P802.15.4ab

Submitter Email:
Type of Project: Amendment to IEEE Standard 802.15.4-2020
Project Request Type: Initiation / Amendment
PAR Request Date:
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PAR Expiration Date:
PAR Status: Draft
Root Project: 802.15.4-2020

1.1 Project Number: P802.15.4ab
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Project Title: IEEE Standard for Low-Rate Wireless Networks Amendment: Enhanced Ultra Wide-Band (UWB) Physical Layers (PHYs) and Associated MAC Enhancements.

3.1 Working Group: Wireless Specialty Networks (WSN) Working Group(C/LM/802.15 WG)
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE SA for Initial Standards Committee Ballot: Dec 2022
4.3 Projected Completion Date for Submittal to RevCom: Dec 2023

5.1 Approximate number of people expected to be actively involved in the development of this project: 40
5.2.a Scope of the complete standard: This standard defines the physical layer (PHY) and medium access control (MAC) sublayer specifications for low-data-rate wireless connectivity with fixed, portable, and moving devices with no battery or very limited battery consumption requirements. In addition, the standard provides modes that allow for precision ranging. PHYs are defined for devices operating in a variety of geographic regions.
5.2.b Scope of the project: This amendment enhances the Ultra Wideband (UWB) physical layers (PHYs) medium access control (MAC), and associated ranging techniques while retaining backward compatibility with enhanced ranging capable devices (ERDEVs).
Areas of enhancement include: additional coding, preamble and modulation schemes to support improved link budget and/or reduced air-time; additional channels and operating frequencies; interference mitigation techniques to support higher density and higher traffic use cases; improvements to accuracy, precision and reliability and interoperability for high-integrity ranging; schemes to reduce complexity and power consumption; definitions for tightly coupled hybrid operation with narrowband signaling to assist UWB; enhanced native discovery and connection setup mechanisms; sensing capabilities to support presence detection and environment mapping; and mechanisms supporting low-power low-latency streaming as well as high data-rate streaming allowing at least 50 Mbit/s of throughput.
Support for peer-to-peer, peer-to-multi-peer, and station-to-infrastructure protocols are in scope, as are infrastructure synchronization mechanisms. This amendment includes safeguards so that the high

throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases.

5.3 Is the completion of this standard contingent upon the completion of another standard? No
5.4 Purpose: The standard provides for ultra low complexity, ultra low cost, ultra low power consumption, and low data rate wireless connectivity among inexpensive devices, especially targeting the communications requirements of what is now commonly referred to as the Internet of Things. In addition, some of the alternate PHYs provide precision ranging capability that is accurate to one meter. Multiple PHYs are defined to support a variety of frequency bands.
5.5 Need for the Project: The application of Ultra Wideband (UWB) has expanded and is included in many kinds of devices including high volume consumer platforms. UWB is being applied to an ever wider range of applications using the unique capabilities of UWB to provide very accurate ranging, localization, sensing and data communication with excellent coexistence properties. New applications require added flexibility and scalability varying in size, shape and number of devices in a network from a few devices within a meter or less of each other to hundreds or more devices with distances of up to 100m. This amendment enables use of the standard in application areas previously addressed with non-standard solutions. The project addresses demands of users in the consumer, public health, industrial and transportation sectors using UWB in widely varying environments.
5.6 Stakeholders for the Standard: The stakeholders include chip vendors, product manufacturers and users of consumer, industrial, transportation, public health.

6.1 Intellectual Property

6.1.1 Is the Standards Committee aware of any copyright permissions needed for this project? No

6.1.2 Is the Standards Committee aware of possible registration activity related to this project? No

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

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8.1 Additional Explanatory Notes: This amendment builds upon the base standard to address current and emerging application requirements in a vastly expanding application space for UWB. This amendment addresses the need to expand available data rates to both lower rates with greater distances and higher rates at short distances, to expand trade-off options among distance, rate and energy consumption. The inherently low impact coexistence characteristics of UWB makes it attractive to use in conjunction with other wireless technologies and supports a high density of devices in a given space. MAC enhancements leveraging these characteristics which improve handling of new kinds of data content combined with high precision ranging and sensing in both static and dynamic environments, add support for coordinated use of multiple PHYs and multiple links, and enhance support for integration within the 802 architecture. Compatibility and positive coexistence with legacy ERDEVs is provided to enhance without disruption the capabilities provided by already deployed devices.