

IEEE P802.15
Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)		
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Title	Enhanced Ultra WideBand (UWB) Physical Layers (PHYs) and Associated MAC Enhancements Criteria for Standards Development Draft		
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Abstract	[CSD for 802.15.4ab]		
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Purpose	[CSD and PAR development]		
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IEEE 802 LAN/MAN STANDARDS COMMITTEE (LMSC)

CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 4 August 2020
Last edited 31 August 2020

1. IEEE 802 criteria for standards development (CSD)

The CSD documents an agreement between the WG and the Sponsor that provides a description of the project and the Sponsor's requirements more detailed than required in the PAR. The CSD consists of the project process requirements, 1.1, and the 5C requirements, 1.2.

1.1 Project process requirements

1.1.1 Managed objects

Describe the plan for developing a definition of managed objects. The plan shall specify one of the following:

- a) The definitions will be part of this project. **Yes**
- b) The definitions will be part of a different project and provide the plan for that project or anticipated future project.
- c) The definitions will not be developed and explain why such definitions are not needed.

1.1.2 Coexistence

A WG proposing a wireless project shall prepare a Coexistence Assessment (CA) document unless it is not applicable.

- a) Will the WG create a CA document as part of the WG balloting process as described in Clause 13? (yes/no) **Yes**
- b) If not, explain why the CA document is not applicable.

1.2 5C requirements

1.2.1 Broad market potential

Each proposed IEEE 802 LMSC standard shall have broad market potential. At a minimum, address the following areas:

- a) Broad sets of applicability.
Currently the capabilities provided by the IEEE Std 802.15.4 UWB PHYs (IEEE Std 802.15.4-2020 and IEEE Std 802.15.4z-2020) enable a wide variety of applications based on the unique capabilities of highly precise ranging, localization, sensing and communication. Applications range from consumer products to high social value uses such as contact tracing. As adoption and availability of UWB continues to expand in

consumer platforms, there are other applications for UWB beyond ranging. There are applications where enhancement to the existing standard can further promote standards-based solutions. This project will continue enhancing the capabilities for ranging, localization and sensing, and target new application requirements taking advantage of the unique bandwidth available to UWB for supporting low latency data transport capabilities and increase the tradeoff between range, data rate and power consumption. This standard will address applications in:

- Consumer products: Personal devices such as wearables, phones, and related connected devices.
- Industrial users: Location and tracking of objects and people, sensing.
- Transportation: Vehicle entry, vehicle location, and proximity sensing

b) Multiple vendors and numerous users.

UWB technology based upon the current standard, IEEE Std 802.15.4, is presently deployed in many devices from many vendors. There are multiple vendors providing ICs, modules and supporting subsystems. This project builds upon that technology and so assures support from multiple vendors. The availability of UWB capabilities in commodity consumer devices is spawning a plethora of new applications supporting many user groups. This amendment to IEEE Std 802.15.4 will enable further growth in the breadth and depth of applications using IEEE Std 802.15.4 based UWB solutions.

1.2.2 Compatibility

Each proposed IEEE 802 LMSC standard should be in conformance with IEEE Std 802, IEEE 802.1AC, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 WG prior to submitting a PAR to the Sponsor.

- a) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q? **No.**
- b) If the answer to a) is no, supply the response from the IEEE 802.1 WG. This project is an amendment to an existing standard for which it has been previously determined that compliance with the above IEEE 802 standards is not possible.

The review and response is not required if the proposed standard is an amendment or revision to an existing standard for which it has been previously determined that compliance with the above IEEE 802 standards is not possible. In this case, the CSD statement shall state that this is the case.

1.2.3 Distinct Identity

Each proposed IEEE 802 LMSC standard shall provide evidence of a distinct identity. Identify standards and standards projects with similar scopes and for each one describe why the proposed project is substantially different.

This project builds on the distinct identity of IEEE Std 802.15.4 in providing low power, low complexity and flexibility. The project will address device needs such as highly efficient peer to peer topologies; The very high accuracy ranging, localization and sensing and moderate data

rates enabled by the Impulse Radio Ultra Wideband (IR-UWB) is distinct from other 802 wireless technologies optimized for high data rates. The IR-UWB PHYs can provide very precise relative timing (sub nanosecond) near instantaneously (with a single reception). The very low transmit power and noise-like characteristics of the IR-UWB signals can enable small coexistence impacts and enable high density use of heterogeneous wireless technologies in a given space.

1.2.4 Technical Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence that the project is technically feasible within the time frame of the project. At a minimum, address the following items to demonstrate technical feasibility:

- a) Demonstrated system feasibility.
The existing IEEE Std 802.15.4 UWB PHYs have been implemented in volume and widely deployed in many applications, demonstrating feasibility and value. This project builds upon this proven technology.
- b) Proven similar technology via testing, modeling, simulation, etc.
The enhancements created by this project have been proven by implementation, testing and demonstration in non-standards-based products, prototypes and demonstration systems. This project brings these proven capabilities into the standard in a way compatible with existing standards-based solutions.

1.2.5 Economic Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence of economic feasibility. Demonstrate, as far as can reasonably be estimated, the economic feasibility of the proposed project for its intended applications. Among the areas that may be addressed in the cost for performance analysis are the following:

- a) Known cost factors.
The proposed amendment enhances capabilities defined in the existing standard and does not add any significant cost to either the infrastructure or the attached stations.
- b) Balanced costs.
The standard is built upon IEEE Std 802.15.4 UWB which has been widely deployed at reasonable costs.
- c) Consideration of installation costs.
There are no or at most minimal additional costs associated with installation.
- d) Consideration of operational costs (e.g., energy consumption).
Costs associated with operation are negligible.
- e) Other areas, as appropriate.