IEEE P802.11
Wireless LANs

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| Comment resolution for 27.7.3.2 |
| Date: 2017-05-01 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (25 CIDs):

* 4845, 4848, 4849, 4850, 4851, 5663, 5665, 6044, 7189, 7398, 7399, 7629, 7630, 7631, 7632, , 8132, 8595, 9313, 9979, 5084, 5664, 9576, 10280, 7635, 4847

Note: 4846, and 8130 moved to another document. 7635, and 4847 moved from another document.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial fix (changes highlighted in green).

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** |
| 4845 | Alfred Asterjadhi | 183 | 51 | need to specify the value of the Wake TBTT Negotiation field. Also the STA "may" have membership in Broadcast TWT IDs as a result fo the negotiation of broadcast IDs.. | As in comment. | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested changes.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4845. |
|  |  |  |  |  |  |  |
| 4848 | Alfred Asterjadhi | 184 | 23 | Outside of a trigger-enabled TWT. Same as the case of individual TWT descriptions. | As in comment | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change, which is to say that the trigger frame is sent outside of a trigger-enabled TWT SP.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4848. |
| 4849 | Alfred Asterjadhi | 184 | 30 | As mentioned in the previous comment. the UL MU Response Schedulign can be considered a Trigger frame if it allows the STA to also send BSRs. | As in comment. | Revised –Agree in principle. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4849. |
| 4850 | Alfred Asterjadhi | 184 | 36 | "The TWT scheduling STA should schedule delivery of DL BUs during unannounced TWT SPs." is too vague. Cant the AP schedule DL BUs delivery when the STA has declared to be in awake state? | As in comment. | Revised –**POSTPONED.**Agree in principle with the comment. Proposed resolution is to clarify this aspect.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4850. |
| 4851 | Alfred Asterjadhi | 185 | 18 | Make sure that these rules are consistent with those of the individual TWT agreement case. Also not clear the context of the AM mode in this condition. Seems out of place. | As in comment. | Revised –Agree in principle. Proposed resolution is to clarify these rules so that they are consistent. The changes in this document, and in others are reviewed to ensure consistency.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4851. |
| 5663 | Guoqing Li | 184 | 15 | The sentence here is confusing. The trigger field is to indicate there the TWT is trigger enabled or not. It does not indicate whether it is implicit or not. | change to "othersie, it shall set the "trigger field to 0 to indicate a non-trigger-enabled TWT" | Revised –Agree in principle. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 5663. |
| 5665 | Guoqing Li | 185 | 12 | This paragraph seems to conflict with the previous paragraph which says the STA doesn't need to follow AP operation during CP while the previous paraph says the STA shall follow the AP operation during CP. The condition for the two cases are not clearly specified. | Clarify | Revised –Agree in principle. Proposed resolution clarifies this aspect by specifying that this is an exception.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 5665. |
| 6044 | Jarkko Kneckt | 184 | 1 | The opportunistic PS seems to suggest that any active mode non-AP STA is added to the opportunistic TWT SP, unless the FILS Discovery or TIM frame at the beginning of the opportunistic TWT SP indicate that the STA will not get service. In page 184L1 there is a contradicting statement. | Please modify the statement in the P184L1. The AP may include AID of the STA in power save mode only if it has established a membership to a broadcast TWT. The active mode STAs may be triggered at any time. | Revised –Agree in principle. The correct statement is to specify that the STA is in awake state because the STA can be a PS STA but awake and that would also be okay.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 6044. |
| 7189 | kaiying Lv | 184 | 14 | Whether a TWT is implicit or not is indicated by implicit subfield in request type field. Please change "Otherwise, it shall set the Trigger field to 0 to indicate an implicit TWT." to "otherwise it shall set the Trigger field to 0 to indicate it is an implicit TWT with no trigger." | As in comment | Revised –Agree with comment. Proposed resolution accounts for the suggested change and is editorially changed to be inline with other CIDs that are targeting the same sentence.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7189. |
| 7398 | Laurent Cariou | 184 | 14 | In a trigger-enabled SP, it is not clear if all STAs have to be triggered or not. It seems not, so the behavior of the STA and APs are not clear. | Same as comment | Revised –The AP is expected to schedule those STAs that are in awake state. Proposed resolution clarifies this aspect.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7398. |
| 7399 | Laurent Cariou | 184 | 52 | Description of TWT Flow Identifier subfield equal to 3 is missing | Provide description for it | Revised –Agree in principle. Proposed resolution is to add a sentence pointing out where the normative behavior for this case is defined. TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7399. |
| 7629 | Liwen Chu | 184 | 11 | "Alternate TWT when the periodic TWT is being modified"This should be removed since TWT Information provide better solution. | As in comment | Rejected –The Alternate TWT command is being used by the TWT scheduling AP to indicate that the schedule for that particular broadcast TWT is being modified, and is part of the beacon signaling (broadcast). TWT Information frames indicate a temporary suspension, or modification of the next TWT schedule, which is not a long term solution. Also TWT information frames are action (ack) frames, so cannot be sent in broadcast.  |
| 7630 | Liwen Chu | 184 | 14 | Change "itshall set the Trigger field to 0 to indicate an implicit TWT." to "itshall set the Trigger field to 0 to indicate an non Trigger-enabled TWT." | As in comment | Revised –Agree with comment. Proposed resolution accounts for the suggested change and is editorially changed to be inline with other CIDs that are targeting the same sentence.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7630. |
| 7631 | Liwen Chu | 184 | 42 | It should be TWT scheduled STA here. For TWT scheduling STA, there is no restriction about the types of frames to be transmitted. | As in comment | Revised –Agree with the comment. That there is no restriction on the types of frames transmitted by the TWT scheduling STA is also described in Table 9-262k1 (obviously there are requirements in terms of Triggers but that is already defined as part of the normative behavior of this sublcause). Proposed resolution is to remove that sentence as this subclause describes behavior of TWT scheduling STA.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7631. |
| 7632 | Liwen Chu | 184 | 42 | For Flow ID 3, whether random RU can be allocated in UL MU is missing. Add it. | As in comment | Revised -- Flow ID 3 has the same requirement as Flow ID 0 when it comes to random RU allocations in a Trigger frame transmitted. Proposed resolution clarifies this by adding Flow ID 3 to the normative behavior.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7632. |
|  |  |  |  |  |  |  |
| 8132 | Matthew Fischer | 184 | 38 | Table reference is incorrect | Change 9-248l1 to 9.262kl maybe? | Accepted (with certainty) |
| 8595 | Sheng Sun | 184 | 20 | "Trigger-enabled TWT SP" need to be defined | as in comment | Revised –Proposed resolution is to explicitly add trigger-enabled TWT SP where the Trigger field is set to 1 in the preceding paragraph that defines the trigger-enabled TWT. TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 8595. |
| 9313 | Tomoko Adachi | 185 | 19 | AM is not defined as an acronym. It seems to be used for "active mode". | Change "AM" in page 185 line 19 to "active mode". | Revised –Actually that term is not needed since the delivery does not depend on the power mode of the STA, since the STA is supposed to be in awake state for the duration of the TWT SP. Proposed resolution is to remove the AM qualifier, which is identical behavior defined for the individual TWT counterpart.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 9313. |
| 9979 | Yuchen Guo | 185 | 23 | In the case of broadcast TWT, TWT scheduled STAs do not know which Beacon frame contains a TWT IE, hence they have to read every Beacon in order not to miss any TWT IE, which is not power efficient | Devise a scheme for TWT scheduled STAs to receive Beacon frames for the TWT IEs | Rejected –There is already a scheme where the TWT scheduled STAs negotiate the TBTT and the intervals between the TBTTs at which the STAs wake up to receive Beacons that contains a broadcast TWT element. Please refer to 27.7.3.4 (Negotiation of wake TBTT and listen interval). |
| 5084 | Der-Zheng Liu | 185 | 16 | To remove one of double dots. | An unannounced TWT SP, without following the rules in 11.2.2.2.6 (AP operation during the CP) | Revised –The crossreferences are wrong (extra 2), and need to be fixed. Proposed resolution is to fix the three ocurrences.TGax Editor: Replace 11.2.2.2.6 with 11.2.2.6 throughout the draft (including 11.2.2.2..6). |
| 5664 | Guoqing Li | 185 | 18 | It is better to spell out AM as active mode | spell out "AM" | Revised –The proposed resolution is the same as for CID 9313 that removes AM from that portion of the spec.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 5664. |
| 9576 | Yonggang Fang | 183 | 57 | "The TWT scheduled STA may include a TWT element ...." is to describe the behavior of TWT scheduled STA. It should not be in the "Rule for TWT scheduling STA section. | Move this sentence to 27.7.3.3 | Revised –Agree with the comment. Proposed resolution is to remove the sentence as this behavior does not belong in this subclause.TGax editor: Remove the following sentence from 27.7.3.2:“*A TWT scheduled STA may include a TWT element with the Wake TBTT Negotiation subfield set to 1 in (Re)Association Request frames.*” |
| 10280 | Yusuke Tanaka | 184 | 17 | "of" may be needed between "transmission" and "a Trigger". L25, neither. | Add "of". | Rejected –The current sentence is correct as it indicates the schedule for transmission. Adding “of” is incorrect. Quoting the sentence under discussion:*“The TWT scheduling AP shall schedule for transmission a Trigger frame addressed to one or more TWT scheduled STAs during a trigger-enabled TWT SP.”* |
| 7635 | Liwen Chu | 185 | 42 | The behavior of the scheduling AP is not complete. Add the following rule: an AP shall not incude Per STA Info of a STA in a TWT SP which is announced in a Beacon whose TBTT is not the STA's wake TBTT. | As in comment | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 7635. |
| 4847 | Alfred Asterjadhi | 184 | 2 | Too limited. The AP should not include the AID of the STA in the Trigger frame in certain cases, but in other cases it could, e.g., the STA is in AM mode, etc. | As in comment. | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/0683r1 under all headings that include CID 4847. |

**Discussion: *None.***

* Rules for TWT scheduling AP

**TGax Editor: *Change the paragraph below as follows (#CID 4845):***

A TWT scheduling AP may include a broadcast TWT element in a Beacon frame that is scheduled at a TBTT (see 11.1.3.2 (Beacon generation in non-DMG infrastructure networks)). The TWT scheduling AP shall include one or more TWT parameter sets in the TWT element, and each TWT parameter set may indicate a periodic occurrence of TWTs. The TWT scheduling AP shall set the NDP Paging Indicator subfield to 0, the Broadcast subfield to 1, the Implicit subfield to 1, the Wake TBTT Negotiation subfield to 0*(#4845)* and the Responder PM Mode subfield to 0 in the TWT element (see 10.43.7 (TWT Sleep Setup)). Each TWT parameter set specifies the TWT parameters of a specific broadcast TWT that are valid within a broadcast TWT SP. Each specific broadcast TWT is identified as indicated in 27.7.3.1 (General). Individual STAs may have membership in broadcast TWTs as the result of negotiation with a TWT scheduling AP as described in 27.7.3.1 (General) *(#4845)*.

**TGax Editor: *Remove the sentence below as follows (#CID 9576):***

*(#9576)*A TWT scheduling AP may include a TWT element with the Broadcast subfield set to 1 in (Re)Association Response frames.

The TWT scheduling AP sets the TWT parameters of each TWT parameter set as described below.

The TWT scheduling STA shall set the TWT Request subfield to 0 and the TWT Setup Command subfield to Accept TWT, except that it may set the TWT Setup Command subfield to:

* Reject TWT when the periodic TWT is being terminated or,
* Alternate TWT when the periodic TWT is being modified

**TGax Editor: *Change the paragraphs below as follows (#CID 8595, 7630, 7189, 5663, 7398, 6044, 7635, 4847):***

The TWT scheduling AP shall set the Trigger field to 1 to indicate a trigger-enabled TWT and trigger-enabled TWT SP*(#8595)*. Otherwise, it shall set the Trigger field to 0 to indicate that it is not a trigger-enabled*(#7630, 7189, 5663)* TWT.

The TWT scheduling AP shall schedule for transmission a Trigger frame addressed to one or more TWT scheduled STAs expected to be in awake state during a trigger-enabled TWT SP. Theis in awake state, or with that Broadcast TWT ID or has indicated to receive the Beacon, as defined in 27.7.3.4 (Negotiation of wake TBTT and wake interval), preceding the beacon interval that contains this TWT SP *(#7398, 6044, 7635, 4847)*

**TGax Editor: *Change the paragraph and note below as follows (#CID 4848, 4849):***

The TWT scheduling AP that intends to transmit additional Trigger frames during a trigger-enabled TWT SP shall set the Cascade Indication field of the Trigger frame to 1 to indicate that it will transmit another Trigger frame within the same TWT SP. The TWT scheduling AP shall set the Cascade Indication 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 trigger-enabled TWT SP*(#4848)*.

NOTE 1—The TWT scheduling AP is not required to schedule for transmission a Trigger frame for the TWT scheduled STA when the broadcast TWT is not a trigger-enabled TWT or when the TWT scheduled STA has sent an OMI A-Control field that has the UL MU disable bit equal to 1 (see 27.8 (Operating mode indication)).

NOTE 2—The Trigger frame can also be an UMRS Control field 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*(#4849)*.

The TWT scheduling AP shall set the Flow Type field to 1 to indicate an unannounced TWT. Otherwise, it shall set the Flow Type field to 0 to indicate an announced TWT.

**TGax Editor: *Change the paragraph below as follows (#CID 4850):***

The TWT scheduling AP should schedule delivery of DL BUs during unannounced TWT SPs for TWT scheduled STAs that have declared to be awake during that beacon interval*(#4850)*.

**TGax Editor: *Change the paragraph below as follows (#CID 8132):***

The TWT scheduling AP shall set the TWT Flow Identifier field according to Table 9.262k1 (TWT Flow Identifier field for a broadcast TWT element) *(#8132)*.

**TGax Editor: *Change the paragraph below as follows (#CID 7631, 7632, 7399):***

*(#7631)*A Trigger frame transmitted during a broadcast TWT SP whose TWT parameter set has the TWT Flow Identifier subfield equal to 0 or 3*(#7632)* may contain zero or more random RU (see 27.5.2.6 (UL OFDMA-based random access)). A Trigger frame transmitted during a broadcast TWT SP whose TWT parameter set has the TWT Flow Identifier subfield equal to 1 shall contain no random RU (see 27.5.2.6 (UL OFDMA-based random access)). A Trigger frame transmitted during a broadcast TWT SP whose TWT parameter set has the TWT Flow Identifier subfield equal to 2 shall contain at least one random RU (see 27.5.2.6 (UL OFDMA-based random access)). The TWT scheduling AP sends a TIM frame or FILS Discovery frame at the start of a broadcast TWT SP whose TWT parameter set has the TWT Flow Identifier subfield equal to 3 (see 27.14.3 (Opportunistic power save in congested environment)).*(#7399)*

The TWT scheduling AP shall set the TWT field to the TSF timer [4: 19] at which the first TWT is scheduled for this TWT parameter set.

The TWT scheduling AP shall include a nonzero value for the TWT wake interval in the TWT Wake Interval Exponent and TWT Wake Interval Mantissa fields for a periodic TWT and a zero value for an aperiodic TWT.

The TWT parameters are valid for each successive TWT of the periodic TWT or for the only TWT of the aperiodic TWT.

The TWT scheduling AP may set the TWT Protection field to 1 to indicate that TXOPs within the TWT SP shall be initiated with a NAV protection mechanism defined in 10.3.2.4 (Setting and resetting the NAV), 10.3.2.8a (MU-RTS/CTS procedure), or CTS-to-self as described in 10.3.2.13 (NAV distribution); otherwise it shall set it to 0.

**TGax Editor: *Change the paragraph below as follows (#CID 9313, 5664, 5084, 5665, 4851):***

A TWT scheduling AP that receives a PS-Poll or an APSD trigger frame from a TWT scheduled STA during an announced TWT SP shall follow the rules defined in 11.2.2.6*(#5084)* (AP operation during the CP) to deliver buffered BUs to the STA except that it may deliver multiple buffered BUs as defined here*(#5665)*. A TWT scheduling AP may deliver multiple buffered BUs to the TWT scheduled STA during:

* An announced TWT SP, without following the rules in 11.2.2.6*(#5084)* (AP operation during the CP) as long as the BU delivery does not exceed the duration of the TWT SP and the PS STA sending the QoS Null frame does not follow APSD.
* An unannounced TWT SP, without following the rules in 11.2.2.6*(#5084)* (AP operation during the CP) as long as the BU delivery does not exceed the duration of the TWT SP*(#9313, 5664)*.

NOTE—The TWT scheduling AP can deliver the buffered BUs in an A-MPDU under a BlockAck agreement. The TWT scheduling AP can exceed the duration of the TWT SP if the TWT scheduled STA is in Active mode.*(#9313, 5664)*

A TWT scheduling AP should indicate Alternate TWT or Reject TWT in the TWT Command Setup field of the broadcast TWT element for as many DTIM periods as needed to exceed the longest interval any STA is expected to not receive Beacon frames either when:

* The TWT parameters of a periodic TWT have changed, or
* The periodic TWT specified by that TWT parameter set is terminated.

A change in the TWT parameter set occurs in a subsequent DTIM Beacon frame.