**IEEE P802.15**

**Wireless Specialty Networks (WSN)**

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| Project | IEEE P802.15 Working Group for Wireless Specialty Networks (WSN) |
| Title | **Next Generation SUN PHY Technical Guidance Document**  |
| Date Submitted | 13 March 2024 |
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| Re: | SG NG OFDM PHY Technical Guidance for Proposals |
| Abstract |  |
| Purpose | To capture essential PHY requirements, parameterized into a set of PHY characteristics that technical proposals can address. Guide discussion within task group, help proposers and provide a framework for evaluation of proposals by the TG. |
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DRAFT 802.15.4 Next Generation SUN PHY Technical Guidance Document

# Document is based on IEEE 802.15.4w. Yellow parts are for IEEE 802.15.4w and have to be updated!

# Introduction

## 802.15.4 Purpose

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## 802.15 Need

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## 802.15 Scope

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## Methodology

The methodology is based on a consensus approach to defining a minimal set of features, characteristics, performance and constraints to be considered when making a proposal.

This document provides a functional view of the PHY characteristics, in the form of specific parameters which define externally verifiable performance and interoperability considerations.

The parameters discussed in this document are essential parameters for the design of physical layer and also satisfy the PAR. The proposal shall reference the relevant regulations. Devices implementing shall abide by regulations in the region it is operating.

### Proposal Criteria

The following shall be included in the proposal:

Receiver Sensitivity

* One mode with a sensitivity of at least -120dBm with an occupied channel bandwidth of at least 500 kHz

Data Rate

* One mode with an effective payload data rate higher than of 2.4 Mbps
* Proposers are encouraged to propose modes with higher data rates

Channel Bandwidth

* Proposers should support a minimum channel spacing of 200kHz for the OFDM modes to meet the regulation in specific regions
* Proposers should support at least one mode with an occupied channel bandwidth of at least 500kHz

**Mandatory and Optional Features**

Proposals shall clearly stipulate the mandatory and optional behaviors/features.

**Minimum Required Sensitivity**

The proposal shall be able to reach a minimum reception level of -140 dBm normalized to a noise figure of
3 dB.

**Data Rate**

The proposer shall support lower data rates compared to the LECIM FSK PHY.

**Symbol/Chip Rate**

The proposer shall specify the symbol/chip rate.

**Forward Error Correction**

The proposer shall specify the forward error correction schemes.

**Modulation/ Coding**

The proposer shall specify the utilized FSK modulation/coding schemes.

**Fragmentation**

The proposer shall specify the fragmentation method. The proposal may include methods to use optional ARQ and PHY security schemes.

**Time- / Frequency Patterns**

The proposer shall specify the time- and frequency patterns of the fragments.

**Frequency, Synchronization and Timing**

The proposer shall state the required accuracies for all types of devices and whether or not they are symmetric.

**PHY Frame Structure**

The PHY shall be based on the LECIM FSK PHY.

**Transmit PSD**

The proposer should state adjacent channel leakage power ratio (ACL). ACL is defined as the ratio of the power contained in the adjacent channel to the desired channel.

**Coexistence Features**

The proposal shall at a minimum include discussion of the coexistence impacts wrt. other IEEE 802 networks.

It is recommended that the proposer addresses other networks in the same and/or adjacent bands.

In addition, it is highly recommended that the proposer explains how interference to existing IEEE 802.15.4 networks can be avoided.

**Operational Bands**

At least one of the operational bands relevant to the scope of the project shall be supported.

**Multipath Robustness**

The proposer shall describe the immunity to multi-path reception. Simulation results using the channel model defined in section 5.2 of the IG report (DCN 15-17-0528-01) (outdoor urban, hBS=140m, 3Hz Doppler) showing the impact of multi-path on the PER are recommended.

**Interference Robustness**

The proposer shall describe the immunity to interference. Simulation results using the interference model defined in section 4.3 of the IG report (DCN 15-17-0528-01) (Parameters: Channel model outdoor urban, hBS=140m) showing the impact on the PER are recommended.