

Usage of Channel Coding Techniques for Peak-to-Average Power Ratio Reduction in Visible Light Communications Systems

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Abstract : High peak-to-average power ratio (PAPR) is a concern of orthogonal frequency division multiplexing (OFDM) based visible light communication (VLC) systems. Discrete Fourier Transform spread (DFT-s) OFDM is an alternative single carrier modulation scheme which would address this concern. Employing channel coding techniques is another mechanism to reduce the PAPR. Previous research has been conducted to study the impact of these techniques separately. However, to the best of the knowledge of the authors, no study has been done so far to identify the improvement which can be harnessed by hybridizing these two techniques for VLC systems. Therefore, this is a novel study area under this research. In addition, channel coding techniques such as Polar codes and Turbo codes have been tested in the VLC domain. However, other efficient techniques such as Hamming coding and Convolutional coding have not been studied too. Therefore, the authors present the impact of the hybrid of DFT-s OFDM and Channel coding (Hamming coding and Convolutional coding) on PAPR in VLC systems using Matlab simulations.

Keywords : convolutional coding, discrete Fourier transform spread orthogonal frequency division multiplexing, hamming coding, peak-to-average power ratio, visible light communications

Conference Title : ICLFT 2022 : International Conference on Li-Fi Technology

Conference Location : New York, United States

Conference Dates : August 08-09, 2022