IEEE P802.11
Wireless LANs

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| Comment resolutions for 27.7.2 |
| Date: 2018-11-01 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D3.0 with the following CIDs (7 CIDs):

* 15094, 15095, 15849, 16424, 16453, 16961, 16962

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Incorporated changes during the discussions. Changes in green. Deferred CID 16961 (waiting for feedback from Xiaofei).

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.***

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 15094 | Abhishek Patil | 314.04 | NDP Paging Indicator subfield should be 0 for all HE STAs (regardless of individual or broadcast TWT). Same applies to RAW mechanism. | Add a statement to 27.7.1 "An HE STA shall not use the RAW mechanism for protection and shall set the NDP Paging Indicator subfield to 0" so that it applies to all TWT forms for HE STAs. The corresponding statement can be removed from 27.7.2 | Rejected –NDP Paging Indicator is already specified that will be set to 0 in both cases. Please refer to 27.7.2:*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.*And to 27.7.3:*The TWT scheduling AP shall set the NDP Paging Indicator subfield to 0 and the Negotiation Type subfield to 2 and may set the Responder PM Mode subfield to 0 in the TWT element (see 10.43.7 (TWT Sleep Setup)).*As for the RAW mechanism, this is a feature that is defined in sub 1 GHz (dot11S1Goptionimplemented equal to true) which cannot be used by an amendment unless explicitly allowed (which is not done for dot11HEoptionimplemented equal to true). |
| 15095 | Abhishek Patil | 316.26 | Note 1 should be removed - the rules for soliciting an UL are specified in 27.5.3 and don't need to be repeated in this note | Delete the Note 1 | Rejected –The note was added during the past comment resolutions to clarify what does it mean that a Trigger frame is intended to a STA. The reason of the ambiguity arose due to the different settings of the TA field for different BSSIDs and the existence of random RUs as well, which are not used in this particular setting.  |
| 15849 | Laurent Cariou | 316.36 | "or any indication that the STA ... is in the awake state". In other places in the TWT spec, there is a note that indicate that a response to NFRP is such an indication. This note should also be present here or a reference to it should be added. | As in comment | Rejected –The note is present in the paragraph immediately preceding the paragraph where the comment is made. Quoting the note: *NOTE 2—Other indications that the STA is in the awake state are the transmission of an HE TB NDP PPDU in response to an NFRP Trigger frame (see 27.5.6 (NDP feedback report procedure)) or the transmission of a frame that indicates that the STA is in active mode (see 11.2.3.2 (STA power management modes)).*In alternative to a rejection of the comment, the proposed resolution can be revised and moving the note to follow the paragraph where the comment has pointed the lack of the note. |
| 16424 | Matthew Fischer | 316.47 | The language here is a bit misleading, in that it mentions only that the BU count rules are not to be followed, but really, the wake determination rules are also modified | change "without waiting for an explicit indication that the STA is in the AWAKE state, and disregarding the limits of the number of buffered Bus" to "without following the rules regarding the number of buffered BUs" | Revised –Agree in principle with the comment. Proposed resolution is to separate the two cases (announced and unannounced) in separate sentences so that the rules that are exemptions are clear.TGax editor to make the changes shown in 11-18/1697r1 under all headings that include CID 16424. |
| 16453 | Matthew Fischer | 315.53 | Nowhere does it say that an iTWT participant non-AP STA is allowed to use normal EDCA access within its iTWT SP, add it. There might need to be some conditions, for example, if the iTWT is triggered, then should the non-AP STA be allowed to use normal EDCA parameters instead of MU EDCA during its iTWT SPs? I doubt it. But what if it is triggered and announced? Then maybe so... | Add statements indicating when it is ok to use normal EDCA vs MU EDCA during iTWT SPs. | Revised –Ommitance in the rules indicates that normal contention is followed. To clarify this aspect a note is added that specifies that the TWT requesting STA contends for accessing the medium as defined in 27.2.6.TGax editor to make the changes shown in 11-18/1697r1 under all headings that include CID 16453. |
| 16961 | Xiaofei Wang | 313.38 | What if a non-AP that doesn't support TWT attemps to associate with an AP which has set TWT Required subfield to 1, will the STA be rejected? If so, please add the normative text; and may need to define additional rejection reason in Status code field in the association response. | Please clarify whether a non-AP that doesn't support TWT attemps to associate with an AP which has set TWT Required subfield to 1, will the STA be rejected? If so, please add the normative text; and may need to define additional rejection reason in Status code field in the association response. | Rejected –It is up to the AP to decide whether to reject the association of a STA. In general, the AP can reject association of a STA for any reason, on of which can be the non-support of a feature. As for adding a status code there is no benefit for adding it since there is no actionable step that can be taken by the STA, well perhaps generate an e-mail to the implementer asking to implement the feature, but this is clearly out of scope of the standard. |
| 16962 | Xiaofei Wang | 316.13 | In previous sections in Clause 27, trigger frame or TRS control subfield used to trigger uplink transmissions have always been treated as two cases. It is better to make the text uniform across the same spec, and not using language such as "The Trigger frame can also be an TRS Control subfield" since trigger frame is a particular frame and is not a TRS control subfield. | move the content of Note 2 to normative text and clearly list the case a TRS Control subfield is used to solicitate HE TB transmissions. | Revised –The AP is still required to send a Trigger frame in the TWT SP if the STA reported a nonzero BSR. Proposed resolution clarifies that the AP allocates enough resources for the STA to transmits the data it reported in the BSR.TGax editor to make the changes shown in 11-18/1697r1 under all headings that include CID 16962. |

**Discussion: *None.***

* Individual TWT agreements

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 (#11167)and the AP has set the TWT Required subfield to 1 in the HE Operation element it transmits; 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.
* 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)(#11167).(#11837)
* 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.

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 defined in 10.43.1 (TWT overview) and 10.43.4 (Implicit TWT operation). A TWT or TWT SP that is set up under an implicit TWT agreement is an implicit TWT or implicit TWT SP, respectively (see 10.43.1 (TWT overview)). A TWT or TWT SP that is set up under a trigger-enabled TWT agreement is a trigger-enabled TWT or trigger-enabled TWT SP, respectively.

An HE STA may execute the individual TWT setup exchanges defined in Table 27-5 (TWT setup exchange for unsolicited TWT and recommended broadcast TWT switch) in addition to the exchanges defined in 10.43 (Target wake time (TWT)). An HE STA that intends to set up an individual TWT(#11344) shall set the Negotiation Type subfield to 0 as defined in 10.43 (Target wake time (TWT)) or as defined in Table 27-5 (TWT setup exchange for unsolicited TWT and recommended broadcast TWT switch). 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 27-5 (TWT setup exchange for unsolicited TWT and recommended broadcast TWT switch) to provide recommended broadcast TWT schedules for the requesting STA.(#11340, #12519, #12520)

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| * TWT setup exchange for unsolicited TWT and recommended broadcast TWT switch
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| TWT Setup Command field in an initiating frame(#11377) | TWT Setup Command field in a response frame(#11377) | TWT condition after the completion of the exchange |
| 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, 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 schedule exists that uses the TWT parameters identified in the response frame including a Broadcast TWT IDs. The broadcast TWT schedules are not necessarily newly created. 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, #12090) |
| 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 set up a TWT in a subsequent initiating frame that it transmits.(#12520) |
| NOTE 1—The Negotiation Type field in the TWT element contained in these frames is 0 if the Broadcast subfield is 0 and is 3 if the Broadcast subfield is 1.(#11377, #13779)NOTE 2—The initiating frame and response frame settings not listed in the tables in 10.43 (Target wake time (TWT)) or 27.7 (TWT operation) are not allowed(#12045, #13779). The initiating frame is a TWT request if the TWT element carried in the frame has the TWT Request field set to 1; otherwise it is a TWT response (see Table 9-262k (TWT Setup Command field values)). The response frame is a TWT response if the TWT element contained in the frame has the TWT Request field equal to 0.(#11377, #13779, #11035) |

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 11.2.2.1 (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)

An HE STA may tear down an individual TWT agreement by sending a TWT Teardown frame with the Negotiation Type field set to 0.(#13040, #12529)

An HE AP may send an unsolicited TWT response with the Trigger subfield equal to 1 to a non-AP HE STA 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 response with the TWT Command of Accept TWT may transmit a TWT Teardown frame to delete the unsolicited individual TWT agreement.(#12521)

An HE STA shall not transmit BAT, TACK, or STACK frames, which are allowed in 10.43.2 (TWT acknowledgment procedure)).(#11167)

**TGax Editor: *Change the paragraph below in this subclause as follows (#CID 16453):***

A TWT requesting STA should not transmit frames to the TWT responding STA outside of negotiated TWT SPs for that TWT agreement and should not transmit frames that are not contained within HE TB PPDUs to the TWT responding STA within trigger-enabled TWT SPs for that TWT agreement.

NOTE—The TWT requesting STA decides what frames to transmit within or outside TWT SPs and while it is recommended that the STA not transmit using EDCA within or outside TWT SPs, it is still permitted to do so. If the STA decides to transmit then the STA might contend for accessing the medium as defined in 10.24.2 HCF contention based channel access (EDCA) and in 27.2.7 (EDCA operation using MU EDCA parameters).*(#16453)*

The TWT responding STA of a trigger-enabled TWT agreement shall schedule for transmission of 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 subfield in the Common Info field(#11003) 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 subfield(#11003) 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.

NOTE 1—The TWT responding STA does not intend to schedule for transmission of 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 subfield(#14137) that has the UL MU Disable subfield equal to 1 (see 27.8 (Operating mode indication).(#11345)

**TGax Editor: *Change the paragraph below in this subclause as follows (#CID 16962):***

NOTE 2— The Trigger frame can also be an TRS Control subfield(#13136)(#14137) 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, and is recommended to allocate enough resources in subsequent Trigger frames sent during the TWT SP so that the STA can send as much as possible of the data reported in the BSR.*(#16962)*.

A TWT requesting STA transmits an HE TB PPDU 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 a U-APSD trigger frame(#13320) in the HE TB PPDU if the TWT is an announced TWT unless the STA has already transmitted a PS-Poll or U-APSD trigger frame(#13320) 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).

NOTE 1–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 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 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 AP or the(#11036, #13780) transmitted BSSID under the conditions defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and TRS Control subfield).

NOTE 2—Other indications that the STA is in the awake state are the transmission of an HE TB NDP PPDU in response to an NFRP Trigger frame (see 27.5.6 (NDP feedback report procedure)) or the transmission of a frame that indicates that the STA is in active mode (see 11.2.3.2 (STA power management modes)).(#12308)

**TGax Editor: *Change the paragraph below in this subclause as follows (#CID 16424):***

A TWT responding STA that receives a PS-Poll frame or a U-APSD trigger frame(#13320) 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) except that the TWT responding STA should deliver to the TWT requesting STA as many buffered BUs as available at the TWT responding STA, provided that the BU delivery does not exceed the duration of the TWT SP, the TWT requesting STA has indicated to be in the awake state for that 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 (Power save operation during TWT SPs)).

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) except that the TWT responding STA should deliver to the TWT requesting STA as many buffered BUs available at the TWT responding STA, provided that 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 (Power save operation during TWT SPs)).*(#16424)*

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, 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.

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)