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Visible Light Communication and Challenges

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Abstract : Visible light communication is an emerging technology for almost a decade now; there is a growing need for VLC systems to overcome the challenges faced by radio frequency RF communication systems. With the advancement in the development of solid-state sources, in the future would replace incandescent and fluorescent light sources. These solid-state devices are not only to be used for illumination but can also be employed for communication and navigational purposes. The replacement of conventional illumination sources with highly efficient light-emitting diodes (LED's) (generally white light) will reduce energy consumption as well as environmental pollution. White LEDs dissipate very less power as compared to conventional light sources. The use of LED's is not only beneficial in terms of power consumption, but it also has an intrinsic capability for indoor wireless communication as compared to indoor RF communication. It is considerably low in cost to operate than the RF systems such as Wi-Fi routers, allows convenient means of reusing the bandwidth, and there is a huge potential for high data rate transmissions with enhanced data security. This paper provides an overview of some of the current challenges with VLC and proposes a possible solution to deal with these challenges; it also examines some joint protocols to optimize the joint illumination and communication functionality.

Keywords : visible light communication, line of sight, root mean square delay spread, light emitting diodes
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