IEEE P802.11
Wireless LANs

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| Some LB 249 Passive TB Ranging CR – Part II |
| Date: 2020-09-16 |
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Abstract

This document proposes resolutions to TGaz LB249 comments, for the most related to Passive TB Ranging. The changed described here are in relation to [1].

The 36 TGaz LB249 CIDs addressed in this document are CIDs:

3052, 3053, 3152, 3165, 3166, 3279, 3280, 3301, 3307, 3308, 3309, 3310, 3547, 3548, 3554, 3555, 3556, 3557, 3558, 3654, 3655, 3656, 3658, 3659, 3789, 3790, 3791, 3800, 3801, 3804, 3808, 3841, 3858, 3874, 3890, and 3891.

OR in the order the CIDs appear in the text:

3858, 3307, 3052, 3053, 3874, 3558, 3554, 3555, 3557, 3556, 3655, 3656, 3658, 3654, 3659, 3800, 3801, 3804, 3808, 3165, 3890, 3166, 3891, 3308, 3309, 3547, 3548, 3789, 3790, 3791, 3301, 3152, 3841, 3310, 3279, and 3280.

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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. |

**Discussion for CID 3858:** The Secundus Broadcast RSTA Passive TB Ranging Measurement Report frame is an Action No Ack frame of category “Public”. Change accordingly.

***TGaz Editor: Change the text in Subclause 9.6.7.51 (Secundus RSTA Broadcast Passive TB Ranging Measurement Report frame format) starting on P100L21 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)**

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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** |
| 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. |
| 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. |

**Discussion for CIDs 3052, 3053, and 3874:** The naming of these frames with “Primus” and “Secundus” seems to be controversial. We can avoid this by changing their names to “First” and “Second”.

***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. |

**Discussion for CID 3558:** The ISTAs that measure time of arrivals of each other’s ranging NDPs are the *same* ISTAs that are performing ranging exchanges with the RSTA. We are adding a qualifier indicating that.

***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**

… <Scroll to P116L29>

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. |

**Discussion for CID 3554: Change** "Passive TB Ranging opportunity" to the more generic "Passive TB Ranging operation".

***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**

… <Scroll to P116L34>

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) starting on P117L3 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. |

**Discussion for CID 3555:** The RSTA Availability Window element may not be "for Passive TB Ranging", but the ranging availability window is be "for Passive TB Ranging". Change to reflect this.

***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**

… <Scroll to P117L9>

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. The 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. |

**Discussion for CID 3556:** Change from using the term "blocked LOS" to text that instead describes the issue with a lack of line of sight.

***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**

**…** <Scroll to P117L13>

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 issues 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** |
| 3655 | 127.32 | 11.22.6.3.8 | It's not "Section" it's "Subclause" | As it says in the comment | Revised. Agree in principle with the commenter.Change to 'Subclause'. TGaz editor, make the changes as shown below in document 11/20-1020. |

**Discussion for CID 3655:** Yes, should be Subclause instead of Subsection. Change accordingly.

***TGaz Editor: Change the text in Subclause 11.22.6.3.8 (Passive TB Ranging measurement negotiation) starting on P132L15 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. Agree in principle with the commenter. 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. |

**Discussion for CID 3656:** 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: 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**

… <Scroll to P132L22>

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. |

**Discussion to CID 3658:** It is OK to state that in Passive TB Ranging, the transmission of the ISTA Passive TB Ranging Measurement Report frame is mandatory, so no need to move that to a note. However, we can improve a little on the formulation of the text that describes that the I2R LMR Feedback subfield is reserved so we ar doing that.

***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**

… <Scroll to P132L29>

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 IFTMR 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" | Revised. Agree in principal with the commenter. TGaz editor, make the changes as shown below in document 11/20-1020. |

**Discussion for CID 3659:** Yes, no need to state that the LCI Report is unsolicited. Change to that effect.

***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**

… <Scroll to P132L41>

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 for CID 3800:**

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. |

**Discussion for CID 3804:** The wording ‘optionally in addition’ is here better than “alternatively in addition”. Changing to that effect. Some other minor edits of the wording and the punctuation are also made.

***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**

… <Scroll to P176L3>

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, with optionally in addition the PS-TOAs, for the I2R NDPs received from other ISTAs participating in the Passive TB Ranging Polling-Sounding-Reporting triplet identified by the 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.   |

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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**

… <Scroll to P118L38>

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** |
| 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 changed to be included in notes. TGaz editor, make the changes as shown in document 11/20-1020. |

**Discussion for CIDs 3308 and 3309:** The list of what subclauses of what applies to Passive TB Ranging is still informative. For this reason we are moving it to a note.

**Discussion for CIDs 3547 and 3548:** The list of Give the full list of exceptions, even if it may not be complete is stil useful. Moving it to a note.

**Discussion for CIDs 3789 and 3780:** The ‘exceptions’ listed are true. No need to say that they are ‘some of the exceptions’. Removing the text stating that these are ‘some of the exceptions’.

**Discussion for CID 3791:** The draft has some of the same content in 11.22.6.1.3 which we are changing to be included in notes.

***TGaz Editor: Change the text in Subclause 11.22.6.1.3 (Passive TB Ranging overview) starting on P115L1 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, #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: **(#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** |
| 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. |
| 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. |

**Discussion for CID 3301:** Propose to instead change to call it “'Passive TB Ranging Measurement Table Counter”. Also adding the missing description of the field.

**Discussion for CID 3152:** Yes, “counter” is better then “number”. Change accordingly.

**Discussion for CID 3841:** Change to refer to the “Passive TB Ranging LCI Table field” which is defined.

***TGaz Editor: Change the text in Subclause 9.4.2.304 (Passive TB Ranging LCI Table element) as follows: (I.e., remove the Passive TB Ranging Measurement Table Report field from the Passive TB Ranging LCI Table Report element.)***

**9.4.2.304 Passive TB Ranging LCI Table element**

… <scroll to P90L1>

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ElementId | ElementLength | ElementIDExtension |  | Number of ISTA LCIReportEntries | ISTA LCI Reports Entries | RSTA LCI Report (Optional) | RSTA Location Civic Report (Optional) |
| Octets: | 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.

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 (ISTA LCI Report Entry field).

***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**

… <Scroll to P99L23>

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category  | Public Action | Passive Location Dialog Token | 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 Category field is defined in 9.4.1.11 (Action field). 28

The Public Action field is defined in 9.6.7.1 (Public Action frames). (#**1693**)

… <Scroll to P100L1>

The Passive TB Ranging LCI Table Counter is a number serving as a reference to the version of the latest Passive TB Ranging LCI Table element transmitted by the RSTA transmitting the Primus RSTA Broadcast Passive TB Ranging Measurement Report frame. **(#3152, #3841)**

The Passive TB Ranging LCI Table Countdown Info field contains two subfields as shown in Figure 9-981f (Passive TB Ranging LCI Table Countdown Info field).

|  |  |  |
| --- | --- | --- |
|  | New LCI Table | Passive TB Ranging LCI Table Countdown |
| Octets: | 1 | 1 |

Figure 9-981f - Passive TB Ranging LCI Table Countdown Info field.

***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**

… <Scroll to P176L22>

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

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

— Passive TB Ranging LCI Table Countdown Info

— RSTA Passive TB Ranging Measurement Report

— Passive TB Ranging LCI Table (optionally present)

Each time an RSTA transmits a Primus RSTA Broadcast Passive TB Ranging Measurement Report frame, it shall set the Passive TB Ranging LCI Table Counter value such as to refer to the latest version of the Passive TB Ranging LCI Table element transmitted by the RSTA. **(#3152)**

If a Passive TB Ranging LCI Table element is included in the Primus RSTA Broadcast Passive TB Ranging Measurement Report frame, and this element has different content as compared to the last transmitted Passive TB Ranging LCI Table element, then Passive TB Ranging LCI Table Counter shall be incremented by 1 (modula 256) from the value associated with the previous Passive TB Ranging LCI Table element content. (The first time the RSTA transmits a Passive TB Ranging LCI Table element the value shall be set to 0.) This new value of the Passive TB Ranging LCI Table Counter is now associated with this new version of the Passive TB Ranging LCI Table element. **(#3152)**

If a Passive TB Ranging LCI Table element is included in the Primus RSTA Broadcast Passive TB Ranging Measurement Report frame, and this element has the same content as the last transmitted Passive TB Ranging LCI Table element, then Passive TB Ranging LCI Table Counter value shall be the value associated with this last version of the Passive TB Ranging LCI Table element transmitted by the RSTA. **(#3152)**

If a Passive TB Ranging LCI Table element is not included in the Primus RSTA Broadcast Passive TB Ranging Measurement Report frame, then the Passive TB Ranging LCI Table Counter value shall be the value associated with the last version of the Passive TB Ranging LCI Table element transmitted by the RSTA. **(#3152)**

**…** <Scroll to L177P6>

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** |
| 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. |

**Discussion for CID 3310:** The BW subfield here should really carry the same information as the Bandwidth and Format subfield in the Ranging Parameters field in the Ranging Parameters element. Therefore we propose to simply refer to that field here, and also change the name of the field from ‘BW’ to ‘Bandwidth and Format’.

***TGaz Editor: Change the text in Subclause 9.4.2.295 (RSTA Availability Window element) starting on P76L1 as follows:***

…

|  |  |  |
| --- | --- | --- |
|  | B0 B3 | B4 B7 |
|  | Format and Bandwidth | Reserved |
| Bits: | 6 | 2 |

**Figure 9-1005—** **Passive TB Ranging parameters subfield**

The Format and Bandwidth subfield is defined in Table 9-1001 (Format and Bandwidth subfield) and indicates the requested or allocated PPDU format and bandwidth used to transmit the I2R/R2I NDP exchanged as part of the Passive TB Ranging measurement exchange in the Passive TB Ranging availability window. Depending on the medium availability, the bandwidth used for the exchanged frames is equal to or smaller than the nominal BW **(#1646, 7 #1103, #3310)**.

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| --- | --- | --- | --- | --- | --- |
| **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. |

**Discussion for CIDs 3279 and 3280:** For ranging we always need the clock to run continuously between the TOD time and the TOA time. For Passive TB Ranging, as an ISTA can receive and measure the TOA of an NDP both before and after it transmits its own NDP, we need to expand on the requirement what is needed for TB Ranging. Either way we don’t have this specified also for TB Ranging. We here propose to solve this problem for both TB Ranging and Passive TB Ranging by specifying that 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. This also solves the problem that we need the FTM time-stamping clock to run at the rate as the clock that generates the carrier.

***TGaz Editor: Change the text in Subclause 11.22.6.4.3.1 (General – In 11.22.6.4.3 TB Ranging measurement exchange) as follows):***

**11.22.6.4.3.1 General**

… <Scroll to P140L16>

During the availability window, measurement resources and results are made available to each ISTA whose poll response was received at the RSTA; see 11.22.6.4.3.3 (Measurement Sounding Phase of TB Ranging) and 11.22.6.4.3.4 (Reporting Phase of TB Ranging Measurement) (#**2156**). This may also lead to extra instances of polling/sounding/reporting triplets, even if all ISTAs assigned to this availability window were polled in the first polling phase instance (e.g., if the RSTA is not able to accommodate all ISTAs that responded in a single measurement sounding phase instance; see 11.22.6.4.3.3 (Measurement sounding phase of TB Ranging).

The valid time stamps reported within each availability window shall be reflective of a clock that is tied to the the symbol clock and cannot have any discontinuities during the availability window. **(#3279, #3280)**

NOTE – The clock used for the time stamps is allowed to wrap within the availability window.

Within each availability window, an RSTA shall use an AID or Ranging Session ID (RSID) to identify an associated or unassociated ISTA respectively. The AID and RSID assignment shall be non-conflicting and shall have the same size and valid address space (as defined in 9.4.1.8 and 26.17.4). The RSID usage shall follow the same rules as that of AIDs for HE operations. The RSIDs are assigned to unassociated ISTAs during the FTM negotiation; see 11.22.6.3 (Fine timing measurement procedure negotiation).

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**References:**

**[1] Draft P802.11az\_D2.3**