**IEEE P802.15**

**Wireless Specialty Networks**

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| Project | IEEE P802.15 Working Group for Wireless Specialty Networks (WSNs) | |
| Title | Technical Specification Framework for 802.15.4ab | |
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| Re: | Developing technical content | |
| Abstract | This document provides a framework from which amendment draft content will be developed. | |
| Purpose | Support development of technical content for the draft | |
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Technical Specification Framework

For 802.15.4ab

# Overview

## Purpose of the Technical Specification Framework

The purpose of this document is to provide a framework for developing content from which the amendment draft text can be developed. This document is intended to reflect the working consensus of the group on the outline for the amendment and capture feature and specifications as consensus is reached. As such it is expected to begin with minimal detail reflecting agreement on specific techniques and identifying areas where specification effort is required. In other words, this is a continuous work in progress in support of draft development.

The organization of this document follows the outline of the standard. It is expected that this amendment will not include all content for all clauses. Inclusion in the framework is intended to promote consideration of “the big picture” as we assemble technical content for consideration of how the content we are adding or changing affects the overall standard. Not all PHY clauses are included, only those where changes are anticipated. We can add and/or remove clauses as the framework develops.

The goal is understanding what needs to be put in the draft. As technical proposals are accepted by the group they are fit into the framework. This helps to identify where further contributions are needed to achieve a technically complete specification to be included in the draft standard.

# References

For the technical specification frame work, consider all references that may be helpful in understanding the content contained herein. When we transition to preparation of the standard draft, the group will determine, with guidance from the technical editor, what to include as normative references and what to include in the bibliography.

# Definitions, acronyms, and abbreviations

## Definitions

Add new definitions of terms used. Keep in mind definitions of terms is not to contain any requirements, functional descriptions or details with regard to characteristics of the thing the term describes. If a term is used only once, it’s meaning should be made clear where it is used and the term should not be included in clause 3.

## Acronyms and abbreviations

Note that if an acronym or abbreviation is used only once, it is not appropriate: use the full term. Acronyms and abbreviations are not required, but should be used only when clarity is enhanced. Sometimes it is more clear to use the full term.

# Format conventions

This clause is used to describe the notation and formats used in the standard. It also includes the default transmission order of fields based on the type of data contained in the field (the order used unless otherwise specified in normative text for a specific field or structure). If a new data type is introduced or a new method of representing data structures is introduced in the amendment it may be appropriate to add to clause 4. Consider this a “global” clause.

# General description

This clause contains informative text that helps understand the specification provided in normative clauses. An overview of operation, relationship between features and parts of the amendment, and context for a given technical feature are appropriate topics for clause 5.

The scope of the amendment encompasses the following areas of enhancement to the standard:

* additional coding, preamble and modulation schemes to support improved link budget and/or reduced air-time relative to IEEE Std 802.15.4 UWB;
* additional channels and operating frequencies; interference mitigation techniques to support greater device density and higher traffic use cases relative to the IEEE Std 802.15.4 UWB;
* 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.

This framework considers this list of potential enhancements in identifying the most likely areas of the standard this amendment may touch. This is only a starting point: nether inclusion nor exclusion of a clause in this framework should be taken as either a requirement or prohibition. This is a working document for the task group and so may evolve as needed, and can be abandoned when no longer useful.

The project objectives as summarized in the Technical Guidance Document:

* Safeguards so that the high throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases
* Interference mitigation techniques to support higher density and higher traffic use cases
* Other coexistence improvement
* Backward compatibility with enhanced ranging capable devices (ERDEVs)
* Improved link budget and/or reduced air-time
* Additional channels and operating frequencies
* Improvements to accuracy / precision / reliability and interoperability for high-integrity ranging
* Reduced complexity and power consumption
* Hybrid operation with narrowband signaling to assist UWB
* Enhanced native discovery and connection setup mechanisms
* Sensing capabilities to support presence detection and environment mapping
* Low-power low-latency streaming
* Higher 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
* Infrastructure synchronization mechanisms

# MAC Functional Description

The following projects objectives will likely require additional MAC functions:

* Safeguards so that the high throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases
* Interference mitigation techniques to support higher density and higher traffic use cases
* Other coexistence improvement
* Backward compatibility with enhanced ranging capable devices (ERDEVs)
* Reduced complexity and power consumption
* Hybrid operation with narrowband signaling to assist UWB
* Enhanced native discovery and connection setup mechanisms
* Sensing capabilities to support presence detection and environment mapping
* Low-power low-latency streaming
* Higher 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
* Infrastructure synchronization mechanisms

# MAC frame formats

It can be anticipated that additional MAC features will require over the air signaling accomplished by extending the existing (version 2) MAC frames via new (or revised) information elements.

# MAC Services

Addition of MAC and PHY capabilities will require additions and/or changes to the MAC services.

# Security

Minimal changes to the MAC security clause are anticipated based on the scope and project objectives.

# General PHY requirements

Project objectives likely to touch in this clause include:

* Additional channels and operating frequencies
* Interference mitigation techniques to support higher density and higher traffic use cases
* Other coexistence improvement
* Hybrid operation with narrowband signaling to assist UWB
* Sensing capabilities to support presence detection and environment mapping

# PHY services

Additional PHY PIB attributes will likely be added with PHY enhancements.

# O-QPSK PHY

Project objectives that might add features to this PHY clause:

* Hybrid operation with narrowband signaling to assist UWB

# HRP UWB PHY

Project objectives that might add features to this PHY clause:

* Safeguards so that the high throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases
* Other coexistence improvement
* Backward compatibility with enhanced ranging capable devices (ERDEVs)
* Improved link budget and/or reduced air-time
* Additional channels and operating frequencies
* Improvements to accuracy / precision / reliability and interoperability for high-integrity ranging
* Reduced complexity and power consumption
* Hybrid operation with narrowband signaling to assist UWB
* Sensing capabilities to support presence detection and environment mapping
* Low-power low-latency streaming
* Higher data-rate streaming allowing at least 50 Mbit/s of throughput

# LRP UWB PHY

# SUN FSK PHY

# SUN OFDM PHY

# SUN O-QPSK

Project objectives that might add features to this PHY clause:

* Hybrid operation with narrowband signaling to assist UWB

# Annexes

We must not forget to add PICS for this amendment!