**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | New Standard – “Narrow Band” (a.k.a. Non-UWB) PHYsandNew Standard – UWB PHYsCriteria for Standards Development Draft |
| Date Submitted | [26-April-2021] |
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| Re: |  |
| Abstract | [CSD for 802.15.14 & 802.15.15] |
| Purpose | [CSD and PAR development] |
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CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 13 November 2015

Last edited 3 December 2015

 **Title:**

IEEE Standard for

[New standards for 802.15.4 Non-UWB PHYs and UWB PHYs]

# 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.

## Project process requirements

### Managed objects

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

1. The definitions will be part of this project. Yes
2. The definitions will be part of a different project and provide the plan for that project or anticipated future project.
3. The definitions will not be developed and explain why such definitions are not needed.

###  Coexistence

A WG proposing a wireless project shall demonstrate coexistence through the preparation of a Coexistence Assurance (CA) document unless it is not applicable.

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

## 5C requirements

### Broad market potential

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

1. Broad sets of applicability.

Currently the 802.15.4 standard is extensively implemented for an increasingly diverse range of applications including low complexity, very low cost, very 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. 802.15.4 specifies a range of PHYs which are suitable for vastly different applications. These include higher data rate PHYs for lower latency applications, and low data rate with increased link budget for challenging environments. In addition, some of the alternate PHYs provide precision ranging capability that is accurate to much better than one meter. Multiple PHYs are currently defined to support a variety of frequency bands.

Applications include utility, smart city, industrial, entertainment and other consumer products including smart phones, automotive, and the list keeps growing.

This project builds upon the existing standard, simplifying use of the standard to enable further adoption.

1. Multiple vendors and numerous users.

802.15.4 has been extensively adopted. The existing standard is used by a number of industry alliances, including ISA100, Thread, Wi-SUN, ZigBee, the Connected Car Consortium (CCC), Fine Ranging Consortium (FiRa), and the UWB Alliance. There are hundreds of vendors of 802.15.4 products and solutions. The number of deployed devices is estimated in the 100s of millions and this figure continues to grow. The enhancements included in this project are implementable by many of these existing vendors and will attract many new vendors supporting many different user communities.

### 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.

1. Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?

No. While the amendment shall comply with IEEE Std 802, it cannot comply with IEEE Std 802.1Q and IEEE Std 802.1AC because IEEE Std 802.15.4 uses 64-bit MAC addresses.

1. If the answer to a) is no, supply the response from the IEEE 802.1 WG.

Compliance with IEEE Std 802.1Q and IEEE Std 802.1AC is not possible due to IEEE Std 802.15.4 using 64-bit MAC addresses

* + 1. 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 802.15.4 in providing low power, low complexity and flexibility. The success of 802.15.4 has caused it to evolve into a large and complex standard which becomes increasingly complex both to use and to amend/enhance. For example, certain MAC functionality is added to take full advantage of specific PHY capabilities, but which is not applicable for other PHYs.

UWB PHYs with their associated MAC functionality are being used by no fewer than 3 upper layer business alliances, including CCC, FiRa, and UWBA, with more to come. “Narrow Band” (or non-UWB) PHYs are being used by no fewer than 4 upper layer business alliances, including ISA100, Thread, Wi-SUN, and ZigBee Alliance.

With the tremendous growth of these 2 unique application domains it has become apparent that separation of the UWB PHYs and the other “Narrow Band” (Non-UWB) PHYs, with their associated MAC functionality, into 2 distinct standards, will improve the “Distinct Identity” of each standard. This separation will allow each standard to further evolve more easily, each with distinct identity.

### 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:

1. Demonstrated system feasibility.

The existing 802.15.4 PHYs have been implemented in volume and widely deployed in many applications, demonstrating feasibility and value. This standard consolidates this proven technology.

1. Proven similar technology via testing, modeling, simulation, etc.

Any enhancements created by this project will have been proven by implementation, testing and demonstration in existing standards-based and 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.

### 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:

1. Balanced costs (infrastructure versus attached stations).

The proposed new standard consolidates the PHYs and applicable MAC functionality in 802.15.4 and does not add any significant cost to either the infrastructure or the attached stations.

1. Known cost factors.

 The standard is built upon 802.15.4 which has been widely deployed at reasonable costs.

1. Consideration of installation costs.

There are no or at most minimal additional costs associated with installation.

1. Consideration of operational costs (e.g., energy consumption).

Costs associated with operation are negligible.

1. Other areas, as appropriate.

 None.