IEEE P802.11  
Wireless LANs

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| LB225 CR Sub-clause 10.22.2.7 and 10.22.2.8 | | | | |
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Abstract

This submission proposes resolutions of comments received from TGax LB225.

(The proposed change is based on TGax Draft 1.0.)

* CIDs: 7668, 7669, 7906, 9694, 4833, 5775, 9600, 5969, 9861, 5968, 7670, 7881, 9346, 3188 (14 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 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.***

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 7668 | 132.01 | 10.22.2.7 | The bullet at L1 should be separated to two cases, DL MU + UL MU acknowledgement, Trigger + UL MU acknowledgement. | As in comment | Revised-  Agree in principle.  Add the missing case of A-MPDU that solicits an HE trigger based PPDU.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 7669 | 131.51 | 10.22.2.7 | HE MU sounding is missing fron the frame exchange sequence. Add it. | As in comment | Revised-  Agree in principle.  Add the missing case of HE sounding.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 7906 | 132.04 | 10.22.2.7 | Need to account for HE beamforming too | Add a para "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" and a para " an HE NDP Announcement frame followed after SIFS by an HE NDP followed after SIFS by a BRP Trigger frame followed after SIFS by a PPDU containing one or more HE Compressed Beamforming frames, or" | Revised-  Agree in principle.  Add the missing case of HE sounding.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 9694 | 132.06 | 10.22.2.7 | "-- 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..." The HE sounding procedure should be included. Insert the following: "-- an HE NDP Announcement frame followed after SIFS by an HE NDP optionally followed after SIFS by a PPDU containing one or more HE Compressed Beamforming And CQI frames or," | As per comment. | Revised-  Agree in principle.  Add the missing case of HE sounding.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 4833 | 132.33 | 10.22.2.7 | i) it is not clear what "the RU Allocation subfields of the MU-RTS frame for all intended receiver are equal to the BW subfield in the Common Info field of the MU-RTS frame" means. The two fields that are compared are encoded in quite different ways. ii) in the 'otherwise' case, the 'preceding PPDU' may be an MU-RTS, but the previous bullet that is supposed to describe the MU-RTS case does not cover all the MU-RTS cases, pointing to the 'otherwise', hence there is a loop and something missing. | Make sure there is a defiend behavior for all the cases | Revised-  Agree on the first comment.  Make a change for considering two different field encoding.  But, regarding the second comment, ‘otherwise’ case is covering all things that do not meet the condition of the first bullet.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 5775 | 132.34 | 10.22.2.7 | If MU-RTS can be sent in HT PPDU or VHT PPDU format, describe how to set TXVECTOR parameter CH\_BANDWIDTH | Clarify | Rejected-  If a MU-RTS frame is transmitted in an HT PPDU or a VHT PPDU format, the below base rule is applied.  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. |
| 9600 | 132.51 | 10.22.2.7 | "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." When an HE AP transmits an HE DL MU PPDU with preamble puncture, the TXVECTOR parameter CH\_BANDWIDTH selection rule should be seperately defined. Because the above current rule does not cover it. | As per comment. | Revised-  Agree in principle.  When an HE AP transmits multiple HE DL MU PPDUs with preamble puncture in a same TXOP, additional constraint for the RU allocation is needed.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 5969 | 132.64 | 10.22.2.8 | Please clarify can an HE MU PPDU contain a Trigger frame or UL MU Response scheduling HE Variant HT Control field to allocate resources for UL MU acknowledgements transmission. | Please add clarification are Trigger frames or UL MU response scheduling A-Control fields to solicit UL BAs allowed in HE MU DL PPDUs when the TXOPLimit is 0. | Revised-  Agree in principle.  Add the missing case of multiple HE trigger-based PPDU transmissions in a TXOP with the TXOP limit equal to 0.  In consequence, multiple Trigger frames (or UL MU response scheduling A-Control fields) to solicit multiple UL BAs are allowed in HE DL MU PPDU when the TXOPLimit is 0.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 9861 | 132.64 | 10.22.2.8 | Multiple HE trigger-based PPDU can be sent as long as all the trigger-based PPDUs are sent as immediate response to same Trigger frame. Need further clarification | As in the comment. | Revised-  Agree in principle.  Add the missing case of multiple HE trigger-based PPDU transmissions in a TXOP with the TXOP limit equal to 0.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 5968 | 133.05 | 10.22.2.7 | It is unclear may there be just one Trigger frame or multiple trigger frames in a TXOP with TXOP Limit set to 0. | Please change to:"5) A basic trigger variant Trigger frame." | Revised-  Agree in principle.  Single Trigger frame is allowed in a TXOP with the TXOP limit equal to 0.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 7670 | 133.15 | 10.22.2.8 | Add HE sounding subclause | As in comment | Revised-  Agree in principle.  Add the missing reference for HE sounding sub-clause.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 7881 | 133.17 | 10.22.2.8 | Link adaptation is also described in 27.13 | Add "and 27.13" after "10.31" | Revised-  Agree in principle.  Add the missing reference for HE link adaptation sub-clause.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 9346 | 133.18 | 10.22.2.8 | Link adaptation through the HE variant HT Control field is specified in 27.13 and it should be also included. | Add "and 27.13 (Link adaptation using the HE variant HT Control field)" at the end of item e). | Revised-  Agree in principle.  Add the missing reference for HE link adaptation sub-clause.  TGax editor makes changes as shown in the as specified in 11-17/0210r1. |
| 3188 | 133.28 | 10.22.2.8 | Also when the Duration value is non-zero, an HE STA may include frames that solicit an acknowledgment response frame but no other response frames. | "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 frame that solicit a control response frame from the AP. When the Duration field value in the MAC header of an HE trigger-based PPDU is non-zero, the HE trigger-based PPDU shall not include any frame that solicit a control response frame from the AP other than Ack, Block-Ack, Multi-STA Block-Ack." Or similar to the language for an RD responder in 10.28.4 (P136L60 of 11ax D1.0): "An HE STA shall not transmit an MPDU (either individually or aggregated within an A-MPDU) in a trigger-based PPDU that is not one of the following frames: Ack, multi-STA BlockAck, QoS  data, management" | Rejected-  What is a frame that solicits a control response frame from the AP other than Ack, BlockAck, multi-STA BlockAck?  Only RTS, CF-END, Trigger, HE NDP Announcemnt frames can be corresponded to such case.  And, it is obvious that those frames can be transmitted by only TXOP holder.  Because the HE trigger-based PPDU is not transmitted by the TXOP holder, there is no reason to specify the proposed constraint. |

***TGax editor: modify the sub-clause 10.22.2.7 and 10.22.2.8 as the following:***

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

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 trigger-based PDU (such as a ~~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 ~~the requested immediate response~~ a response HE trigger-based 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, or
  + 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, or
  + a Beamforming Report Poll Trigger frame followed after SIFS by an HE trigger-based PPDU containing one or more HE Compressed Beamforming And CQI frames (#7669, 7906, 9694)

…

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 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 frame 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 frame for all intended receiver are equal to a value that corresponds to a channel bandwith that is indicated in (#4833) the BW subfield in the Common Info field of the MU-RTS frame.
* 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)

**10.22.2.8 TXOP limits**

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)

1) One or more SU PPDUs carrying fragments of a single MSDU or MMPDU

2) An SU PPDU or a VHT MU PPDU or an HE MU PPDU or an 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 an 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

5) A Basic variant Trigger frame or a BSRP variant Trigger frame or a BQRP variant Trigger frame (#5968)

6) An HE trigger-based PPDU carrying A-MPDUs from different users (a single A-MPDU from each user) (#9861)

1. Any required acknowledgments
2. 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)

1. Any frames required for beamforming as specified in 10.30 (Sounding PPDUs), 10.34.5 (VHT sounding protocol) ~~and~~, 10.38 (DMG beamforming) and 27.6 (HE sounding protocol) (#7670).
2. 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)
3. Any number of BlockAckReq or MU-BAR or Multi-TID BlockAckReq or a GCR MU-BAR frames

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.