IEEE P802.11
Wireless LANs

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| CC23 MAC CR Miscellaneous Part 1  |
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Abstract

This submission proposes resolutions of comments received from TGax comment collection 23.
(The proposed change is based on TGax Draft 0.5.)

* CIDs:
* 1920, 2441, 2671 (Sub-clause 25.11)
* 2262, 2396, 2454, 2604, 2605, 1734 (Sub-clause 10.3.2.11)
* 118, 691, 822, 1353 (Sub-clause 9.7.3)

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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| 1920 | 65.27 | 25.11 | Bullet list describes a number of cases where the RU is intended for a group of STAs. However, it does not seem to cover the case where the group consists of a selection of STAs from the BSS. | Describe how to configure STA\_ID\_LIST for cases where an RU is intended for multiple - but not all - STAs in a BSS | Revised- An HE AP can transmit a group addressed M-BA in the HE MU PPDU for multiple STAs (but not all STA in a BSS)But, it is restricted to only one M-BA frame transmission in the HE MU PPDU. Please refer the following submission. <https://mentor.ieee.org/802.11/dcn/16/11-16-1163-00-00ax-concluding-ofdma-m-ba-transmission.pptx>In such case, the STA\_ID\_LIST element is set to a same value which is designated for a case of all STAs in a BSS.TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 2441 | 65.40 | 25.11 | The RTS or CTS frame can be carried in the HE PPDU. And, a STA transmitting an HE RTS or HE CTS PPDU that is addressed to an AP shall not set the TXVECTOR parameter UPLINK\_FLAG to 1.Otherwise, the 3rd party STA can ignore the HE RTS or HE CTS PPDU because it may enter a doze state as specified in 25.13.1 (Intra-PPDU power save for HE non-AP STAs).Change the second paragraph of sub-clause 25.11 as the following:"The Uplink Flag is carried in the TXVECTOR parameter UPLINK\_FLAG of an HE SU PPDU, HE extended range SU PPDU, and HE MU PPDU and is set as follows:--A STA transmitting an HE PPDU that is addressed to an AP and does not contain a control frame shall set the TXVECTOR parameter UPLINK\_FLAG to 1--A STA transmitting an HE PPDU that is addressed to an AP and contains a control frame shall set the TXVECTOR parameter UPLINK\_FLAG to 0" | As per comment | Revised- Agree in principal. The RTS and CTS frames can be carried in the HE PPDU format (e.g., an HE extended range SU PPDU). Also, the TXVECTOR parameter TXOP\_DURATION can be set to all 1s. In such case, for updating the NAV from the MAC header of the RTS and CTS frames, 3rd party STA shall not ignore the RTS or CTS frames carried in the HE PPDU. TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 2671 | 65.60 | 25.11 | A case that the BSS Color subfield is set to 0 is not described. If there's no special case that BSS Color of 0 is defined, the range of BSS Color subfield should be from 0 to 63. | Describe a case that the BSS Color subfield is set to 0, or modifiy the sentence from "... in the range 1 to TBD ..." to "... in the range 0 to 63 ...". | Revised- A case that the BSS Color subfield is set to 0 is described in <https://mentor.ieee.org/802.11/dcn/16/11-16-0862-03-00ax-comment-resolution-on-subclause-25-11.docx>Because 11-16/0862r3 was already approved, TGax editor does not need any change for CID 2671. |

* TXVECTOR parameters STA\_ID\_LIST, UPLINK\_FLAG and BSS\_COLOR for an HE PPDU

***TGax editor: change the sub-clause 25.11 as the following:***

Each element of the TXVECTOR parameter STA\_ID\_LIST identifies the STA or group of STAs that is the recipient of an RU in the HE MU PPDU. If an RU is intended for a single STA, then the STA\_ID\_LIST element for that RU is set to the AID of the STA receiving the PSDU contained in that RU. If an RU is intended for an AP, then the STA\_ID\_LIST contains only one element that is set to the AID of the non-AP STA transmitting the PPDU. If an RU is intended for a group of STAs then the STA\_ID\_LIST element is set as follows:

* For an AP with dot11MultiBSSIDActivated equal to false, if the RU is intended for ~~all~~ more than one STAs in the BSS, the STA\_ID\_LIST element is set to 0
* For an AP with dot11MultiBSSIDActivated equal to true, if the RU is intended for ~~all~~ more than one STAs in any of its BSSs, the STA\_ID\_LIST element is set to partial virtual bitmap value assigned for the group addressed frame (see 9.4.2.6 (TIM element))
* For an AP with dot11MultiBSSIDActivated equal to true, if the RU is intended for ~~all~~ more than one STAs on all its BSSs, the STA\_ID\_LIST element is set to 2047

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The Uplink Flag is carried in the TXVECTOR parameter UPLINK\_FLAG of an HE SU PPDU, HE extended range SU PPDU, and HE MU PPDU and is set as follows:

* A STA transmitting an HE PPDU that is addressed to an AP shall set the TXVECTOR parameter UPLINK\_FLAG to 1, except when the HE PPDU is an an HE extended range SU PPDU with the TXOP Duration field set to all 1s and contains an RTS or CTS frame in which case the STA may set the TXVECTOR parameter UPLINK\_FLAG to 0
* An AP transmitting an HE PPDU that is addressed to a non-AP STA shall set the TXVECTOR parameter UPLINK\_FLAG to 0
* A STA transmitting an HE PPDU in a direct path to a (T)DLS peer STA, or to a member of an IBSS, or to a mesh STA, shall set the TXVECTOR parameter UPLINK\_FLAG to 0

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| 2262 | 44.47 | 10.3.2.11.4 | When a DL ACK of an UL STA is multiplexed in an RU larger than the RU where the UL transmission occurs, AID information in SIG-B of HE MU PPDU cannot calls the multiple DL ACK recipients. | Insert the following at 10.3.2.11.4 line 31."When a Multi-STA BlockACK frame is sent in an OFDMA HE MU PPDU format, AP shall assign an AID for a group of DL ACK recipients temporarily. The temporary AID shall be included in the Trigger Frame that solicits the UL MU PPDU." | Revised- Agree in principal. But, for a group addressed M-BA transmission in the HE MU PPDU, a different solution was already approved as the following: <https://mentor.ieee.org/802.11/dcn/16/11-16-1163-00-00ax-concluding-ofdma-m-ba-transmission.pptx>TGax editor does not need any change for CID 2262. |
| 2396 | 43.11 | 10.3.2.11.4 | The OFDMA BA cannot be sent within EIFS duration in 20MHz bandwidth for MCS0 and Nss=1, even in single user case. Specific rules to transmit BlockAck frames or Multi-STA BlockAck frames need to be determined. | Insert the following sentence in the paragraph as below:When receiving multiple frames from more than one STA that are part of an UL MU transmission (Clause 9.42.2) and that require an immediate acknowledgement, an AP may send multiple BlockAck frames (or ACK frames) in an OFDMA HE MU PPDU or a Multi-STA BlockAck (M-BA) frame. The AID field carries the AID of the STA for which the Per STA Info field is intended. 'If BlockAck or Multi-STA BlockAck frames are transmitted, it should be transmitted using appropriate Ack mechanism with proper MCS and Nss which does not exceed EIFS duration.' Additional conditions to transmit multiple BlockAck frames (or ACK frames) in an OFDMA HE MU PPDU or Multi-STA BlockAck are TBD. | Rejected- Regarding the below proposed wording, “If BlockAck or Multi-STA BlockAck frames are transmitted, it should be transmitted using appropriate Ack mechanism with proper MCS and Nss which does not exceed EIFS duration.”It is an implementation issue.  |
| 2454 | 42.38 | 10.3.2.11.3 | As shown in Table 9-421 and 9-426a, the Block ACK Request frame is present in the A-MPDU. Such A-MPDU can be transmitted in HE MU PPDU.But, the following Trigger based UL MU Ack indication mechanism does not work for the Block ACK Request frame. Because the Block ACK Request frame does not have QoS Control field."A non-AP STA that is the recipient, within a HE MU PPDU, of an MPDU that solicits an immediate response with Ack Policy '01' in QoS Control field, shall send the immediate response according to the scheduling information defined by the UL trigger information that is carried either in the Trigger frame(s) or in MAC header."Please provide the Trigger based UL MU Ack indication mechanism for the Block ACK Request frame that is transmitted in HE MU PPDU.A suggestion is to use the BAR Ack Policy subfield in the BAR Control field in the Block ACK Request frame. | As per comment | Revised- The Block ACK Request (BAR) frame and the MU-BAR frame can not be transmitted togetherPlease refer the following submission. <https://mentor.ieee.org/802.11/dcn/16/11-16-1186-01-00ax-a-mpdu-content-comment-resolution.docx>So, the related text for 10.3.2.10.2 is proposed. TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 2604 | 42.16 | 10.3.2.11.2 | For VHT MU PPDU sent to HE STA, MU-BAR frame can additionally be used for soliciting non-immediate responses. | Modify the text to "Responses to A-MPDUs within a VHT MU PPDU or an HE MU PPDU that are not immediate responses to the VHT MU PPDU or the HE MU PPDU are transmitted in response to explicit BlockAckReq or explicit MU-BlockAckReq frames by the AP.". | Revised- Agree in principal. It is resolved by the CID 1073. Please refer the following submission. <https://mentor.ieee.org/802.11/dcn/16/11-16-1332-03-00ax-some-cids-on-mu-acknowledgement-procedure.docx>. TGax editor does not need any change for CID 2604. |
| 2605 | 42.26 | 10.3.2.11.2 | For VHT MU PPDU sent to HE STA, MU-BAR frame can additionally be used for soliciting non-immediate responses. | Modify the text to "BlockAckRequest or MU-BlockAckRequest frames related to A-MPDUs within a VHT MU PPDU or an HE MU PPDU can be transmitted in a TXOP separate from the one that contained the VHT MU PPDU or the HE MU PPDU.". | Revised- Agree in principal. It is resolved by the CID 1073. Please refer the following submission. <https://mentor.ieee.org/802.11/dcn/16/11-16-1332-03-00ax-some-cids-on-mu-acknowledgement-procedure.docx>. TGax editor does not need any change for CID 2605. |
| 1734 | 44.39 | 10.3.2.11.4 | Figure 10-ax8 is confusing mainly because there is no discussion on how STA will be grouped to multiple M-BA frames. Is there any advantage to this procedure compared to the AP sending a single M-BA frame acking all the transmissions? | Clarify or delete | Revised- An HE AP can’t transmit multiple addressed M-BA frames in the HE MU PPDU. **TGax editor deletes the last paragraph of sub-clause 10.3.2.10.3 as shown the below.** **“An example of a Multi-STA BlockAck frame acknowledgement in an OFDMA HE MU PPDU is given in Figure 10-12e (An example of UL MU transmissions with an immediate OFDMA HE MU PPDU containing****Multi-STA BlockAck frames(#1732)).(#1427)”****And, also remove Figure 10-12e (An example of UL MU transmissions with an immediate OFDMA HE MU PPDU containing Multi-STA BlockAck frames)** |

10.3.2.10.2 Acknowledgement procedure for DL(#1410) MU PPDU in MU format

***TGax editor: change the sub-clause 10.3.2.10.2 as the following:***

A non-AP STA that is the recipient, within an(#2829) HE MU PPDU, of a QoS Data frame or QoS Null frame(#2606) that solicits an immediate response with Ack Policy equal to MU Ack in QoS Control field, of an MU-BAR frame (#2454), or of an MMPDU that solicits an immediate response(#130), shall send the immediate response according to the scheduling information defined by the UL trigger information that is carried either in the Trigger frame(s) or in the(#1402) MAC header. If no valid Trigger frame(s) (see 9.3.1.23 (Trigger frame for-mat))(#130)(#407) or MAC header header (see 9.2.4.6.4.2 (UL MU response scheduling))(#130)(#407) con-taining UL trigger information is received, then the STA shall not respond. An example of UL OFDMA acknowledgement to an HE MU PPDU is shown in Figure 10-12a (An example of an HE MU PPDU trans-mission with an immediate UL OFDMA acknowledgement(#1730)).

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| 118 | 53.40 | 9.7.3 | may/shall statements are not appropriate in clause 9 (where frame formats are defined). I noticed multiple occurrences of them throughout clause 9. Avoid them by replacing "shall" with declarative statement, "may" with "can", and "should" with "smth" throughout clause 9 and add the appropriate normative behavior statements in their respective subclauses in 10/11 or 25. Also if there are additional rules these are not to be defined here but rather in subclause 10 (under A-MPDU operation and under BlockAck procedure) so remove this additional rules are TBD from here and add the missing rules in clause 10 in subclauses for A-MPDU operation and in subclause for BA operation. | As in comment. | Revised- Agree in principal. But, additional rules are described in 25.10.4 (A-MPDU with multiple TIDs). So, a related refererence is added. TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 691 | 35.42 | 9.7.3 | Additional rues are TBD. | Define the additional rules | Revised- Agree in principal. But, additional rules are described in 25.10.4 (A-MPDU with multiple TIDs). So, a related refererence is added. TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 1353 | 35.40 | 9.7.3 | "An A-MPDU carried in a HE MU PPDU may include MPDUs with different values of the TID field. Additional rules are TBD." is or should be covered by the A-MPDU contexts/contents tables | Delete this para | Revised- Revised- Agree in principal. But, additional rules are described in 25.10.4 (A-MPDU with multiple TIDs). So, a related refererence is added. TGax editor makes changes as shown in the as specified in 11-16/1352r1. |
| 822 | 35.21 | 9.7 | For early frame content examination, the reserved bit in MPDU delimiter can be utilized to indicate whether next MPDU is data or not. | Insert the following contents in 9.7.1 A-MPDU format"Set reserved bit(B1) of MPDU delimiter to Data frame indication. A sending STA copy the value of B6 in frame control field of the next Data type MPDU into data frame indication field. If the next MPDU is not Data type MPDU, a sending STA set the Data frame indication bit(B1) to 0. A receiving STA recognizes presence of data frame before decoding each MPDU in A-MPDU by the indication bit." | Rejected- The receiver must decode all MPDUs contained in A-MPDU except for EOF Padding. It seems that the indication of the frame type of the next MPDU in the A-MPDU is useless. |

9.7.3 A-MPDU contents

***TGax editor: change the sub-clause 9.7.3 as the following:***

An A-MPDU carried in an(#2829) HE SU PPDU, HE extended range SU PPDU, HE trigger-based PPDU and HE MU PPDU ~~may~~ can include MPDUs with different values of the TID field~~. Additional rules are TBD.~~  as described in 25.10.4 (A-MPDU with multiple TIDs).