IEEE P802.11
Wireless LANs

|  |
| --- |
| Comment resolutions for 27.7.2 |
| Date: 2018-05-01 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  |  |
| Abhishek Patil | Qualcomm Inc. |  |  |  |
| Matthew Fischer | Broadcom Ltd. |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGax D2.0 with the following CIDs:

* 11167, 11340, 11341, 11342, 11344, 11345, 11346, 11838, 11925, 11994,
* 11995, 12029, 12030, 12090, 12091, 12307, 12308, 12315, 12517, 12518,
* 12519, 12520, 12521 (23 CIDs)

Revisions:

* Rev 0: Initial version of the document.

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 TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 11167 | Albert Petrick | 272.60 | A mandatory requirement is stated - HE STA shall not transmit BAT, TACK and STACK frames. These frames are not defined in D2.0 or in the 802.11-2016 baseline. However they are defined in .11ah but not obvious. | Just like other normative Notes in D2.0, add reference Note to .11ah clauses were these frames are described. | Revised –Agree in principle. However, the reference need not be where the frames are defined but rather where they are used. TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11161 and under all headings that include AA. |
| 11340 | Alfred Asterjadhi | 271.52 | Calling this field Wake TBTT Negotiation field now is ambiguous. Find a better name for it given the generalization of its functionality. | Clarify. | Revised –These two bits were already renamed as Negotiation Type. Proposed resolution is to use the same terminology in this subclause as well. TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11340. |
| 11341 | Alfred Asterjadhi | 271.52 | THe AP can actually send a trigger frame to poll the STA for indicating its wake state. This case is missnig in the list. Add it. | Specify that the AP may include the STA in the list if it intends to poll the STA for declaring its wake state. | Rejected –The comment refers to P271L52 that discussed the setting of the fields in the TWT setup exchanges and have nothing to do with normative behavior of STAs to indicate the awake state. |
| 11342 | Alfred Asterjadhi | 273.52 | The case of unannouced TWT is not covered. Specify that in the case of unannounced TWT the STA shall be in awake state at the start of the TWT SP and need not explicitly send an indication to the AP that it is in the awake state. Ensure that it is harmonized with broadcast TWT as well. Or maybe add a reference to 27.7.5. I think this is defined there (and if it is not then maybe that sublcause is better for this type of behavior to be defined). | As in comment. | Revised –Agree in principle. Proposed resolution is to add a declarative statement to the note to clarify this aspect.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11342. |
| 11344 | Alfred Asterjadhi | 270.50 | Sentence is not clear. A STA clearly supports TWT if it transmits the TWT element. Suggest rephrasing. Also specify the difference between these commands and the ones in 10.43 (i.e., shifting to broadcast TWT membership and unsolicited TWT responses). | Replace "An HE STA that supports TWT shall set the" with "An HE STA that transmits a TWT setup frame shall set the". And add clarification as per comment. | Revised –Agree in principle. Proposed resolution is to specify that the STA that intends to setup an individual TWT since this is the subclause that describes it.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11344. |
| 11345 | Alfred Asterjadhi | 273.16 | Actually the TWT responding STA wil not schedule rather than might not schedule since the STA has not disabled responding to Trigger frames. | Replace "might not" with "does not". | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11345. |
| 11346 | Alfred Asterjadhi | 274.01 | This sentence and the note that follows is redundant. It is obvious (from baseline) that a STA can transmit to another STA in Active mode at any time. Delete the sentence and the note. Same observations for the broadcast subclause. | As in comment. | Revised –Deleting note and keeping sentence, while adding a reference to the baseline subclause that states this in normative behavior.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11346. |
| 11838 | Guoqing Li | 274.03 | regarding "to indicate that it is in awake state", Active mode can not be in awake state even though it is available to recevie frames. | change to "to indicate that it is in Active mode" or "it is available to receive frames" | Revised –Deleting the note and providing a reference to the subclause that defines the Active mode which clearly indicates the responsibilities (one of which is actually to be in awake state) of a STA that is in active mode. TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11838. |
| 11925 | Ian Sherlock | 272.39 | "An HE STA that successfully sets up an individual TWT agreement ... is exempt from the requirements for receiving Beacon frames". There is no clear statement or treatment for AP's broadcast frames which the STA may miss during the doze period. Losing broadcasts may be problematic for upper layer protocols. | Add reference to one of the mechanisms that ensure the AP will buffer broadcast frames for the STA while it is in doze mode. | Revised –Agree in principle with the comment. Proposed resolution adds a reference for this purpose.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 11925. |
| 11994 | James Yee | 271.40 | The TWT operation description here is quite confusing and potentially conflict with existing TWT operation, exemplified by the statement here: "all the additional rules defined in this subclause supersede all the respective rules defined in 10.43.1..." | Please further consolidate and simplify the rules related to TWT operations. | Rejected –These statements are added to be consistent with the editorial style guide wherein the editor instructs that the new amendments call out what from the baseline is followed and explicitly add whether exceptions or addititions to the rules are specified by the new amendment. Consolidating the rules would mean to add the normative behavior in subclause 10.43, but this would be against to the new editorial guidelines. |
| 11995 | James Yee | 272.62 | The TWT mechanism schedules tx opportunities for a STA for more efficient operation. Specifying that "A TWT requesting STA should not transmit frames to the TWT responding STA outside of negotiated TWT SPs for that TWT agreement" seems unnecessary and an over reach of the intent of the mechanism. The Note which follows correctly states that a STA can tx within or outside the TWT SP as it pleases, so it is not clear what is trying to be achieved here. | Please more clearly describe the TWT operation. | Rejected –The intent is to specify that the STA is recommended to not transmit outside of the service periods since it is scheduled for exchanges within service periods. The recommendation provides guidance on what is the right behavior when operating under these conditions. This behavior is inline with baseline TWT recommendation:“A TWT requesting STA that is a non-AP STA should transmit frames only within TWT SPs.”And inline with the recommendation added as part of quiet time operation:“The QTP (Quiet time period) is an optional feature that defines a period for peer-to-peer operation during which only HE STA which supports the peer-to-peer operation may transmit frames. During the period an HE STA should not transmit frames unless it participates in peer-to-peer operation.”While in certain scenarios it would be beneficial that the allocations are more restrictive it is the groups opinion that this be a recommendation since the STA might have QoS sensitive traffic to be delivered. |
| 12029 | Jarkko Kneckt | 273.13 | The Cascade Indication is used in UORA and in TWT power save. This makes the Cascade Indication difficult to use. The Cascade Indication should not be set to 0 when a STA in PS that uses TWT has not transmitted or received all its traffic. This prevents the UORA users to get termination signaling. Only in rare cases the Cascade Indication can indicate that no more random access opportunities will be allocated. | Please, simplify the Cascade Indication use and use it only to control whether the AP transmits triggers allocating RUs for the UL OFDMA random access. | Rejected –The comment fails to identify a technical issue. If an AP does not want STAs that are not the intended recipients of the Trigger frame to go to doze state can simply set the Cascade Indication field (now called More TF) to 1. Now that No Further RA-RU field is added to the Trigger frame for random access (see Figure 9-52i) then Cascade Indication is not used by UORA anymore. Hence it makes things even simpler for implementation (on top of simply setting a Cascade Indication field to 1). |
| 12030 | Jarkko Kneckt | 273.13 | The Cascade Indication set to 0 can terminate many unannounced TWT SPs. The Cascade Indication requires good understanding the state of the all ongoing TWT SPs and precise synchronization between the AP and the STAs with ongoing TWT SPs. In high density situations the cascade indication is very hard to implement and poor implementations put many non-AP STAs to doze unnecessarily. When STAs go to Doze unnecessarily the throughputs and delay performance of the TWT power saving STAs is severely degraded. | The Cascade Indication should control only will AP allocates more UL random access opportunities. This ensures simple and timely power save for UORA. The AP should terminate each TWT SP with signaling that is addressed each receiver separately. This avoids erroneously transmitted early TWT SP terminations and ensures that STAs are not put ot doze in error. | Rejected –The comment fails to identify a technical issue. If an AP does not want STAs that are not the intended recipients of the Trigger frame to go to doze state can simply set the Cascade Indication field to 1. |
| 12090 | Jinsoo Ahn | 272.02 | The row 'Accept TWT with Broadcast subfield set to 1 and with an individual address in the RA field of the MPDU.' is for Broadcast TWT. It is duplicated with Table 27-3 | Delete the row from the Table 27-2 | Rejected –Table 27.3 provides the settings of the TWT commands for the broadcast TWT announcmenents while Table 27.3 is providing frame exchanges for individual TWT setup (in this case specifying the AP cannot respond to an individual TWT request with an assignment to a broadcast TWT. As such this row is needed to explicitly forbid this sequence. |
| 12091 | Jinsoo Ahn | 273.07 | It says 'The TWT responding STA should solicit buffer status reports from the TWT requestingSTA at the start of the TWT SP following the procedure described in 27.5.3.6 (HE buffer status feedbackoperation for UL MU) or as described in 27.5.6 (NDP feedback report procedure).'What if the Trigger-enabled TWT is an announced TWT? When the TWT requesting STA receives the BSR trigger, does it transmit Buffer status report? or PS-Poll frame? | Make the presence check is preceded to the transmission of buffer status report | Rejected –The normative behavior for inclusion of frames in the HE TB PPDU that is sent in response to a BSRP Trigger frame is already clearly defined in 27.5.3.6 (HE buffer status feedback operation for UL MU). If the Trigger is a Basic Trigger frame then the STA can include both a PS-Poll and othe frames as well, which may contain the BSR reports. This is also clearly stated in the normative behavior: “A TWT requesting STA that is in PS mode and is awake shall include a PS-Poll frame or an APSD trigger frame in the HE TB PPDU if the TWT is an announced TWT unless the STA has already transmitted a PS-Poll or APSD trigger frame or transmitted any other indication that the STA is in the awake state within that TWT SP or has, previous to the TWT SP, otherwise indicated to the AP that it is currently in the awake state. The STA may include other frames in the HE TB PPDU when other rules do not prohibit their inclusion, see 27.5.3 (UL MU operation).” |
| 12307 | Laurent Cariou | 272.25 | In Table 27-2 - HE individual TWT setup exchange command interpretation, Accept TWT with Broadcast subfield set to 1 and with an individual address in the RA field of the MPDU: this should be in the Broadcast table. | This entry shall be deleted as it belongs to Broadcast TWT Agreement (the table delas with Individual TWT setup) and should be move to the broadcast table | Revised –Agree with the comment. This sequence is already present in Table 27-6. Removed.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12307. |
| 12308 | Laurent Cariou | 273.24 | A TWT requesting STA that is in PS mode and is awake shall include a PS-Poll frame or an APSD trigger frame in the HE TB PPDU if the TWT is an announced TWT unless the STA has already transmitted the a PS-Poll or APSD trigger frame or transmitted any other indication that the STA is in the awake state within that TWT SP or has, previous to the TWT SP. Any other indication is not fully clear. This should be clarified. | Clarify what is any other indication. An NDP feedback report sent in response to an NDP feedback report poll trigger frame should be explicitly part of the indications that the STA is awake. | Rejected –This addition was added purposefully to specify any other indication, since it can be a response to an NFRP trigger frame, or the fact that the STA is in active mode, etc. By having a generic statement (indication as known at the AP) we don’t need to explicitly add all possibilities. |
| 12315 | Laurent Cariou | 272.45 | Unsolicited TWT response frames should not be allowed for certain modes. For instance, a periodic unannounced TWT should not be allowed. | Exclude some TWT modes when used with the unsolicited TWT response frames | Rejected –The comment fails to identify a technical issue. It is up to the AP to decide which mode to enable depending on scheduling, traffic, operation requirements and so on. If the STA does not like (or “support”) certain modes then the STA can tear down those particular ones.  |
| 12517 | Liwen Chu | 272.08 | Add that the STA is recommanded to join the broadcast TWT | As in comment | Revised –Agree with the comment. Incorporated the suggested change.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12517. |
| 12518 | Liwen Chu | 272.08 | Why can't Suggest, Demand TWT be used like Request TWT | Clarify it | Revised –Agree in principle. Proposed resolution is to specify that this command can be sent in response to Suggest and Demand TWT as well.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12518. |
| 12519 | Liwen Chu | 272.08 | contradict with Broadcast vs Wake TBTT Negotiation Table. Broadcast=1, Wake TBTT Negotiation =0 is in broadcast frame. | Fix the issue mentioned in comment. | Revised –Proposed resolution clarifies that the Negotiation Type is 3 (which is not the one that would conflict, value 2 used in broadcast announcemments).TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12519. |
| 12520 | Liwen Chu | 272.30 | Contradict with the Table name | Fix the table name or move the row to another table. | Revised –Agree with the comment. Proposed resolution proposes a name for the Table that reflects the intented use of these sequences. Also clarifies that this row is for individual TWT not broadcast TWT.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12520. |
| 12521 | Liwen Chu | 272.45 | TWT response in association response should be allowed also. | Fix the issue mentioned in comment. | Revised –Agree in principle with the comment. The “frame” is causing the issue since it gives the impression that the TWT response is a frame, which is not true. The TWT response is a MGMT frame that carries a TWT element with a TWT element that contains a TWT Request field set to 0. Proposed resolution removes the “frame” classifier.TGax editor to make the changes shown in 11-18/0661r0 under all headings that include CID 12521 and under all headings that include AA. |

**Discussion: *None.***

* Individual TWT agreements

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID AA):***

An HE STA may negotiate individual TWT agreements with another HE STA as defined in 10.43.1 (TWT overview), except that the STA:

* May set the Responder PM Mode subfield to 1 if it is a TWT responding STA that intends to go to doze state outside of TWT SPs.
* If the TWT responding STA is an AP then it may set the Responder PM Mode subfield to 1 only if all non-AP STAs that are associated to it indicate support of TWT*(#AA)* and the AP has set the TWT Required subfield to 1 in the HE Operation element it transmits(#7620); otherwise it shall set the Responder PM Mode subfield to 0.An AP that sets the Responder PM Mode subfield to 1 follows the rules defined in 10.43.7 (TWT Sleep Setup).
* Shall set the Implicit subfield to 1 and the NDP Paging Indicator subfield to 0 in all TWT elements that it transmits during the TWT setup.
* May set the Trigger subfield to 1 in the TWT element it transmits during the TWT setup to negotiate a trigger-enabled TWT.
* A successful TWT agreement whose Trigger subfield in the TWT response sent by the AP is 1 is a trigger-enabled TWT; otherwise it is not a trigger-enabled TWT.(#5657, #7118)
* Shall set the TWT Channel subfield in the TWT element it transmits to 0 except when the HE STA sets up a subchannel selective transmission operation as defined in 27.7.7 (HE subchannel selective transmission operation) *(#AA)*.
* May set the TWT Protection field to 1 to indicate that TXOPs within the TWT SPs shall be initiated with a NAV protection mechanism, such as (MU) RTS/CTS, or CTS-to-self frame; otherwise it shall set it to 0.
* An HE STA shall not use the RAW mechanism for protection of TWT SPs.(#4767, #4846)

An HE STA that successfully sets up a TWT agreement with another HE STA shall follow the rules defined in 10.43.1 (TWT overview) and 10.43.4 (Implicit TWT operation), except that all the additional rules defined in this subclause supersede all the respective rules(#6741, #5907) defined in 10.43.1 (TWT overview) and 10.43.4 (Implicit TWT operation). A TWT or TWT SP that is set up(#6742) under an implicit TWT agreement is an implicit TWT or implicit TWT SP, respectively (see 10.43.1 (TWT overview))(#6744). A TWT or TWT SP that is set up(#6743) under a trigger-enabled TWT agreement is a trigger-enabled TWT or trigger-enabled TWT SP, respectively.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11340, 12519, 12520, 11344):***

An HE STA may execute the individual TWT setup exchanges defined in Table 27-2 in addition to the exchanges defined in 10.43 (Target wake time (TWT)). An HE STA that intends to setup an individual*(#11344)* TWT shall set the Negotiation Type subfield to 0 as indicated in 10.43 (Target wake time (TWT)) or as indicated in Table 27-2. The HE STA may respond to the TWT request with a TWT response that has the Negotiation Type subfield equal to 3 as indicated in Table 27-2 to provide recommended broadcast TWT schedules for the requesting STA*(#11340, 12519, 12520)*

|  |
| --- |
| * TWT setup exchange for unsolicited TWT and recommended broadcast TWT switch
 |
| Initiating frame: TWT Setup Command field value within a TWT Setup frame transmitted from a first STA to a second STA | Response frame: TWT Setup Command field value within a TWT Setup frame transmitted from the second STA to the first STA | TWT condition after the completion of the exchange(#8425, #9435) |
| Request TWT or Suggest TWT or Demand TWT with Broadcast subfield = 0 | Accept TWT with Broadcast subfield = 1 | This response is not allowed. |
| Request TWT or Suggest TWT or Demand TWT with Broadcast subfield = 0 | Dictate TWT with Broadcast subfield = 1 | No individual TWT agreement exists with the associated TWT Flow identifier. One or more broadcast TWT schedules exist that use the TWT parameters identified in the response frame including their respective Broadcast TWT IDs. The broadcast TWT schedule(s) are not necessarily newly created broadcast TWT schedule(s). The responding STA will not create any new individual TWT agreement with the requester at this time. The STA transmitting the initiating frame is not a member of the broadcast TWT, however the STA is recommended to join any of the broadcast TWT schedules.*(#12517, 12518)* |
| Accept TWT with Broadcast subfield set to 0*(#12307)* | No frame transmitted | The STA receiving this frame now has an individual TWT agreement with the transmitter of the frame where the parameters of the individual TWT agreement are identified by the initiating frame. |
|  |  |  |
| *(#12307)*Alternate TWT or Dictate TWT with Broadcast subfield = 0 | No frame transmitted | The STA receiving this frame is not, through the receipt of this frame, a member of the TWT identified by the initiating frame but can use the information provided to create a request to setup a TWT in a subsequent initiating frame that it transmits.*(#12520)* |
| NOTE—Request frame settings not listed in the table are not allowed. |

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11925):***

An HE STA that successfully sets up an individual TWT agreement and operates in PS mode may listen to Beacon frames, but is exempt from the requirements for receiving Beacon frames as defined in 11.2.3.1 (General). The HE STA follows the rules defined in 11.2.3 (Power management in a non-DMG infrastructure network) to receive group-addressed frames.*(#11925)* (#7820)(#4767, #4846)

An HE STA may tear down an individual TWT agreement by sending a TWT Teardown frame with the Negotiation Type field set to 0.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 12521):***

An HE AP may send an unsolicited TWT response with the Trigger subfield equal to 1 to a non-AP HE STA(#6256) that has set the TWT Requester Support subfield to 1 in the HE Capabilities elements that it transmits to the AP. The TWT response shall have one of these values in the TWT Command field: Accept TWT, Alternate TWT or Dictate TWT. An unsolicited TWT response with TWT Command of Alternate TWT or Dictate TWT contains an advisory notification to the recipient of TWT parameters that are likely to be accepted by the AP if the recipient transmits a subsequent TWT request to the AP that includes those TWT parameters. An unsolicited TWT response with the TWT Command of Accept TWT creates a TWT agreement between the two STAs. A STA that received an unsolicited TWT responsewith the TWT Command of Accept TWT may transmit a TWT Teardown frame to delete the unsolicited individual TWT agreement.*(#12521)* (#4767, #4846)

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11161):***

An HE STA shall not transmit BAT, TACK, or STACK frames, which are allowed in 10.43.2 (TWT acknowledgment procedure)).*(#11161)*

A TWT requesting STA should not transmit frames(#8285) to the TWT responding STA outside of negotiated TWT SPs (#5657, #7188, #7623)for that TWT agreement and should not transmit frames(#8285) that are not contained within HE TB PPDUs to the TWT responding STA within trigger-enabled TWT SPs for that TWT agreement.(#4767, #4846)

NOTE—The non-AP STA decides what frames to transmit within or outside TWT SPs and while it is recommended that the STA not to transmit it is still permitted to do so(#5033).

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID AA):***

The TWT responding STA of a trigger-enabled TWT agreement shall schedule for transmission of(#10279) a Trigger frame for the TWT requesting STA, as described in 27.5.3 (UL MU operation), within each TWT SP for that TWT agreement. The TWT responding STA should solicit buffer status reports from the TWT requesting STA at the start of the TWT SP following the procedure described in 27.5.3.6 (HE buffer status feedback operation for UL MU) or as described in 27.5.6 (NDP feedback report procedure). The TWT responding STA that intends to transmit additional Trigger frames during a trigger-enabled TWT SP shall set the More TF field*(#AA)* of the Trigger frame to 1 to indicate that it will transmit another Trigger frame within the same TWT SP. The TWT responding STA shall set the More TF*(#AA)* field to 0 when the Trigger frame is the last Trigger frame of the TWT SP or when the Trigger frame is sent outside of a TWT SP.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11345):***

NOTE 1—The TWT responding STA does not(#7821) intend to schedule for transmission of(#10279) a Trigger frame for the TWT requesting STA when the TWT agreement is not a trigger-enabled TWT agreement or when the TWT requesting STA has sent an OM Control field(#4727) that has the UL MU Disable subfield equal to 1 (see 27.8 (Operating mode indication)).*(#11345)*

NOTE 2— The Trigger frame can also be an TRS Control field(#Ed) contained in an MPDU carried in a DL MU PPDU, provided that the AP allocates enough resources in the HE TB PPDU for the STA to at least deliver its BSRs in response to the soliciting DL MU PPDU(#4839).

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID AA):***

A TWT requesting STA transmits an HE TB PPDU(#4839) as a response to a Trigger frame that is intended for it and is sent during a trigger-enabled TWT SP (see 27.5.3 (UL MU operation)). A TWT requesting STA that is in PS mode and is awake shall include a PS-Poll frame or an APSD trigger frame in the HE TB PPDU if the TWT is an announced TWT unless the STA has already transmitted within that TWT SP a PS-Poll or APSD trigger frame, or has transmitted*(#AA)* any other indication that the STA is in the awake state within that TWT SP or has, previous to the TWT SP, otherwise indicated to the AP that it is currently in the awake state. The STA may include other frames in the HE TB PPDU when other rules do not prohibit their inclusion, see 27.5.3 (UL MU operation). (#4767, #4846)

NOTE–A Trigger frame is intended for a TWT requesting STA if it is sent by the AP to which the STA is associated and the frame contains the 12 LSBs of the(#7817) STA’s AID in any of its User Info fields. The Trigger frame can have multiple recipients, each of which is identified by the presence of the 12 LSBs of the(#7817) recipient’s AID in any of its User Info fields (see 27.5.3 (UL MU operation)), and can have in the TA field the MAC address of the transmitted BSSID under the conditions defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control field)(#7171).

A TWT responding STA that receives a PS-Poll frame or an APSD trigger frame or any other indication from a TWT requesting STA that is in PS mode during or before an announced TWT SP that the STA is in the awake state during the TWT SP shall follow the rules defined in 11.2.3.6 (AP operation during the CP)(#5890) to deliver buffered BUs to the STA except that it may deliver multiple buffered BUs as defined here. A TWT responding STA that sends frames to a TWT requesting STA that is in PS mode during an unannounced TWT SP shall follow the rules defined in 11.2.3.6 (AP operation during the CP) to deliver buffered BUs to the STA except that it may deliver multiple buffered BUs as defined here.(#5660) A TWT responding STA may deliver multiple buffered BUs to a TWT requesting STA in PS mode during:

* An announced TWT SP, without following the rules regarding the number of buffered BUs to be delivered in 11.2.3.6 (AP operation during the CP)(#5890) as long as the BU delivery does not exceed the duration of the TWT SP and the TWT requesting STA has indicated that it is awake for that TWT SP(#4840) and as long as the TWT requesting STA has not entered the doze state (see 27.7.4.2 (TWT information for individual TWT) and 27.7.5 (PS operation during TWT SPs)).
* An unannounced TWT SP, without following the rules regarding the number of buffered BUs to be delivered in 11.2.3.6 (AP operation during the CP)(#5890) if(#4840) the BU delivery does not exceed the duration of the TWT SP and as long as the TWT requesting STA has not entered the doze state (see 27.7.4.2 (TWT information for individual TWT) and 27.7.5 (PS operation during TWT SPs)).

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11342):***

NOTE—The TWT responding STA can deliver the buffered BUs in an A-MPDU under a block ack agreement if the TWT is an announced TWT and the TWT requesting STA is awake for that TWT SP(#4840), or if the TWT is an unannounced TWT (at the start of which the TWT requesting STA is assumed to already be awake) *(#11342)*. The TWT responding STA can transmit frames to TWT requesting STA after the end of the TWT SP if the STA is in Active mode.(#4840, #4851)

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11346):***

A TWT responding STA may transmit to a TWT requesting STA that is in Active mode at any time (see 11.2.3.2 (STA power management modes)).*(#11346, 11838)*

*(#11346, 11838)*

**27.7.3.2 Rules for TWT scheduling AP**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11346):***

A TWT scheduling AP may transmit to a TWT scheduled STA that is in Active mode at any time (see 11.2.3.2 (STA power management modes)).*(#11346)*

*(#11346)*