**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **DraftC comment resolution #237, #222, #66, #67 and related comments** |
| Date Submitted | April 16, 2024 |
| Sources | Alex Krebs (Apple)  krebs @ apple.com |
| Re: |  |
| Abstract |  |
| Purpose | To propose resolution for MMS related comments for “P802.15.4ab™/D (pre-ballot) C Draft Standard for Low-Rate Wireless Networks” . |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.4ab Task Group. It represents only the views of the participants listed in the “Sources” field above.It is offered as a basis for discussion and is not binding on the contributing individuals. The material in this document is subject to change in form and content after further study. The contributors reserve the right to add, amend or withdraw material contained herein. |

Abstract

This submission contains the proposed comment resolutions for CIDs 66, 67, 237, 646, 753, 754, 799, 800, 825, 827, 829, 831, 833, 835, 917, 918, 919, 920, 921, 922, 923, and 924.

R0: initial content, previous work from 24/103r7

R1: added resolution for CID 222 following the discussion on 24/203r2

# CID 66, 67 and duplicates

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| **Name** | **Idx** | **Pg** | **L.** | **Comment** | **Proposed Change** | **Resolution** |
| Alex Krebs | 66 | 78 | 22 | Rounttriptime description missing | Change line to "The Round-trip Time field is the the time difference between the RMARKERs of the POLL and the RESP MMS fragments measured at the initiator side in 1/499.2MHz resolution." | Revise. The Round-trip Time field is the the time difference between the RMARKERs of the POLL and the RESP MMS fragments measured at the initiator side in ranging counter time units as defined in *10.28.1.4 [4me-rev1]*. |
| Alex Krebs | 67 | 79 | 16 | Reply-time description missing | Change the line to "The Round-trip Time field is the the time difference between the RMARKERs of the POLL and the RESP MMS fragments measured at the responder side in 1/499.2MHz resolution." | Revise. Change the line to "The Reply Time" field is the the time difference between the RMARKERs of the POLL and the RESP MMS fragments measured at the responder side in ranging counter time units as defined in *10.28.1.4 [4me-rev1]*. |
| Rojan Chitrakar | 646 | 78 | 22 | Contents are missing. | Add the contents | Revise. (see #66) |
| Carl Murray | 753 | 78 | 22 | Field description missing | Add field description | Revise. (see #66) |
| Carl Murray | 754 | 79 | 16 | Field description missing | Add field description | Revise. (see #67) |
| Carl Murray | 833 | 101 | 17 | Field description missing | Add field description | Revise. (see #67) |
| Carl Murray | 835 | 102 | 13 | Field description missing | Add field description | Revise. (see #67) |
| Alex Krebs | 917 | 89 | 13 | Reply-time description missing | see #67 | Revise. (see #67) |
| Alex Krebs | 922 | 90 | 10 | Rounttriptime description missing | see #66 | Revise. (see #66) |
| Alex Krebs | 923 | 98 | 21 | Rounttriptime description missing | see #66 | Revise. (see #66) |
| Alex Krebs | 918 | 99 | 13 | Reply-time description missing | see #67 | Revise. (see #67) |
| Alex Krebs | 919 | 100 | 5 | Reply-time description missing | see #67 | Revise. (see #67) |
| Alex Krebs | 924 | 100 | 24 | Rounttriptime description missing | see #66 | Revise. (see #66) |
| Alex Krebs | 920 | 101 | 17 | Reply-time description missing | see #67 | Revise. (see #67) |
| Alex Krebs | 921 | 102 | 13 | Reply-time description missing | see #67 | Revise. (see #67) |
| Carl Murray | 799 | 89 | 13 | Field description missing | Add field description | Revise. (see #67) |
| Carl Murray | 800 | 90 | 10 | Field description missing | Add field description | Revise. (see #66) |
| Carl Murray | 825 | 98 | 21 | Field description missing | Add field description | Revise. (see #66) |
| Carl Murray | 827 | 99 | 13 | Field description missing | Add field description | Revise. (see #67) |
| Carl Murray | 829 | 100 | 5 | Field description missing | Add field description | Revise. (see #67) |
| Carl Murray | 831 | 100 | 24 | Field description missing | Add field description | Revise. (see #66) |

Discussion: 1ps resolution is tbd., question of whether or not to replicate the same text for all CIDs. Offline discussion: agreement to stick with legacy 15.4ab timestamp resolution ~15.65ps. Editor's choice to replicate, or reference the text.

# CID 237

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| **Name** | **Idx** | **Pg** | **L.** | **Comment** | **Proposed Change** | **Resolution** |
| Billy Verso | 237 | 147 | 6 | The channel assignment clause for the HRP UWB PHY, was not updated however we have an new definition in 16.4.1.2 covering an (optional) extended set of channels. Being able to select these individually is needed for instance to do frequency stitched sensing with individual frame TX on the different frequencies, (as an alternative to the automatic stepped case). Would also allow for future regulatory changes without further UWB text update. | Add in coverage for extended range. And, revisit all places UWB channel number is signaled, especially in new 4ab messages. To ensure the UWB channel number field size is sufficient to signal the extern range. | ~~Defer.~~ Revise as shown below. |
| Billy Verso | 222 | 116 | 7 | To allow more flexibility in choosing UWB channel, suggest to combine define the reserved field following this to make extended channel number, (optional support for this only). | In figure 132 take change reserved bits into UWB Channel Extension, and change text here to say that if the UWB Channel Extension field is non-zero it is taken as high order bits and combined with the UWB Channel field value to make an extended UWB channel number as per 16.4.1.2. | Revise as shown below. |

**Discussion:** Not clear what the benefit would be to send longer NB message fields covering overlapping channels 0-97? What is the general idea here regarding the channel number conflict between the legacy 15.4a channels 0-15 (Table-16-27 [4me-D01]? Further discussion with the group needed. Offline discussion: agreement to offset the extended channel numbering to exclude legacy 15.4ab channel numbers. April 9, 2024: 24/203r2 presented alternative solution, group expressed preference to move forward with resolution as proposed in 24/198r0. Added CID #222 to 24/198r1.

**Resolution:**

*Instruction to the editor: change 16.4.1.2 Extended channel bands, p.178, l.1-6 to*

These UWB extended channel bands may be referred to by an integer UWB extended channel number *Nc* which determines the center frequency *fc* according to

*fc* = 499.2 MHz + (*Nc* - 16)×124.8 MHz

where *Nc* may range from 16 to 113.

These extended channel bands intersect with the channels in Table 16-27 *HRP UWB PHY band allocation*, so, for example, an *Nc* value of 76 yields the mandatory high band 7987.2 MHz center frequency.

*Instruction to the editor: change 10.38.10.38 "The Ranging PHY Config field", p.67, l.1-15 to*

**10.38.10.3.8 The Ranging PHY Config field**

This is a 4-octet field formatted as shown in Figure 44.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bits: 0-5** | **6-12** | **13-15** | **16-17** | **18-24** | **25-31** |
| Sequence Code Index | MMRS complementary set zeros | N\_MSR | STS Segment Length | UWB channel | Reserved |

**Figure 44—The Ranging PHY Config field**

The Sequence Code Index field specifies the symbol to use for the RSF, where Sequence Code Index field

values 9 to 24 select length-127 ternary codes from Table 16-8, Sequence Code Index field values 25 to 32,

select length-91 ternary codes from Table 16-9, and Sequence Code Index field values 33 to 48 select

length-128 sequences from Table 50, and other values are reserved.

The MMRS complementary set zeros field specifies the number of zeros to insert into the complementary

set, value range {0, …, 64}. This field is only valid for Sequence Code Index field values in the range 33

to 48.

The N\_MSR field specifies the number of repetitions or the MMRS symbol in each RSF, value range {32,

40, 48, 64, 128, 256}

The STS Segment Length field specifies length of RIF in units of 512 chips (~1 μs), with value range {32,

64, 128, 256}

The UWB channel field specifies the UWB channel to use for MMS. The values 0 to 15 refer to the channels defined in Table 16-27—HRP UWB PHY band allocation [4me-D01]. The values 16 to 113 refer to the extended channels defined in 16.4.1.2 Extended channel bands [4ab-DraftC].

*Instruction to the editor: change Figure 132 "MMS Ranging Configuration field of the AC IE", p.114, l.24 to*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits: 0-2** | **3-5** | **6-11** | **12-18** | **19-21** | **22-23** | **24-30** | **31** |
| Number of RSF | Number of RIF | Preamble Code Index | MMRS Gap Size | MSR For MMRS | STS Segment Length | UWB Channel | Reserved |

*Instruction to the editor: change text on p.116 l.7-8 to*

The UWB Channel field indicates the UWB channel number, as per 16.4.1.2 Extended channel bands [4ab-DraftC], for the forthcoming ranging exchange.