Abstract

Moustafa Hussein Aly

Indoor Wavelet OFDM VLC-MIMO System: Performance Evaluation

Both light emitting diode (LED) characteristics for illumination and communication simultaneously have made visible light communication-orthogonal frequency division multiplexing (VLC-OFDM) a strong competitive to radio frequency (RF). In this juncture, to improve signal to noise ratio (SNR) and coverage contour, the wavelet-OFDM is suggested for indoor VLC systems. In this paper, a wavelet VLC-OFDM is proposed for imaging multiple-input multiple-output (MIMO) systems. The proposed wavelet-OFDM is exploited for a hybrid space-frequency domain pre-equalization technique instead of the traditional fast Fourier transform (FFT)-OFDM technique. The Meyer filter is Selected and employed in the proposed technique. A comparable achievement is elaborated for several numbers of channels to achieve the enhanced performance in terms of bit rate and coverage contour. In addition, a useful comparison is executed between our wavelet VLCOFDM and the traditional FFT-OFDM for a hybrid space-frequency domain pre-equalization technique. The simulation results emphasize the superiority point of wavelet VLC-OFDM MIMO system by improving the coverage contour by ~20% over the traditional OFDM at a 10^{-3} bit error rate (BER) target. Hence, the proposed technique can be potentially executed in indoor VLC-MIMO systems.