IDMP-VLC: IoT Device Management Protocol in Visible Light Communication Networks

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Abstract— The Internet of Things (IoT) can be used to help a variety of things connected to the network in home, building, factory, city, and so on. In the meantime, the Visible Light Communication (VLC) based on Light Emitting Diode (LED) has been focused as future communication facility. In this paper, we propose the IoT Device Management Protocol (IDMP) with VLC, named IDMP-VLC, which can be used to manage IoT devices in VLC networks. The IDMP-VLC protocol is a simple and self-configurable device management protocol. It provides device initialization and management operations, and data transmission operation. The IDMP-VLC will use IPv6 with IPv6 over Low power Wireless Personal Area Network (6LoWPAN). In the proposed scheme, the two different transmission schemes are used for communication between lighting device and IoT device: VLC for downstream from lighting to IoT device and WPAN (ZigBee or Bluetooth) for upstream from IoT device to lighting device. The proposed protocol is implemented and experimented with various devices on top of the Java Virtual Machine (JVM). From the experimentation, it is shown that the proposed IDMP-VLC can be effectively used for initialization, management, and data transmission with IoT devices over VLC networks.

Keyword— Visible Light Communication, Internet of Things, IDMP, 6LoWPAN, CoAP

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