**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Proposed Text for PTF report IEs in 10.36.7** |
| Date Submitted | Nov 14, 2023 |
| Source | Aniruddh Rao Kabbinale, Ankur Bansal, Karthik Srinivasa Gopalan (Samsung Electronics), Frank Leong, Wolfgang Kuchler, Riku Pirhonen, Andreas Gruber (NXP), Dag Wisland, Kristian Granhaug (Novelda), Dries Neirynck (Ultra Radio Ltd) |
| Re: | Contribution to IEEE 802.15.4ab  |
| Abstract |  |
| Purpose | This submission proposes text to for the IEEE Std 802.15.4ab specification framework document. |
| 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 “Source(s)” field above. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |

## Sensing

### 10.36.7 Nested IEs for Sensing

***This document adds PTF report IEs. The baseline is P802.15.4ab-pre-ballot-B.***

***Add this Text at end of 10.36.7.1***

**10.36.7.1**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Bits: 0** | **1** | **2** | **3** |  | **4** |  | **4** | **5** | **5-7** |
|  |  | Angle of Arrival (Azimuth) | Angle of Arrival (Elevation) | Delay | Velocity |  | RSSI |  | Span | Span reference | Reserved |

Figure xx1 – Processed Target Feature Request Parameters

Angle of Arrival (Azimuth) – 0 if not requested, 1 if requested

Angle of Arrival (Elevation) – 0 if not requested, 1 if requested

Delay – 0 if not requested, 1 if requested

Velocity – 0 if not requested, 1 if requested

RSSI – 0 if not requested, 1 if requested

Span – 0 if span is not requested for delay, angle; 1 if span is requested for delay, angle.

Span Reference – 0 if span reference is “center”, 1 if span reference is “closest edge”

DEFLATE – 0 if DEFLATE compression not enabled, 1 if DEFLATE compression enabled

***Add this Text after 10.36.7.5***

**10.36.7.6 Processed Target Feature Report IEs**

Processed Target Feature IE enables exchange of processed report for sensing apart from CIR report. The IE enables exchange of parameter values for Angle of arrival, Delay, velocity, RSSI.

The Processed Target Feature response IE when DEFLATE compression is not enabled is as shown in Figure XX2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits: 0-5** | **6** | **7** | **8-13** | **14-19** |  | **0/Variable** | **0/variable** | **8 bits** | **8 bits** | **8 bits** |
| Number of Targets | EOL | Reserved | Number of Full Targets | Number of Sparse Targets |  | Full Target list | Sparse Target list | Receiver Orientation (Azimuth) | Receiver Orientation (Elevation) | Receiver Orientation (Rotation) |

Figure xx2 – Processed Target Feature response IE

Number of Targets – Indicates the number of targets detected

EOL - End-Of-List indicator. If set to zero, the target list will be continued in the next report frame. If set to one, the current report frame completes the list.

Number of Full Targets – Number of targets for which Full target report is available

Number of Sparse Targets - Number of targets for which sparse target report is available

Full Target List - List of full target reports.

Sparse Target List - List of sparse target reports, which contain only Delay and velocity

Receiver Orientation (Azimuth) – an 8 bit receiver orientation Azimuth relative to Transmitter.

Receiver Orientation (Elevation) – an 8 bit receiver orientation Elevation relative to Transmitter.

Receiver Orientation (Rotation) – an 8 bit receiver orientation Rotation relative to Transmitter.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Bits: 0-5** | **0/7 bits** | **0/7 bits** | **0/ 8 bits** | **0/8 bits** | **0/4 bits** | **0/ 8 bits** | **0/8 bits** | **0/8 bits** |
|  |  | Target ID | Azimuth | Elevation | Delay | Delay Span | Velocity | RSSI | Angle Span (Azimuth) | Angle Span (Elevation) |

Figure xx3 – Full Target report

|  |  |  |
| --- | --- | --- |
| **Bits: 0-5** | **Bits: 0/8 bits** | **0/4 bits** |
| Target ID | Delay | Velocity |

Figure XX4 – Sparse Target report

Target ID – a 6 bit identifier for target

Azimuth - Azimuth-of-Arrival of a target (7 bits, linear from -π to +π). Optionally, one Azimuth field is sent for each target in the full target list.

Elevation - Elevation-of-Arrival of a target (7 bits, linear from -π to +π). Optionally, one Elevation field is sent for each target in the full target list.

Delay - Delay of a target (8 bits, positive integer). One Delay field is sent for each target in both full and sparse target lists.

Velocity - Velocity of a target (4 bits, signed integer). One Velocity field is sent for each target in both full and sparse target lists.

RSSI - An 8 bit received signal strength per target. Maximum value indicates value not measured.

Delay Span – A 8 bit per target information about Delay Span for the target. An example filter for Delay span calculation would be 10% of peak amplitude of the CIR Taps.

Angle Span (Azimuth) – an 8 bit per target Angle span (Azimuth).

Angle Span (Azimuth) – an 8 bit per target Angle span (Azimuth).

The Processed Target Feature response IE when DEFLATE compression is enabled is as shown in Figure XX5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bits: 0-5** | **6** | **7-12** | **13-18** | **19-23** | **Variable** |
| Number of Targets | EOL | Number of Full Targets | Number of Sparse Targets | Reserved | DEFLATE compressed report |

Figure xx2 – Processed Target Feature response IE

DEFLATE compressed report would contain Number of Full Targets, Number of Sparse Targets, CIR Report, Full Target List and Sparse Target List - appended and compressed together. DEFLATE compressed report can be zero padded to enable byte-wise processing.