**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 Comments Resolution for 15.4ab D1.0 Sensing Comments- Part 3** | |
| Date Submitted | February 2025 | |
| Sources | Pooria Pakrooh (Qualcomm) |  |
| Abstract | Resolution to comments: 99, 245, 246, 252, 256, 259, 267, 268, 888, 898, 1250 | |
| Purpose | To propose comments resolution 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. | |

***Comment Index #99 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 99 | Frank Leong | 16.2.10 | 190 | 25 | Splitting frequency stitiching across multiple packets is cumbersome, and results in link budget penalty, especially when using large numbers of small frequency steps. | Specify {8,16,32} as optional numbers of segments inside the sensing field. |

**Discussion:**

Same comment on pre-ballot draft C has been addressed in DCN 15-24-0298-00.

The commenter specifies that for the case of large number of frequency stitching, it could be desirable to conduct frequency stitching over one sensing packet with many segments.

With the existing SENS packet configurations in draft 01 (including 1-4 segments), the frequency stitching feature can still enable stitching over large number of overlapped channels and provide full link budget benefits. This can be done either via sending Non-SENS fields (SYNC,SFD), on a dedicated channel, or via the existing out of sequence stitching method, and longer number of symbols per SENS segment (256, or 512).

**Resolution: Rejected**

***Comment Index #245 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 245 | Li-Hsiang Sun | 10.39.4.6.2 | 132 | 31 | whether the alpha is the same as the Normalization Factor in CIR report? | If they are the same, whether the description here can explicitly indicate that |

**Discussion:**

The normalization factor in the CIR report is equal to in page 132, Line 31. Agree that a clarification is needed.

**Resolution: Revised**

**Change page 132, line 31 as follow:**

The new quantized real and imaginary values would be respectively, where is the Normalization Factor in the CIR report, as specified in Figure 167.

***Comment Index #246 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 246 | Li-Hsiang Sun | 10.39.6.2 | 155 | 1 | Not very clear about the definition of Timing Offset field. In Fig 139, the earliest CIR tap defines the timing grid, should this filed always be 0? | Clarify the definition or Fig 139 |

**Discussion:**

The earliest detected tap at the receiver does not necessarily fall on a grid of reported CIR taps. The receiver may do extra interpolation to come up with an accurate estimate of the reference tap. This timing offset information could be useful to the Tx, and thus, it should be included in the CIR report. This value can be set to zero when there is no extra interpolation at the Rx, or when the reference tap is on the grid of CIR report.

Agree that the figure needs clarification on the associated values.

**Resolution: Revised**

**Change page 55, line 1, as follows:**

“The Timing Offset field value represents 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*). Since the CIR report is sampled at an oversampling of ratio two, the receiver can include the timing offset between the detected reference tap and the reference tap in the CIR report, when it has higher resolution timing estimate of the detected reference tap through extra interpolation. The value is a 6-bit signed quantity, in two’s complement format, covering an offset range of –32 to +31 units.”

***Comment Index #252 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 252 | Li-Hsiang Sun | 10.39.5.3 | 136 | 8 | “The CIR Report IE transmitted by the sensing initiator shall include the address of the sensing responder that generated the sensing measurement report carried in the CIR Report IE.”  If the initiator is sensing receiver, then all the reports should still have responder’s address | as in comment |

**Discussion:**

Agree that a clarification is needed for the case that the initiator is the sensing receiver.

**Resolution: Revised**

**Change page 132, line 31 as follow:**

When the Responder Address field is present in the CIR Report IE transmitted by the sensing initiator, it identifies the address of the sensing responder that generated the sensing measurement report carried in the CIR Report IE. For the case that the CIR report is generated by the sensing initiator, the Responder Address field identifies the sensing transmitter***.***

***Comment Index #256 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 256 | Li-Hsiang Sun | 10.39.6.1 | 143 | 2 | If sensing mode is mono-static, i.e. responder is both sensing transmitter and receiver. then responder role should be reserved | as in comment |

**Discussion:**

Agree with the comment.

**Resolution: Revised**

**Change page 143 line 3 as follows:**

“The Responder Role field specifies the role of the responder to be played in the sensing round(s) that follow the AC IE. The Responder Role field shall have one of the values defined in Table 30. The Responder Role field is reserved when the Sensing Mode Field value is 0.”

***Comment Index #259 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 259 | Li-Hsiang Sun | 10.39.6.1 | 144 | 1 | Can the CIR bitmap configuration, compression, … (e.g. Fig 154) be different for different responders in the same multi-static session (i.e. same session ID) ? | Please clarify |

**Discussion:**

For the multistatic session, it is assumed that capability exchange is done between initiator and each responder via an OOB mechanism. If needed, the initiator should be able to request different CIR report parameters for different responders. This is the default assumption for all parameters, including the compression.

**Resolution: Revised**

**Change page 143 line 13 as follows:**

“The Sensing Report Parameters field is formatted as per Figure 153. In the multistatic sensing mode, the initiator may agree on different sets of report parameters for with different responders.”

***Comment Indices #267, #268 and #270 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| 267 | Li-Hsiang Sun | 10.39.6.2 | 153 | 15 | when bitmap mode is 1, how does one bitmap covers all tx/rx CIRs? | Please clarify |
| 268 | Li-Hsiang Sun | 10.39.6.1 | 147 | 16 | “where Smax is the magnitude of the strongest detected CIR tap.” strongest among all (ANT, SEG) tuples or just the current (ANT,SEG)? | Please clarify |

**Discussion:**

1. The Report Parameters Control Field of the CIR report is common for all Segment/antenna pairs. Bitmap is defined relative to the reference tap for each segment. So, it is a relative concept for each segment. This concept is defined in the CIR report subclause.
2. Smax is the strongest detected value for each CIR report, therefore, defined per (Segment,Rx antenna) pair.

**Resolution: Revised**

**Change page 147 line 16 as follows:**

“where *Smax* is defined as the magnitude of the strongest detected CIR tap for each pair of sensing segment and receiver antenna index.”

***Comment Index #888 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 888 | Carl Murray | 10.39.4.6.1 | 131 | 19 | Figure 139 does not unambiguously indicate what the BMoffset and BMlength are.   For example it could be interpreted that the BMoffset =2 and BMlength =3. However in this case a BMlength of 3 has 4 taps | Specify the values of BMoffset and BMlength in figure 139 |

**Discussion:** In Figure 139, BMoffset= 2, BMlength=4”.

**Resolution: Revised**

**Change page 131 line 20 as follows:**

In the caption of Figure 139, add: “In this Figure, BMoffset= 2, BMlength=4”.

***Comment Index #898 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | | **Proposed Change** |
| 898 | Carl Murray | 10.39. 6.1 | 145 | 6 | To be consistent with the definitions on pg132 it would be better for the CBW field to specify the format of the real and imaginary components, e.g.16-bit signed value rather than 16 bits. Also it would be good to reference the normalization in pg 132 | Align the CBW description with the definitions on pg 132 | |

**Discussion:**

1. The phrase “signed value” can be added to every row of table 34.
2. The definition of the normalization process is already well defined in the CIR report subclause, and it is not much relevant to the AC IE discussion in this subclause.

**Resolution: Revised**

**Change page 145, table 34 as follows:**

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| **CBW Field** | **Value Meaning** |
| 0 | 10 bits signed value for each real value and 10 bits signed value for each imaginary value |
| 1 | 12 bits signed value for each real value and 12 bits signed value for each imaginary value |
| 2 | 14 bits signed value for each real value and 14 bits signed value for each imaginary value |
| 3 | 16 bits signed value for each real value and 16 bits signed value for each imaginary value |

***Comment Index #1250 in 15-24-0371-13-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 1250 | Billy Verso | 10.39. 6.1 | 143 | 6 | This is a strange "minus one", the paragraph says a value of zero is valid, indicating no offset, and a non-zero value indicates the offset, with a minus 1. So we cannot use this field to specify an offset of 1. Also, as this is a 10-bit field, it so can represent an offset up to 1023 without subtracting one, which is enough to specify where to start in a 1K sized array. Adding 1 to the value, would yield a max offset of 1024, an offset to the position 1 after the end of a 1K sized array. This does not seem useful. | Delete the "minus one" from the line, or just re-write to say it is the offset (which can be 0). |

**Discussion:** The page number for this comment seems to be incorrect. I assume the comment is regarding page 146, line 6.

Bitmap offset value of 1 indicates that there are no taps in between first tap and reference tap, or equivalently, first tap is the one after the reference tap. A field value of 1023 shows 1022 taps between the first tap and reference tap, corresponding to the extreme case of reporting the single last tap in the CIR window.

However, the commenter seems to be interested to remove the “minus 1”.

**Resolution: Revised.**

**Change page 146 line 5-7 as below:**

“The Bitmap Offset field when zero indicates the first CIR tap within the window is the reference tap. If the Bitmap Offset field is non-zero, the value of the Bitmap Offset field shall indicate the time offset between the first CIR tap within the window and the reference tap, in the unit of CIR sampling resolution.”