**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Proposed Resolution for AC IE Comments Part Two** |
| Date Submitted | October 2023 |
| Sources | Bin Qian, Lei Huang, Chenchen Liu, David Xun Yang (Huawei)  |  |
| Re: |   |
| Abstract |  |
| Purpose | To propose resolution to AC IE comments for “P802.15.4ab™/D (pre-ballot) B 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. |

***Comment Index #45 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.1 | 85 | 2 | There should be a capability for responder to indicate if it support Feedback control value 2 | as in comment |

**Discussion:**

When frequency stitching is performed, if the Feedback Control field is 2, the responder shall report for the aggregated channel after the last transmission of the sensing initiator. Not all responders support this feedback type, it is reasonable to indicate the capability of this feature.

**Resolution: Revised**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B:**

**10.37.4.1 HRP UWB Association Request command**

*Change Figure 95 on page 92 as follows*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bits: 0** | **1** | **2-3** | **4** | **5** | **6** | **7-15** |
| LDPC | High Throughput | Supported AIFS | SBP | Frequency Stitching | Aggregated Channel Report | Reserved |

Add a paragraph after the end of Line 12 on Page 92 as follows

The Frequency Stitching field shall be set to one if the controlee supports frequency stitching. Otherwise, it shall be set to zero.

The Aggregated Channel Report field shall be set to one if the controlee supports report for the aggregated channel after the last transmission of frequency stitching.

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***Comment Index #203 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Pooria Pakrooh | 10.36.7.1 | 85 | 3 | Nonsensing Tx CIR report field is not added in AC IE. | Add Nonsensing Tx CIR report field is not added in AC IE. |

**Resolution: Revised, no change is needed since this comment has already been solved by pre-ballot draft B**

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***Comment Index #34 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.1 | 81 | 7 | Are CIR Report Parameters, Frequency Stitch parameters, Non-sensing TX CIR report parameters same for all sensing responders? | If these parameters can be different then add address field before the parameter subfields/ sensing control field |

**Discussion**：

If these parameters are different among different responders, a simple solution is that the sensing initiator could send the AC IE to each responder individually.

**Resolution: Reject**

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***Comment Index #42 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.1 | 79 | 24 | RIF STS length, and RSF to RIF gap seems to be missing from MMS ranging config IEWhether we need to have different preamble code/gap size for initiator and responder? | add missing info and make tx/rx config to be the same  |

**Discussion**：

The parameters needed in the MMS Ranging Configuration field are same as the UWB PHY Config. and UWB MAC Config. in 15-22-0381-04ab-nba-uwb-ranging-text-proposal-for-15-4ab-tfd. It is reasonable to keep consistency.

**Resolution: Revised.**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B:**

*Change Line 22 on page 79 as follows*

The MMS Ranging Configuration field if present specifies the parameters for UWB-only MMS based ranging. The Content field of the AC IE shall be formatted as shown in Figure 79.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Bits: 0-2** | **3-5** | **6** | **7-12** | **13-19** | **20-22** | **23-24** | **25-28** | **29-31** |
| Number of RSF | Number of RIF | RSF-to-RIF Gap | Preamble Code Index | MMRS Gap Size | MSR For MMRS | STS Segment Length | UWB Channel | Reserved |

Figure 79 – MMS Ranging Configuration field of the AC IE

The Number of RSF field specifies the number of RSFs that will be used in the forthcoming ranging exchange. The Number of RSF field shall have one of the values defined in Table x.1.

Table x.1 – Value of the Number of RSF subfield of the MMS Ranging Configuration

|  |  |
| --- | --- |
| **Number of RSF field value** | **Meaning** |
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 4 |
| 4 | 8 |
| 5 | 16 |
| 6-7 | Reserved |

The Number of RIF field specifies the number of RIFs that will be used in the forthcoming ranging exchange. The Number of RIF field shall have one of the values defined in Table x.2.

Table x.2 – Value of the Number of RIF subfield of the MMS Ranging Configuration

|  |  |
| --- | --- |
| **Number of RIF field value** | **Meaning** |
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 4 |
| 4 | 8 |
| 5-7 | Reserved |

The RSF-to-RIF Gap field specifies the gap between the start of the last RSF and the start of the first RIF. The RSF-to-RIF Gap field shall have one of the values defined in Table x.3.

Table x.3 – Value of the RSF-to-RIF Gap subfield of the MMS Ranging Configuration

|  |  |
| --- | --- |
| **RSF-to-RIF Gap field value** | **Meaning** |
| 0 | 1 ms |
| 1 | 2 ms |

If the Number of RIF field is set to zero, the RSF-to-RIF Gap field shall be omitted.

The Preamble Code Index field indicates the preamble code that will be used in the forthcoming ranging exchange.

The MMRS Gap Size field indicates the MMRS gap size that will be used in the forthcoming ranging exchange. If the Preamble Code Index field is set from 9 to 32, the MMRS Gap Size field shall be omitted.

The MSR for MMRS field indicates the MSR that will be used in the forthcoming ranging exchange. The MSR for MMRS field shall have one of the values defined in Table x.4.

Table x.4 – Value of the MSR for MMRS subfield of the MMS Ranging Configuration

|  |  |
| --- | --- |
| **MSR for MMRS field value** | **Meaning** |
| 0 | 32 |
| 1 | 40 |
| 2 | 48 |
| 3 | 64 |
| 4 | 128 |
| 5 | 256 |
| 6-7 | Reserved |

The STS Segment Length field specifies the configuration options for STS segment length. The STS Segment Length field shall have one of the values defined in Table x.5.

Table x.5 – Value of the STS Segment Length subfield of the MMS Ranging Configuration

|  |  |
| --- | --- |
| **STS Segment Length field value** | **Meaning** |
| 0 | 32 |
| 1 | 64 |
| 2 | 128 |
| 3 | 256 |

The UWB Channel field indicates the UWB channel number, which is as per 11.1.3.5 for the HRP UWB PHY for the forthcoming ranging exchange.

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***Comment Index #48 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.2 | 87 | 1 | If the reference tap is common among all tx/rx CIR reports, then the Timing offset field should have +/- values or a value indicating not within the range that can be specified by the field | as in comment |

**Discussion**：

The Timing Offset field reports the timing offset between the reference tap and the CIR report timing grid. The time unit is $2^{-7}$ of the 499.2 MHz chipping period. The CIR measurement report shall be sampled at Over Sampling Ratio (OSR) of 2.

With bandwidth 499.2 MHz, the time interval between two adjacent taps is about 1 ns. A properly chosen reference tap for each tx/rx CIR report is sufficient such that the time offset is within [-0.5ns, 0.5ns].

**Resolution: Revised.**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B:**

*Change Line 1 on page 87 as follows*

The Bit 0 to Bit 4 of the Timing Offset field reports the absolute value of the timing offset between the reference tap and the CIR report timing grid in the time units specified in 10.26.1.4 (Ranging counter time unit). The Bit 5 of the Timing Offset field shall be set to one if the time offset is negative, and shall be set to zero otherwise.

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***Comment Index #47 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.2 | 87 | 3 | The normalization factor description needs to describe that this is the power of two number CIR tap value needs to be divided by, in order to compare with CIR values with other TX/RX pairs | as in comment |

**Resolution: Revised.**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B:**

*Change Line 3 on page 87 as follows*

The Normalization Factor field specifies a normalization factor applied to the CIR taps being reported in the CIR Taps field, i.e., the I and Q (in-phase and quadrature) tap values in the CIR Taps field are divided by two to the power of the normalization factor.

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***Comment Index #46 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.7.2 | 86 | 6 | Antennas field plus 1 should be the number of number of tx/rx antenna pairs | as in comment |

**Resolution: Revised, no change is needed since this comment has been solved by the approved document 15-23-0462-00-04ab-proposed-updates-for-10.36**

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***Comment Index #61 in 15-23-0475-16-04ab-cc-consolidated-comments***

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| **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| Libra Xiao | 10.36.7.1 | 82 | 18 | Figure 62 is missing and should be redrew. | A new figure 62 should be filed in the line18 of Page 82. |

**Discussion**：

In P802.15.4ab™/D (pre-ballot) B, the figure 86 on page 84 is missing, which corresponds to figure 62 in P802.15.4ab™/D (pre-ballot) A.

**Resolution: Revised.**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B:**

*Add Figure 86 on page 84 as follows*

Figure 86 shows an example of the sequence of channel use in frequency stitching, where the Channel Sequence Order field is set to 1, the Carrier Frequency Grid field is set to 2, and the Number of Transmissions field is set to 5. In Figure 86, the interval between two overlapping sensing fragments (SF) is greater than or equal to 1 ms. The first three SFs belong to a sensing packet and the last three SFs belong to another sensing packet.



Figure 86 – Channel sequence order