IEEE P802.11
Wireless LANs

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| CC36 comment resolution for miscellaneous comments part 3 |
| Date: 2022-04-05 |
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Abstract

This submission proposes resolutions for multiple comments related to TGbe D1.0 with the following CIDs:

 4286, 6075, 6076, 7001

 5159

Revisions:

* Rev 0: Initial version of the document.

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 TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | Resolution |
| 4286 | 35 |   | Subclause for BlockAck protocol enhancements for EHT is missing. Needed for 512K, 1K, etc. Use 11ax respective subclause as well to specify what type of control responses are sent depending on what type of PPDU is soliciting them. | As in comment. | RevisedGenreally agree with the commenter.TGbe editor to add changes in this document under CID 4286 |

**35.4 EHT acknowledgment procedure(#4111)(#5167)**

**35.4.1 Overview**

TGbe Editor: Please add the following text at the end of 35.4.1: (#4286)

An EHT AP that sends a Multi-STA BlockAck frame where the Per AID TID Info fields are all addressed to a single recipient STA and that is not sent in response to an EHT TB PPDU shall set the RA field of the Multi-STA BlockAck frame to the address of the recipient STA.

An EHT STA that receives a Multi-STA BlockAck frame that is a response to frames requiring acknowledgment shall examine Per AID TID Info field received in the Multi-STA BlockAck frame, and shall process each Per AID TID Info field using the procedure defined in 26.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).

An EHT STA that transmits a Multi-TID BlockAckReq frame in an EHT TB PPDU may set each of the TID Value subfields in the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame to a TID that corresponds to any AC.

An EHT STA that transmits a BlockAckReq frame in an EHT TB PPDU may set the TID subfield in the AID TID Info field in the BAR Information field of the BlockAckReq frame to a TID that corresponds to any AC.

An EHT STA that responds to an EHT MU PPDU with an EHT TB PPDU follows the same rules as an HE STA that responds to an HE SU PPDU or HE ER SU PPDU with an SU PPDU as defined in **26.4.4.4 (Responding to an HE MU PPDU, HE SU PPDU or HE ER SU PPDU with an HE TB PPDU)** with the following changes

Replacing HE MU PPDU, HE SU PPDU or HE ER SU PPDU by EHT MU PPDU

Replacing HE TB PPDU by EHT TB PPDU

Replacing HE STA by EHT STA.

An EHT STA that responds to an EHT MU PPDU with a PPDU carrying a frame addressed to a single STA follows the same rules as an HE STA that responds to an HE MU PPDU with an SU PPDU as defined in **26.4.4.3 (Responding to an HE MU PPDU with an SU PPDU)** with the following changes

Replacing HE MU PPDU by EHT MU PPDU

Replacing SU PPDU by a PPDU carrying a frame addressed to a single STA

Replacing HE STA by EHT STA.

An EHT AP that responds to an EHT TB PPDU with a PPDU other than EHT MU PPDU addressed to multiple STAs follows the same rules as an HE AP that responds to an HE TB PPDU with an SU PPDU as defined in **26.4.4.5 (Responding to an HE TB PPDU with an SU PPDU)** with the following changes

Replacing HE TB PPDU by EHT TB PPDU

Replacing SU PPDU by a PPDU carrying a frame addressed to a single STA

Replacing HE STA by EHT STA.

An EHT AP that responds to an EHT TB PPDU with an EHT MU PPDU follows the same rules as an HE AP that responds to an HE TB PPDU with an HE MU PPDU as defined in **26.4.4.6 (Responding to an HE TB PPDU with an HE MU PPDU)** with the following changes

Replacing HE TB PPDU by EHT TB PPDU

Replacing HE MU PPDU by EHT MU PPDU

Replacing HE STA by EHT STA.

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | Resolution |
| 6075 | 243 | 5 | since some STA can't support same BW as the BSS operating BW and those STAs can be HE STAs, the methods to better use BSS BW should be provided. One of them is that within SST, an EHT STA with same BW as BSS operating BW can park in secondary channel. With this the A-PPDUs have higher chance to use the whole BSS operating BW. | Address the issue raised by the comment. | RejectedA-PPDU is not adopted in the current 11be draft.  |
| 6076 | 243 | 5 | The dynamic channel puncture for 5GHz band and 6GHz band should be provided | Address the issue raised by the comment. | RejectedThe static channel puncture can address the issue of incumbent users overlapped with some 20MHz channel of BSS operating channel. The dynamic channel puncture tris to address the some issue whose improvement is not as big as static channe lpuncture. The group can’t get the consensus to support dynamic channel puncture at this stage. |
| 7001 | 262 | 31+32 | There is no EHT SU PPDU, only EHT MU and EHT TB. | Remove 'EHT SU PPDU'. | RevisedThe cited text by the commenter was replaced by “EHT MU PPDU directed to a single (#1752)EHT STA” in 11be D1.5Note to editor: no frther change is need. |

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | Resolution |
| 5159 | 261 | 37 | Procedure for response to BAR and reshuffling of sequence number is not clear for MLD operation. Please define | As in the comment | RevisedDiscussion: 11beD1.0 allows a recipient MLD to transmit BA in one link to optionally carry the acknowledgement information of frames received in another link. It is up to the recipient MLD to decide the method to implement the scoreboard context (e.g. per link scoreboard contect or MLD level scoreboard context).In the current BA creation rules, the bits in BA bitmap whose related SNs are larger than WinEndR need to be set to 0 and the bits in BA bitmap whose related SNs are less than WinStartR are set to either 1 or 0. When other links’ acknowledgement information is carried in BA, the WinStartR, WinEndR should be redefined, e.g. when the difference between WinStartR in the link where the BA will be transmitted and WinEndR in another link whose acknowledgement is optionally transmitted is more than the negotiated BA bitmap size (64 when the negotiated buffer size is no more than 64, 256 when the negotiated buffer size is more than 64 and no more than 256…).In 11baseline, when the SN of a received frame is more than WinStartR + 2^11 and less than WinStartR, the scoreboard context is not changed. With multiple links being used, the acknowledgement information may be wrong. The following is an example:The AP MLD sends A-MPDU1 with SNs from 0 to 1023 in link 1 and receives BA where all the frames are acknowledged. The AP MLD sends A-MPDU2 with SNs from 1024 to 2047  in link 2 and receives BA where all the frames are acknowledged. The AP MLD sends A-MPDU3 with SNs from 2048 to 3071  in link 2 and receives BA where all the frames are acknowledged. The AP MLD sends A-MPDU4 with SNs from 3072 to 4095  in link 1. The STA of destined non-AP MLD in link 1 doesn’t updates its scoreboard context since the SNs are less than WinStartR and are >=WinStartR + 2048. The frames in A-MPDU4 will never be acknowledged. After discarding the frames in A-MPDU4, the AP MLD transmits A-MPDU5 with SNs from 0 to 1023 where only one frame is correctly received. However the non-AP MLD responds with BA with all 1s in its BA bitmap…. TGbe editor to make changes in this document under CID 5159 |

**35.3.8 Block ack procedures in Multi-link operation**

***TGbe editor: Please add the following paragraphs in 35.3.8***

***Option 1***

A recipient MLD may do one of the following: ***(#5159)***

* Have a separate scoreboard context control with partial state operation in each link
* Have one scoreboard context control with partial state operation for all links
* Have one scoreboard context control with full state operation for all links

***(#5159)*** If a STA affiliated with a recipient MLD in a link is not capable of using reordering buffer information to update its scoreboard context and the recipient MLD has a separate scoreboard context control in each link, the STA shall implement the partial-state operation and should discard the temporary record in the following defined time periods:

* After sending a BA where the BA and the acknowledged A-MPDU(s) are in one TXOP and before processing the scoreboard context of the next  received the QoS Data frame of the TID from the initiator MLD in the link if BA is transmitted
* After the end of the current TXOP and right before processing the scoreboard context of the next received the QoS Data frame of the TID from the initiator MLD in the link in a new TXOP if BA is not transmitted at the end of the current TXOP

***(#5159)*** NOTE----a STA affiliated with a recipient MLD that discards the temporary record later than the time periods mentioned in the previous paragraph could fail to update the scoreboard context per the received frame within the transmit buffer control of the initiator MLD and can’t acknowledge the received frame.

***Option 2***

A recipient MLD may do one of the following: ***(#5159)***

* Have a separate scoreboard context control with partial state operation in each link
* Have one scoreboard context control with partial state operation for all links
* Have one scoreboard context control with full state operation for all links

***(#5159)*** If the following conditions are true

* a recipient MLD has a separate scoreboard context control in each link,
* The STA affiliated with the MLD is capable of using reordering buffer information to update its scoreboard context.
* a STA affiliated with the MLD receives a frame with SN that satisfies *WinStartR*+211  *SN*  *WinStartR*
* The SN of the frame doesn’t satisfy *WinStartB*+211  *SN*  *WinStartB*

the STA shall update the scoreboard context as if the frame with SN that satisfies *WinEndR*  *SN*  *WinStartR* +211 is received.

***(#5159)*** NOTE x----This can happen when the originator MLD uses more than one link to transmit (A)MPDUs for a TID and the recipient MLD uses either full-state operation or partial-state operation. See 10.25.6.3 (Scoreboard context control during full-state operation) and 10.25.6.4 (Scoreboard context control during partial-state operation).

***(#5159)*** If a STA affiliated with a recipient MLD in a link is not capable of using reordering buffer information to update its scoreboard context and the recipient MLD has a separate scoreboard context control in each link, the STA shall implement the partial-state operation and should discard the temporary record in the following defined time periods:

* After sending a BA where the BA and the acknowledged A-MPDU(s) are in one TXOP and before processing the scoreboard context of the next  received the QoS Data frame of the TID from the initiator MLD in the link if BA is transmitted
* After the end of the current TXOP and right before processing the scoreboard context of the next received the QoS Data frame of the TID from the initiator MLD in the link in a new TXOP if BA is not transmitted at the end of the current TXOP

***(#5159)*** NOTE----a STA affiliated with a recipient MLD that discards the temporary record later than the time periods mentioned in the previous paragraph could fail to update the scoreboard context per the received frame within the transmit buffer control of the initiator MLD and can’t acknowledge the received frame.

***Option 3***

A recipient MLD may do one of the following: ***(#5159)***

* Have a separate scoreboard context control with partial state operation in each link
* Have one scoreboard context control with partial state operation for all links
* Have one scoreboard context control with full state operation for all links

***(#5159)*** If the following conditions are true

* a recipient MLD has a separate scoreboard context control in each link,
* The STA affiliated with the MLD is capable of using reordering buffer information to update its scoreboard context.
* a STA affiliated with the MLD receives a frame with SN that satisfies *WinStartR*+211  *SN*  *WinStartR*
* The SN of the frame doesn’t satisfy *WinStartB*+211  *SN*  *WinStartB*

the STA shall update the scoreboard context as if the frame with SN that satisfies *WinEndR*  *SN*  *WinStartR* +211 is received.

***(#5159)*** NOTE x----This can happen when the originator MLD uses more than one link to transmit (A)MPDUs for a TID and the recipient MLD uses either full-state operation or partial-state operation. See 10.25.6.3 (Scoreboard context control during full-state operation) and 10.25.6.4 (Scoreboard context control during partial-state operation).

***(#5159)*** If a STA affiliated with a recipient MLD in a link is not capable of using reordering buffer information to update its scoreboard context and the recipient MLD has a separate scoreboard context control in each link, the STA shall implement the partial-state operation and should discard the temporary record in the following defined time periods:

* After sending a BA where the BA and the acknowledged A-MPDU(s) are in one TXOP and before processing the scoreboard context of the next  received the QoS Data frame of the TID from the initiator MLD in the link if BA is transmitted
* After the end of the current TXOP and right before processing the scoreboard context of the next received the QoS Data frame of the TID from the initiator MLD in the link in a new TXOP if BA is not transmitted at the end of the current TXOP

***(#5159)*** NOTE----a STA affiliated with a recipient MLD that discards the temporary record later than the time periods mentioned in the previous paragraph could fail to update the scoreboard context per the received frame within the transmit buffer control of the initiator MLD and can’t acknowledge the received frame.

(#***5159***)If the following conditions are true

* a recipient MLD has a separate scoreboard context control in each link,
* The STA affiliated with the MLD is capable of using reordering buffer information to update its scoreboard context.
* a STA affiliated with the MLD receives two A-MPDUs with SNs that are *WinStartR* £ *SN* < *WinEndR* or a STA affiliated with the MLD updates its WinStartR and WinEndR per the received second A-MPDU where the new WinStartR is less than the WinEndR and more than the WinSrartR updated per the received first A-MPDU, and  between two A-MPDUs the following event happens: WinStartB is more than WinStartR + 2^11 the first A-MPDU

the STA shall flush the scoreboard context and update the scoreboard context after receiving the second PPDU.