IEEE P802.11
Wireless LANs

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| 11ax D2.0 Comment Resolution 27.5.3.2.4 10.22.2.7 |
| Date: 2018-01-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Liwen Chu | Marvell |  |  |  |
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Abstract

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

* 11049, 11050, 12446, 12447, 13916.

Revisions:

* .

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** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| 11049 | 197 | 58 | "A DL MU PPDU may carry MPDUs addressed to multiple recipients" -- unnecessary normative verb. This is clear from the definition of MU. There is no need to grant permission here. | Change "may" to "can" | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0074r0 under CID 11049** |
| 11050 | 197 | 61 | "the rules in this subclause apply."What this is really saying is that the rules in the subclause do not apply in certain circumstances. That should not be buried in the middle of the subclause. | Create a clear statement of when the rules in the subclause apply to the top of the subclause. Delete cited para.For example, consider "The rules in this subclause apply to a non-HE QoS STA or an HE STA that <condition>". | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0074r0 under CID 11050** |
| 12446 | 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****Generally agree with the commenter.****TGax editor to make changes in 11-18/0074r0 under CID 12446**  |
| 12447 | 197 | 62 | the rules in this subclause can't be applied to HE DL MU without changes. 11ax defines additional rules. | Change the text per the comment. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0074r0 under CID 12447** |

**10.22.2 HCF contention based channel access (EDCA)**

**10.22.2.2 EDCA backoff procedure**

***TGax editor: change the 2nd paragraph in subclause 10.22.2.2 as follows:***

For the purposes of this subclause, transmission failure of an MPDU is defined as follows:

* After transmitting an MPDU (even if it is carried in an A‑MPDU, as part of a VHT MU PPDU or as part of a HE MU PPDU that is sent using TXVECTOR parameter NUM\_USERS > 1) that requires an immediate response:
* The STA shall wait for a timeout interval of duration aSIFSTime + aSlotTime + aRxPHYStartDelay, starting when the MAC receives a PHY-TXEND.confirm primitive. If a PHY-RXSTART.indication primitive does not occur during the timeout interval, the transmission of the MPDU has failed.
* If a PHY-RXSTART.indication primitive does occur during the timeout interval, the STA shall wait for the corresponding PHY-RXEND.indication primitive to recognize a valid response MPDU (see Annex G) that either does not have a TA field or is sent by the recipient of the MPDU requiring a response. If anything else, including any other valid frame, is recognized, the transmission of the MPDU has failed.
* The nonfinal (re)transmission of an MPDU that is delivered using the GCR unsolicited retry retransmission policy (10.22.2.11.2 (Unsolicited retry procedure))) is defined to be a failure.
* In all other cases, the transmission of the MPDU has not failed.

***TGax editor: change the 4th paragraph and 5th paragraph in subclause 10.22.2.2 as follows:***

The backoff procedure shall be invoked by an EDCAF when any of the following events occurs:

* An MA-UNITDATA.request primitive is received that causes a frame with that AC to be queued for transmission such that one of the transmit queues associated with that AC has now become non-empty and any other transmit queues associated with that AC are empty; the medium is busy on the primary channel as indicated by any of the following:
* physical CS;
* virtual CS;
* a nonzero TXNAV timer value;
* a mesh STA that has dot11MCCAActivated true and a nonzero RAV timer value, and the backoff timer has a value of 0 for that AC.
* The transmission of the MPDU in the final PPDU transmitted by the TXOP holder during the TXOP for that AC has completed and the TXNAV timer has expired, the PPDU doesn’t solicit HE TB PPDU, and the AC was a primary AC. (See 10.22.2.6 (Sharing an EDCA TXOP)).
* The transmission of an MPDU in the initial PPDU of a TXOP fails, as defined in this subclause, the PPDU doesn’t solicit HE TB PPDU, and the AC was a primary AC.
* The transmission attempt collides internally with another EDCAF of an AC that has higher priority, that is, two or more EDCAFs in the same STA are granted a TXOP at the same time.
* The transmission attempt of a STA coordinated by an MM-SME collides internally with another STA coordinated by the same MM-SME (see 11.34 (MMSL cluster operation)), which is indicated to the first MAC entity with a PHY-TXBUSY.indication(BUSY) primitive as response to the PHY-TXSTART.request primitive.
1. The transmission of at least one MPDU in the final PPDU transmitted by the TXOP holder during the TXOP for that AC has completed, the PPDU solicits HE TB PPDU and the TXNAV timer has expired.
2. The transmission of all MPDUs in the initial PPDU of a TXOP fails, as defined in this subclause, and the PPDU solicits HE TB PPDU.

In addition, the backoff procedure may be invoked by an EDCAF when:

1. The transmission by the TXOP holder of an MPDU in a non-initial PPDU of a TXOP fails, as defined in this subclause, and the PPDU doesn’t solicit HE TB PPDU.
2. The transmission by the TXOP holder of all MPDUs in a non-initial PPDU of a TXOP fails, as defined in this subclause, and the PPDU solicits HE TB PPDU.

***TGax editor: change the last two paragraphs in subclause 10.22.2.2 as follows:***

If the backoff procedure is invoked for reason a) above, the value of CW[AC] shall be left unchanged. If the backoff procedure is invoked for reason b) and f) above, the value of CW[AC] shall be reset to CWmin[AC].

If the backoff procedure is invoked for reason c), d), e), g), h) or i) above, or the transmission failure of a non-initial frame by the TXOP holder, the value of CW[AC] shall be updated as follows before invoking the backoff procedure:

* If the QSRC[AC] or the QLRC[AC] has reached dot11ShortRetryLimit or dot11LongRetryLimit respectively, CW[AC] shall be reset to CWmin[AC].
* If dot11RobustAVStreamingImplemented is true and either the QSDRC[AC] or the QLDRC[AC] has reached dot11ShortDEIRetryLimit or dot11LongDEIRetryLimit, respectively, CW[AC] shall be reset to CWmin[AC].
* Otherwise,
* If CW[AC] is less than CWmax[AC], CW[AC] shall be set to the value (CW[AC] + 1) × 2 – 1.
* If CW[AC] is equal to CWmax[AC], CW[AC] shall be left unchanged.

NOTE—An HE STA updates its local MIB variables related to CWmin and CWmax as defined in 10.2.4.2 (HCF con-tention based channel access (EDCA)) and in 27.2.6 (Obtaining an EDCA TXOP for HE non-AP STAs using MU EDCA parameters).

**10.22.2.7 Multiple frame transmission in an EDCA TXOP**

***TGax editor: change the first paragraph in subclause 27.5.3.2.4 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) where HE TB PPDU is optionally followed after SIFS by an acknowledgement
* 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 frames, or
* an HE NDP Announcement frame followed after SIFS by an HE NDP where HE NDP Announcement has a broadcast address in its RA field (#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)

 (#11049, 11050, 12447)

**27.5 MU operation**

**27.5.1 HE DL MU operation**

**27.5.1.1 General**

***TGax editor: add the following paragraph at the end of subclause 27.5.1.1(#11049, 11050, 12447):***

The AP shall follow the EDCA procedure defined in subclause 10.22 and the following additional rules:

* If at least one of those frame exchanges in HE DL MU operation requires an immediate response (i.e., the AP includes at least one Trigger frame or UMRS Control field) and if the AP receives an immediate response with at least one correct MPDU from at least one of the solicited STAs, the frame exchange is successful. If at least one of those frame exchanges in HE DL MU operation requires an immediate response (i.e., the AP includes at least one Trigger frame or UMRS Control field) and if the AP receives no immediate response, the frame exchange is not successful.

The AP follows the MPDU aggregation rules as defined in 27.10 (A-MPDU Operation) which obsoletes the rules in 10.22.2.6 (Sharing an EDCA TXOP).

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| ~~11101~~ | ~~250~~ | ~~30~~ | ~~"parameter is set based on NSYM" -- lazy specification.~~ | ~~Add an equation or reference to a clause where the relationship is defined.~~ |  |
| ~~11711~~ | ~~248~~ | ~~52~~ | ~~the duration of Immediate response is not define~~ | ~~Specify the time needed to receive immediate response. For example, "If an AP does not receive an immediate response within aSIFSTime + aSlotTime + aPHY-RX-START-Delay or this response is not valid,"~~ |  |
| 13916 | 248 | 20 | "If the PPDU contains frames that are not Trigger frames in addition to a Trigger frame, then the AP shall access the medium using the primary AC as defined in 10.22.2.6 (Sharing an EDCA TXOP)."See the below definition of the primary AC in REVmd."primary access category (AC): The AC associated with the enhanced distributed channel access function (EDCAF) that gains channel access."Because the primary AC is a terminology after gaining a channel access, accessing the medium using the primary AC is a nonsense. | Rephrase the wording without using a primary AC. | **Revised****Generally agree with the commenter.** **TGax editor to make changes in 11-18/0074r0under CID 13916** |

Further discussion about subclause 27.5.3.2.4:

Based on the current frame exchange definition, the multiple frame exchange rules defined in 10.22.2.7 can’t be used in UL MU operation: after a frame exchange, additional DL SU/MU frame exchange can be done if the remaining TXOP allows it. If the acknowledgement of HE TB PPDU is a separate frame exchange, the acknowledgement of HE TB PPDU is not considered when deciding whether the following UL MU frame exchange can be done. Propose to combine acknowledgement of HE TB PPDU with Trigger + HE TBPPDU as a single frame exchange.

The first and second paragraphs are not true. When the UL MU frame exchange is successful (as in the first paragraph), the backoff rules in 10.22.2.2 are also used. When the UL MU frame exchange is not successful, the rules in 10.22.2.7 are also used.

**27.5.3.2.4 AP access procedures for UL MU operation**

***TGax editor: change subclause 27.5.3.2.4 as follows (***#13916)***:***

The AP shall follow the EDCA procedure defined in subclause 10.22 and the following additional rules:

* When an AP receives an immediate response with at least one MPDU from at least one STA solicited by a Trigger frame or UMRS Control field, the frame exchange is successful.
* When an AP does not receive an immediate response with at least one MPDU from at least one STA solicited by a PPDU that contains at least one Trigger frame the frame exchange is not successful.
* An AP may use any AC for sending a PPDU that contains only Trigger frames.
* If the PPDU contains frames that are not Trigger frames in addition to a Trigger frame, then the AP follows the MPDU aggregation rules as defined in 27.10 (A-MPDU Operation) which obsoletes the rules in 10.22.2.6 (Sharing an EDCA TXOP).