

Enhanced Bit Error Rate in Visible Light Communication: A New LED Hexagonal Array Distribution

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Abstract : Due to the exponential growth of mobile devices and wireless services, a huge demand for radiofrequency has increased. The presence of several frequencies causes interference between cells, which must be minimized to get the lower Bit Error Rate (BER). For this reason, it is of great interest to use visible light communication (VLC). This paper suggests a VLC system that decreases the BER by applying a new LED distribution with a hexagonal shape using a Frequency Reuse (FR) concept to mitigate the interference between the reused frequencies inside the hexagonal shape. The BER is measured in two scenarios, Line of Sight (LoS) and Non-Line of Sight (Non-LoS), for each technique that we used. The recommended values of BER in the proposed model for Soft Frequency Reuse (SFR) in the case of LoS at 4, 8, and 10 dB signal to noise ratio (SNR), are 3.6×10^{-6} , 6.03×10^{-13} , and 2.66×10^{-18} , respectively.

Keywords : visible light communication (VLC), field of view (FoV), hexagonal array, frequency reuse

Conference Title : ICECE 2022 : International Conference on Electronics and Communication Engineering

Conference Location : Rome, Italy

Conference Dates : March 03-04, 2022