated to analyze the intersymbol interference impact on the system performance. The power standard deviation (STD) was calculated as well to measure uniformity of distributed power. The received power fluctuations under our proposed LED lamp arrangement were reduced from 4.46 to 0.93 dBm, the STD is decreased from 1.01 to 0.23, and the SNR fluctuations were reduced from 9 to 1.8 dB leading to almost identical communication across the entire room with high quality.