IEEE P802.11
Wireless LANs

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| Comment resolutions for 10.22.2.6-9 |
| Date: 2018-01-05 |
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Abstract

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

* 11051, 11052, 12086, 12446, 12448, 12449, 12450, 12788, 12789, 13733 (10 CIDs)

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: CIDs 12086 and CID 12450 are deferred to tomorrow (follow up with Yongho, liwen and Kiseon on the normative behaviour. Some editorials 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** |
| 11051 | Adrian Stephens | 199.48 | "thefragment is not a dynamic fragment" - how is this condition known? Is it a property of the frame? | Replace condition with specific values of specific fields in the frame, or a reference to the subclause that describes the process of dynamic fragmentation.Ditto throughout this list. | Revised –Agree in principle with the comment. A fragment that is generated using the procedure defined in 10.5 (MPDU fragmentation) is a non-dynamic fragment, while a fragment that is generated using the procedures define in 27.3 (Fragmentation and defragmentation) is a dynamic fragment. Proposed resolution is to add a reference to these subclauses in the first instances of the terms.TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 11051. |
| 11052 | Adrian Stephens | 200.08 | "where these fit within the TXOP limit and it is only the response" -- this is awkward.Use of "where" to establish a condition is something TGmc tried to avoid. "these" followed by "it" creates surprise, because they refer to different antecedents.Also there are lots of 'and' and 'or', and the logic is not clear. | Reword with indented list: "Transmission of one of the following sequences provided the sequence fits within the TXOP limit and it is only the response to the sequence and the immediately precedingSIFS that causes the TXOPlimit to be exceeded:-- an HE NDP Announcement frame and NDP,-- an HE NDP Announcement frame and NDP and BRP Trigger frame-- transmission of a BRP Trigger frame" | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested changes.TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 11052. |
| 12086 | Jinsoo Ahn | 200.57 | "the most recent NAV update was due to aninter-BSS frame", Actually "regular NAV" is defined and it includes more NAVs than the NAV set by inter-BSS frame. | If the words are used intentinally, define the case that the NAV is set by a frame that cannot be idenfied as intra-BSS or inter-BSS. If it is not intended, use terms of "intra NAV" and "regular NAV" which are defined in 27.2.4. | Revised –The HE STA only supports two NAVs, intra-BSS NAV and regular NAV (frames that cannot be determined as neither intra- nor inter- fall under the regular NAV operation).Proposed resolution clarifies this aspect. TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 12086. |
| 12446 | Liwen Chu | 197.52 | If HE NDPA and NDP is defined as a frame exchange, the following issues exist:1, it contradict with the previous bullet.2, if the following BRP Trigger transmission is not successful is not successful, the beamformer can retransmit the Trigger without backoff. | Change to "-- an HE NDP Announcement frame followed after SIFS by an HE NDP where HE NDP is followed after SIFS by a BRP Trigger frame, and the BRP Trigger is followed after SIFS by an HE TB PPDU containing one or more HE Compressed Beamforming And CQI frames, or" | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change (accommodated some editorial suggestions).TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 12446. |
| 12448 | Liwen Chu | 199.01 | Add the following bullet "Any required response" | As in comment | Rejected –This is already covered by bullet b) in P199L14:b) any required acknowledgments  |
| 12449 | Liwen Chu | 200.05 | the HE sounding is allowed in same TXOP. So change the last bullet to:Transmission of an HE NDP Announcement frame and NDP or transmission of an HE NDPAnnouncement frame and NDP and BRP Trigger frame,where these fit within the TXOP limit and it is only the response and the immediately precedingSIFS that cause the TXOP limit to be exceeded. | As in comment | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change while merging the proposed change with those of CID 11502.TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 12449. |
| 12450 | Liwen Chu | 200.51 | Two issues with the text:1, this is not approprite normative hehavior description.2, When it applies to single-TID STA, additionalrequirement to NAV timer is needed. | Changethe text per the comment. | Revised –Agree in principle with the first issue of the comment (resolving it by specifying as a should behavior). Not sure what the second issue has anything to do with the NAV update rules. **Actually, not sure what a Single-TID STA is. Need to check with Liwen what the issue number 2 is.** TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 12450. |
| 12788 | Mark RISON | 200.36 | It should be made clear a Trigger frame cannot cause the TXOP limit to be exceeded, except for BRP | At the end of the "NOTE---The TXOP limit is not exceeded for the following situations:" list add a bullet "Transmission of a Trigger frame, other than a BRP Trigger frame, where it or the response does not fit within the TXOP limit" | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 12788. |
| 12789 | Mark RISON | 199.52 | There should be no exception for A-MSDUs re TXOP limit, as the STA should not aggregate if it will exceed the TXOP limit | Delete "or A-MSDU" at 199.53, 199.55, 199.58 and "/A-MSDU" at 200.29, 200.30 | Accepted |
| 13733 | Woojin Ahn | 199.40 | A TXOP holder may exceed the TXOP limit for retransmission of an MPDU, not in an A-MPDU consisting of more than one MPDU. However If the retransmitted MPDU is not the same as the initailly transmitted MPDU, the TXOP limit shall not be exceeded. Note: A retransmitted dynamic fragment may have different size under a certain condition. | A TXOP holder may exceed the TXOP limit for retransmission of an MPDU unless the size of the MPDU is the same as the initially transmitted MPDU | Revised –Agree in principle with the comment. Proposed resolution clarifies this aspect. TGax editor to make the changes shown in 11-18/0040r1 under all headings that include CID 13733. |

**Discussion: *None.***

* Sharing an EDCA TXOP

Change the 1st three paragraphs as follows:

This mode applies only to an AP that supports DL~~-~~MU-MIMO or DL OFDMA(#9239). The AC associated with the EDCAF that gains an EDCA TXOP becomes the primary AC. TXOP sharing is allowed when primary AC traffic is transmitted in a VHT MU PPDU or an HE MU PPDU and resources permit traffic from secondary ACs to be included, targeting up to four STAs if it is transmitted in a(#6530) VHT MU PPDU. The inclusion of secondary AC traffic in a VHT MU PPDU shall not increase the duration of the VHT MU PPDU beyond that required to transport the primary AC traffic. The inclusion of secondary AC traffic in an HE MU PPDU is described in 10.22.2.7 (Multiple frame transmission in an EDCA TXOP)(#9860). If a destination in a VHT MU PPDU is targeted by frames in the queues of both the primary AC and at least one secondary AC, the frames in the primary AC queue shall be transmitted to the destination first, among a series of downlink transmissions within a TXOP. The decision of which secondary ACs and destinations are selected for TXOP sharing, as well as the order of transmissions, are implementation specific and out of scope of this standard. The inclusion of secondary AC traffic in an HE MU PPDU(#6531) shall not cause the TXOP limit of the primary AC to be exceeded.

When sharing, the TXOP limit that applies is the TXOP limit of the primary AC.

NOTE—An AP can protect an immediate response by preceding the VHT MU PPDU or the HE MU PPDU (which might have TXVECTOR parameter NUM\_USERS > 1) with an RTS/CTS exchange or an MU-RTS/CTS exchange or a CTS-to-self transmission.

* Multiple frame transmission in an EDCA TXOP

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 12446):***

Change the 1st paragraph as follows:

A frame exchange, in the context of multiple frame transmission in an EDCA TXOP, may be one of the following:

* A frame not requiring immediate acknowledgment (such as a group addressed frame or a frame transmitted with an acknowledgment policy that does not require immediate acknowledgment) or an A-MPDU containing only such frames
* A frame requiring acknowledgment (such as an individually addressed frame transmitted with an acknowledgment policy that requires immediate acknowledgment) or an A-MPDU containing at least one such frame, followed after SIFS by a corresponding acknowledgment frame
* A frame soliciting an HE TB PPDU (such as a Trigger frame or a frame carrying an UL MU Response Scheduling A-Control subfield) or an A-MPDU containing at least one such frame, followed after SIFS by an HE TB PPDU(#7668)
* Either
* a VHT NDP Announcement frame followed after SIFS by a VHT NDP followed after SIFS by a PPDU containing one or more VHT Compressed Beamforming frames, or
* a Beamforming Report Poll frame followed after SIFS by a PPDU containing one or more VHT Compressed Beamforming frames
* an HE NDP Announcement frame followed after SIFS by an HE NDP followed after SIFS by a PPDU containing one or more HE Compressed Beamforming And CQI frames, or
* an HE NDP Announcement frame followed after SIFS by an HE NDP followed after SIFS by a BRP Trigger frame followed by an HE TB PPDU containing one or more HE Compressed Beamforming And CQI frames, *(#12446)* or
* a BRP Trigger frame followed after SIFS by an HE TB PPDU containing one or more HE Compressed Beamforming And CQI frames(#7669, #7906, #9694)

A DL MU PPDU may carry MPDUs addressed to multiple recipients, hence multiple frame exchanges are performed simultaneously. If at least one of those frame exchanges requires an immediate response (i.e., the AP includes at least one Trigger frame or UMRS Control field(#Ed)) and if the AP receives an immediate response with at least one correct MPDU from at least one of the solicited STAs, the rules in this subclause apply.

Change the paragraphs 7 - 9 as follows:

If a TXOP is protected by an RTS or CTS frame carried in a non-HT or a non-HT duplicate PPDU, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of a PPDU as follows:

* To be the same or narrower than the(#6532) RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT of the last received CTS frame in the same TXOP, if the RTS frame with a bandwidth signaling TA and TXVECTOR parameter DYN\_BANDWIDTH\_IN\_NON\_HT set to Dynamic has been sent by the TXOP holder in the last RTS/CTS exchange.
* Otherwise, to be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH of the RTS frame that has been sent by the TXOP holder in the last RTS/CTS exchange in the same TXOP.

If a TXOP is protected by an MU-RTS or CTS frame carried in a non-HT or a non-HT duplicate PPDU, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of a PPDU as follows:

* To be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH of the MU-RTS Trigger frame(#9481) that has been sent by the TXOP holder in the last MU-RTS/CTS exchange in the same TXOP, if the RU Allocation subfields of the MU-RTS Trigger frame(#9481) for all intended receivers(#6534) are equal to a value that corresponds to the channel bandwidth that is indicated in(#4833) the BW subfield in the Common Info field of the MU-RTS Trigger frame(#9481).
* Otherwise, to be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH of the preceding PPDU that it has transmitted in the same TXOP.

If there is no RTS/CTS or MU-RTS/CTS exchange in non-HT duplicate format in a TXOP, and the TXOP includes at least one non-HT duplicate frame exchange that does not include a PS-Poll, then the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a PPDU sent after the first non-HT duplicate frame that is not a PS-Poll to be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the initial frame in the first non-HT duplicate frame exchange in the same TXOP.

If there is no non-HT duplicate frame exchange in a TXOP, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of a non-initial PPDU to be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH of the preceding PPDU that it has transmitted in the same TXOP, subject to the following constraints:

* If the preceding PPDU is an HE DL MU PPDU with preamble puncture, the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH of the non-initial PPDU to a value whose corresponding 20 MHz channels are within a set of 20 MHz channels where pre-HE modulated fields of the preceding PPDU are located.
* If the non-initial PPDU is an HE DL MU PPDU with preamble puncture, the TXOP holder shall set the TXVECTOR parameter RU\_ALLOCATION of the non-initial PPDU to a value whose corresponding RU is within a set of 20 MHz channels where pre-HE modulated fields of the preceding PPDU are located.(#9600)
* TXOP limits

Change the subclause as follows:

The duration of a TXOP is the time a STA obtaining a TXOP (the TXOP holder) maintains uninterrupted control of the medium, and it includes the time required to transmit frames sent as an immediate response to TXOP holder transmissions. The TXOP holder shall, subject to the exceptions below, ensure that the duration of a TXOP does not exceed the TXOP limit, when nonzero.

The TXOP limits are advertised by the AP in the EDCA Parameter Set element in Beacon and Probe Response frames transmitted by the AP.

A TXOP limit of 0 indicates that the TXOP holder may transmit or cause to be transmitted (as responses) the following within the current TXOP:

* One of the following at any rate, subject to the rules in 10.7 (Multirate support)
* One or more SU PPDUs carrying fragments of a single MSDU or MMPDU
* An SU PPDU or a VHT MU PPDU or an HE MU PPDU or an HE TB PPDU carrying a single MSDU, a single MMPDU, a single A‑MSDU, or a single A-MPDU
* A VHT MU PPDU or an HE MU PPDU carrying A-MPDUs to different users (a single A-MPDU to each user)
* A QoS Null frame or PS-Poll frame
* A(#9862) Basic Trigger frame, BSRP Trigger frame or BQRP Trigger frame(#5968)
* An HE TB PPDU carrying A-MPDUs from different users (a single A-MPDU from each user)(#9861)
* Any required acknowledgments
* Any frames required for protection, including one of the following:
* An RTS/CTS or MU-RTS/CTS exchange
* CTS to itself
* Dual CTS as specified in 10.3.2.8 (Dual CTS protection)
* Any frames required for beamforming as specified in 10.30 (Sounding PPDUs), 10.34.5 (VHT sounding protocol), 27.6 (HE sounding protocol)(#7670) and 10.38 (DMG beamforming).
* Any frames required for link adaptation as specified in 10.31 (Link adaptation) and 27.13 (Link adaptation using the HE variant HT Control field).(#7881, #9346)
* Any number of BlockAckReq, MU-BAR Trigger or Multi-TID BlockAckReq or a GCR MU-BAR Trigger frames(#10252)

NOTE 1—This is a rule for the TXOP holder. A TXOP responder need not be aware of the TXOP limit nor of when the TXOP was started.

NOTE 2—This rule prevents the use of RD when the TXOP limit is 0.

When dot11OCBActivated is true, TXOP limits shall be 0 for each AC.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11051, 11052, 12449, 12789, 13733):***

The TXOP holder may exceed the TXOP limit only if it does not transmit more than one Data or Management frame in the TXOP, and only for the following situations:

* Retransmission of an MPDU, not in an A-MPDU consisting of more than one MPDU, wherein the size of the retransmitted MPDU is the same as the initially transmitted MPDU*(#13733)*
* Initial transmission of an MSDU under a block ack agreement, where the MSDU is not in an AMPDU consisting of more than one MPDU and the MSDU is not in an A-MSDU
* Transmission of a Control MPDU or a QoS Null MPDU, not in an A-MPDU consisting of more than one MPDU
* Initial transmission of a non-dynamic fragment of an MSDU or MMPDU (see 10.5 (MPDU fragmentation)), if a previous fragment of that MSDU or MMPDU was retransmitted *(#11051)*
* Transmission of a non-dynamic fragment of an MSDU or MMPDU fragmented into 16 fragments (#6961)*(#11051)*
* Transmission of the 16th dynamic fragment of an MSDU or MMPDU (see 27.3 (Fragmentation and defragmentation))(#6189)*(#11051, 12789)*
* Initial transmission of the first dynamic fragment of an MSDU or MMPDU, where the size of the first fragment is equal to the minimum fragment size specified by the receiver STA and the MSDU or MMPDU is not in an A-MPDU consisting of more than one MPDU(#6189)*(#11051, 12789)*
* Transmission of an A-MPDU consisting of the initial transmission of a single MPDU not containing an MSDU and that is not an individually addressed Management frame
* Transmission of a group addressed MPDU, not in an A-MPDU consisting of more than one MPDU
* Transmission of a null data packet (NDP)
* Transmission of a VHT NDP Announcement frame and NDP or transmission of a Beamforming Report Poll frame, where these fit within the TXOP limit and it is only the response and the immediately preceding SIFS that cause the TXOP limit to be exceeded.
* Transmission of one of the following sequences, provided that the sequence fits within the TXOP limit and it is only the response and the immediately preceding SIFS that causes the TXOP limit to be exceeded:
1. An HE NDP Announcement frame and NDP,
2. An HE NDP Announcement frame and NDP and BRP Trigger frame,
3. A BRP Trigger frame.(#6189)*(#11052, 12449)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11051, 12788, 12789):***

Except as described above, a STA shall fragment an individually addressed MSDU or MMPDU so that the initial transmission of the first fragment does not cause the TXOP limit to be exceeded.

NOTE—The TXOP limit is not exceeded for the following situations:

* Initial transmission of an MPDU containing an unfragmented though fragmentable (see 10.2.7 and 27.3 (Fragmentation and defragmentation)) MSDU/MMPDU(#6189)
* Initial transmission of the first non-dynamic fragment of a fragmented MSDU/MMPDU, except ~~for an~~ when the MSDU/MMPDU is fragmented into 16 fragments*(#11051)*
* Initial transmission of an A-MSDU
* Initial transmission of a non-dynamic fragment of a fragmented MSDU/MMPDU, if no previous fragment of that MSDU/ MMPDU was retransmitted, except ~~for an~~ when the MSDU/MMPDU is fragmented into 16 fragments*(#11051)*
* Initial transmission of a dynamic fragment of a fragmented MSDU/MMPDU, except for, either the first dynamic fragment of a fragmented MSDU/MMPDU using the minimum fragment size specified by the receiver STA, or the 16th dynamic fragment of a fragmented MSDU/MMPDU(#6189)*(#11051, 12789)*
* Transmission of an A-MPDU consisting of a single MPDU containing an A MSDU or individually addressed Management frame, unless this is a retransmission of that MPDU
* Transmission of an A-MPDU consisting of more than one MPDU, even if some or all of the MPDUs are retransmissions
* Transmission of a Trigger frame, other than a BRP Trigger frame, where either the Trigger frame or its response does not fit within the TXOP limit*(#12788)*

If the TXOP holder exceeds the TXOP limit, it should use as high a PHY rate as possible to minimize the duration of the TXOP.

The duration of a TXOP for a mesh STA that has dot11MCCAActivated true shall not exceed the time between the start of the TXOP and the end of the current MCCAOP reservation.

NOTE—The rules in this subclause also apply to priority-downgraded MSDUs and A-MSDUs (see 10.22.4.2).

When the Duration field value in the MAC header of an HE TB PPDU is set to 0, the HE TB PPDU shall not include any frames that solicit a control response frame from the AP.

* Truncation of TXOP

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 12450, 12089):***

Insert the following at the end of the subclause:

An HE STA that receives a CF-End frame should reset its NAV unless either of following conditions are met:(#6535)

* The received CF-End frame is an inter-BSS frame and the most recently updated NAV was due to an intra-BSS frame (see 27.2.4 (Updating two NAVs)).
* The received CF-End frame is an intra-BSS frame and the most recently updated NAV was due to an inter-BSS frame or due to a frame that cannot be identified as inter-BSS frame or as intra-BSS frame (see 27.2.4 (Updating two NAVs)).*(#12450, 12089)*

NOTE 1—For HE STAs with two NAVs, the TXOP truncation rule applies to each NAV separately.