

AC-based phosphor LED visible light communication by utilizing novel signal modulation

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Abstract We propose and demonstrate a new AC-light emitting diode based visible light communication system, in which the message signal is up-converted to 400 kHz frequency band and combine with the 60 Hz AC-power from the outlet. A special design bias-tee circuit is first implemented to combine the message signal and the AC-power for minimizing the signal distortion. Thus, the spectra of both signals are well separated. A special design clock recovery is used to synchronize the AC-power with the message signal; hence the message signal can be correctly applied to the rectified AC-power cycle.

Keywords AC LED · Visible light communication (VLC) · Networking

1 Introduction

Light emitting diodes (LEDs) have the benefits of high-efficiency, low-cost and long lifetime etc. Hence, LED would be important for general lighting in the near future. Furthermore, LED could also be used in visible light communication (VLC) due to its characteristic of faster modulation speed when compared with the conventional lighting sources, such as fluorescent lamp. Besides, the LED VLC transmission can provide the advantages of license-free, electromagnetic interference free (EMI-free), and cable free wireless communications. However, due to the direct modulation bandwidth limitation of the LED, digital equalizations

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