IEEE P802.11
Wireless LANs

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| 11az LB249 Comment Resolution Section 11.22.6.4.3 |
| Date: 2019-04-03 |
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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: 3664, 3985, 3115, 3242, 3669, 3672, 3675
* 11.22.6.4.3.3: 3688, 3689, 3692, 3693, 3695, 3697, 3698, 3699, 3470, 3702, 3906, 3701, 3703, 3705, 3706

Revisions:

1. Adde more CIDs (3470, 3702, 3906, 3701, 3703, 3705, 3706 )

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** |
| **3664** | 135.20 | 11.22.6.4.3.1 | “An RSTA and ISTA participating in TB ranging shall perform any measurement sounding and measurement results reporting activities only within the availability windows.” suggests the polling (sub)phase can be outside the window | Change to “An RSTAand ISTA participating in TB ranging shall perform any polling, measurement sounding and measurementresults reporting activities only within the availability windows.” | **Accepted** |
| **3985** | 135.00 | 11.22.6.4.3.1 | It is not clear whether only HE STAs can participate in the TB Ranging Measurement exchange or a new type of STAs compliant to 11ax can also perform the exchange. | Clarify the point in the comment. | **Rejected**Only STAs that implement 11az features can participate, this includes ceratin HE STA features, but also beyond. |
| **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 |
| 3242 | 136.29 | 11.22.6.4.3.1 | "and set the Rx Control Frame to MultiBSS subfield in HE MAC Capabilities Information field to 1" - how does this apply to un-associated STAs? | Clarify if this applies to un-associated STAs, which do not exchange an HE MAC Capabilities Information field |  |
| **3669** | 136.17 | 11.22.6.4.3.1 | "An RSTA shall not transmit a Ranging Trigger frame as part of an A-MPDU. " -- I don't think that's what's intended, since everything in VHT and HE is transmittted as part of an A-MPDU. I think what is intended is non-A-MPDU (see definition in baseline) | Change to "An RSTA shall transmit a Ranging Trigger frame as a non-A-MPDU. " | **Accepted** |
| 3672 | 136.20 | 11.22.6.4.3.1 | “An ISTA shall only transmit any Fine Timing Measurement Request frame outside an Availability Window allocated to itself. (#1170, #1566)” is extremely unclear. Seems to be saying that FTMR frames must be transmitted outside AWs, but I think it's trying to say that the only kind of FTM-related frame that may be sent outside an AW is an FTMR frame" | Change to “An ISTA shall may transmit a Fine Timing Measurement Request frame outside an Availability Window allocated to it. Other frames involved in TB ranging shall not be transmitted outside this window.” |  |
| **3675** | 136.22 | 11.22.6.4.3.1 | “A RSTA, in which dot11MultiBSSIDImplemented is true, that transmits a Ranging Trigger frame or a Ranging NDP Announcement frame to a set of ISTAs in which at least two ISTAs have a TB Ranging Measurement exchange with different BSSIDs in the Multiple BSSID set of the RSTA shall set the TA field of the frame to the transmitted BSSID. Otherwise, the RSTA shall set the TA field of the Ranging Trigger frame or a Ranging NDP Announcement frame to its MAC address.” -- first sentence might be duplication of 9.3.3.1 in baseline (depends on what RA is set to, which is not specified) and second definitely is | Change to “A RSTA in which dot11MultiBSSIDImplemented is true and that transmits a Ranging Trigger frame or a Ranging NDP Announcement frame to a set of ISTAs in which at least two ISTAs have a TB Ranging Measurement exchange with different BSSIDs in the Multiple BSSID set of the RSTA shall set the RA field of the frame to the broadcast address.” | **Revised**Typo? It is the TA field, not the RA field, and why broadcast? |
| **3688** | 138.23 | 11.22.6.4.3.3 | “Each TF Ranging Sounding shall allocate uplink resources for one or more ISTA's I2R NDP multiplexed in the spatial stream domain” -- not clear if can also be multiplexed in the frequency domain | As it says in the comment | **Rejected**“Not clear” is not an actionable comment.Furthermore, specifying that a frame is multiplexed in spatial domain does not imply it could alternatively or additionally be multiplexed in the frequency domain.Lastly, the TF Ranging Sounding User Info filed does not have an RU allocation subfield |
| **3689** | 138.26 | 11.22.6.4.3.3 | “the RSTA shall transmit an NDP Announcement frame followed by a R2I NDP (#2161); the NDPA is a Ranging NDP Announcement frame, see subclause 9.3.1.19 “ is a very roundabout way to say this. Also the subclause xref is not of any significant benefit" | Change to “the RSTA shall transmit an Ranging NDP Announcement frame followed by an R2I NDP (#2161)” | **Revised**Chage to “…the RSTA shall transmit an NDPA followed by a R2I NDP” |
| **3692** | 138.31 | 11.22.6.4.3.3 | “The NDPA is addressed to and the R2I NDP is used by all ISTA taking part in the exchange.” is not clear" | Change to "The Ranging NDP Announcement frame is broadcast and the R2I NDPs are transmitted to each of the ISTAs taking part in the exchange." | **Revised**Chage to “The NDPA’s STA INFO fields specify all the ISTA that will use the R2I NDP, which are all the ISTA that were allocated uplink resources in this Measuerment Sounding Phase.” |
| **3693** | 138.26 | 11.22.6.4.3.3 | “the RSTA shall transmit an NDP Announcement frame followed by a R2I NDP” but F11-36d should multiple R2I NDPs" | Change to "... followed by concurrent transmission of an R2I NDP to each ISTA" | **Rejected**The text is correct, although the figure is maybe not clear. In the figure UL-MIMO separated in spatial domain (HE-MU format) and DL using NSS>1 (HE-SU format) are shown with different shades of grey (the former) vs. same gray (the latter). The multiple NSS of the R2! NDP are processed by all the ISTAs (so they don’t get one each). |
| **3695** | 139.12 | 11.22.6.4.3.3 | “Any ISTA that transmits an I2R NDP as a response to the TF Ranging Sounding shall set the TXVECTOR parameter CH\_BANDWIDTH to the value defined in the BW subfield of the Common Info field of the soliciting TF” is duplication of the baseline rules" | Delete the cited text | **Accepted** |
| **3697** | 139.7 | 11.22.6.4.3.3 | “The RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH of the TF Ranging Sounding to that same bandwidth and use the same value for the BW subfield of the Common Info field of said TF.” is I think duplication of the baseline rules, and if it isn't it's unclear" | Delete the cited text | **Revised**This is not baseline, since it describes how to use the bandwidth value negotiated between ISTA and RSTA(s), see also text right above.To clarify, change“This bandwidth shall be equal to or smaller than the bandwidth indicated by the RSTA in the initial Fine Timing Measurement frame. It may be different from the bandwidth used in the polling phase, but shall adhere to the rules of multiple” |
| **3698** | 139.7 | 11.22.6.4.3.3 | “The RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH of the TF Ranging Sounding to that same bandwidth and use the same value for the BW subfield of the Common Info field of said TF.” is I think duplication of the baseline rules, and if it isn't it's unclear" | Change to “The RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH of the TF Ranging Sounding to the value indicated in the BW subfield of the Common Info field.” | **Rejected**For once, this is contradictory to CID 3697, but also the point here is that the TF is transmitted using this bandwidth \*and\* the allocation in the UL uses the same bandwidth |
| **3699** | 139.15 | 11.22.6.4.3.3 | “In the Sounding subvariant of the Ranging Trigger frame, the RSTA shall set the I2R Rep subfield of the User Info fields corresponding to each AID/RSID of the ISTAs triggered by the Trigger frame to a value in the range 0 to RSTA Assigned I2R Rep. Similarly, in the Ranging NDP Announcement frame, the RSTA shall set the R2I Rep subfield of the STA Info fields corresponding to each AID/RSID of the ISTAs, addressed by that frame, to a value in the range 0 to RSTA Assigned R2I Rep. “ -- why the references to AID/RSID? | Change to “In the Sounding subvariant of the Ranging Trigger frame, the RSTA shall set the I2R Rep subfield of the User Info fields corresponding to each of the ISTAs triggered by the Trigger frame to a value in the range 0 to RSTA Assigned I2R Rep, as indicated by each ISTA. Similarly, in the Ranging NDP Announcement frame, the RSTA shall set the R2I Rep subfield of the STA Info fields corresponding to each of the ISTAs addressed by that frame to a value in the range 0 to RSTA Assigned R2I Rep, as indicated by each ISTA.“ | **Accepted** |
| **3470** | 140.19 | 11.22.6.4.3.3 | This is not the RTT observed by ISTA, it's the ToF observed by ISTA | Change "The Round-Trip Time (RTT) observed by ISTA" to "The time of flight observed by ISTA" | **Rejected**The equation as shown is the sum of two ToF (round-trip), compared to other definitions of RTT the processing delay is removed, but we stick here with previously used notation in the FTM protocol. |
| **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 |
| **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:”When 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.” |
| **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 subclause(c) will try to improve figure |
| **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 “DL 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 DL power control, timing and frequency synchronization requirements of unassociated STAs performing TB ranging shall follow the same rules as those of associated HE STAs.” |
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11.22.6.4.3.1 General

TGaz Editor: Change the second paragraph of 11.22.6.4.1 as follows:

Each availability window of the TB ranging measurement exchange consists of one or more triplets of sequential phases: polling phase, measurement sounding phase and measurement reporting phase. Figure 11-36a shows an example of two availability windows, each composed of a single triplet of polling, measurement sounding and measurement reporting phases. An RSTA and ISTA participating in TB ranging shall perform any polling, measurement sounding and measurement results reporting activities only within the availability windows. (#3664)

TGaz Editor: Change line 17 on page 136 as follows:

* An RSTA shall transmit a Ranging Trigger frame as a non-A-MPDU. (#3669)

TGaz Editor: Change the fifth paragraph on page 136 as follows:

An RSTA in which dot11MultiBSSIDImplemented is true and that transmits a Ranging Trigger frame or a Ranging NDP Announcement frame to a set of ISTAs, in which at least two ISTAs have a TB Ranging Measurement exchange with different BSSIDs in the Multiple BSSID set of the RSTA, shall set the TA field of these frames to the transmitted BSSID. An ISTA that supports TB Ranging Measurement exchange shall support the reception of a Control frame with TA equal to the transmitted BSSID and set the Rx Control Frame to MultiBSS subfield in HE MAC Capabilities Information field to 1. (#1115, #3675)

11.22.6.4.3.3 Measurement Sounding Phase of TB Ranging

TGaz Editor: Change the first four paragraphs of 11.22.6.4.3 as follows:

The measurement-sounding phase commences SIFS time after the polling phase and is the second phase of each polling/sounding/reporting triplet (see Figure 11-36d). The measurement sounding phase consists of one or more Trigger frames of variant Ranging, subvariants Sounding (see 9.3.1.22.9 (Ranging Trigger variant)) allocating uplink resources to one or more ISTAs (see Figure 11-36a and Figure 11-36c). The Ranging Trigger frame of subvariant Sounding is called the TF Ranging Sounding (#1977). Each TF Ranging Sounding shall allocate uplink resources for one or more ISTA’s I2R NDP multiplexed in the spatial stream domain. The format (#2161) of the I2R NDP is an HE TB Ranging NDP (see subclause 27.3.17b HE Ranging NDP). SIFS time after receiving the last I2R NDP, the RSTA shall transmit an NDPA followed by an R2I NDP (#2161, #3689); the NDPA is a Ranging NDP Announcement frame, see 9.3.1.19 (VHT/HE/Ranging NDP Announcement frame format) and the R2I NDP is an HE Ranging NDP, see 27.3.17a (HE Ranging NDP). Figure 11-36d shows an availability window with an RSTA and two ISTAs (ISTA 1 and ISTA 4) responding to the poll. The TF Ranging Sounding allocates a separate spatial stream to each ISTA. The NDPA’s STA INFO fields specify all the ISTA that will use the R2I NDP, which are all the ISTA that were allocated uplink resources in this measurement sounding phase. (#3692)

The RSTA shall select a bandwidth value for the measurement sounding phase based on the Format and Bandwidth subfield of the Ranging Parameters element(s) (see 9.4.2.296 (Ranging Parameters element)) provided by each of the ISTAs during negotiation. This bandwidth shall be equal to or smaller than the bandwidth indicated by the RSTA in the initial Fine Timing Measurement frame.It may be different from the bandwidth used in the polling phase, butshall adhere to the rules of multiple frame transmission in an EDCA TXOP (see 10.22.2.7 (Multiple frame transmission in an EDCA TXOP)). (#1847, #1124, #3697)

* The RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH of the TF Ranging Sounding to that same bandwidth and use the same value for the BW subfield of the Common Info field of said TF.
* When transmitting the Ranging NDP Announcement frame and R2I NDP frames, the RSTA shall set the TXVECTOR parameter CH\_BANDWIDTH to that same bandwidth.

In the Sounding subvariant of the Ranging Trigger frame, the RSTA shall set the I2R Rep subfield of the User Info fields corresponding to each of the ISTAs triggered by the Trigger frame to a value in the range 0 to *RSTA Assigned I2R Rep*, as indicated by each ISTA. (#3699)

Similarly, in the Ranging NDP Announcement frame, the RSTA shall set the R2I Rep subfield of the STA Info fields corresponding to each the ISTAs, addressed by that frame, to a value in the range 0 to *RSTA Assigned R2I Rep*, as indicated by each ISTA. (#3699)

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). When 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. (#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 first paragraph of page 142 as follows:

The DL 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)