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Energy efficiency of visible light communication system using OFDM and SC-FDE

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Wireless internet access technology can experience a major revolution through the use of breakthrough technology of Visible Light Communication (VLC) or Li-Fi (light fidelity) which could promise much higher data rates and better security and integrity of the data at the physical layer. There are many challenges being faced when visible light communication is being used resulting in low efficiency of the system. The main purpose of this paper is to endeavour to achieve highest data rate possible in an indoor environment while tackling problems which include low modulation bandwidth of the transmitters currently used. This paper targets two novel techniques of orthogonal frequency division multiplexing (OFDM) and single carrier frequency-domain equalization (SC-FDE) for gigabyte per second (Gbps) short-range optical wireless access networks based on direct intensity modulation with direct detection (IM-DD). Efficiency was measured in terms of peak-to-average power ratio (PAPR) where a significant reduction was obtained relative to asymmetrically clipped optical OFDM (ACO-OFDM). Bit error performance (BER) was also an indicator of efficiency for both the methods. The use of polar representation for complex signals were proposed to achieve a much higher data rate and spectral efficiency so the novel idea of using Polar OFDM and Polar SC-FDE were investigated and evaluated.

Biography

Samavia Rizwan is in the final year of his Bachelor's degree in Electrical Engineering at the University of Wollongong. His professional memberships include the following but not limited to Institute of Electrical and Electronics Engineer (IEEE), and Engineers Australia.

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