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Optical Repeater Assisted Visible Light Device-to-Device Communications

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Abstract : Device-to-device (D2D) communication is considered a promising technique to provide wireless peer-to-peer communication services. Due to increasing demand on mobile services, available spectrum for radio frequency (RF) based communications becomes scarce. Recently, visible light communications (VLC) has evolved as a high speed wireless data transmission technology for indoor environments with abundant available bandwidth. In this paper, a novel VLC based D2D communication that provides wireless peer-to-peer communication is proposed. Potential low operating power devices for an efficient D2D communication over increasing distance of separation between devices is analyzed. Optical repeaters (OR) are also proposed to enhance the performance in an environment where direct D2D communications yield degraded performance. Simulation results show that VLC plays an important role in providing efficient D2D communication up to a distance of 1 m between devices. It is also found that the OR significantly improves the coverage distance up to 3.5 m.

Keywords : visible light communication, light emitting diode, device-to-device, optical repeater
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