**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 on CIR Report IE format** |
| Date Submitted | November 2023 |
| Sources | Rojan Chitrakar, Lei Huang, Bin Qian (Huawei)rojan.chitrakar@huawei.com |  |
| Re: |   |
| Abstract |  |
| Purpose | To propose a flexible format for CIR Report IE to support various sensing scenarios and also to resolve an SBP comment 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. |

Rev 0: Initial version. Addresses the following comments: #40

***Comment Index #40 in 15-23-0475-13-04ab-cc-consolidated-comments***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Sub-Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| Li-Hsiang Sun | 10.36.6.3 | 76.19 | what is the message/IE used to send report? | add an address field in CIR report IE for initiator identity different responders to the SBP requesting device |

**Discussion**：



We agree with the comment to use the CIR Report IE to carry the sensing measurement report in the SBP reporting as well. We also agree that an address field may be optionally present in the CIR Report IE to identify the sensing responder to the SBP requesting device.

Note: Table 10-143 (Address Size Specifier field) in the base spec is reused to indicate the size of the responder address field.



**Disposition: Revised**

**Disposition Detail:**

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

**10.36.6.3 SBP reporting**

***Make the following changes in the subclause (Track changes ON):***

In the SBP reporting procedure, the sensing initiator may sequentially transmit one or more CIR Report IEs carrying the sensing measurement reports of the corresponding sensing measurement exchange to the sensing requesting device. Alternatively, the sensing initiator may transmit an aggregated sensing measurement report to the sensing requesting device, which includes two or more CIR Report IEs, each CIR Report IE carrying the sensing measurement reports of the corresponding sensing measurement exchange. 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.

**Proposed text changes on P802.15.4ab™/D (pre-ballot) B as modified by 23/496r1:**

**10.36.7.2 CIR Report IE**

***Make the following changes in the subclause (Track changes ON):***

The CIR report IE is used to send information on the CIR. This may be used by an SDEV to send a sensing 2 report to a companion device participating in a sensing network. The Content field of the CIR report IE 3 shall be formatted as shown in Figure 88.

|  |  |  |
| --- | --- | --- |
| Octets: 2/4/10 | 0/7/11/19/36 | Variable$×N$ |
| Report Identity Control | Report Parameters Control | Receive Report(s) |

**Figure 88—CIR report IE Content field format**

The Report Identity Control field shall be formatted as shown in Figure 8x1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bits: 0-1 | 2 | 3-7 | Octets: 1 | 0/2/8 |
|  Responder Address Mode | First Report Fragment | Remaining Report Fragments | Measurement ID | Responder Address |

**Figure 8x1—** **Report Identity Control field format**

The Responder Address Mode field specifies the size of the address used in the Responder Address field. The encoding of the Responder Address Mode field is exactly the same as the encoding of the Address Size Specifier field defined in Table 10-143 (Address Size Specifier field values).

The First Report Fragment field is set to 1 for the first fragment of a fragmented report or for an unfragmented report and set to 0 otherwise.

The Remaining Report Fragments field indicates the number of remaining report fragments and is set to 0 for the last report fragment or an unfragmented report and set to a value between 1 and 31 for a report fragment that is not the last fragment.

The Measurement ID field carries a unique ID that identifies a particular sensing measurement instance. The Measurement ID can be used by the sensing initiator to identify reports corresponding to a particular sensing measurement instance.

The Responder Address field, when present, identifies the SDEV that generated the CIR report.

The Report Parameters Control field shall be present only if the First Report Fragment field in the Report Identity Control field is equal to 1. The Report Parameters Control field shall be formatted as shown in Figure 8x2.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Bits: 0-1 | 2-3 | 4-13 | 14-15 | 16 | 17-23 | Octets: 4/8/16/32 |  |
|  Number of Rx Antennas | Bitmap Length | Bitmap Offset |  Number of Segments | Compression | Reserved | CIR Bitmap |  |

**Figure 8x2—Report Parameters Control field format**

The Number of Rx Antennas field value plus one shall indicate the number of antennas being reported on. For each Rx antenna there shall be a separate Receive Report field included in the CIR report IE.

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The CIR Bitmap field indicates which CIR taps are present in the Receive Report(s) field. A binary one indicates that the tap value is present in the Receive Report(s) field, while binary zero indicates the tap value is not present.

The Receive Report(s) field shall have a Receive Report field for each pair of the receiver chain and segment. The number of the receive reports (*N*) included in the Receive Report(s) field is equal to the number of receiver chain times the number of segments. Multiple receive reports included in the Receive Report(s) field shall be arranged in the sequence of antenna ID first and the segment index second. For example, when there are two Rx antennas and two segments, the Receive Report(s) field is formatted as shown in Figure xx.

|  |  |  |  |
| --- | --- | --- | --- |
| Octets: Variable | Variable | Variable | Variable |
| Receive Report for Antenna 1 and Segment 1 | Receive Report for Antenna 1 and Segment 2 | Receive Report for Antenna 2 and Segment 1 | Receive Report for Antenna 2 and Segment 2 |

Figure xx – Example of the Receive Report(s) field

Each Receive Report field shall be formatted as shown in Figure 89.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Bits: 0-5 | 6-9 | 10-11 | 12-13 | 14-15 | Octets: 1 | Variable |
| Timing Offset | Normalization Factor | Rx Antenna ID | Segment ID | Reserved | RSSI | CIR Taps |

**Figure 89 - Format of the Receive Report field(s) of the CIR report IE**

The Timing Offset field reports 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 Normalization Factor field specifies 4-bit power-of-two 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 have each been shifted left by this amount.

If the report is fragmented, the Rx Antenna ID field identifies the receive antenna corresponding to the CIR taps. The Rx Antenna ID field shall be reserved if the report is not fragmented.

If the report is fragmented, the Segment ID field identifies the Sensing PPDU SENS segment corresponding to the CIR taps. The Segment ID field shall be reserved if the report is not fragmented.

Note – If the First Report Fragment field in the Report Identity Control field is equal to 1 and the Remaining Report Fragments field in the Report Identity Control field is equal to 0, it indicates that the report is not fragmented. Any other values of the First Report Fragment field and the Remaining Report Fragments field indicate that the report is fragmented.

The RSSI field is a measure of the received signal strength at the antenna for the received sequence used to generate this Receive Report field, e.g., for a SENS segment being received via a particular antenna.

The CIR Taps field, contains the CIR tap values, there is one CIR tap value for each bit in the CIR Bitmap that is set to a binary-one, each CIR tap consists of a signed 16-bit in-phase value and a signed 16-bit quadrature value.