**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | Coexistence Document for IEEE 802.15.4ab (proposed outline) | |
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| Re: | Analyze the coexistence of 802.15.4z and other 802 wireless systems | |
| Abstract | IEEE 802.15.4 Coexistence Document | |
| Purpose | Document coexistence analysis | |
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# Introduction

This document provides a summary of coexistence analysis which has been performed evaluate the performance of systems using the 802.15.4 UWB (HRP and LRP) PHYs as amended by P802.15.4ab with respect to other 802 wireless standards which may operate in the same band.

The PAR for P802.15.4ab may be found in [1] .

802 standards to consider:

* 802.11 (ax, be)
* 802.15.6a
* Legacy 802.15.4 UWB (HRP, LRP)
* 4ab NB and UWB
* ??

## Acronyms

## Terminology

The following terms, when used in this document, have the following meaning:

“base standard” means 802.15.4-2020 as and all approved amendments at the time this document has been prepared including 802.15.4z-2020.

“802.15.4” means the base standard.

“This amendment” means amendment P802.15.4ab [1]: Standard for Low-Rate Wireless Network Amendment: Enhanced Ultra Wide-Band (UWB) Physical Layers (PHYs) and Associated Medium Access and Control (MAC) sublayer Enhancements

# Overview

Things to cover in the overview

* Background on UWB
* History of UWB in 15.4 (briefly: 4a, f, z)
* Methodology used
* Reference to other relevant documents (coex studies and demonstrations)
* Coexisting systems considered
* Coexistence scenarios

Other stuff we know about:

* 802.15.4 PHYs operating in the overlapping bands (new NB channels in 6 GHz)
* 802.16 operating in the 3.4 to 3.8 GHz band (maybe no longer relevant)
* 802.11 OFDM operating in 5GHz and 6GHz bands (11ax, 11be)

## Overview of 802.15.4z UWB

### Frequency bands of interest

The defined channel plans for UWB cover the frequency range from 3.1 GHz to 10.6 GHz. The actual spectrum used varies by region.

The 802.15.4 Narrow band channel plan defined in this amendment overlaps with the UWB channel plan the frequency range from xx to yy GHz.

The 802.11 OFDM channel plan overlaps the UWB channel plan in the frequency range 5 GHz to 7 GHz.

[can provide details of the channel plans]

### Relevant 802 Standards

Table 1 lists the other 802 standard that may operate in overlapping bands. This information was derived from Annex E of [4] and [5]. [NEEDS TO BE UPDATAED]

Table 1: Other 802 Wireless Standards in the Subject Bands

|  |  |  |  |
| --- | --- | --- | --- |
| **Standard** | **Frequency Band (MHz)** | **PHY description** | **Notes** |
| 802.15.4 | 3244–4742 | HRP UWB low band | Clause 16 |
| 802.15.4 | 5944–10 234 | HRP UWB high band | Clause 16 |
| 802.15.4 | 6289.6–9185.6 | LRP UWB | Clause 19 |
| 802.11-2016 | 4000 | 10, 20, 40 MHz channel spacing | Not specifically analyzed in this document: WLAN operation is restricted by regional regulations and not expected to be operating in same place as UWB systems.[[1]](#footnote-1) |
| 802.11-2016 | 4002.5 | 5 |
| 802.11-2016 | 4850 | 20 |
| 802.11-2016 | 4890 | 10,20, 80, 160 MHz channel spacing |
| 802.11-2016 | 4937.5 | 5 MHz channel spacing |
| 802.11-2016 | 5000 | 10, 20, 40, MHz channel spacing |
| 802.11-2016 | 5002.5 | 5 |
| 802.11ax | 5935 - 7115 | 10,20, 80, 160 |  |
| 802.16-2012 | 3400 - 3800 |  |  |

Note that the majority of WLAN applications use channel spacing 20 to 80 MHz. The analysis referenced in this document mostly consider channel spacing from 5 to 160 MHz.

### Summary of Amendment

* Overview of the amendment

### MAC Enhancements and Coexistence Impact

## Overview of Coexistence Mechanisms in 802.15.4

* CSMA, SSBD, Aloha
* Other features to enhance coexistence including new features

## Coexistence Analysis Methodology

Mostly by references.

# Dissimilar Systems Sharing the Same Frequency Bands

This clause presents coexistence considerations with other 802 systems which are specified to operate in some of the same frequency bands. For the purpose of this clause, dissimilar is defined as other than IR-UWB operating according to the 802.15.4 UWB standard.

## 802.11 Coexistence

### 802.11 WLAN impact on 802.15.4 UWB

### 802.15.4 UWB impact on 802.11 WLAN

## 802.15.4 Coexisting Systems

As shown in Table 1, the 802.15.4 UWB channel plans avoid the bands used by non-UWB PHYs defined by 802.15.4. Coexistence with legacy UWB systems is described in 4 .

## Other 802 Wireless systems considered

# 802.15.4 UWB systems

This clause describes the coexistence situation for this amendment and existing 802.15.4 UWB systems.

## HRP

## LRP

# 802.15.6 UWB systems

# Conclusions

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1. Per the advice of the 802.11 WG Coexistence SC in response to inquiry by the task group. [↑](#footnote-ref-1)