IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Corrections to Passive Location Ranging Amendment Text | | | | |
| Date: 2019-01-16 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | Email |
| Erik Lindskog | Samsung | 3655 N 1st St, San Jose, CA 95134, USA |  | [e.lindskog@samsung.com](mailto:e.lindskog@samsung.com) |
|  |  |  |  |  |

**Abstract**

This submission proposes corrections to the IEEE 802.11\_D0.6 ammendment text for Passive Location.

The proposed changes are relative to TGaz Draft 0.6 and TGmd Draft 2.0.

***TGaz Editor: Edit Section 9.6.7.38 (ISTA Passive Location Measurement Report frame format) as shown below:***

**9.6.7.38 ISTA Passive Location Measurement Report frame format**

The ISTA Passive Location Measurement Report frame is an Action No Ack frame of category Ranging. The ISTA Passive Location Measurement Report frame is used to support the passive location ranging mechanisms of the FTM procedure described in 11.22.6 (Fine timing measurement (FTM) procedure). The format of the ISTA Passive Location Measurement Report Action field is shown in Figure 9-xxx (ISTA Passive Location Measurement Report Action field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Category | Public Action | ~~Passive Location Dialog Token~~ | ISTA Passive Location Measurement Report |
| Octets: | 1 | 1 | ~~1~~ | Variable |

**Figure 39 —Figure 9-xxx ISTA Passive Location Measurement Report Action field format**

The Category field is defined in 9.4.1.11 (Action field).

The Public Action field is defined in 9.6.8.1 (Public Action frames).

The ISTA Passive Location Measurement Report field is defined in Section 9.4.2.nnn titled ‘ISTA Passive Location Measurement Report’.

***TGaz Editor: Edit Section 9.4.2.285 (ISTA Passive Location Measurement Report element) as shown below:***

**9.4.2.285 ISTA Passive Location Measurement Report element**

The ISTA Passive Location Measurement Report element, defined in Figure 9-yyy, is used to convey measurement results and associated parameters from an ISTA to the RSTA in a Passive Location ranging exchange.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element Id | Element Length | Element ID Extension | Dialog Token | CFO | N Time Stamp Measurement Reports | Time Stamp Measurement Reports |
|  | Octets: | 1 | 1 | 1 | 1 | 1 | variable |

Figure 28 -- Figure 9-yyy – ISTA Passive Location Measurement Report Element

The Element ID, Length and Element ID Extension fields are defined in 9.4.2.1.

The Dialog Token field shall be copied from the Sounding Dialog Token field in the Ranging NDP Announcement frame corresponding to the measurement sounding part from which the reported ISTA time-stamps were measured (see 11.22.6.4.3 Measurement Exchange in TB Mode).

The CFO element indicates the reporting ISTAs carrier frequency offset with respect to the RSTA. The CFO element is a signed integer in twos-complements format indicating the CFO in units of 0.5 ppm.

The N Time Stamp Measurement Reports field is an unsigned integer indicating the number of Time Stamp Measurement Reports.

Time Stamp Measurement Reports field contains one or more Time Stamp Measurement Report fields defined as in Figure 9-zzz.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 B49 | B50 B57 | B66 B81 | B82 B87 |
|  | Type | Valid | Time-Stamp | Time-Stamp Error | RID | Reserved |
| bits: | 1 | 1 | 48 | 16 | 16 | 6 |

Figure 9-zzz – Time Stamp Measurement Report field

The Type subfield is set to 0 if the reported time-stamp is a TOD time-stamp and is set to 1 if the reported time stamp is a TOA time-stamp.

The Valid subfield is set to 1 if the time-stamp is deemed valid and set to zero otherwise.

The Time-Stamp subfield conatins a TOD or TOA time-stamp.

The TOD time-stamp represents the time, with respect to the ISTA’s time base, at which the start of the preamble of the NDP in question appeared at the transmit antenna connector.

The TOA time-stamp represents the time, with respect to the ISTA’s time base, at which the start of preamble of the NDP in question arrived at the receive antenna connector.

The Time-Stamp subfield contains the TOD or TOA time-stamp, is in units of pico-seconds.

The Time-Stamp Error subfield indicates the absolute value of the estimated max error.

The Time Stamp Error field is structured as shown in Figure 9-aaa (Format of Time-Stamp Error field).

|  |  |  |
| --- | --- | --- |
|  | B0 B4 | B5 B15 |
|  | Max Error Exponent | Reserved |
| Bits: | 5 | 11 |

**Figure 9-aaa – Format of Time-Stamp Error field**

The maximum errors in the time-stamp values are represented using the function defined in Equation (9-x).

Equation (9-x):

,where

*F* is the Max Error Exponent

*Emax* is the maximum time-stamp error, respectively, in units of picoseconds

The RID subfield contains the ranging AID of the STA that transmitted the NDP in question. When the STA that transmitted the NDP is the RSTA the value zero is reported in the RID subfield.

***TGaz Editor: Edit Section 9.4.2.287 (RSTA Passive Location LMR element) as shown below:***

9.4.2.287 RSTA Passive Location LMR element

The RTSA Passive Location LMR element, defined in Figure 9-sss, is used to broadcast measurement results and associated parameters from an RSTA to STAs that want to use this information.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Element Id | Element Length | Element ID Extension | Dialog Token | N Time Stamp Measurement Reports | Time Stamp Measurement Reports |
|  | Octets: | 1 | 1 | 1 | 1 | variable |

1. Figure 9-sss – RSTA Passive Location Measurement Report Element

The Element ID, Length and Element ID Extension fields are defined in 9.4.2.1.

The Dialog Token field shall be copied from the Sounding Dialog Token field in the Ranging NDP Announcement frame of the corresponding to the measurement sounding part from which the reported RSTA time-stamps were measured (see 11.22.6.4.3 Measurement Exchange in TB Mode).

The N Time Stamp Measurement Reports field is an unsigned integer indicating the number of Time Stamp Measurement Reports.

Time Stamp Measurement Reports field contains one or more Time Stamp Measurement Report fields defined as in Figure 9-zzz.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 B49 | B50 B65 | B66 B81 | B82 B87 |
|  | Type | Valid | Time-Stamp | Time-Stamp Error | RID | Reserved |
| bits: | 1 | 1 | 48 | 16 | 16 | 6 |

1. Figure 9-zzz – Time Stamp Measurement Report field

The Type subfield is set to 0 if the reported time-stamp is a TOD time-stamp and is set to 1 if the reported time stamp is a TOA time-stamp.

The Valid subfield is set to 1 if the time-stamp is deemed valid and set to zero otherwise.

The TOD timestamp that represents the time, with respect to the RSTA’s time base, at which the start of the preamble of the NDP in question appeared at the transmit antenna connector.

The TOA time-stamp represents the time, with respect to the RSTA’s time base, at which the start of preamble of the NDP in question arrived at the receive antenna connector.

The Time-Stamp subfield contains the TOD or TOA time-stamp, is in units of pico-seconds.

The Time-Stamp Error subfield is structured as shown inFigure4Figure 9-aaa (Format of Time-Stamp Error field).

|  |  |  |
| --- | --- | --- |
|  | B0 B4 | B5 B15 |
|  | Max TOD Error Exponent | Reserved |
| Bits: | 5 | 11 |

1. Figure 9-aaa – Format of Time-Stamp Error field

The maximum errors in the Time-Stamp values are represented using the function defined in Equation (9-y).

Equation (9-y):

,where

*F* is the Max Error Exponent

*Emax* is the maximum Time-Stamp error, respectively, in units of picoseconds

The RID subfield contains the ranging AID of the STA that transmitted the NDP in question. When the STA that transmitted the NDP is the RSTA, i.e. the time-stamp is here a TOD time-stamp, then the RID subfield is set to zero.

***TGaz Editor: Edit Section 9.6.7.39 (Primus RSTA Broadcast Passive Location Measurement Report frame format) as shown below:***

**9.6.7.39 Primus RSTA Broadcast Passive Location Measurement Report frame format**

The Primus RSTA Broadcast Passive Location Measurement Report frame is an Action No Ack frame of category Ranging. The Primus RSTA Broadcast Passive Location Measurement Report frame is used to support the passive location ranging mechanisms of the FTM procedure described in 11.22.6 (Fine timing measurement (FTM) procedure). The format of the Primus RSTA Broadcast Passive Location Measurement Report Action field is shown in Figure 9-fff (Primus RSTA Broadcast Passive Location Measurement Report Action field format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category | Public Action | ~~Passive Location Dialog Token~~ | Current Passive Location LCI Table Number | Passive Location LCI Table Countdown Info | RSTA Passive Location LMR | Passive Location LCI Table (optional) |
| Octets: | 1 | 1 | ~~1~~ | 1 | 1 | Variable | Variable |

1. Figure 9-fff Primus RSTA Broadcast Passive Location Measurement Report Action field format

The Category field is defined in 9.4.1.11 (Action field).

The Public Action field is defined in 9.6.8.1 (Public Action frames).

The Current Passive Location LCI Table Number field contains the number of the current valid Passive Location LCI Table.

***TGaz Editor: Edit Section 11.22.6.4.10 (Measurement Exchange in Passive Location Ranging mode), and subsections, as shown below:***

11.22.6.4.10 Measurement Exchange in Passive Location Ranging mode

11.22.6.4.10.1 General

…

The Passive Location Ranging exchanges occur in the scheduled Passive Location Ranging Availability windows.

11.22.6.4.10.2 Passive Location Ranging Measurement Sounding

… (No edits in this subsection)

11.22.6.4.10.3 ~~TB~~ Passive ~~Range~~ Location Ranging Measurement Reporting

…

In the Passive Location Ranging measurement reporting part, an RSTA shall send a Location Measurement Report frame and the LMR Sub-variant Ranging Trigger Frames to one or more ISTAs that sent an HE Ranging NDP PPDU in the preceding passive location ranging measurement sounding part. An ISTA addressed by the LMR Sub-variant Ranging Trigger Frame shall transmit an ISTA Passive Location Measurement Report frame a SIFS time after the LMR Sub-variant Ranging Trigger Frame transmission. The ISTA Passive Location Measurement Report frame is defined in Section 9.6.7.38 (ISTA Passive Location Measurement Report frame format) and contains the ISTAs TOD and TOA time stamps measured by the ISTA during a Passive Location Polling-Sounding-Reporting triplet identified by a Dialog Token included in the report.

The RSTA shall send two RSTA Broadcast Passive Location Measurement Report frames a SIFS time after receiving the ISTA Passive Location Measurement Report frames from the ISTA.

The Primus RSTA Broadcast Passive Location Measurement Report frame containing the following is transmitted first:

* Current Passive Location LCI Table Number
* Passive Location LCI Table Countdown
* RSTA Passive Location LMR
* Passive Location LCI Table (optionally present)

See Section 9.6.7.39 (Primus RSTA Broadcast Passive Location Measurement Report frame format).

The Secundus RSTA Broadcast Passive Location Measurement Report frame containing the following is subsequently transmitted a SIFS interval later.

* ISTA Passive Location Measurement Reports

See Section 9.6.7.40 Secundus RSTA Broadcast Passive Location Measurement Report frame format.