**P802.15.xx**

Submitter Email: bheile@ieee.org
Type of Project: New IEEE Standard
PAR Request Date: 10-June-2019
PAR Approval Date:PAR Expiration Date:Status: Unapproved PAR, PAR for a New IEEE Standard

1.1 Project Number: P802.15.7r2
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title:

Standard for High Rate OCC Study Group

3.1 Working Group: Wireless Personal Area Network (WPAN) Working Group (C/LM/WG802.15)
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3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: Mar. 2022
4.3 Projected Completion Date for Submittal to RevComNote: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: Nov. 2022

5.1 Approximate number of people expected to be actively involved in the development of this project: 30
5.2 Scope: This standard revises the Physical (PHY) and Media Access Control (MAC) layer in the existing IEEE 802.15.7-2018 for short range optical wireless communication (OWC). The current IEEE 802.15.7-2018 standard has already considered vehicular communication particularly within PHY IV modes. However, only few modulation schemes, with only the capability of delivering hundred-kilo-bps of data rate, can be candidates for vehicular applications. A new standard for high-rate OCC can add one PHY working mode for addressing strict requirements of vehicular communications and specific vehicular applications. This revised standard provides optical camera communication technology using light wavelengths from 10000 nm to 190 nm (VLC to NIR) with optional of laser technology in optically transparent media for AI-based high rate optical camera communications. The standard is capable of delivering data rates up to 100 Mbit/s. It is designed for point-to-point and point-to-multipoint communication. The standard includes adaptation to varying channel conditions and maintaining connectivity during high mobility (speed up to 350 km/h), flicker mitigation, RF co-existence, distance range (up to 200 m). MIMO concept (e.g. MIMO-OFDM) can also be provided in this standard to deal with high-level of interference in the challenged communication environments while guarantee the high-rate data transmission. The standard adheres to applicable eye safety regulations. The standard may include relaying mechanisms enabling heterogeneous operation with existing RF wireless data communications standards.

5.3 Is the completion of this standard dependent upon the completion of another standard: No
5.4 Purpose: This purpose of this standard is to utilize OWC/OCC, to provide a global solution initially targeting industrial applications requiring, secure, high data rate (up to 100Mbits/sec), and long range optical camera communication (up to 200m). The standard provides (i) access to unlicensed spectrum; (ii) inherent communication security due to inability to penetrate through optically opaque walls, (iii) data delivery without using RF spectrum; (iv) AI-based PHY and MAC layers; and (v) communication augmenting and complementing existing services (such as illumination, indication, localization, etc.). These are also attributes that will be valuable in commercial and business settings, both of which are expected to be significant emerging markets.

5.5 Need for the Project: Given the growing expectation of ubiquitous wireless connectivity in high mobility environments, the rapid development of AI concept for PHY for effective and high-speed signal processing, the need for unlicensed, high bandwidth, easy-to-use wireless communications technology, immune to RF interference and which does not overload existing RF spectrum or necessarily require additional hardware, has never been greater. This standard specifically addresses these needs. In particular, optical wireless based solutions to this problem address a significant opportunity, extending to billions of existing industrial devices, to provide secure, non RF based communications between industrial devices and/or between industrial devices and fixed infrastructure on a one to one, or one to many or many to one basis at acceptable data rates. Potential applications include ADAS, V2X communication, control of mobile robots in a personalized manufacturing cells or at an assembly lines, automated guided vehicular systems, collision avoidance in V2X network or drone network, small cell backhaul, patient monitoring in hospitals, security monitoring in manufacturing factories and petrochemical plants, etc, secure communications in nuclear facilities, etc. There is also a similar emerging need in commercial/business settings, especially in environments requiring high data rates and high levels of security.

5.6 Stakeholders for the Standard: automotive manufacturers, locomotive manufacturers, ship manufacturers, drone and aircraft manufacturers, robot manufacturers, logistics companies, industrial devices manufacturers, system integrators, medical equipment manufacturers, lighting manufacturers, silicon providers, chemical manufacturers, networking equipment manufacturers, and academic researchers.

Intellectual Property6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint DevelopmentIs it the intent to develop this document jointly with another organization?: No

8.1 Additional Explanatory Notes: