IEEE P802.11
Wireless LANs

|  |
| --- |
| CR for Passive Location |
| Date: 2018-11-15 |
| Author(s): |
| Name | Company | Address | Phone | Email |
| Erik Lindskog | Samsung | 3655 N 1st St, San Jose, CA 95134, USA |  | e.lindskog@samsung.com  |
|  |  |  |  |  |

**Abstract**

This submission proposes resolutions of comments received from TGaz CC28.

* CIDs: 68, 101, 107, 108, 109, 117, 118, 119, 120, 124, 125, 126, 128, 127, 129, 130, 131, 226, 227, 458, 459, 461, 463, 464, 465, 466, 467, 534

The comments are based on TGaz Draft 0.4 and the proposed changes are relative to TGaz Draft 0.5 and TGmd Draft 1.0.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 68 | 11.22.6.4.9.1 | 69 | Why does Secure LTF Required need to be set to 0 in this instance? | As in comment. | Answer: Because one cannot use secure ranging when doing HEz Passive Ranging as the ranging there need to be able to be received by any STA. |
| 101 | 11.22.6.2 | 47 | "HEz Passive Range Measurement Support field" - no such field | Add this field to the extended capabilities element | Revised: Split into separate responder and initiator capabilities for the Passive Ranging case and added corresponding capability and MIB variables.  |
| 107 | 9.3.1.23.9 - Table xxxx - Location Trigger subtype | 22 | Missing 'd in 'HEz Passive Uplink Souning' | Add 'd'. | Revised: Changed name to 'Passive Location Sounding'. |
| 108 | 9.3.1.23.9.4 | 24 | Subfield in Common info field TBD | Define fields. | Revised: Removed text describing functionality that is not specific to Passive Ranging. |
| 109 | 9.3.1.23.9.4 | 24 | UL Target RSSI field in the User Info field is TBD. | Define fields. | Revised: Removed text describing functionality that is not specific to Passive Ranging. |
| 117 | 9.6.7.38 | 42 | Passive Location Measurements Report' in the 'Passive Location Measurement Report Action field format' is TBD. | Define field. | Revised: Defined Passive Location Measurement Report frame format. |
| 118 | 9.6.7.38 | 42 | Dialog Token' in the 'Passive Location Measurement Report Action field format' is TBD. | Change to: The Dialog token field should be set to the value of the Dialog Token corresponding to the reported measurement. | Revised: Defined a Passive Location Dialog token and how it functions and is used. |
| 119 | 11.22.6.1 | 44 | Missing description for passive ranging in 'Overview' section. | Before line 36 add: There is also a variant mode of the FTM procedure that allows 'passive' STAs to listen in to the ranging between ranging ISTAs/RSTA. This mode enables these passive STAs to estimate their differential distance to pairs or sets of the ranging ISTAs/RTA. These differential distances can be used by the passive STAs to estimate their location. | Revised: Added description and added section 11.22.6.1.3 RSTA centric Scheduling for HEz Passive Ranging operation overview. |
| 120 | 11.2.6.1 | 45 | Missing enumerated description for HEz Passive Ranging passive ranging in 'Overview' section. | Add: (f) Hez PassiveAdd Ranging: Similar to HEz Ranging in c) above but with some modifications enabling 'passive' STAs to listen in the exchanges between the ISTAs and the RSTA, as well as between ISTAs. These passive STAs can use the measurements to estimate their differential distance to pair or subsets of the ISTAs/RSTA, enabling the passive STAs to estimate their location. | Revised: Added section 11.22.6.1.3 RSTA centric Scheduling for HEz Passive Ranging operation overview |
| 124 | 11.22.6.4.9.1 | 69 | Incorrect section number reference '11.22.6.4.2'. | Change '11.22.6.4.2' to '11.22.6.4.3' | Accepted |
| 125 | 11.22.6.4.9.1 | 69 | Incorrect section number reference '11.22.6.4.8.2'. | Change '11.22.6.4.8.2' to '11.22.6.4.9.2'. | Accepted |
| 126 | 1.22.6.4.9.1 | 69 | Incorrect section number reference '11.22.6.4.8.3'. | Change '11.22.6.4.8.3' to '11.22.6.4.9.3'. | Accepted |
| 127 | 11.22.6.4.9.1 | 69 | References to 'HEz Type subfield' in the 'HEz Specific Parameters field' in the 'Initial Fine Timing Measurement Request Frame' seems unclear. Not finding the desctiption of this field. | Add description of this subfield if missing or maybe add easier to find reference if we already have this description. | Revised: Changed to 'Passive Location Ranging' field and added that field to the HEz Specific Parameters field in an initial Fine Timing Measurement Request frame and described its function.  |
| 128 | 11.22.6.4.9.3 | 70 | The ISTA to RSTA LMR frame for HEz Passive Ranging is slightly different from the ISTA to RSTA LMR frame for HEz Ranging. | Add specification for ISTA to RSTA LMR frame for HEz Passive Ranging and refer to this frame. This LMR frame should contain the LMR report from the ISTA containing the ISTAs time stamps, their errors, and indentifying information for these time stamps, such as the RID of the transmitting RSTA or ISTA. This report optionally also contains the receive time stamps for UL NDPs received from other ISTA in the same ranging measurement phase. | Revised: Added specification for the 'ISTA LMR frame' and described its functionality. |
| 129 | 11.22.6.4.9.3 | 71 | The broadcast 'Passive Location Measurement Report frames' are not defined. | Define the two 'Passive Location Measurement Report frames'. The first frame should contain information that is available early for the RSTA, such as LCI information, MAC addresses and RIDs, for the ISTAs ranged with and the RSTA, and the time-stamps, with identifiers, for the RSTA. The second frame to contain the broadcasting of the ISTA to RSTA LMR reports from the ISTAs ranged with. | Revised: Defined the two broadcast RSTA LMR/LCI frames and how they function. |
| 130 | 11.22.6.4.9 | 69 | Need to add announcing of schedule of HEz Passive Ranging. | Add specification for announcement of schedule for HEz. Suggest to include the availability window information in every beacon. Availability window information to include Partial TSF, Duration, Periodicity (in units of 10TU) and the BW used for the availability window. | Revised: Added specification for announcement of Passive Location Ranging availability window but but with different units. |
| 131 | 11.22.6.4.9 | 69 | Need to add rule for transmit power to use for frames in the HEz Passive Ranging sequence. | Since the frames for in the HEz Passive Ranging sequence are intended to be received also by 'passive' clients, the power with which they should be transmitted could be different from the frames in the HEz Ranging sequence. For simplicity I propose they be transmitted with max power. (Though one could consider other options.) | Reject: Not changing regular function. |
| 226 | 9.3.1.23.9.4 | 23 | "The CS Required subfield in the Common Info field is set as described in 27.5.3.5 (UL MU CS 33mechanism). " is already in the baseline. Do we need to say this again? Similar for lines around this | If we do need to say it again, we need to say it again for all the other subtypes/subvariants | Revised: Removed text describing functionality that is not specific to Passive Ranging. |
| 227 |   |   | "Passive Uplink Sounding (PUS)" -- if the abbreviation is to be used it should be used everywhere except the very first time | As it says in the comment | Revised: Removed abbrevation 'PUS'. |
| 458 | 11.22.6.4.9.1 | 69 | "STA whose dot11PassiveRangingImplemented equal to true" is odd | Change to "STA with dot11<blah> set to true" or whatever the baseline generally does | Revised: Changed to 'is true' and revised description of the naming and functionality of this variable and related variables.  |
| 459 | 11.22.6.4.9.1 |   | " See 11.22.6.4.8.2 (Hez Passive Range Measurement Sounding)" broken reference | Make sure all references are actual hyperlinks, not plain text (e.g. 3 lines down too) | Revised: Fixed reference. Leaving it for the editor has to make the references hyperlinks. |
| 461 | 11.22.6.4.9.2 | 70 | "An ISTA addressed by the RA field of the HEz PUS Sub-variant Location Trigger frame shall transmit an uplink HEz SU sounding NDP PPDU a SIFS time after the reception of the HEz PUS Sub-variant Location Trigger frame. " -- TFs are responded to with TB PPDUs, not SU PPDUs | As it says in the comment | Rejected. Here we are having the ISTA respond with an SU PPDU NDP. |
| 463 |   |   | "appears SIFS time"/"appears a SIFS time" is not the normal wording | Change to "is transmitted a SIFS after" or whatever the baseline generally uses | Revised: Fixed in the passive ranging text. Should be fixed in 11-18-1742 for TB ranging. |
| 464 | 11.22.6.4.9 | 69 | This so-called passive ranging seems to involve transmission by ISTAs | Clarify why this mode of operation is considered passive | Revised: Added text in '11.22.6.4.9.1 General' describing this.  |
| 465 | 11.22.6.4.9.2 | 70 | "An RSTA shall transmit one or more HEz PUS Sub-variant Location Trigger frames each of which is addressed to a single ISTA a SIFS time after the HEz polling part. " is not achievable. Only the first one can be sent a SIFS after the polling part | As it says in the comment | Revised: Fixed description so that we can trigger more than one NDP transmissions. |
| 466 |   |   | "with a SIFS interval" -- yet another non-canonical formulation | Change both to "after a SIFS" or whatever is used in the baseline | Revised: Corrected language. |
| 467 |   |   | What does it mean to execute TOF measurements? | Clarify the 3 instances | Revised: Chanded the passive ranging text. Changed from use of '(execute) TOF measurements' to '(execute) measureemnts'. Should be fixed in 11-18-1742 for TB ranging |
| 534 | 9.3.1.23.9.4 | 23 | "The RA field of the HEz PUS sub-variant Location Trigger frame is set to the MAC address of the recipient ISTA."In order to make that the passive location client to overhear this Trigger frame, the RA field of the HEz PUS sub-variant Location Trigger frame shall be set to a broadcast MAC address. | As in comment. | Accepted |

***TGaz Editor: Modify Table 1-Table xxxx as indicated below:***

**9.3.1.23 Trigger frame format**

…

**9.3.1.23.9 Location variant**

1. —Table xxxx — Location Trigger subtype of the Location Trigger Dependent Common Info Field

|  |  |
| --- | --- |
| Trigger Subtype field value | Description |
| 0 | TB Poll |
| 1 | TB Uplink Sounding |
| 2 | TB LMR |
| 3 | Location Negotiation |
| 4 | ~~TB~~ Passive Location ~~Uplink~~ Sounding |
| 5-15 | Reserved |

***TGaz Editor: Modify the text in Section ‘9.3.1.23.9.4 TB Passive Uplink Sounding (PUS) Sub-variant’***

***as indicated below:***

9.3.1.23.9.4 ~~TB~~ Passive Location ~~Uplink~~ Sounding ~~(PUS)~~ Sub-variant

The Passive Location Sounding sub-variant Location Trigger frame follows the definition of the TB Ranging Sounding Location Trigger frame sub-variant, with a Trigger Subtype field value set to 4 and the RA field set to the broadcast address.

~~The Trigger Dependent User Info subfield is not present for the TB PUS sub-variant Location Trigger frame.~~

~~The RA field of the TB PUS sub-variant Location Trigger frame is set to the MAC address of the recipient ISTA.~~

~~The CS Required subfield in the Common Info field is set as described in 27.5.3.5 (UL MU CS mechanism).~~

~~The UL BW subfield in the Common Info field indicates the total PPDU bandwidth, and is defined in Table 9-25c (UL BW subfield encoding).~~

~~The UL Length, More TF, MU-MIMO LTF Mode, UL STBC, LDPC Extra Symbol Segment, UL Packet Extension, UL Spatial Reuse, Doppler and UL HE-SIG-A2 Reserved subfields in the Common Info field are reserved.~~

~~The GI And LTF Type, Number Of HE-LTF Symbol and Midamble Periodicity, AP TX Power subfield in the Common Info field are TBD.~~

~~The AID12 subfield in the User Info field carries the 12 LSBs of either the AID of the associated ISTA or the RID of the unassociated ISTA for which the User Info field is intended.~~

~~The RU Allocation, UL FEC Coding Type, UL MCS, UL DCM and SS Allocation fields in the User Info field are reserved.~~

~~The UL Target RSSI field in the User Info field is TBD.~~

***TGaz Editor: Instruct to insert row in Table 9-31 (Beacon frame body) as shown below:***

*Insert row in Table 9-31 (Beacon frame body) as shown below:*

##### 9.3.3.3 Beacon frame format

…

**Table 9-31 – Beacon frame body**

|  |
| --- |
|  |
| **Order** | **Information** | **Notes** |
| 1 | Timestamp |  |
| … | … | … |
| 71 (M40) | Max Channel SwitchTime | The Max Channel Switch Time element is optionally presentwhen a Channel Switch Announcement or an Extended ChannelSwitch Announcement element is also present. |
| ANA | Passive Location Ranging Availability Window | The Passive Location Ranging Availability Window element is optionally present if dot11PassiveLocationRangingResponderActivted is true and a Passive Location Ranging Availability Window is present. |
| Last | Vendor Specific | One or more vendor-specific elements are optionally present. These elements follow all other elements. |

***TGaz Editor: Edit Table ‘Table 7—Table 9-283—Extended Capabilities element’ as indicated below:***

**9.4.2.26 Extended Capabilities element**

**…**

1. —Table 9-283—Extended Capabilities element

|  |  |  |
| --- | --- | --- |
| Bits | Information | Notes |
| <ANA> | Secure LTF Support | A STA sets the Secure LTF Support field to 1 when dot11SecureLTFImplemented is true. Otherwise, the STA sets the Secure LTF Support field to 0. See 11.22.6.4a (Secure LTF Measurement Exchange Protocol). |
| <ANA> | ~~TB Passive Range Measurement Support~~ Passive Location Ranging Responder Measurement Support | A STA sets the ~~TB Passive Range Measurement Support~~ Passive Location Ranging Responder Measurement Support field to 1 when ~~dot11PassiveRangeMeasurementImplemented~~ dot11PassiveLocationRangingResponderActivated is true. Otherwise, the STA sets the ~~TB Passive Range Measurement Support~~ Passive Location Ranging Responder Measurement Support field to 0. See ~~11.22.6.4.8~~ 11.22.6.4.9 (Measurement Exchange in ~~TB~~ Passive ~~Range~~ Location Ranging mode). |
| <ANA> | Passive Location Ranging Inititiator Measurement Support | A STA sets the Passive Location Ranging Initiator Measurement Support field to 1 when dot11PassiveLocationRangingInitiatorActivated is true. Otherwise, the STA sets the Passive Location Ranging Initiator Measurement Support field to 0. See 11.22.6.4.9 (Measurement Exchange in Passive Location Ranging mode). |

***TGaz Editor: Instruct to insert Section 9.4.2.nnn as follows:***

*Insert the following sub-clause in section 9.4.2 as shown below:*

**9.4.2.nnn Passive Location Ranging Availability Window element**

The Passive Location Ranging Availability Window element, defined in Figure 9-709b, is used to announce the availability window in which Passive Location Ranging is being performed to enable STAs to listen in to the there occurring Passive Location Ranging exchanges in order to estimate their location. It is carried within the beacon of an AP STA. The objective with this announcement is to enable STAs not actively participating in the Passive Location Ranging exchanges to listen in to these exchanges for the purpose of estimating their location.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element Id | Element Length | Element ID Extension | Availability Window |
| octets: | 1 | 1 | 1 | 5 |

Figure 9-709b - Passive Location Ranging Availability Window element

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

The Availability Window field is defined in Figure 9-709c.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B21 | B22 B28 | B29 B36 | B37 B40 | B41 B47 |
|  | Partial TSF  | Duration | Periodicity | BW | Reserved |
| bits: | 16 | 7 | 8 | 4 | 7 |

Figure 9-709c – Availability Window field

The Partial TSF Timer sub-field in the Availability Window field indicates what the partial value of the Responder’s TSF timer will be at the start of the Availability Window for the Passive Location Ranging. The allowed value to give for the Partial TSF is limited to be less than 62/64 of 65 536 TUs (<63 488 TUs) ahead of the TSF time at which the frame containing the Availability Window field is transmitted and 1/64 of 65 536 TUs earlier (inclusive) (≥1024 TUs).

The Partial TSF timer value is defined as follows: from the 64 bit TSF timer, remove the most significant 38 bits and the 10 least significant bits. The units of the Partial TSF timer is thus 1024us, and its max value is about 67.1 seconds.

The Duration subfield indicates the length of the Passive Location Ranging availbility window in unit of 100 us. (Giving it a value from 0 to ~12.8 ms).

The Periodicity subfield in the Availability Window Information subfield indicates the periodicity of the Availability Window assigned to the ISTA in units of the value of the Beacon Interval field in the most recent beacon sent by the RSTA. (Giving it a value from 0 to ~25.6 s when the beacon interval is 100 TU)

The BW subfield, defined in Table 302b, indicates the nominal BW used for the transmissions in the Passive Location Ranging availbility window. Depending on the medium availability smaller bandwidth may be used for the exchanged frames.

|  |  |  |
| --- | --- | --- |
|  | BW subfield value |  BW in MHz |
|  | 0 | 20 |
|  | 1 | 40 |
|  | 2 | 80 |
|  | 3 | 80+80 or 160 |
|  | 4-15 | Reserved |
|  |  |  |  |  |

Table 302b – BW subfield for Availability Window field in the Passive Location Ranging Availability Element

***TGaz Editor: Add rows as shown below to Table 9-87 (Element IDs), with the appropriate section referneces, as indicated, and Element ID numbering:***

|  |
| --- |
| * Element IDs
 |
| Element | Element ID | Element ID Extension | Extensible | Fragmentable(11ai) |
| … | … | … | … | … |
| Passive Location Ranging Availability Window element (see 9.4.2.nnn) | 255 | ANA | TBD | NO |
| ISTA Passive Location Measurement Report (see 9.4.2.nnn) | 256 | ANA | TBD | YES |
| RSTA Passive Location LMR (see 9.4.2.nnn) | 257 | ANA | TBD | YES |
| Passive Location LCI Table (see 9.4.2.nnn) | 258 | ANA | TBD | YES |

***TGaz Editor: Edit Section ‘9.6.7.38 ISTA Passive Location Measurement Report frame format’ as indicated 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 |

1. **—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 Dialog Token field is TBD~~

If the Passive Location Polling-Sounding-Reporting triplet being reported on is the current Polling-Sounding-Reporting triplet, then the Passive Location Dialog Token field is set to 1, else it is set to the value of the Passive Location Dialog Token corresponding to the Passive Location Polling-Sounding-Reporting triplet reported on. If the ISTA was not able to receive the Passive Location Dialog Token it sets the reported Passive Location Dialog Token to 0.

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

***TGaz Editor: Instruct to insert Section ‘9.4.2.nnn ISTA Passive Location Measurement Report’ as indicated below:***

*Insert the following sub-clause in section 9.4.2 as shown below:*

**9.4.2.nnn 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 | CFO | N Time Stamp Measurement Reports | Time Stamp Measurement Reports |
|  | Octets: | 1 | 1 | 1 | 1 | variable |

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 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 9-aaa (Format of the 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).

(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: Instruct to insert Section ‘9.6.7.nnn Primus RSTA Broadcast Passive Location Measurement Report frame format’ as shown below:***

*Insert the following sub-clause in section 9.6.7 as shown below:*

**9.6.7.nnn 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 Passive Location Dialog Token field contains the Passive Location Dialog Token associated with the current Passive Location Polling-Sounding-Reporting triplet. The RSTA manages assigning Passive Location Dialog Tokens for the Passive Location Polling-Sounding-Reporting triplet. The Passive Location Dialog Token cannot be set to zero or one though as these value is reseved for use by ISTAs to report that they don’t know the value of the Passive Location Dialog Token or that their Passive Location Ranging measurements reported stem from the current Passive Location Polling-Sounding-Reporting triplet, respectively.

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

The Passive Location LCI Table Countdown Info field contains two subfields as shown in Figure 9-rrr ‘Passive Location LCI Table Countdown field’.

|  |  |  |
| --- | --- | --- |
|  | B0  | B1 B7 |
|  | New LCI Table | Passive Location LCI Table Countdown |
| Bits: | 1 | 7 |

**Figure 9-rrr – Passive Location LCI Table Countdown field**

The subfield New LCI Table is 0 if the current LCI table and LCI table to be transmited at the end of the countdown are the same, else it is 1.

The Passive Location LCI Table Countdown subfield is an index pointing the the next Passive Location Ranging Availability window where the Passive Location LCI table will be contained in the Primus RSTA Broadcast Passive Location Measurement Report frame. The current availability window has index zero, the next one has index 1, the one after that has index 2, and so on.

The RSTA Passive Location LMR field is defined in Section 9.4.2.nnn titled ‘RSTA Passive Location LMR’.

The Passive Location LCI Table field is defined in Section 9.4.2.nnn titled ‘Passive Location LCI Table Report’.

***TGaz Editor: Instruct to insert Section ‘9.4.2.nnn RSTA Passive Location LMR as shown below:***

*Insert the following sub-clause in section 9.4.2 as shown below:*

**9.4.2.nnn 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 | Passive Location Dialog Token | N Time Stamp Measurement Reports | Time Stamp Measurement Reports |
|  | Octets: | 1 | 1 | 1 | 1 | variable |

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 Passive Location Dialog Token field is set to the Passive Location Dialog Token value corresponding to the Passive Location Ranging Polling-Sounding-Reporting triplet reported on.

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 |

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 in 9-aaa (Format of the Time-Stamp Error field).

|  |  |  |
| --- | --- | --- |
|  | B0 B4 | B5 B15 |
|  | Max TOD 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).

(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 transamitted 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: Insert Section ‘9.4.2.nnn Passive Location LCI Table as shown below:***

*Insert the following sub-clause in section 9.4.2 as shown below:*

**9.4.2.nnn Passive Location LCI Table element**

The Passive Location LCI Table Report element, defined in Figure 9-ggg, is used by an RSTA to broadcast LCI data for the ISTAs participating in its Passive Location Ranging exchanges.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element Id | Element Length | Element ID Extension | Passive Location LCI Table Number | RSTA LCI | Number of ISTA LCI Reports | ISTA LCI Reports |
|  | Octets: | 1 | 1 | 1 | Variable | 1 | Variable |

Figure 9-ggg - Passive Location LCI Table Report Element

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

The RSTA LCI field contains a Measurement Report element with Measurement Type field equal to LCI (see Table 9-118 (Measurement Type field definitions for measurement reports)), which indicates the LCI of the transmitting RSTA and includes the Z and Usage Rules/Policy subelement or indicates an unknown LCI (see 11.22.6.7 (LCI and Location Civic retrieval using FTM procedure)). The Late, Incapable and Refused bits in the Measurement Report Mode field are set

to 0.The Co-Located BSSID List subelement is present in the Measurement Report element with

Measurement Type field equal to LCI, when there is at least one other BSS which is co-located with the

reporting BSS.

The ISTA LCI Reports field contains Number of ISTA LCI Reports ISTA LCI Report field fields defined as in Figure 9-hhh.

|  |  |  |  |
| --- | --- | --- | --- |
|  | ISTA RID | ISTA MAC ADDRESS | ISTA LCI |
| octets: | 2 | 6 | variable |

Figure 9-hhh – ISTA LCI Report field

The ISTA RID subfield contains the ranging ID of the ISTA reported on.

The ISTA MAC ADDRESS subfield contains the MAC address of the ISTA reported on.

The ISTA LCI subfield is TBD.

***TGaz Editor: Insert Section ‘9.6.7.mmm Secundus RSTA Broadcast Passive Location Measurement Report frame format’ as shown below:***

*Insert the following sub-clause in section 9.6.7 as shown below:*

**9.6.7.mmm Secundus RSTA Broadcast Passive Location Measurement Report frame format**

The Secundus Broadcast RSTA Passive Location Measurement Report frame is an Action No Ack frame of category Ranging. The Secundus 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 Secundus RSTA Broadcast Passive Location Measurement Report Action field is shown in Figure 9-ggg (Secundus RSTA Broadcast Passive Location Measurement Report Action field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Category  | Public Action | Number of ISTA Passive Location Measurement Reports | ISTA Passive Location Measurement Reports |
| Octets: | 1 | 1 | 1 | Variable |

1. —Figure 9-ggg Secundus 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 Number of ISTA Passive Location Measurement Reports field indicates the number of following Passive Location ISTA to RSTA LMR report fields.

The ‘ISTA Passive Location Measurement Reports’ field contains ‘Number of ISTA Passive Location Measurement Reports’ ‘ISTA Passive Location Measurement Report elements’. The ‘ISTA Passive Location Measurement Reports element’ is defined in Section 9.4.2.nnn ISTA Passive Location Measurement Report.

***TGaz Editor: Edit ‘Figure 9-610d TB Specific Parameters subelement format’ as follows:***

9.4.2.278 Ranging Parameters

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Subelement ID (1) | Length | Availability Window | Ranging ID | Response | Trigger Frame MAC Padding Duration  | Passive Location Ranging | Reserved | MaxToAAvailableExp () | BSS Color |
| bits | 8 | 8 | TBD | 16 | 1 | 2 | 1 | ~~2~~1 | 4 | 8 |

1. —Figure 9-610d TB Specific Parameters subelement format

***TGaz Editor: Edit the text following ‘Figure 9-610d TB Specific Parameters subelement format’ that defines the parameters in the ‘TB Specific Parameters subelement’ as follows:***

The Element ID and Length fields are defined in 9.4.3 (Subelements).

The definition of Availability Window is TBD

The Ranging ID is the same as the AID if the initiator is associated with the responder; and is similar to AID and is assigned by the responder to identify the unassociated initiator. The Ranging ID and the AID are derived the same space and are non-conflicting.

The Passive Location Ranging field is set to 1 by the Initiator to request Passive Location Ranging operation, otherwise it is set to 0.

The Passive Location Ranging field is set to 1 by the Responder to grant Passive Location Ranging operation, otherwise it is set to 0.

The Response field is either set to 0 or 1, indicating Immediate or Delayed response. If the Response field is set to Immediate then the ToD andToA values included in the corresponding Location Measurement Report (LMR) frame are from the current range measurement; and if the Response field is set to Delayed then the ToD and ToA values in the corresponding LMR frame are from the previous range measurement.

The MaxToAAvailableExp field is the same as described under VHTz Specific subelement.

The BSS Color field is an unsigned integer in the range 1 to 63 whose value is set to the same BSS Color value contained in the HE Operation element that an RSTA transmit.

One or more of the Non-TB specific or the TB specific subelements are included in the initial 23 FTM Request. Only one of the Non-TB specific or the TB specific subelement shall be included 24 in the Ranging Parameters element contained in the initial FTM and indicates the range 25 measurement protocol selected by the responder for the negotiated FTM session.

***TGaz Editor: Edit Section ‘11.22.6.1 Overview’ as indicated below:***

11.22.6.1 Overview

*Modify the following paragraphs of Clause 11.22.6.1 as shown below:*

For DMG and EDMG, an FTM session shall be preceded by a First Path Beamforming Training 6 as described in 10.39.9.6 First Path Beamgorming Training [802.11ay D1.2].

The FTM procedure allows a STA to determine its distance and (for DMGz and EDMGz STAs) 8 its direction to or from another STA. In order for a STA to obtain its location, the STA may 9 perform this procedure with multiple STAs whose locations are known.

There is also a mode of the FTM procedure that allows a STA that only listens to the ranging exchanges of a pair/set of STAs enganged in Passive Location Ranging to determine its differential distance to them. In order for such a STA to obtain its location, the STA may listen in to Passive Location Exchanges between multiple STAs whose locations are known.

An FTM session is an instance of an FTM procedure between an initiating STA and a responding STA along with the associated scheduling and operational parameters of that ~~instance (see 9.4.2.166 (Fine Timing Measurement Parameters element))~~.(see 9.4.2.168 (Fine Timing Measurement Parameters element)) and 9.4.2.246 (Ranging Parameters element)). An FTM session is composed of a negotiation, measurement exchange and termination. ….

A responding STA (RSTA) might be required to establish overlapping FTM sessions with a large number of initiating STAs (e.g., an AP providing measurements to STAs at a mall or a store). On the other hand, an initiating STA (ISTA) might have multiple ongoing FTM sessions on the same or different channels with different responding STAs, while being associated with an AP for the exchange of data or signaling.

*Insert the following paragraphs of Clause 11.22.6.1 as shown below:*

In order to obtain an ISTA to RSTA RTT (Round Trip Time) there are two basic scheduling methods: RSTA centric scheduling and ISTA centric scheduling. In RSTA centric scheduling the RSTA assigns the ISTA a set of known availability time windows during which measurements occur, and the RSTA has full control of the measurement timing. In ISTA centric scheduling the ISTA initiates a measurement based on loose scheduling limitations provided by the RSTA.

A variant of the RSTA centric scheduling is part of a Passive Location Ranging procedure that enables a STA that to, by only listen to the ranging exchanges, measure differential distances to pairs/sets of STAs and use this information to estimate its location.

The measurement exchange is one of the following:

The measurement exchange is one of the following:

1. FTM Measurement Exchange: Exchange of Fine Timing Measurement frames in bursts
2. VHTz Ranging: a sequence of uplink Null Data Packet Announcement, uplink Null Data Packet, downlink Null Data Packet and downlink Location Measurement Report
3. TB Ranging: Multiuser exchange of downlink poll, multiuser uplink poll response, downlink trigger, multiuser uplink NDPA, multiuser uplink NDP, downlink NDP and downlink Location Measurement Report to multiple STAs
4. Passive Location Ranging: Same as the TB Ranging apart from some exceptions. See Section 11.22.6.4.9.
5. DMGz Ranging: it shall set the DMG Range Measurement field of the Extended Capabilities element to 1. Otherwise it shall set the Multi User Range Measurement field of the Extended Capabilities element to 0. A STA that additionally supports Direction Measurement shall include a DMG Direction Measurement Capabilities field in the DMG Capabilities element and set one of the first 4 subfields of this field to 1
6. eDMGz Ranging, it shall set the EDMG Range Measurement field of the Extended Capabilities element to 1. Otherwise it shall set the Multi User Range Measurement field of the Extended Capabilities element to 0. A STA that additionally supports Direction Measurement shall include a DMG Direction Measurement Capabilities field in the DMG Capabilities element and set one of the first 4 subfields of this field to 1.

Sequences (b), (c), (d) and (e) above are referred to as 802.11az ranging protocols in this specification.

*Insert the following paragraphs of Clause 11.22.6.1 as shown below:*

For DMG and EDMG, an FTM session shall be preceded by a First Path Beamforming Training as described in 10.39.9.6 First Path Beamgorming Training.

*Insert the following sub-clause header, 11.22.6.1.1 between the two paragraphs in 11.22.6.1:*

*“A responding STA (RSTA) might be required to establish overlapping FTM sessions with a large number of initiating STAs (e.g., an AP providing measurements to STAs at a mall or a store). On the other hand, an initiating STA (ISTA) might have multiple ongoing FTM sessions on the same or different channels with different responding STAs, while being associated with an AP for the exchange of data or signaling.”*

***TGaz Editor: Instruct to insert Section 11.22.6.1.*3 RSTA centric Scheduling for Passive Location Ranging operation overview *as follows:***

*Insert the following sub-clause in section 11.22.6.1 as shown below:*

**11.22.6.1.3 RSTA centric Scheduling for Passive Location Ranging operation overview**

The RSTA centric Scheduling for Passive Location Ranging operation operates as the RSTA centric Scheduling for TB Ranging operation described in Section 11.22.6.1.1. The availability window is here referred to as a Passive Location Ranging Availability window. The RSTA announces the schedule for the Passive Location Ranging Availability window, assuming it is present, in every beacon frame.

***TGaz Editor: Edit Section ‘11.22.6.2 FTM capabilities’ as indicated below:***

**11.22.6.2 FTM capabilities**

If the STA in which dot11FineTimingMsmtRespActivated is true or dot11FineTimingMsmtInitActivated is true supports:

…

~~(e) TB Passive Ranging, it shall set the TB Passive Range Measurement Support field of the Extended Capabilities element to 1. Otherwise it shall set the TB Passive Range Measurement Support field of the Extended Capabilities element to 0.~~

If the STA in which dot11FineTimingMsmtRespActivated is true supports:

(a) Passive Location Ranging, it shall set the Passive Location Ranging Responder Measurement Support field of the Extended Capabilities element to 1. Otherwise it shall set the Passive Location Ranging Responder Measurement Support field of the Extended Capabilities element to 0.

If the STA in which dot11FineTimingMsmtInitActivated is true supports:

(a) Passive Location Ranging, it shall set the Passive Location Ranging Initiator Measurement Support field of the Extended Capabilities element to 1. Otherwise it shall set the Passive Location Ranging Initiator Measurement Support field of the Extended Capabilities element to 0.

A STA in which dot11FineTimingMsmtRespActivated is false shall set the Fine Timing Measurement Responder field of the Extended Capabilities element to 0.

A STA in which dot11FineTimingMsmtInitActivated is false shall set the Fine Timing Measurement Initiator field of the Extended Capabilities element to 0.

***TGaz Editor: Edit Section 11.22.6.4.1 titled ‘FTM Measurement exchange overview’ as follows:***

**11.22.6.4.1 FTM Measurement exchange overview**

FTM measurement has three basic scheduling mechanisms:

— RSTA centric EDCA based legacy scheduling mode (including DMGz and EDMGz) described in section 11.22.6.4.2

— TB scheduling mode described in section 11.22.6.4.3

— Non-TB scheduling mode described in section 11.22.6.4.4

— ~~TB~~ ~~passive~~ Passive Location Ranging ~~range~~ mode described in section ~~11.22.6.4.8~~ 11.22.6.4.9

***TGaz Editor: Insert the following section heading before the section heading ‘11.22.6.4.10.1 General’ (on page 75):***

11.22.6.4.10 Measurement Exchange in Passive Location Ranging mode

***TGaz Editor: Edit Section 11.22.6.4.10.1 titled ‘General’ as follows:***

11.22.6.4.10.1 General

The Passive Location Ranging mode is a variant of the TB Ranging mode that consists of ranging exchanges between an RSTA and a set of ISTAs. These ranging exchanges and associated measurement reporting are set up such that an arbitrary STA can listen in to them and use the ranging exchanges and reported ranging measurements to estimate its differential distance to pairs or sets consisting of the RTA and/or one or more ISTAs. This listening STA need not itself be an active (as in transmitting) participant in the ranging exchange. That is, this listening STA can passively estimate differential distances to the RTA and the ISTAs. It can then use these differential distances together with knowledge of the RSTA and ISTA locations to estimates its own location.

An ISTA whose ~~dot11PassiveRangingImplemented~~ dot11PassiveLocationRangingInitiatorActivated ~~equal to~~ is true and an RSTA whose ~~dot11PassiveRangeImplemented~~ dot11PassiveLocationRangingResponderActivated ~~equal to~~ is true may activte ~~TB passive range mode. In~~ passive location ranging exchanges in which case, the ISTA and RSTA follow the rules described in subclause ~~11.22.6.4.2~~ 11.22.6.4.3(Measurement Exchange in TB Mode) with the ~~following~~ exceptions~~:~~ described in Section 11.22.6.4.9 (Measurement Exchange in TB Passive Range Location Ranging mode), with subsections.

An RSTA in which dot11PassiveLocationRangingRespoinderActivated is true shall set the Passive Location Ranging Responder Measurement Support field in the Extended Capabilities element to 1.

When an ISTA sets the Passive Location Ranging field in the TB Specific Parameters field in an initial Fine Timing Measurement Request frame to 1, the ISTA shall set the Secure LTF Required subfield in the Ranging Parameters field in an initial Fine Timing Measurement Request frame to 0.

When an RSTA has set the Passive Location Ranging Responder Measurement Support field to 1 in the Extended Capabilities element it transmits, an ISTA with dot11PassiveLocationRangingActivated equal to true may set the Passive Location Ranging field in the TB Specific Parameters field in an initial Fine Timing Measurement Request frame to 1 to request a Passive Location Ranging measurement session between the ISTA and the RSTA.

~~—~~ The RSTA sends the ~~TB~~ Passive Location ~~Uplink~~ Sounding ~~(PUS)~~ Sub-variant Location Trigger frame instead of the TB ~~Uplink~~ Sounding Sub-variant Location Trigger frame. Upon receipt of the ~~TB PUS~~ Passive Location ~~Uplink~~ Sounding Sub-variant Location Trigger frame, the ISTA responds with an ~~uplink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU instead of an HE TB Ranging NDP PPDU ~~uplink TB TB sounding NDP PPDU~~. See 11.22.6.4.~~8~~9.2 (~~TB~~ Passive ~~Range~~ Location Ranging Measurement Sounding) for further details.

~~—~~ The RSTA broadcasts two RSTA Broadcast Passive Location Measurement Report frames containg ~~TOF measurement executed at the RSTA and ISTAs~~ measurement data and related information. See 11.22.6.4.~~8~~9.3 (TB Passive ~~Range~~ Location Ranging Measurement Reporting) for further details.

~~An RSTA in which dot11PassiveRangeImplemented is true shall set the TB Passive Range Measurement Support field in the Extended Capabilities element to 1.~~

~~When an RSTA has set the TB Passive Range Measurement Support field to 1 in the Extended Capabilities element it transmits, an ISTA with dot11PassiveRangeImplemented equal to true may set the TB Type subfield in the TB Specific Parameters field in an initial Fine Timing Measurement Request frame to 1 to activate an TB passive range measurement exchange mode between the ISTA and the RSTA.~~

~~When an ISTA sets the TB Type subfield in the TB Specific Parameters field in an initial Fine Timing Measurement Request frame to 1, the ISTA shall set the Secure LTF Required subfield in the Ranging Parameters field in an initial Fine Timing Measurement Request frame to 0.~~

The Passive Location Ranging exchanges occur in the scheduled Passive Location Ranging Availability windows. The RSTA manages assigning a Passive Location Dialog Token number to each Passive Location Polling-Sounding-Reporting triplet. The Passive Location Dialog Token cannot be set to one or zero though as these values are reseved for use by ISTAs to report that their Passive Location Ranging measurements reported stem from the current Passive Location Ranging Polling-Sounding-Reporting triplet, or that it does not know the value of the Passive Location Dialog Token, respectively. See Sections 9.6.7.38 (ISTA Passive Location Measurement Report frame format) and 9.6.7.nnn (Primus RSTA Broadcast Passive Location Measurement Report frame format).

***TGaz Editor: Edit Section 11.22.6.4.10.2 titled ‘TB Passive Range Measurement Sounding’ as follows:***

11.22.6.4.10.2 ~~TB~~ Passive ~~Range~~ Location Ranging Measurement Sounding

The ~~TB passive range~~ Passive Location Ranging measurement sounding part commences a SIFS time after the TB polling part in the and is the 2nd part of the ~~TB passive range~~ Passive Location Ranging measurement sequence. The ~~TB passive range~~ Passive Location Ranging measurement sounding part is composed by one or more ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame and ~~an~~ ~~uplink~~ ~~TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU exchanges ~~sequences~~, a Ranging NDPA frame, and an ~~downlink~~ HE Ranging NDP PPDU ~~TB SU sounding NDP PPDU~~ transmission~~s~~.

An RSTA shall transmit one or more ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frames each of which is addressed to a single ISTA, the first one coming a SIFS time after the TB polling part.

An ISTA addressed by the ~~RA field~~ RID in ~~of~~ the ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame shall transmit an ~~uplink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU a SIFS time after the reception of the ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame.

After sending all pending ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frames, the RSTA shall transmit a Ranging NDPA frame followed by an ~~downlink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU with~~in~~ a SIFS interval.

An RSTA transmitting a~~n~~ ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame to an ISTA shall not use a bandwidth wider than that indicated in the initial Fine Timing Measurement frame sent to the ISTA and the RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH to be the same value as the BW subfield of the Common Info field in the ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame.

An RSTA transmitting a Ranging NDP Announcement frame and an ~~downlink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU after receiving an ~~uplink TB TB sounding NDP PPDU~~ HE Ranging NDP PPDU as a response ~~of~~  to a~~n~~ ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame shall set the TXVECTOR parameter CH\_BANDWIDTH to be the same value as the BW subfield of the Common Info field in the ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame.

An ISTA transmitting an ~~uplink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU as a response ~~of~~ to a~~n~~ ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame shall set the TXVECTOR parameter CH\_BANDWIDTH to be the same value as the BW subfield of the Common Info field in the ~~TB PUS~~ Passive Location Sounding Sub-variant Location Trigger frame.

Similar to in TB Ranging, an ISTA participating in a Passive Location Ranging exchange shall measure the TOD of its own HE Ranging NDP PPDU and the TOA of when it receives the RSTA’s HE Ranging NDP PPDU. In addition, optionally the ISTA also reports the TOAs of when it receives the HE Ranging NDP PPDUs transmitted by the other ISTAs participating in the Passive Location Ranging exchange. By reporting the TOA time stamps for when it received the other ISTAs NPD transmissions, the quality of the location estimate for a STA listening in to the Passive Location exchanges can be improved.

The max number of Nsts used in the Passive Location Ranging exchanges is limited to 4.

***TGaz Editor: Edit Section 11.22.6.4.10.3 titled ‘TB Passive Range Measurement Reporting’ as follows:***

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

The last part of the ~~TB~~ ~~p~~Passive ~~range~~ Location Ranging measurement sequence is the ~~TB~~ ~~p~~Passive ~~range~~ Location Ranging measurement reporting part and ~~appears~~ is transmitted a SIFS time after the ~~TB~~ ~~p~~Passive ~~range~~ location ranging measurement sounding part.

In the ~~T~~ ~~passive range~~ Passive Location Ranging measurement reporting part, an RSTA shall send a Location Measurement Report frame and the LMR Sub-variant Location Trigger frames to one or more ISTAs that sent an ~~uplink TB SU sounding NDP PPDU~~ HE Ranging NDP PPDU in the preceding ~~TB~~ passive ~~range~~ location ranging measurement sounding part. ~~according to 11.22.6.4.23.4 (TB Measurement Reporting Part).~~ An ISTA addressed by the LMR Sub-variant Location Trigger frame shall transmit ~~a~~ an ISTA Passive Location Measurement Report frame a SIFS time after the LMR Sub-variant Location 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 Passive Location Dialog Token included in the report.

The RSTA shall send two ~~broadcast~~ RSTA Broadcast Passive Location Measurement Report frames a SIFS time after receiving the ISTA Passive Location Measurement Report frames from ~~containing TOF measurements executed at~~ the ISTA~~s~~.

The Primus RSTA Broadcast Passive Location Measurement Report frame containing ~~one or more of~~ the following is transmitted first~~.~~ :

~~— TBD~~

* Passive Location Dialog Token
* 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.nnn Primus RSTA Broadcast Passive Location Measurement Report frame format.

The Secundus RSTA Broadcast Passive Location Measurement Report frame containing ~~one or more of~~ the following is ~~transmitted~~ subsequently transmitted ~~with~~ a SIFS interval later.

~~— TBD~~

* ISTA Passive Location Measurement Reports

See Section 9.6.7.mmm Secundus RSTA Broadcast Passive Location Measurement Report frame format.

***TGaz Editor: Edit the following in Annex C.3 as indicated:***

**C.3 MIB Detail**

*Insert the following entry at the end the following object as shown below:*

Dot11WirelessMgmtOptionsEntry ::=

SEQUENCE {

…

dot11RMCivicConfigured TruthValue,

dot11SecureLTFImplemented TruthValue

dot11PassiveLocationRangingResponderActivated TruthValue

dot11PassiveLocationRangingInitiatorActivated TruthValue

}

…

dot11PassiveLocationRangingResponderActivated OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that a support for Passive Location Ranging acting as a responder is implemented (see Section 11.22.6.4.9 Measurement Exchange in Passive Location Ranging mode) is implemented. The capability is disabled otherwise."

DEFVAL { false }

::= { dot11WirelessMgmtOptionsEntry <appropriate number>}

dot11PassiveLocationRangingInitiatorActivated OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that a support for Passive Location Ranging acting as an initiator is implemented (see Section 11.22.6.4.9 Measurement Exchange in Passive Location Ranging mode) is implemented. The capability is disabled otherwise."

DEFVAL { false }

::= { dot11WirelessMgmtOptionsEntry <appropriate number>}