IEEE P802.11
Wireless LANs

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| 11az LB249 Comment Resolution Section 11.22.6.4.3 Part 2 |
| Date: 2020-02-28 |
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Abstract

This submission proposes the comment resolution of CIDs in LB240 related to section 11.22.6.4.3

CIDs:

* 11.22.6.4.3.1: 3115, 3242, 3719
* 11.22.6.4.3.3: 3702, 3906, 3703, 3705, 3706, 3707, 3711, 3712, 3685, 3686
* 11.22.6.4.3.4: 3713, 3657, 3714, 3715, 3718, 3247, 3907

Revisions:

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGaz Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGaz Editor: Editing instructions preceded by “TGaz Editor” are instructions to the TGaz editor to modify existing material in the TGaz draft. As a result of adopting the changes, the TGaz editor will execute the instructions rather than copy them to the TGaz Draft.***

**The text preceded by “Discussion” is not part of the adopted changes.**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| **3115** | 136.18 | 11.22.6.4.3.1 | It seems to have an arbitrary limitation on the behavior with the text "-- An RSTA shall not transmit a Ranging Trigger frame in a VHT MU PPDU or HE MU PPDU." | Remove the "disallowance of HE MU PPDU" hence enabling transmission of trigger in OFDMA where each user is assigned an RU containing the trigger frame. The 11ax ISTAs are able to decode such a frame. | **Rejected**Trigger frames are inherently broadcast frames, as such it doesn’t make sense to send them in an MU format |
| **3702** | 140.24 | 11.22.6.4.3.3 | "from the TOD and TOA fields of the relevant LMR" -- but Figure 11-36f--Timing diagram of a Measurement Sounding phase in TB Ranging doesn't show any LMRs | Add LMRs from ISTA to RSTA and back in Figure 11-36f--Timing diagram of a Measurement Sounding phase in TB Ranging | **Revised**The definition of which LMR is relevant is not in section 9, but in the reporting phase, change the reference to TB Ranging reporting phaseSee document 11-20/0368 |
| **3906** | 140.26 | 11.22.6.4.3.3 | "The Round-Trip Time (RTT) observed by RSTA is defined as" The RSTA can compute the RTT only when the ISTA2RSTA LMR Feedback is negotiated. | Replace "The Round-Trip Time (RTT) observed by RSTA is defined as" with "When the ISTA2RSTA LMR Feedback is negotiated, the RSTA can compute the RTT as:" | **Accepted** |
| 3118 | 141.16 | 11.22.6.4.3.3 | Add text to describe when ISTA receives multiple subsequent sounding trigger frame in exception conditions (secure or non-secure) it records & delivers the TOD measurement corresponding to the last I2R NDP frame in its LMR report (if optionally transmitted). | As per comment |  |
| 3701 | 141.1 | 11.22.6.4.3.3 | “RSTA shall consider the CFO as reported in the CFO Parameter field in I2R LMR.” -- OK, and after carefully considering it over a cup of tea, what does it do with it? | Delete the cited text | **Revised**Moved the text to next paragraph and changed to:”If considering CFO in the conversion from the ISTA’s time basis to the RSTA’s, the RSTA shall use the CFO reported in the CFO Parameter field of the I2R LMR.”See document 11-20/0368 |
| **3703** | 141.8 | 11.22.6.4.3.3 | "The TOA field contains" -- the TOA field of what? Nothing discussed above in this subclause has a TOA field | Prefix "In an LMR," | **Accepted** |
| **3705** | 141.13 | 11.22.6.4.3.3 | “If the measurement sounding phase includes more than a single TF Ranging Sounding frame (see 13Figure 11-36e TB Ranging availability window with multiple TF Ranging Sounding), the ISTA and RSTA shall refer to the t1 and t2 of the I2R NDP frame transmitted by that ISTA (see Figure 11-36g Measurement Sounding Phase with I2R TDMA Multiplexing).” -- (a) it's obvious that you need to look at the NDPs for the RSTA in question (b) the concept of “TDMA Multiplexing” is not descibed anywhere (c) the figure makes it look as if ISTA #1 relays the RNDPA and the R21 NDP to ISTA #2 | Delete the cited text and the figure it refers to | **Revised**(a) tried to clarify that if there are multiple ISTA-RSTA pairs, they will use their dedicated I2R NDP for t1/t2 and the “shared”R2I NDP for t3/t4.(b) is described in first paragraph of this subclauseSee document 11-20/0368 |
| **3706** | 142.3 | 11.22.6.4.3.3 | “The I2R power control, timing and frequency synchronization requirements of associated and unassociated STAs performing TB ranging shall follow the same rules as those of any associated HE STA . “ -- I2R power control is not defined, and the rest is obvious/default" | Delete the cited text | **Revised**I2R power control is meant to be “UL power control”, was replaced erroneously.The point of the text is that this behaviour is not specified for unassociated STAs in HE baseline.Changed to “The UL power control, timing and frequency synchronization requirements of unassociated STAs performing TB ranging shall follow the same rules as those of associated HE STAs.”See document 11-20/0368 |
| **3707** | 142.6 | 11.22.6.4.3.3 | “A RSTA maintains a trigger poll counter. Before transmitting a Trigger poll frame, the RSTA shall increase trigger poll counter by one (modulo 16) and set the Token field of the Trigger Poll per the value in trigger poll counter. (#1888) “ - it is not clear what Token field is being referred to. There's one in Figure 9-61c.x--The STA info field when AID11/RSID11 has value 2044 but that's only 3 bits, so it can't be that one. Ditoo Figure 9-61d.x--Trigger Dependent Common Info subfield for the Ranging Trigger variant (#1888). And the “modulo 16” has the wrong font size. And anyway no behaviour is specified for the receiver of any Token field | Delete the cited text. Change “Token” to “Reserved” in Figure 9-61c.x--The STA info field when AID11/RSID11 has value 2044 and delete the last para of the subclause; ditto for Figure 9-61d.x--Trigger Dependent Common Info subfield for the Ranging Trigger variant (#1888). Delete the para at 142.15 | **Revised**Cleaned up and clarified. Counter is three bits, so modulo 8, made more clear when the Token subfield in the TF or the NDPA is refered to.See document 11-20/0368 |
| **3711** | 142.20 | 11.22.6.4.3.3 | "when adjusting TSF[21:6]" -- there has been no discussion of anyone adjusting their TSF timer so far, so this makes no sense. Also "the start of subsequent TB based measurement service period" should be "...periods", "less than Partial TSF" should be "less than the received Partial TSF", and I suspect 2<sup>16-1</sup> should be 2<sup>16</sup>-1 | Delete the NOTE | **Revised**Rephrased to make clear that STAs will not ”adjust” their local TSF, but track the difference between their local TSF and the RSTAs TSF in some implementation specific way.See document 11-20/0368 |
| **3712** | 142.20 | 11.22.6.4.3.3 | This para seems to be causing the ISTA to fiddle with its TSF, but per the baseline the TSF is supposed to track information received in beacons (/probe responses). This is likely to lead to some kind of ping-ponging of the TSF between the beacons and the Trigger Poll frames | Delete the para | **Revised**Duplicate of #3711?See resolution of #3711 |
| **3713** | 142.25 | 11.22.6.4.3.4 | This is not really a shall | Change to "can" | **Accepted** |
| **3657** | 143.7 | 11.22.6.4.3.4 | "Each LMR is a unicast frame. It is carried in Action No Ack frames (see 9.6.7.37) and are therefore neither acknowledged nor retransmitted." -- grammar, and also this should be a NOTE since it's just duplication of normative material" | Change to "NOTE---LMR feedback is carried in Action No Ack frames (see 9.6.7.37) and is therefore neither acknowledged nor retransmitted." | **Accepted** |
| **3714** | 143.10 | 11.22.6.4.3.4 | "All the RSTA2ISTA LMR frames are carried in one HE MU PPDU" -- what if there are too many ISTAs for this to be possible? E.g. maybe the BSS bandwidth has narrowed since the TF Ranging Poll was sent" | Change to "The RSTA2ISTA LMR frames are carried in one or more HE MU PPDUs" | **Rejected**By design, there will always be enough RUs available. This is because the ISTAs that will receive feedback are a strict subset of the ISTAs that were polled uing a single TF poll and allocated RUs for their UL-OFDMA response. |
| **3715** | 143.12 | 11.22.6.4.3.4 | "If ISTA2RSTA LMR was negotiated, the RSTA shall assign I2R resources to the ISTAs using a Trigger frame of variant Ranging, subvariant Report; see subclause 9.3.1.22.9 (Ranging Trigger variant)." -- it's not clear what I2R resources are being allocated here" | Change to "If ISTA2RSTA LMR was negotiated, the RSTA shall obtain this using a Trigger frame of variant Ranging, subvariant Report; see subclause 9.3.1.22.9 (Ranging Trigger variant)." | **Revised**This was a typo due to query-replace all UL with I2R. It should refer to “UL Resources” as in RU allocation in an UL OFDMA frame.See document 11-20/0368 |
| 3717 | 143.21 | 11.22.6.4.3.4 | "In response to the TF, each addressed ISTA shall respond by transmitting an ISTA2RSTA LMR frame. If an ISTA negotiated delayed ISTA2RSTA LMR reporting, and if the TOA measurement for the previous availability window is not ready, then the ISTA shall not respond to the TF Ranging Poll in the polling phase of any availability window until the ISTA2RSTA LMR is ready." seems self-contradictory | Modify to say send QoS Null if TOA not available |  |
| **3718** | 143.30 | 11.22.6.4.3.4 | "Figure 11-36h--TB Ranging measurement reporting phase with Bidirectional LMR" implies only OFDMA can be used, but presumably MU-MIMO can be too | In the figure change Frequency to Frequency and/or spatial stream. Ditto in Figure 11-36u--Passive TB Ranging measurement reporting phase (#1578) | **Rejected**It is specifically limited to OFDMA only and no MU-MIMO |
| **3247** | 144.10 | 11.22.6.4.3.4 | "In the secured mode of TB Ranging, ..." This paragraph does not belong in this subclause, remove it or move it to subclause 11.22.6.4.6.2 | Remove or move to an appropriate place in 11.22.6.4.6.2 | **Revised**Moved to 11.22.6.4.6.2 (TB Ranging measurement exchange for Secure LTF)See document 11-20/0368 |
| **3907** | 144.10 | 11.22.6.4.3.4 | "In the secured mode of TB Ranging, a device should discard ranging measurements when it detects that the transmit center frequency offset (CFO) between the ISTA and the RSTA exceeds the allowed tolerance from the values specified in 27.3.18.3 and 27.3.14.3." It is not clear what a secure mode really means. Regardless whether in a secured mode, a device should discard ranging measurements when it detects that the transmit center frequency offset (CFO) between the ISTA and RSTA exceeds the allowed tolerance specified in the spec. Additionally, it was agreed by TGaz prior to 11az\_D1.0, this should apply to TB ranging, non-TB ranging and EDMG ranging. However, in 11az, the relevant text only occurs for the TB ranging." | Replace "In the secured mode of TB Ranging, a device should discard ranging measurements when it detects that the transmit center frequency offset (CFO) between the ISTA and the RSTA exceeds the allowed tolerance from the values specified in 27.3.18.3 and 27.3.14.3.". with "A device should discard ranging measurements when it detects that the transmit center frequency offset (CFO) between the ISTA and the RSTA exceeds the allowed tolerance from the values specified in 27.3.18.3 and 27.3.14.3." Add the same text to the appropriate sections for Non-TB ranging and EDMG ranging as well. | **Reject**It is not clear why this should apply to a non-secure 11az session. |
| **3685** |  | 11.22.6.4.3 | It seems that Nss in Figure 11-36d--TB Ranging availability window with two ISTAs and Figure 11-36e--TB Ranging availability window with multiple TF Ranging Sounding is not the number of spatial streams but the spatial stream index | Change Nss to i\_SS in both figures | **Accepted** |
| **3686** |  | 11.22.6.4.3 | Figure 11-36d--TB Ranging availability window with two ISTAs and Figure 11-36e--TB Ranging availability window with multiple TF Ranging Sounding show UL MU-MIMO operation, but UL OFDMA should also be possible | In both figures change "Spatial" to "MU" and delete the "Nss = <n>"s | **Rejected**It is specifically limited to MU-MIMO only and no OFDMA  |
| **3719** |  | 11.22.6.4.3.1 | It's not clear what "OFDMA/Frequency" is supposed to mean on the vertical axis | Delete the cited text in Figure 11-36b--TB Ranging availability window with two instances of polling/ sounding/ reporting triplets within a single TXOP and Figure 11-36a--TB Ranging availability windows each with one instance of a polling/ sounding/ reporting triplet and Figure 11-36c--TB Ranging availability window with two instances of polling/ sounding/ reporting triplets in separate TXOPs | **Accepted** |

TGaz Editor: Change Figure 11-36a (TB Ranging availability windows each with one instance of a polling/ sounding/ reporting triplet ) as follows (remove Frequency Y-axix): (#3719)



TGaz Editor: Change Figure 11-36b (TB Ranging availability window with two instances of polling/ sounding/ reporting triplets within a single TXOP) as follows (remove Frequency Y-axix): (#3719)



TGaz Editor: Change Figure 11-36c (TB Ranging availability window with two instances of polling/ sounding/ reporting triplets in separate TXOPs) as follows (remove Frequency Y-axix): (#3719)



TGaz Editor: Change Figure 11-36d (TB Ranging availability window with two ISTAs) as follows (replace Nss with i\_SS): (#3685)



**11-36d—TB Ranging availability window with two ISTAs**

TGaz Editor: Change Figure 11-36e (TB Ranging availability window with multiple TF Ranging Sounding) as follows (replace Nss with i\_SS): (#3685)

**Figure 11-36e—TB Ranging availability window with multiple TF Ranging Sounding**

TGaz Editor: Change the following paragraph after Figure 11-36f as follows:

The mechanism by which the ISTA derives t3’ and t2’ from the TOD and TOA fields of the relevant RSTA-to-ISTA LMR (see 11.22.6.4.3.4 (TB Ranging measurement reporting phase)) are implementation dependent. (#3702)

TGaz Editor: Change starting from line 26 on page 140 as follows:

When the ISTA2RSTA LMR Feedback is negotiated, the RSTA can compute the RTT as (#3906)

RTTRSTA = [(t4’-t1’) – (t3-t2)]

where t1’ and t4’ are the time at which the I2R NDP was transmitted and the time at which the R2I NDP was received, respectively, as converted by the RSTA from the ISTA’s time basis to its own time basis.

The mechanism by which the RSTA derives t4’ and t1’ from the TOD and TOA fields of the relevant ISTA-to-RSTA LMR (see 11.22.6.4.3.4 (TB Ranging measurement reporting phase)) are implementation dependent (#3702). If using CFO in the conversion from the ISTA’s time basis to the RSTA’s, the RSTA shall use the CFO reported in the CFO Parameter field of the I2R LMR. (#3701)

NOTE—Refer to subclause 27.3.14.3 Pre-correction accuracy requirements for carrier frequency offset (CFO) correction requirement for HE TB PPDU transmission. (#1156)

In an LMR (#3703), the TOA field contains a timestamp that represents the time, with respect to a time base, at which the start of the preamble of the corresponding NDP frame arrived at the receive antenna connector. The TOD field’s value contains a timestamp that represents the time, with respect to the same time base, at which the start of the preamble of the corresponding (#2274) NDP frame appeared at the transmit antenna connector.

If the measurement sounding phase includes more than a single TF Ranging Sounding frame (see Figure 11-36e TB Ranging availability window with multiple TF Ranging Sounding), each ISTA-RSTA pair shall refer to the t1 and t2 of the I2R NDP frame transmitted by that ISTA, while t3 and t4 will be based on the single R2I NDP received by all ISTAs (see Figure 11-36g Measurement Sounding Phase with I2R TDMA Multiplexing). (#3705)

TGaz Editor: Change the following paragraphs of page 142 as follows:

The UL power control, timing and frequency synchronization requirements of unassociated STAs performing TB ranging shall follow the same rules as those of associated HE STAs. (#3706)

To aid in synchronizing the TSF time at the ISTAs, the RSTA maintains a trigger poll counter. Before transmitting a TF Ranging Poll, the RSTA shall increase the trigger poll counter by one (modulo 8) and set the Token subfield of the trigger dependent common info subfield in the TF Ranging Poll to the value of the trigger poll counter. (#1888, #3707)

When transmitting a Ranging NDP Announcement frame as part of the TB Ranging measurement exchange, an RSTA shall include a value in the Partial TSF subfield in the STA Info field with the AID11 subfield equal to 2044, that equals to the RSTA’s TSF[21:6] at the time of transmission of the preceeding TF Ranging Poll. Specifically the time that the first data symbol of the PSDU of said frame was transmitted to the PHY plus the RSTA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. (#3707)

Additionally, the RSTA shall set the Token subfield in the STA Info field with the AID11 subfield equal to 2044 to the same trigger poll counter value as the Token subfield in the TF Ranging Poll whose partial TSF time is carried in the Ranging NDP Announcement frame. (#1888, #3707)

NOTE—An ISTA that tries to synchronize to the RSTA’s TSF time will need to keep track of the difference between its local TSF[63:22] and the RSTA’s TSF[63:22] when adjusting TSF[21:6]. When receiving a partial TSF value in a Ranging NDP Announcement frame from the RSTA, to synchronize its TSF time with the RSTA’s TSF time in order to determine the start of a subsequent TB Ranging availability window: (#1888, #3711)

* The ISTA should check if its TSF[21:6] at the reception of TF Ranging Poll was larger than the received Partial TSF and the absolute difference is more than 216-1, then the ISTA should increase the RSTA’s tracked TSF [63:22] value by 1. If the ISTA’s TSF [21:6] at the reception of the TF Ranging Poll was less than the Partial TSF and the absolute difference is more than 216-1, the ISTA should decrease the RSTA’s tracked TSF [63:22] value by 1. (#3711)

TGaz Editor: Change the first paragraphs of 11. 22.6.4.3.4 on page 142 (line 36) as follows:

The last phase of each polling/sounding/reporting triplet is the measurement reporting phase, which is transmitted a SIFS time after the measurement sounding phase (see Figure 11-36c). The measurement results shall be carried in LMR frames (see subclause 9.6.7.37 Location Measurement Report frame format). LMR frames shall carry measurement results from the RSTA to the ISTA, and if negotiated also from the ISTA to the RSTA (see Figure 11-36g). If the Range Reporting is performed in the context of a Secure Fine Timing Measurement Session, the corresponding LMR and FTM (See 11.22.6.5.1 Availability Window parameter modification) frames shall be transmitted using the Protected Dual of Public Action frames (See 9.6.10 Protected Dual of Public Action frames). (#2523, #2524) The feedback type of the ISTA2RSTA and RSTA2ISTA LMRs can (#3713) be either immediate (i.e., from the current availability window) or delayed (i.e., from the last availability window in which the ISTA responded to the TF Ranging Poll and the RSTA allocated resources to that ISTA during the measurement sounding phase).

TGaz Editor: Change the third paragraphs of 11. 22.6.4.3.4 on page 143 (line 7) as follows:

NOTE—LMR feedback is carried in Action No Ack frames (see 9.6.7.37) and is therefore neither acknowledged nor retransmitted.

The RSTA shall transmit an RSTA2ISTA LMR to all (#1157) ISTAs that were allocated resources in the preceding measurement sounding phase. All the RSTA2ISTA LMR frames are carried in one HE MU PPDU; if there is only one RSTA2ISTA LMR it may be carried in an HE SU PPDU. If ISTA2RSTA LMR was negotiated, the RSTA shall assign uplink resources to the ISTAs using a Trigger frame of variant Ranging, subvariant Report; see subclause 9.3.1.22.9 (Ranging Trigger variant). The Ranging Trigger frame of subvariant Report is called the TF Ranging LMR (#1977).

TGaz Editor: Move the second paragraph of pag 144 (line 10) to 1.22.6.4.6.2 TB Ranging measurement exchange for Secure LTF: