

P802.15.7a

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Type of Project: Amendment to IEEE Standard 802.15.7-2018

PAR Request Date: 19-Sep-2019

PAR Approval Date:

PAR Expiration Date:

Status: Unapproved PAR, PAR for an Amendment to an existing IEEE Standard

1.1 Project Number: P802.15.7a

1.2 Type of Document: Standard

1.3 Life Cycle: Full Use

2.1 Title: Draft Standard for Local and metropolitan area networks - Part 15.7: Short-Range Optical Wireless Communications Amendment defining High Data Rate Optical Camera Communications (OCC)

3.1 Working Group: Wireless Personal Area Network (WPAN) Working Group (C/LM/WG802.15)

Contact Information for Working Group Chair

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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: 07/2022

4.3 Projected Completion Date for Submittal to RevCom

Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 02/2023

5.1 Approximate number of people expected to be actively involved in the development of this project: 20

5.2.a. Scope of the complete standard: This standard defines a Physical (PHY) and Media Access Control (MAC) layer for short-range optical wireless communications in optically transparent media using light wavelengths from 10,000 nm to 190 nm. The standard is capable of delivering data rates sufficient to support audio and video multimedia services and also considers mobility of the optical link, compatibility with various light infrastructures, impairments due to noise and interference from sources like ambient light and a MAC layer that accommodates the unique needs of visible links as well as the other targeted light wavelengths. It also accommodates optical communications for cameras where transmitting devices incorporate light emitting sources and receivers are digital cameras with a lens and image sensor. The standard adheres to applicable eye safety regulations.

5.2.b. Scope of the project: This amendment defines a high-rate Optical Camera Communications (OCC) Physical Layer (PHY) using light wavelengths from 10000 nm to 190 nm in optically transparent media. It is capable of delivering data rates up to 100 Mbit/s and is designed for point-to-point and point-to-multipoint communication. Adaptation to varying channel conditions and maintaining connectivity during high mobility (speeds up to 350 km/h), flicker mitigation, RF co-existence, and a communication range of up to 200 m, are included. MIMO (e.g. MIMO-OFDM) is utilized to deal with high-levels of optical interference while maintaining high-rate data transmission. Relaying mechanisms are included enabling heterogeneous operation with existing RF wireless data communications standards. The Amendment adheres to applicable eye safety regulations.

5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: This standard provides a global standard for short-range optical wireless communication. The standard provides (i) access to several hundred THz of unlicensed spectrum; (ii) immunity to electromagnetic interference and noninterference with Radio Frequency (RF) systems; (iii) for visible light systems, additional security by allowing the user to see the communication channel; and (iv) communication augmenting and complementing existing services (such as illumination, display, indication, decoration, etc.).

5.5 Need for the Project: Given the growing need for ubiquitous wireless connectivity in high mobility environments, 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 amendment specifically addresses these needs. In particular, OCC based Optical Wireless Communications (OWC) solutions to this problem address a significant opportunity, extending to billions of existing communication devices, providing secure, non RF based communications between industrial devices and/or between consumer 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 manufacturing cells or on assembly lines, automated guided vehicular systems, collision avoidance in V2X or drone networks, small cell backhaul, patient monitoring in hospitals, security monitoring in manufacturing factories and petrochemical plants, 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, academic researchers and end users.

Intellectual Property

6.1.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?: Yes

If yes please explain: Submitted only for RAC awareness and review

7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development

Is it the intent to develop this document jointly with another organization?: No

8.1 Additional Explanatory Notes: