IEEE P802.11  
Wireless LANs

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| Comment Resolution on 10.22.2 and 10.22.4 | | | | |
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Abstract

This submission proposes resolutions of comments received from TGax comment collection (TGax Draft 0.1).

* CIDs: 2468, 2470, 2448, 2450, 2451, 809 (6 CID)

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 TGah 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** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 2468 | 46.19 | 10.22.2.2 | 802.11 base specification is saying the following: "In addition, the backoff procedure may be invoked for an EDCAF when the transmission of the MPDUs in a noninitial PPDU by the TXOP holder fails." In understanding of 802.11 base specification, any transmission failure by the non-TXOP holder (such as, RD operation and UL MU operation) shall not cause to invoke a backoff procedure. Please clarify whether the the backoff procedure is invoked for an EDCAF when the transmission of the HE trigger-based PPDU by the non-TXOP holder fails. | As per comment | Revised-  Agree in principal.  In July 2016 TGax F2F meeting, the following MU Motion was approved.  •Move to add the following to the next revision of the TG draft:  –Insert the following at the end of 10.22.2.2:  When an HE STA successfully receives the corresponding acknowledgement frame in response to the MPDU sent in HE trigger based PPDU, the backoff for the associated EDCAF resumes the backoff counter countdown  –Insert the following at the end of 10.22.2.2:  When an HE STA does not receive the corresponding acknowledgement frame in response to the MPDU sent in HE trigger based PPDU, the backoff for the associated EDCAF resumes the backoff counter countdown  –Insert the following at the end of 10.22.2.2:  If an HE STA does not successfully receive the corresponding acknowledgement frame in response to the MPDU sent in an HE trigger based PPDU, the short retry counters and long retry counters for the associated EDCAF are not changed  The passed motion already resoved this CID. So, TGax editor does not need any technical changes on TGax Draft. |
| 2470 | 46.37 | 10.22.4.2.3 | 802.11 base specification is saying the following: "If the used\_time value reaches or exceeds the admitted\_time value, the corresponding EDCAF shall no longer transmit QoS Data frames or QoS Null MPDUs using the EDCA parameters for that AC as specified in the QoS Parameter Set element." In understanding of 802.11 base specification, any transmission that is not triggered by the EDCAF (such as, RD operation and UL MU operation) is possible even though the used\_time value reaches or exceeds the admitted\_time value Please clarify whether the HE trigger-based PPDU can be transmitted when the used\_time value reaches or exceeds the admitted\_time value. | As per comment | Revised-  Agree in principal.  Since a contention based admission control procedure is widely commercialized by the Wi-Fi Alliance (e.g., such as WMM-AC certification program), a clarification of an admission control procedure for the HE trigger-based PPDU is needed.  TGax editor makes changes as shown in the as specified in 11-16/1110r0. |
| 2448 | 46.19 | 10.22.2.4 | 802.11 base specification is saying the following: "If a non-VHT STA receives an RTS frame with the RA address matching the MAC address of the STA and the MAC address in the TA field in the RTS frame matches the saved TXOP holder address, then the STA shall send the CTS frame after SIFS, without regard for, and without resetting, its NAV." It assume that the TXOP holder address is a static during a TXOP. But, from the sub-clause 25.5.2.2.2 (Allowed settings of the Trigger frame fields), it is obivous that the previous assumption is broken. "If dot11MultiBSSIDActivated is true and at least two of the Trigger frame recipient STAs are associated with two different BSSIDs, then the TA shall be set to a common address TBD." See the following example: 1) An AP transmits a Trigger frame having TA field equal to a common address (TBD). 2) After receiving the Trigger frame, a STA1 saves the common address as the TXOP holder address. 3) The AP receives the HE trigger-based PPDUs from target STAs. 4) The AP transmits a RTS frame (having TA field equal to a BSSID1) to the STA1. 5) The STA1 can not respond the CTS frame because of its NAV.  Simple solution is to have the following a constraint: During a TXOP, Address 2 field of all control frames sent by a TXOP holder address uses the same address value. It means that, if the first frame of the TXOP holder is transmitted with a common address, all other frames transmitted from the TXOP holder shall have the TA field set to a common address. | As per comment | Revised-  Agree in principal.  During a TXOP, Address 2 field of all control frames sent by a TXOP holder address uses the same address value. It means that, if the first frame of the TXOP holder is transmitted with a common address, all other frames transmitted from the TXOP holder shall have the TA field set to a common address.  TGax editor makes changes as shown in the as specified in 11-16/1110r0. |
| 2450 | 46.19 | 10.22.2.8 | 802.11 base specification is saying the following: "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:" When the TXOP limit is equal to 0, the HE MU PPDU or HE trigger-based PPDU can be transmitted. Change 3rd paragraph of sub-clause 10.22.2.8 (TXOP limits) as the following: ... a) One of the following at any rate, subject to the rules in 10.7 (Multirate support) 1) One or more SU PPDUs carrying fragments of a single MSDU or MMPDU 2) An SU PPDU or a VHT MU PPDU or a HE MU PPDU or a HE Trigger-based PPDU carrying a single MSDU, a single MMPDU, a single A-MSDU, or a single A-MPDU 3) A VHT MU PPDU or a HE MU PPDU carrying A-MPDUs to different users (a single A-MPDU to each user) 4) A QoS Null frame or PS-Poll frame ... c) Any frames required for protection, including one of the following: 1) An RTS/CTS or MU-RTS/CTS exchange 2) CTS to itself 3) Dual CTS as specified in 10.3.2.8 (Dual CTS protection) ... f) Any number of BlockAckReq or MU-BlockAckReq frames | As per comment | Revised-  Agreen in principal.  When the TXOP limit is equal to 0, the HE MU PPDU or HE trigger-based PPDU can be transmitted.  Change 3rd paragraph of sub-clause 10.22.2.8 (TXOP limits) as suggested by the commenter.  TGax editor makes changes as shown in the as specified in 11-16/1110r0. |
| 2451 | 46.19 | 10.22.2.8 | 802.11 base specification is saying the following: "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." When an HE AP is a TXOP holder and it transmits a Trigger frame, the Length information of the Trigger frame should also be aware of the remaining TXOP duration for not exceeding the TXOP limit. And, because the HE trigger-based PPDU solicited by the Trigger frame can request a control response (e.g., Block ACK). The TXOP holder should also maintain uninterrupted control of the medium for a control response of the HE trigger-based PPDU. Change the first paragraph of sub-clause 10.22.2.8 as the following: "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, plus the time required to transmit a control response frame of an HE trigger-based PPDU if the immediate response to TXOP holder is the HE trigger-based PPDU. The TXOP holder shall, subject to the exceptions below, ensure that the duration of a TXOP does not exceed the TXOP limit, when nonzero." | As per comment | Revised-  Agree in principal.  The HE trigger-based PPDU solicited by the Trigger frame should be aware of the remaining TXOP duration.  TGax editor makes changes as shown in the as specified in 11-16/1110r0. |
| 809 | 46.19 | 10.22.2 | Sharing an EDCA TXOP should be applied to DL OFDMA also. (As specified in SFD, "DL-OFDMA may reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.") | Insert the following "10.22.2.6 Sharing an EDCA TXOP This mode applies only to an AP that supports DL-MU-MIMO'/DL-OFDMA'. 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'/HE' MU PPDU and resources permit traffic from secondary ACs to be included, targeting up to four STAs. The inclusion of secondary AC traffic in a VHT'/HE 'MU PPDU shall not increase the duration of the VHT'/HE' MU PPDU beyond that required to transport the primary AC traffic. If a destination 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. 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'/HE' MU PPDU (which might have TXVECTOR parameter NUM\_USERS > 1) with an '(MU-)'RTS/CTS exchange or a CTS-to-self transmission." | Revised-  Agree in principal.  Sharing an EDCA TXOP should be applied to HE MU PPDU as well. (As specified in SFD)  TGax editor makes changes as shown in the as specified in 11-16/1110r0. |

**10.22.2.4 Obtaining an EDCA TXOP**

***TGax editor: modify the last paragraphs of the sub-clause 10.22.2.4 as the following:***

A STA shall save the TXOP holder address for the BSS in which it is associated, which is the MAC address from the Address 2 field of the frame that initiated a frame exchange sequence except when this is a CTS frame, in which case the TXOP holder address is the Address 1 field. If the TXOP holder address is obtained from a Control frame, a VHT STA or an HE STA shall save the nonbandwidth signaling TA value obtained from the Address 2 field. If a non-VHT and non-HE STA receives an RTS frame with the RA address matching the MAC address of the STA and the MAC address in the TA field in the RTS frame matches the saved TXOP holder address, then the STA shall send the CTS frame after SIFS, without regard for, and without resetting, its NAV. If a VHT STA or an HE STA receives an RTS frame with the RA address matching the MAC address of the STA and the nonbandwidth signaling TA value obtained from the Address 2 field in the RTS frame matches the saved TXOP holder address, then the STA shall send the CTS frame after SIFS, without regard for, and without resetting, its NAV. When a STA receives a frame addressed to it that requires an immediate response, except for RTS and Trigger frames (see 25.5.2.4 (UL MU CS mechanism)), it shall transmit the response independent of its NAV. The saved TXOP holder address shall be cleared when the NAV is reset or when the NAV counts down to 0.

***TGax editor: insert the following at the end of the sub-clause 10.22.2.4:***

During an EDCA TXOP, Address 2 field excluding the Individual/Group bit of all control frames sent by a TXOP holder shall be set to the same address value. (#2448)

**10.22.2.6 Sharing an EDCA TXOP**

***TGax editor: modify 1st – 3rd paragraphs of the sub-clause 10.22.2.6 as the following:***

This mode applies only to an AP that supports DL-MU-MIMO or DL-OFDMA (#809). 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 (#809) and resources permit traffic from secondary ACs to be included, targeting up to four STAs if it is transmitted in the VHT MU PPDU (#809). 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 25.10.4 (A-MPDU with multiple TIDs). (#809) If a destination in a VHT MU PPDU (#809) 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. For an HE MU PPDU, the inclusion of secondary AC traffic in the HE MU PPDU shall not cause the TXOP limit of the primary AC to be exceeded. (#809)

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 (#809) (which might have TXVECTOR parameter NUM\_USERS > 1) with an RTS/CTS exchange or an MU-RTS/CTS exchange (#809) or a CTS-to-self transmission.

**10.22.2.8 TXOP limits**

***TGax editor: modify 3rd paragraph of the sub-clause 10.22.2.8 as the following:***

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:

1. One of the following at any rate, subject to the rules in 10.7 (Multirate support)
2. One or more SU PPDUs carrying fragments of a single MSDU or MMPDU
3. An SU PPDU or a VHT MU PPDU or an HE MU PPDU or an HE trigger-based PPDU (#2450) carrying a single MSDU, a single MMPDU, a single AMSDU, or a single A-MPDU
4. A VHT MU PPDU or an HE MU PPDU (#2450) carrying A-MPDUs to different users (a single A-MPDU to each user)
5. A QoS Null frame or PS-Poll frame
6. Trigger frame (#2450)
7. Any required acknowledgments
8. Any frames required for protection, including one of the following:
9. An RTS/CTS or MU-RTS/CTS (#2450) exchange
10. CTS to itself
11. Dual CTS as specified in 10.3.2.8 (Dual CTS protection)
12. Any frames required for beamforming as specified in 10.30 (Sounding PPDUs), 10.34.5 (VHT sounding protocol) and 10.38 (DMG beamforming).
13. Any frames required for link adaptation as specified in 10.31 (Link adaptation)
14. Any number of BlockAckReq or MU-BlockAckReq (#2450) frames

***TGax editor: insert the following at the end of the sub-clause 10.22.2.8:***

When the Duration field value in the MAC header of an HE trigger-based PPDU is set to 0, the HE trigger-based PPDU shall not include any frames that solicit a control response frame from the AP. (#2451)

10.22.4.2 Contention based admission control procedures

10.22.4.2.3 Procedure at non-AP STAs

***TGax editor: modify the sub-clause 10.22.4.2.3 as the following:***

The MPDUExchangeTime equals the time required to transmit the MPDU sequence. For the case of an MPDU transmitted with Normal Ack policy and without RTS/CTS protection, this equals the time required to transmit the MPDU plus the time required to transmit the expected response frame plus one SIFS. Frame exchange sequences for Management frames and the HE trigger-based PPDU (#2470) are excluded from the used\_time update. If the used\_time value reaches or exceeds the admitted\_time value, the corresponding EDCAF shall no longer transmit QoS Data frames or QoS Null MPDUs using the EDCA parameters for that AC as specified in the QoS Parameter Set element. However, a STA may choose to temporarily replace the EDCA parameters for that EDCAF with those specified for an AC of lower priority, if no admission control is required for those ACs.