IEEE P802.11
Wireless LANs

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| Some LB 249 Passive TB Ranging CR |
| Date: 2020-09-08 |
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Abstract

**WORK IN PROGRESS!**

This document proposes resolutions to TGaz LB249 comments related to Passive TB Ranging, in particular related to general description of its function or description. The changed described here are in relation to [1].

The 52 TGaz LB249 CIDs addressed in this document are CIDs:

3103, 3020, 3310, 3830, 3336, 3045, 3277, 3278, 3273, 3143, 3301, 3047, 3234, 3274, 3275, 3857, 3337, 3289, 3152, 3841, 3858, 3279, 3280, 3307, 3308, 3309, 3547, 3548, 3789, 3790, 3791, 3052, 3053, 3874, 3558, 3554, 3555, 3655, 3656, 3658, 3557, 3556, 3165, 3890, 3166, 3891, 3654, 3659, 3800, 3801, 3804, and 3808,

OR in ascending order, CIDs:

3020, 3045, 3047, 3052, 3053, 3103, 3143, 3152, 3165, 3166, 3234, 3273, 3274, 3275, 3277, 3278, 3279, 3280, 3289, 3301, 3307, 3308, 3309, 3310, 3336, 3337, 3547, 3548, 3554, 3555, 3556, 3557, 3558, 3654, 3655, 3656, 3658, 3659, 3789, 3790, 3791, 3800, 3801, 3804, 3808, 3830, 3841, 3857, 3858, 3874, 3890, and 3891.

CID checked that they contain CID # labels, when applicable, in the changed draft text:

3103, 3020, 3310, 3830, 3336, 3045, 3277, 3278, 3273, 3143, 3301, 3047, 3234, 3274, 3275, 3857, 3337, 3289, 3152, 3841, 3858, 3279, 3280, 3307, 3308, 3309, 3547, 3548, 3789, 3790, 3791, 3052, 3053, 3874, 3558, 3554, 3555, 3655, 3656, 3658, 3557, 3556, 3165, 3890, 3166, 3891, 3654, 3659, 3800, 3801, 3804, and 3808.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3103 | 49.00 | 9.3.3.2 | Table 9-34 has two entrees for optionally including Passive TB Ranging Availability window on Row 4 and Row 6. If we don't need both, remove one. | As per comment | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

**Discussion:** The row pertaining the the element ‘Passive TB Ranging Availability Window’ element should be removed as we don’t have such an element. That information is carried in the RSTA Availability Window element.

***TGaz editor: Modify the Table 9-34 (Beacon frame body) in*** *9.3.3.2* ***(Beacon frame format) starting on P49 as:***

**Table 9-34—Beacon frame body (#3103)**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| 1  | Timestamp |  |
| …  | …  | … |
|  |  |  |
| Last  | Vendor Specific  | One or more vendor-specific elements are optionally present.These elements follow all other elements. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3020 | 55.30 | 9.4.2.21.10 | Text describes that the values are relative to "specified reference location", but there is no reference where this "specified reference location" is defined. Please add the reference. | Add the reference. | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.4.2.21.10 (LCI report (Location configuration information report)) as follows:***

**9.4.2.21.10 LCI report (Location configuration information report)**

…

The Relative Compact LCI field is only used in the Passive TB Ranging LCI Table Report element (see 9.4.2.304 (Passive TB Ranging LCI Table element) that contains an RSTA LCI report field. The reported location of the RSTA serves as the reference location for the reporting of the Relative Latitude, Longitude, and Altitude subfields in the Relative Compact LCI field. **(#3020)**

The Relative Latitude subfield contains a signed integer in two’s complement format indicating the latitude offset of the reported location in relation to the RSTAreference location, in units of 1.8e-07 deg. (Corresponds to approximately two cm at the equator.) (#**1789, #3020**)

The Relative Longitude subfield contains a signed integer in two’s complement format indicating the longitude offset of the reported location in relation to the RSTA reference location, in units of 1.8e-07 deg. (Corresponds to approximately two cm at the equator.) (#**1790, #3020**)

The Relative Altitude subfield contains a signed integer in two’s complement format indicating the elevation offset of the reported location in relation to the RSTA reference location, in units of 2 cm. **(#3020)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3310 | 71.10 | 9.4.2.295 | Is it the case that a continuous BSS channel bandwidth, e.g. 160 MHz, can be realized with two adjacent channels driven by separate LOs? If so we may need to communicate this to the PSTAs in the Passive TB Ranging parameters subfield in the RSTA Availability Window element. | Consider if we need to communicate the use of one or two LO's by either the RSTA or the ISTA in the RSTA Availability Window element in the the Passive TB Ranging parameters subfield in the RSTA Availability Window element, and if so add this to Table 9-1000 (BW subfield for Availability Window field in the Passive TB Ranging Availability element). We need this if the PSTAs need to know this in order to properly estimate its TOAs. | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz editor: Modify the Table 9-1000 (BW subfield for Availability Window field in the Passive TB Ranging Availability element) in*** *9.4.2.295 (RSTA Availability Window element)* ***starting on P71L16 as:***

**Table 9-1000—BW subfield for Availability Window field in the Passive TB Ranging 15 Availability element**

|  |  |
| --- | --- |
| **BW subfield value** | **BW** |
| 0 | 20 MHz |
| 1 | 40 MHz |
| 2 | 80 MHz |
| 3 | 80+80 or 160 MHz |
| 4 | 80+80 MHz with separate LOs **(#3310)** |
| 3-15 | Reserved |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3830 | 84.30 | 9.4.2.302 | "The CFO element indicates the reporting ISTAs carrier frequency offset with respect to the RSTA. The CFO element is a 2 octet long signed integer in two's-complements format indicating the CFO in units of 0.01 ppm. " is duplication and misnaming | Change to "The CFO field indicates the reporting ISTA's carrier frequency offset with respect to the RSTA, as signed integer in two's-complements format and in units of 0.01 ppm." | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.4.2.302 (ISTA Passive TB Ranging Measurement Report element) as follows:***

**9.4.2.302 ISTA Passive TB Ranging Measurement Report element (#2340)**

…

The CFO field indicates the reporting ISTA's carrier frequency offset with respect to the RSTA, as a signed integer in two's-complements format in units of 0.01 ppm. **(#3830)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3336 | 84.32 | 9.4.2.302 | Missing definition for "ppm". | Define the meaning of "ppm" or replace "0.01 ppm" with "1 / 10 ^ -8" | Rejected. The unit 'ppm' is a widely accepted term. There are already 40 references to ppm in 802.11REVmd. It is also listed with an explanation in the Merriam-Webster's dictionary. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3045 | 85.19 | 9.4.2.302 | Use of "AID12/RSID12" is NEW! In the spec, as far as I know, we don't use names with number of bits embedded in the name. Any real reason to start having such? | Remove the number of bits (12) from the name or use a different name. This might appear in more places | Rejected. We are using this term in many places in the draft. The number 12 comes from the fact that the AID12/RSID12 subfield carries either the LSBs of the AID for an associated ISTA or the LSBs of the RSID for an unassociated ISTA. |
| 3277 | 85.22 | 9.4.2.302 | The RSTA Passive Location LMR is likely transmitted with low MCS as it is used to broadcast LMR information. For this reason the 'RSTA Passive Location Measurement Report Element' should have a very small byte count. | Given that a STA doing passive locationing does only require the time difference of a TOA and TOD timestamp, the proposal is: Introduce another Type "time difference" in which case the time stamp field holds a time difference of TOA and subsequent TOD. The error field would need to be multiplied by 2 in this case, i.e. 2Emax. When implemented this saves signaling of N/2 time stamps. Also consider allowing fewer bits for this time of time stamp as it does not need to span as large a time interval. | Reject. The group considered various mechanisms to provide measurement information to PSTAs considering power, medium efficiency and simplicity and converged on the described mechanism. There is also a benefit in keeping the time-stamp format for Passive TB Ranging similar to that of TB Ranging. |
| 3278 | 85.22 | 9.4.2.302 | The ISTA Passive Location LMR is likely transmitted with low MCS as it is used to broadcast LMR information. For this reason the 'RSTA Passive Location Measurement Report Element' should have a very small byte count. | Given that a STA doing passive locationing does only require the time difference of a TOA and TOD timestamp, the proposal is: Introduce another Type "time difference" in which case the time stamp field holds a time difference of TOA and subsequent TOD. The error field would need to be multiplied by 2 in this case, i.e. 2Emax. When implemented this saves signaling of N/2 time stamps. Also consider allowing fewer bits for this time of time stamp as it does not need to span as large a time interval. | Reject. The group considered various mechanisms to provide measurement information to PSTAs considering power, medium efficiency and simplicity and converged on the described mechanism. There is also a benefit in keeping the time-stamp format for Passive TB Ranging similar to that of TB Ranging. |
| 3273 | 86.24 | 9.4.2.302 | The definition of the Time-Stamp Error subfield does not seem very efficient or appropriate. We should consider improving on this. | Revisit the definition of the Time-Stamp Error subfield and improve on it by making it use less bits. | Reject.This is an invalid comment. It fails to identify changes in sufficient detail so that the specific proposed wording of the changes can be determined. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3143 | 87.14 | 9.4.2.303 | "Ranging NDP Announcement frame of the corresponding to the measurement sounding phase" - language is not clear what does "of the corresponding to" mean? | replace by "Ranging NDP Announcement frame corresponding to the measurement sounding phase" | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.4.2.303 (RSTA Passive TB Ranging Measurement Report element) as follows:***

**9.4.2.303 RSTA Passive TB Ranging Measurement Report element**

…

The value of the Dialog Token field is the value of the Sounding Dialog Token field in the Ranging NDP Announcement framecorresponding to the measurement sounding phase in which the reported RSTA timestamps were measured (see 11.22.6.4.3 (TB ranging measurement exchange) and 11.22.6.4.8 (Measurement exchange in Passive TB Ranging mode)). **(#1103, #3143)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3301 | 88.05 | 9.4.2.304 | Change file name 'Passive TB Ranging Measurement Table Report' to ' Passive Location LCI Table Number'. Also add description of the field in the text. | As per comment. | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ElementId | ElementLength | ElementIDExtension | Passive TB Ranging LCI Table Counter | Number of ISTA LCIReportEntries | ISTA LCI Reports Entries | RSTA LCI Report (Optional) | RSTA Location Civic Report (Optional) |
| Octets: | 1 | 1 | 1 | 1 | 1 | Variable | Variable | Variable |

**Figure 9-1029—Passive TB Ranging LCI Table Report element (#2438, #3301)**

The Element ID, Length and Element ID Extension fields are defined in 9.4.2.1. 9

The Passive TB Ranging LCI Table Counter field contains the counter value for the transmitted Passive TB Ranging LCI Table. **(#3301)**

The RSTA LCI Report field is present if the RSTA has never transmitted it before or its content has changed, and it is periodically present otherwise. If present, it contains a Measurement Report element with Measurement Type field equal to LCI (see Table 9-118 (Measurement Type field definitions for measurement reports)), which either indicates the LCI of the RSTA and may include the Z subelement Usage Rules/Policy subelement, Antenna Placement and Calibration subelement, or indicates an unknown LCI (see 11.22.6.7 (LCI and Location Civic retrieval using FTM procedure)). (#**2302**)

The RSTA Location Civic Report field is optionally present. If present, it contains a Measurement Report element with Measurement Type field equal to Location Civic (see Table 9-118 (Measurement Type field definitions for measurement reports)), which either indicates the Civic address of the ISTA or an unknown Civic address (see 11.22.6.7 (LCI and Location Civic retrieval using FTM procedure)).

The number of ISTA LCI Reports contained in the ISTA LCI Reports field is indicated by the Number of ISTA LCI Reports ISTA LCI Report field. The format of the ISTA LCI Report field is defined in Figure 9-1030.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3047 | 95.21 | 9.6.7.48 | Table in figure 9-9818 has Reserved bits in the middle, without any reason. Pack the used bits and have ALL reserved bits at the end. | Pack the used bits and have ALL reserved bits at the end. | Reject. The format follows the format for the TOD error field in 802.11REVmd D3.0. |
| 3234 | 95.01 | 9.6.7.48 | Move the ToA/ToD and associated Error fields into an optional subelement. This will make various privacy concerns easier as the element needs not to be included in the ISTA2RSTA LMR | As per comment | Reject. Possibly a good idea but the format here mimics the format of the ‘Fine Timing Measurement frame format’ in Draft P802.11REVmd\_D3.0 so we chose to keep it. |
| 3274 | 95.21 | 9.6.7.48 | The definition of the TOD Error field does not seem very efficient or appropriate. We should consider imprioving on this. | As per comment | Reject.This is an invalid comment. It fails to identify changes in sufficient detail so that the specific proposed wording of the changes can be determined. |
| 3275 | 96.5 | 9.6.7.48 | The definition of the TOA Error subfield does not seem very efficient or appropriate. We should consider imprioving on this. | Revisit the definition of the TOA Error field and improve on it by making it use less bits. | Reject.This is an invalid comment. It fails to identify changes in sufficient detail so that the specific proposed wording of the changes can be determined. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3857 | 96.19 | 9.6.7.48 | "The Invalid Measurement field contains an invalid indication for the TOA field." is confusing | Change to "The Invalid Measurement field indicates whether the TOA field contains a valid value." | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.6.7.48 (Location Measurement Report frame format) as follows:***

**9.6.7.48 Location Measurement Report frame format**

…

The Invalid Measurement field indicates whether the TOA field contains a valid value. It is set to 1 to indicate that the TOA value is invalid and the value 0 in this field indicates that the TOA value is valid. **(#3857)**

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| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3337 | 97.1 | 9.6.7.48 | What is "1.073 741 824 ms"? Numbers are not grouped for fractions. | Delete spaces from "1.073 741 824 ms". | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.6.7.48 (Location Measurement Report frame format) as follows:***

**9.6.7.48 Location Measurement Report frame format**

…

A value of 0 for the Max TOD Error Exponent or the Max TOA Error Exponent field indicates that the upper bound on the error in the corresponding TOD or TOA value is unknown. A value of 31 indicates that the upper bound on the error is greater than or equal to 1.073741824 ms. **(#3337)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3289 | 97.13 | 9.6.7.49 | The ISTA Passive TB Ranging Measurement Report frame that is used by the ISTA to send its LMR to the RSTA in the Passive TB Ranging case, can probably be merged with the Location Measurement Report frame format. We would however in some way make the fram contain either the content in the Location Measurement Report frame format for the case of non-TB and TB Ranging, or the content in the ISTA Passive TB Ranging Measurement Report frame for the case when that is used by the ISTA to send its LMR to the RSTA in the Passive TB Ranging . However, keep in mind that an idea with the ISTA to RSTA LMR reporting in the Passive TB Ranging case is that the RSTA can copy the whole ISTA Passive TB Ranging Measurement Report element from each ISTA when it broadcasts it in the Secundus RSTA Broadcast Passive TB Ranging Measurement Report frame. Thus it makes sense in the Passive TB Ranging case to contain the report from the ISTA intact in the ISTA Passive TB Ranging Measurement Report element. | As per comment. | Reject. It is OK to have a different frame for this purpose. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3152 | 98.9 | 9.6.7.50 | "TB Ranging LCI Table Number" - this name is poor and it is not clear what is meant by "Number". Is it an index to an array of "TB Ranign LCI tables"? Is it a counter? Even after reading clause 11 it is not clear what the meaning is. | Replace number with "index", "counter" and clarify somewhere how this field used. | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |
| 3841 | 98.9 | 9.6.7.50 | "the current valid Passive TB Ranging LCI Table" -- the concept of passive TB ranging LCI tables is not defined, nor is the determination of which should be considered valid | Delete the sentence at the referenced location | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |

***(TGaz Editor: Throughout the draft, replace the term ‘Ranging LCI Table Number’ with the term ‘Ranging LCI Table Counter’.)***

***TGaz Editor: Change the text in Subclause 9.6.7.50 (Primus RSTA Broadcast Passive TB Ranging Measurement Report frame format) as follows:***

**9.6.7.50 Primus RSTA Broadcast Passive TB Ranging Measurement Report frame format**

…

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category  | Public Action | Passive Location Dialog Token | Current Passive TB Ranging LCI Table Counter | Passive TB Ranging LCI Table Countdown Info | RSTA Passive TB Ranging Measurement Report | Passive TB Ranging LCI Table (optional) |
| Octets: | 1 | 1 | 1 | 1 | 1 | Variable | Variable |

Figure 9-981e Primus RSTA Broadcast Passive TB Ranging Measurement Report Action field format. (#3152)

…

The Current Passive TB Ranging LCI Table Counter field contains the counter value for the last transmitted Passive TB Ranging LCI Table. **(#3152, #3841)**

**…**

***TGaz Editor: Change the text in Subclause 11.22.6.4.8.4 (Passive TB ranging measurement reporting phase) as follows:***

**11.22.6.4.8.4 Passive TB Ranging measurement reporting phase**

…

The Primus RSTA Broadcast Passive TB Ranging Measurement Report frame containing the 30 following is transmitted first:

— Current Passive TB Ranging LCI Table Counter **(#3152)**

— Passive TB Ranging LCI Table Countdown

— RSTA Passive TB Ranging Measurement Report

— Passive TB Ranging LCI Table (optionally present)

The Current Passive TB Ranging LCI Table Counter shall be incremented by 1 (modula 256) each time a changed Passive TB Ranging LCI Table is transmitted. **(#3152**)

**…**

When phase shift feedback is negotiated between an ISTA and an RSTA in Passive TB Ranging, the protocol for the measurement reporting phase differs from Passive TB Ranging with TOA feedback on the following points:

* The RSTA shall report its measured PS-TOA in the RSTA2ISTA LMR frame.
* The ISTA shall report its measured PS-TOA(s), in addition to its measured TOA(s), in the ISTA Passive TB Ranging Measurement Report frame.
	+ The PS-TOAs are indicated as phase shift TOA time stamps by setting the Measurement Report field of the ISTA Passive TB Ranging Measurement Report element, see 9.4.2.302 (ISTA Passive TB Ranging Measurement Report element), to the value 10 (PS-TOA).
* In the Primus RSTA Broadcast Passive TB Ranging Measurement Report frame, the RSTA shall send a broadcast frame containing its measured PS-TOA, in addition to its measured TOA, for the I2R NDPs it has received from the ISTA.
* In the Secundus Primus RSTA Broadcast Passive TB Ranging Measurement Report frame the RSTA shall re-broadcast the time-stamps the ISTA has reported to the RSTA. As the ISTA has negotiated phase shift feedback, these would contain PS-TOAs in addition to TOAs.

**(#1515)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3858 | 99.05 | 9.6.7.51 | "an Action NoAck frame of category Ranging" -- there is no such category (see Table 9-53--Category values) | "an Action NoAck frame of category Ranging" -- there is no such category (see Table 9-53--Category values) | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 9.6.7.51 (Secundus RSTA Broadcast Passive TB Ranging Measurement Report frame format) as follows:***

**9.6.7.51 Secundus RSTA Broadcast Passive TB Ranging Measurement Report frame format**

The Secundus Broadcast RSTA Passive TB Ranging Measurement Report frame is an Action No Ack frame of category Public. The Secundus RSTA Broadcast Passive TB Ranging Measurement Report frame is used to support the Passive TB Ranging mechanisms of the FTM procedure described in 11.22.6 (Fine timing measurement (FTM) procedure). The format of the Secundus RSTA Broadcast Passive TB Ranging Measurement Report Action field is shown in Figure 9-981g (Secundus RSTA Broadcast Passive TB Ranging Measurement Report Action field format). **(#3858)**

…

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3279 | 108.17 | 11.22.6 | It may not be entirely clear in the current standards and draft standard what the requirements are on the clock that the FTM time stamps are derived from. We should review this and if missing add specifications for how the clock that the FTM time stamps are derived from is related to the Tx carrier frequency and over what time intervals the clock is required to be continuous. | Review as per the comment and if missing, add specifications for how the clock that the FTM time stamps are derived from is related to the Tx carrier frequency and over what time intervals the clock is required to be continuous. Add this text in a new section where it is easy to find. In this section also refer to all other rules that relates to this and affects the FTM time stamps. | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3280 | 111.06 | 11.22.6.1.3 | For TB ranging, and especially for Passive TB Ranging, to work well, it is desirable that the FTM clocks are continuous during each availability window used for FTM ranging. | Add requirement that the FTM clocks always need to be continuous during each availability window used for FTM ranging. | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |

***TGaz Editor: Insert the text in Subclause 11.22.6.4.3.1 (General – In 11.22.6.4.3 TB Ranging measurement exchange) on page 135 before line 33 (D2.2):***

The time stamps reported within each availability window shall be derived from a clock that runs continuously during the availability window and runs at a rate that is locked relative to the clock generating the carrier frequency. **(#3279, #3280)**

…

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3307 | 111.06 | 11.22.6.1.3 | The standard needs a description description for how the (sounding) dialog token should be managed by the RSTA in the Passive TB Ranging case. | Add description description for how the (sounding) dialog token should be managed by the RSTA in the Passive TB Ranging case. | Reject. The Sounding Dialog Token for Passive TB Ranging is managed by the RSTA same as for TB Ranging, which is described. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3308 | 111.14 | 11.22.6.1.3 | It may not be necessary to in subclause 11.22.6.1.3 give a list of what subclauses 'applies to Passive TB Ranging'. In fact it can be missleading as we already have a general statement saying that except where explicitly stated differently, the Passive TB Ranging mode, its protocols, procedures, components, and definitions follow the rules for TB ranging. | Consider removing the list of what subclauses applies to Passive TB Ranging. | Duplicate. See resolution for 3309 document 11/20-1020. |
| 3309 | 111.14 | 11.22.6.1.3 | It may not be necessary to in subclause 11.22.6.1.3 give a list of what subclauses 'applies to Passive TB Ranging'. In fact it can be missleading as we already have a general statement saying that except where explicitly stated differently, the Passive TB Ranging mode, its protocols, procedures, components, and definitions follow the rules for TB ranging. | Consider removing the list of what subclauses applies to Passive TB Ranging. | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3547 | 111.26 | 11.22.6.1.3 | A list of "example exceptions" is not useful | Give the full list of exceptions | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3548 | 111.26 | 11.22.6.1.3 | Revised. TGaz editor, make th A list of "example exceptions" is not useful | Change to a "NOTE--Examples of cases where passive TB ranging where does not follow the rules for TB ranging are: " | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3789 | 165.30 | 11.22.6.4.8.1 | A list of "example exceptions" is not useful | Give the full list of exceptions | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3790 | 165.30 | 11.22.6.4.8.1 | A list of "example exceptions" is not useful | Change to a "NOTE--Examples of cases where passive TB ranging where does not follow the rules for TB ranging are: " | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |
| 3791 | 165.30 | 11.22.6.4.8.1. | Doesn't this duplicate 11.22.6.1.3, which is also about passive TB ranging? | Delete 11.22.6.4.8 | Revised. The draft has some of the same content in 11.22.6.1.3 which are changing to be included in notes. TGaz editor, make the changes as shown in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive TB Ranging overview) as follows:***

**11.22.6.1.3 Passive TB Ranging overview**

(#**1520**, #**1542**, #**1543**, #**1544**, #**1548**, #**1551**, #**1552**, #**1553**, #**1554**, #**1555**, #**1556**, #**1561**, #**1562**, #**1564**, #**1565**, and #**1574**)

Passive TB Ranging is a variant of the TB ranging mode referred to in 11.22.6 (Fine timing measurement (FTM) procedure). In all aspects, except where explicitly stated differently, the Passive TB Ranging mode, its protocols, procedures, components, and definitions follow the rules for TB ranging.

NOTE—For example, the text in the following subclauses, and their subclauses, apply also to Passive TB Ranging: **(#3308, #3309, #3547, #3548, #3791)**

* Subclause 11.22.6.1.1 (EDCA based Ranging and TB Ranging overview)
* Subclause 11.22.6.3.3 (Negotiation for TB and Non-TB Ranging measurement exchange)
* Subclause 11.22.6.4.3 (TB ranging measurement exchange)
* Subclause 11.22.6.5 (Fine Timing Measurement parameter modification)
* Subclause 11.22.6.5.1 (Availability Window parameter modification)
* Subclause 11.22.6.6.2 (TB Ranging and Non-TB Ranging session termination)

NOTE--Below are a list of example exceptions for Passive TB Ranging where it does *not* follow the rules for TB Ranging: **(#3308, #3309, #3547, #3548, #3791)**

* The rules and procedures specific for the secure version of TB Ranging does not apply to Passive TB Ranging.
* The RSTA uses the Ranging Trigger frame of subtype Passive TB Ranging for its sounding trigger frames.
* The ISTAs use HE Ranging NDPs for its I2R NDPs.
* The ISTAs does not use the Location Measurement Report frame for reporting of I2R 24 LMR but instead uses the ISTA Passive TB Ranging Measurement Report frame for this purpose, with its associated different measurements.
* The RSTA send the Primus and Secundus RSTA Broadcast Passive TB Ranging Measurement Report frames at the end of the measurement reporting phase.
* The number of spatial streams (NSTS) for Passive TB Ranging is limited to 4.
* When phase shift feedback is negotiated for Passive TB Ranging, both the RSTA and the ISTA measures and reports PS-TOAs, in addition to measuring and reporting TOAs.

***TGaz Editor: Change the text in Subclause 11.22.6.4.8.1 (General) in Subclause 11.22.6.4.8 (Measurement exchange in Passive TB Ranging mode) as follows:***

**11.22.6.4.8 Measurement exchange in Passive TB Ranging mode (#1807, #1808)**

**11.22.6.4.8.1 General**

As stated in 11.22.6.1.3 (Passive TB Ranging), the Passive TB Ranging mode is a variant of the TB ranging mode. In all aspects, except where explicitly stated differently, the Passive TB Ranging mode, its protocols, procedures, components, and definitions follow the rules for TB ranging mode. (#**1520**, #**1542**, #**1543**, #**1544**, #**1548**, #**1551**, #**1552**, #**1553**, #**1554**, #**1555**, #**1556**, #**1561**, #**1562**, #**1564**, #**1565**, #**1574**)

In particular the measurement exchanges for Passive TB Ranging follows the rules and procedures described in 11.22.6.4.3 (TB Ranging measurement exchange), with subclauses, unless explicitly stated otherwise.

In Passive TB Ranging, the RSTA sends the Passive TB Ranging subvariant Ranging Trigger frame instead of the TB Sounding Subvariant Ranging Trigger frame. Upon receiving of the Passive TB Ranging Subvariant Ranging Trigger frame, the ISTA shall respond with an HE Ranging NDP instead of an HE TB Ranging NDP; see 11.22.6.4.8.3 (Passive TB Ranging measurement sounding phase) for further details. **(#3789, #3790)**

Furthermore, the RSTA shall broadcast two frames, the Primus and Secundus RSTA Broadcast Passive TB Ranging Measurement Report frames containing measurement data and related information; see 11.22.6.4.8.4 (Passive TB Ranging measurement reporting phase) for further details. **(#3789, #3790)**

The Passive TB Ranging exchanges occur in an availability window used for passive location.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3052 | 97.28 | 9.6.7.50 | The word "Primus" and "Secundus" are new for 802.11. Do we realy need to use such new words from Latin? | Suggest to find a better word (less rare and not from Latin). Why not "First"? | Revised. Change to ‘Primus’ to ‘First’ and ‘Secundus’ to ‘Second’, with the appropriate capitalizations, throughout the draft, as directed in document 11/20-1020.OR Reject. It is common practice in English to borrow words from latin. Also, it is practical to have names for frames that are unique and easy to search for. |
| 3053 | 99.03 | 9.6.7.51 | The word "Primus" and "Secundus" are new for 802.11. Do we realy need to use such new words from Latin? | Suggest to find a better word (less rare and not from Latin) Why not "Second"? | This is a duplicate CID. See resolution for CID 3052. |
| 3874 | 99.03 |  | Primus and secondus could be primary and secondary - continuing existing usage in the spec | Change as suggested | This is a duplicate CID. See resolution for CID 3052. |

***TGaz Editor: Change to ‘Primus’ to ‘First’ and ‘Secundus’ to ‘Second’, with the appropriate capitalizations, throughout the draft.***

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3558 | 112.38 | 11.22.6.1.3 | "In addition to the ranging exchanges between the ISTAs and RSTA1, the Passive TB Ranging protocol also allows the ISTAs to measure time of arrivals of each other's ranging NDPs. An example of one such occurrence is depicted in Figure 11-35b in form of the dotted double arrow between ISTA1 and ISTA2. " is not clear as to what "the ISTAs" refers to, i.e. the ISTAs that are doing a Passive TB Ranging exchange, or the STAs that are listening in to these | As it says in the comment | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive Location Ranging overview) as follows:***

**11.22.6.1.3 Passive Location Ranging overview**

…

In addition to the ranging exchanges between the ISTAs and RSTA1, the Passive TB Ranging protocol also allows the same ISTAs to measure time of arrivals of each other’s ranging NDPs. An example of one such occurrence is depicted in Figure 11-35b in form of the dotted double arrow between ISTA1 and ISTA2. **(#3558)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3554 | 112.43 | 11.22.6.1.3 | "Passive TB Ranging opportunity" -- this notion is not defined | As it says in the comment | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive Location Ranging overview) as follows:***

**11.22.6.1.3 Passive Location Ranging overview**

…

Furthermore, if one of the other APs in Figure 11-35b temporarily takes on the role of being an ISTA, it may also participate in RSTA1’s Passive TB Ranging operation and perform Passive TB Ranging exchanges with RSTA1. **(#3554)**

***TGaz Editor: Change the caption of Figure 11-35b (Example of Passive TB Ranging used for PSTA location – RSTA1 as follows):***

**Figure 11-35b— Example of Passive TB Ranging used for PSTA location – RSTA1 (AP1) operating Passive TB Ranging. (#1577, #3554)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3555 | 113.10 | 11.22.6.1.3 | "a RSTA Availability Window element for Passive TB Ranging" -- nothing in the element indicates what its purpose is, so this cannot be done | Delete "for Passive TB Ranging". Also in next sentence | Revised. Move the reference to Passive TB Ranging to the ranging availability window itself as opposed to the element. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive Location Ranging overview) as follows:***

**11.22.6.1.3 Passive Location Ranging overview**

…

Each of the access points operating as RSTA1, RSTA2, and RSTA3, announces the timing and bandwidth of its ranging availability window for Passive TB Ranging in its beacon in a RSTA Availability Window element. By listening to the AP’s beacons, the PSTA is informed about the timing and bandwidth of the different RSTA availability windows for Passive TB Ranging. **(#3555)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3557 | 113.10 | 11.22.6.1.3 | "Each of the access points operating as RSTA1, RSTA2, and RSTA3, announces the timing and bandwidth of its ranging availability window in its beacon in a RSTA Availability Window element for Passive TB Ranging. By listening to the AP's beacons, the PSTA is informed about the timing and bandwidth of the different RSTA availability windows for Passive TB Ranging. " duplicates text above | Delete the cited para | Reject. Text is not duplicated. |
| 3556 | 113.16 | 11.22.6.1.3 | "blocked LOS" -- not defined | Change to "non-LOS" | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive TB Ranging overview) as follows):***

**11.22.6.1.3 Passive TB Ranging overview**

**…**

The PSTA listens to all of these ranging exchanges. Considering all ranging exchanges between all RSTAs and all ISTAs, the PSTA has the opportunity to overhear a large set of ranging exchanges between RSTAs and ISTAs in different locations, enabling the use of all of them towards its location estimation and also mitigate isses stemming from lack of LOS between the ISTA(s)/RSTA involved in the ranging measurements. **(#3556)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3165 | 115.04 | 11.22.6.2 | "If the STA in which dot11FineTimingMsmtRespActivated is true supports Passive TB Ranging." - the "then" part of the "if" is missing - probably the next sentece | Replace "." with "," at the end of the sentence, Replace "It" with "it" at the beginning of the next sentence. | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. This resolution supreceeds the resolution 11/20-126. |
| 3890 | 115.04 | 11.22.6.2 | should be dot11PassiveTBRangingResponderImplemented instead of dot11FineTimingMsmtRespActivated | as in comment | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |
| 3166 | 115.09 | 11.22.6.2 | "If the STA in which dot11FineTimingMsmtInitActivated is true supports Passive TB Ranging. It" - the "then" part of the "if" is missing - probably the next sentece | Replace "If the STA in which dot11FineTimingMsmtInitActivated is true supports Passive TB Ranging. It" with "If the STA in which dot11FineTimingMsmtInitActivated is true supports Passive TB Ranging, it" | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. This resolution supreceeds the resolution 11/20-126. |
| 3891 | 115.09 | 11.22.6.2 | should be dot11PassiveTBRangingInitiatorImplemented instead of dot11FineTimingMsmtInitActivated | as in comment | Revised. TGaz editor, make the changes as shown in document 11/20-1020. |

**Discussion for resolution to CIDs 3165 and 3890:** The commenter is correct. It should be “dot11PassiveTBRangingResponderImplemented” instead of “dot11FineTimingMsmtRespActivated”. However, in 802.11az Draft 2.2 the text has as a resolution to LB249 CIDs 3165 and 3166 been changed to “dot11FineTimingMsmtRespActivated and dot11PassiveTBRangingResponderImplemented”. We there should change it to only say “dot11PassiveTBRangingResponderImplemented”.

**Discussion for resolution to CIDs 3166 and 3891:** The commenter is correct. It should be “dot11PassiveTBRangingInitiatorImplemented” instead of “dot11FineTimingMsmtInitActivated”. However, in 802.11az Draft 2.2 the text has as a resolution to LB249 CIDs 3165 and 3166 been changed to “dot11FineTimingMsmtInitActivated and dot11PassiveTBRangingInitiatorImplemented”. We there should change it to only say “dot11PassiveTBRangingInitiatorImplemented”.

***TGaz Editor: Change the text in Subclause 11.22.6.2 (FTM capabilities) as follows:***

**11.22.6.2 FTM capabilities**

…

A STA in which dot11PassiveTBRangingResponderImplemented **(#3165, #3890)** is true shall set the Passive TB Ranging Responder Measurement Support field of the Extended Capabilities element to 1. Otherwise it shall set the Passive TB Ranging Responder Measurement Support field of the Extended Capabilities element to 0.

A STA in which dot11PassiveTBRangingInitiatorImplemented **(#3166, #3891)** is true shall set the Passive TB Ranging Initiator Measurement Support field of the Extended Capabilities element to 1. Otherwise it shall set the Passive TB Ranging Initiator Measurement Support field of the Extended Capabilities element to 0.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3655 | 127.32 | 11.22.6.3.8 | It's not "Section" it's "Subclause" | As it says in the comment | Revised. Change to 'Subclause'. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.3.8 (Passive TB Ranging measurement negotiation) as follows:***

**11.22.6.3.8 Passive TB Ranging measurement negotiation**

…

The Passive TB Ranging measurement negotiation follows the rules and procedures for the TB 31 Ranging measurement negotiation detailed in Subclause 11.22.6.3.3 (Trigger-based and non-32 Trigger-based Ranging Measurement Negotiation), unless explicitly stated otherwise. **(#1520, 33 #1542, #1543, #1544, #1548, #1551, #1552, #1553, #1554, #1555, #1556, #1561, #1562, #1564, 34 #1565, and #1574, #3655)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3656 | 127.36 | 11.22.6.3.8 | Something in Extended Capabilities is not dependent on whether the STA is an ISTA or RSTA | Change "An RSTA" to "A STA"; next para change "an RSTA" to "a STA" and "the RSTA" to "that STA" | Revised. Change the first instance of ‘An RSTA’ to ‘A STA’ but don’t make the changes in the second paragraph as the language becomes very cumbersome. The existing specification is still clear. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.3.8 (Passive TB Ranging measurement negotiation) as follows:***

**11.22.6.3.8 Passive TB Ranging measurement negotiation**

…

A STA in which dot11PassiveTBRangingResponderImplemented is true shall set the Passive TB Ranging Responder Measurement Support field in the Extended Capabilities element to 1. (#3656)

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3658 | 127.43 | 11.22.6.3.8 | "In Passive TB Ranging, the transmission of the ISTA Passive TB Ranging Measurement Reportframe is mandatory. Therefore, the ISTA2RSTA LMR Feedback subfield in the Ranging Parameters field of the Ranging Parameters element in the initial Fine Timing MeasurementRequest frame, and in the initial Fine Timing Measurement frame is reserved. " -- the justification is not normative | Change to "The ISTA2RSTA LMR Feedback subfield in the Ranging Parameters field of the Ranging Parameters element in the initial Fine Timing MeasurementRequest frame and in the initial Fine Timing Measurement frame is reserved.NOTE---This is because in Passive TB Ranging, the transmission of the ISTA Passive TB Ranging Measurement Reportframe is mandatory." | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.3.8 (Passive TB Ranging measurement negotiation) as follows:***

**11.22.6.3.8 Passive TB Ranging measurement negotiation**

…

In Passive TB Ranging, the transmission of the ISTA Passive TB Ranging Measurement Report frame is mandatory.

When requesting or responding to a request for Passive TB Ranging, the I2R LMR Feedback subfield in the Ranging Parameters field of the Ranging Parameters element in the initial Fine Timing Measurement Request frame, and in the initial Fine Timing Measurement frame, respectively, is reserved. **(#3658)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3654 | 127.33 | 11.22.6.3.8 | In another subclause (11.22.6.1.3) there was an explicit list of subclauses to refer to, and an informative list of exceptions. Why not here? | As it says in the comment | Reject. We have that list of subclauses and exceptions appear in the overview section. No need to repeat it. |

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3659 | 128.11 | 11.22.6.3.8 | "unsolicited LCI Report " not defined. Also I think it's "report" per the rules on what "$foo report" is to be understood as meaning | Change to "LCI report" | Accept. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.3.8 (Passive TB Ranging measurement negotiation) as follows:***

**11.22.6.3.8 Passive TB Ranging measurement negotiation**

…

When the ISTA sets the Passive TB Ranging field to 1 it shall include an LCI Report in the Fine Timing Measurement Request frame **(#1103, #3659).**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3800 | 168.13 | 11.22.6.4.8.1 | "Figure 11-36t--Example Timing diagram of a Measurement Sounding phase in Passive 13TB Ranging (#1575, #1576) " needs to show the LMRs, which the PSTA needs to receive to find out t1-t4 | As it says in the comment | Reject. We don't need to show the LMR reporting. The point of the diagram is to show the ranging and tranmsissions, reeption and time-stamping. We are not showing the LMR reporting in Figure 11-36i-1 for Non-TB Ranging, Figure 11-36g for TB Ranging, and Figure 11-36f for TB Ranging. |

**Discussion:**

We don't need to show the LMR reporting. The point of the diagram is to show the ranging and tranmsissions, reeption and time-stamping. We are not showing the LMR reporting in Figure 11-36i-1 for Non-TB Ranging, Figure 11-36g for TB Ranging, and Figure 11-36f for TB Ranging.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3801 |  |  | "At the PSTA, the mechanism by which t2' and t3' is derived from t2, t3, and the PSTA's CFO measured with respect to the RSTA, is implementation dependent. " -- missing the CFO (cf. prev sentence) | After "t3, " add "the RSTA's reported CFO," | Reject. The RSTA does not report its CFO so the PSTA cannot use such a report. It’s the PSTA’s CFO w.r.t. the RSTA that should be used. |

**Discussion:**

The RSTA does not report its CFO so the PSTA cannot use such a report. It’s the PSTA’s CFO w.r.t. the RSTA that should be used

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3804 | 170.11 | 11.22.6.3.8 | "alternatively in addition" -- well, is it alternatively or in addition? what "$foo report" is to be understood as meaning | Delete "and alternatively in addition" (2x) | Revised. TGaz editor, make the changes as shown below in document 11/20-1020. |

***TGaz Editor: Change the text in Subclause 11.22.6.4.8.4 (Passive TB ranging measurement reporting phase) as follows:***

**11.22.6.4.8.4 Passive TB ranging measurement reporting phase**

…

The ISTA Passive TB Ranging Measurement Report frame contains an ISTA Passive TB Ranging Measurement Report element, see Subclause 9.4.2.302 (ISTA Passive TB Ranging Measurement Report element), containing the TOD time stamp for the I2R NDP that the ISTA transmitted, the TOA, and optionally in addition the PS-TOA, time stamp of the R2I NDP that the ISTA received from the RSTA, the CFO of the ISTA with respect to the RSTA, and optionally the TOAs, and optionally in addition PS-TOAs, for I2R NDPs received from other ISTAs participating in the Passive TB Ranging Polling-Sounding-Reporting triplet identified by a Dialog Token included in the report. **(#3804)**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3808 |  | 11.22.6.4.8.5 | Technical comments on 11.22.6.4.8.3 on the figure and equations also apply to 11.22.6.4.8.5 | As it says in the comment | Reject. This is an invalid comment. It fails to identify a specific problem in a meaningful way. It is not possible to understand what specific issue is identified.   |

**References:**

**[1] Draft P802.11az\_D2.2\_with\_corrections**