IEEE P802.11
Wireless LANs

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| LB238 CR PPDU format, BW, MCS, NSS, and DCM selection |
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Abstract

This submission proposes resolutions of comments received from TGax LB238.

(The proposed change is based on TGax Draft 4.3.)

* CIDs: 20910, 20912, 20749, 20829, 20940, 20938, 20129, 21100, 21138, 21361, 21362 (11 CIDs)

NOTE2: In 11-19/770r4, CID 20743, 21513, 20237, 20606, 20713, 20913, 20690 are deferred from the May F2F meeting. CID 21138, 21361, 21362 are transferred from TGax editor.

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** |
| --- | --- | --- | --- | --- | --- |
| 20743 | 419.01 | 26.15.2 | Re CID 16120: transmission of HE MU PPDUs by non-AP STAs has no appreciable value. The suggestion made in CID 12627 is dubious and there is no evidence of any market interest in the feature | Change the Rx Partial BW SU Using HE MU PPDU From Non-AP STA subfield in the HE PHY Capabilities Information field (Figure 9-772c and Table 9-321b) and at 419.1 in 26.15.2 change "a 20 MHz HE MU PPDU with a single 106-tone RU to a peer STA unless it has received from the peerSTA an HE Capabilities element with the Rx HE MU PPDU From Non-AP STA subfield in the HE PHYCapabilities Information field equal to 1" to "an HE MU PPDU" and delete following NOTE | Revised- As suggested by the commet in CID 16120, the note for explaining the benefit of the UL HE MU PPDU is added. TGax editor makes changes as specified in 11-19/0770r5 for CID 20743.  |
| ***TGax Editor: Insert the following NOTE in 3.2 (Definitions specific to IEEE 802.11) (#20743):*** uplink (UL) high efficiency (HE) multi-user (MU) physical layer (PHY) protocol data unit (PPDU):An HE MU PPDU transmitted by a non-AP STA. An UL HE MU PPDU carries only one PSDU.NOTE- The UL HE MU PPDU has an HE-SIG-B field that contains additional information (e.g., the identifier of the transmitter) that can be used by the recipient of the UL HE MU PPDU to determine the transmitter of the PPDU even in those cases where the Data field of the PPDU is not received. For example, this allows the originator of persistently failing PPDUs to be identified. |
| 21513 | 419.45 | 26.15.2 | "A Control frame sent as a response to an HE SU PPDU that does not contain a Trigger frame or frame carrying a TRS Control field should be carried in a non-HT PPDU unless the most recent received PPDU sent by the responding STA to the soliciting STA after association was an HE ER SU PPDU in which case the Control frame should be carried in an HE ER SU PPDU."In addition to an HE SU PPDU, the non-HT PPDU should need the same rule. For example, an AP sends a RTS frame in a non-HT PPDU format and a STA responds with a CTS in an HE ER SU PPDU format. | Change "A Control frame sent as a response to an HE SU PPDU that does not contain a Trigger frame or..." to "A Control frame sent as a response to an HE SU PPDU or a non-HT PPDU that does not contain a Trigger frame or..." | Accepted |
| 20237 | 419.47 | 26.15.2 | The statement is wrong | Change the text as below:"unless the most recent received PPDU sent by the soliciting STA to the responding STA..." | Revised- Current statement is correct. But, For more clarification, the wording is changed. TGax editor makes changes as specified in 11-19/0770r5 for CID 20237.  |
| ***TGax Editor: Change the subclause 26.15.2 (PPDU format selection) as follows (#20237):*** — A Control frame sent by an HE STA as a response to an HE ER SU PPDU that does not contain a Trigger frame or frame carrying a TRS Control field should be carried in an HE ER SU PPDU unless the most recently received PPDU sent by ~~the responding STA~~ a recipient of the HE ER SU PPDU to the ~~soliciting~~ HE STA after association was not an HE ER SU PPDU in which case the Control frame should be carried in non-HT PPDU. — A Control frame sent by an HE STA as a response to an HE SU PPDU that does not contain a Trigger frame or frame carrying a TRS Control field should be carried in a non-HT PPDU unless the most recent received PPDU sent by ~~the responding STA~~ a recipient of the HE SU PPDU to the ~~soliciting~~ HE STA after association was an HE ER SU PPDU in which case the Control frame should be carried in an HE ER SU PPDU. |
| 20606 | 420.07 | 26.15.2 | "An HE STA should send an Ack frame in the same PPDU format as the soliciting PPDU if the solicitingPPDU is a VHT PPDU or HT PPDU containing an FTM frame." -- this is outside the scope of the TGax PAR and should be left to TGm or TGaz. Also, there is no such thing as an FTM frame | Delete the cited text at the referenced location. Also delete the proposed bullet g) in 10.6.6.1 | Revised- In previous letter ballot, TGax had debated how to support the FTM operation for the HE STA. And, as the conclusion, the HE STA has this recommendation. But, if the TGm decides that all STAs (including the legacy HT/VHT STA) follows this recommendation, the cited text can be removed from TGax draft. But, regarding the last comment, the FTM frame should be changed to the Fine Timing Measurement frame. TGax Editor replaces “FTM frame” with “Fine Timing Measurement frame” throughout the TGax Draft 4.3. |
| 20713 | 420.51 | 26.15.3 | Re CID 15958: the resolution missed the point of the comment. The comment was about the Tx 1024-QAM Support < 242-tone RU at the AP, not about the Tx 1024-QAM Support < 242-tone RU at the non-AP STA. The point is that an AP must not tell a STA to use narrow RUs with 1024-QAM if it has told the STA that it doesn't support them. Also, editorials | Change "An HE AP shall not set UL MCS subfield of the User Info field in a Trigger frame to 10 or 11 for a 26-, 52-, or 106-tone RU allocation unless the User Info field is addressed to a non-AP HE STA from which the HEAP has received an HE Capabilities element with the Tx 1024-QAM < 242-tone RU Support subfield in theHE PHY Capabilities Information field equal to 1." to "An HE AP shall not set the UL MCS subfield of a User Info field in a Trigger frame to 10 or 11 for a 26-, 52-, or 106-tone RU allocation unless it has set the Rx 1024-QAM < 242-tone RU Support subfield in the HE PHY Capabilities Information field of the HE Capabilities element to 1 and the User Info field is addressed to a non-AP HE STA from which the HE AP has received an HE Capabilities element with the Tx 1024-QAM < 242-tone RU Support subfield in the HE PHY Capabilities Information field equal to 1.". Also, in the para above change "if it has received from the recipient STA" to "if it has received from that STA" | Revised- Agree with the comment. But, the issue is more general. The AP shall not set any subfields of a Trigger frame to a value that is not supported by the AP.TGax editor makes changes as specified in 11-19/0770r5 for CID 20713.  |
| ***TGax Editor: Change the subclause 26.5.2.2.4 (Allowed settings of the Trigger frame fields and TRS Control subfield) as follows (#20713):*** An AP shall not set any subfields of the Common Info field of a Trigger frame to a value that is not supported by all the recipient non-AP STAs of the Trigger frame and the AP.…An AP shall not set any subfields of the User Info field of a Trigger frame to a value that is not supported by the recipient non-AP STA of the User Info field and the AP. An AP shall not set any subfields of a TRS Control subfield to a value that is not supported by the recipient non-AP STA of the TRS Control subfield and the AP. When an RU is allocated to only one non-AP STA the Starting Spatial Stream subfield for that non-AP STA shall be set to 0.***TGax Editor: Change the subclause 26.15.3 (MCS, NSS, BW and DCM selection) as follows (#20713):*** **26.15.3 MCS, NSS, BW and DCM selection**…An HE STA may transmit an HE PPDU with 1024-QAM on a 26-, 52-, and 106-tone RU to a recipient STA if it has received from ~~the recipient~~ that STA an HE Capabilities element with the Rx 1024-QAM < 242-tone RU Support subfield in the HE PHY Capabilities Information field equal to 1; otherwise the HE STA shall not transmit an HE PPDU with 1024-QAM on a 26-, 52-, and 106-tone RU.…An HE AP shall not set the UL MCS subfield of a ~~the~~ User Info field in a Trigger frame to 10 or 11 for a 26-, 52-, or 106-tone RU allocation unless the User Info field is addressed to a non-AP HE STA from which the HE AP has received an HE Capabilities element with the Tx 1024-QAM < 242-tone RU Support subfield in the HE PHY Capabilities Information field equal to 1. |
| 20913 | 422.09 | 26.15.2 | "TX parameter switching" is an undefined concept, and the NOTE has nothing to do with the preceding text anyway | Delete the NOTE at the referenced location | Revsied- As asked by the commenter, need to clarify the TX parameter switching. TGax editor makes changes as specified in 11-19/0770r5 for CID 20913.  |
| ***TGax Editor: Change the following NOTE in the subclause 26.15.2 (PPDU format selection) (#20913):*** NOTE 1— A change of ~~PPDU~~ format of the PPDU containing the control response frame ~~switching~~ between non-HT and HE ER SU PPDU occurs in subsequent TXOPs. A STA that solicits a ~~C~~control response frame from a responding STA accounts for the PPDU format of the ~~C~~control response frame to calculate the expected duration of the TXOP. The responding STA determines that the most recent PPDU sent to the soliciting STA is received(#20724) if it receives an immediate acknowledgment by the soliciting STA in response to the PPDU. |
| 20690 | 422.17 | 26.15.4.1 | The "at that bandwidth" deletions made in 18/2085 in "Otherwise,If the Operating Mode field is received from the first HE STA, the <HE-MCS, NSS> tuple is supported by the first STA on receive as defined 9.4.2.241.4 (Supported HE-MCS And NSS Set field) and by Equation (9-ax2).If the OM Control subfield is received from the first HE STA, the <HE-MCS, NSS> tuple is supported by the first STA on receive as defined 9.4.2.241.4 (Supported HE-MCS And NSS Set field) and by Equation (9-ax2)."(note other instances left behind) and"Otherwise, if the Max HE-MCS For n SS subfield (n = NSS) in each Tx HE-MCS Map For b subfield for b \member {<= 80 MHz, 160 MHz, 80+80 MHz} indicates support, then the <HE-MCS, NSS> tuple is supported by the first STA on transmit as defined in 9.4.2.241.4 (Supported HE-MCS And NSS Set field)." are wrong because the set is defined above as being for each "bandwidth (<= 80 MHz, and 160 MHz or 80+80 MHz)" | Revert the "at that bandwidth" deletions made per 18/2085 | Revised-Agree in principle. Revert the "at that bandwidth" deletions made per 18/2085.TGax editor makes changes as specified in 11-19/0770r5 for CID 20690.  |
| ***TGax Editor: Change the subclause 26.15.4 as follows (#20690):*** * Rate selection constraints for HE STAs
* Rx Supported HE-MCS and NSS Set

The Rx supported HE-MCS and NSS set of a first HE STA is determined by a second HE STA for each <HE-MCS, NSS> tuple NSS = 1, …, 8 and ~~bandwidth~~ a <operating channel width, PPDU bandwidth> combination as defined in Table 9-321c (Subfields of the Supported HE-MCS And NSS Set field) ~~( 80 MHz, and 160 MHz or 80+80 MHz)~~ from the Supported HE-MCS And NSS Set field of the HE Capabilities element received from the first STA as follows:* If support for the HE-MCS for NSS spatial streams at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is mandatory (see 27.1.1 (Introduction to the HE PHY)), then the <HE-MCS, NSS> tuple at that ~~bandwidth bandwidth~~ <operating channel width, PPDU bandwidth> combination is supported by the first STA on receive.
* Otherwise, if the Max HE-MCS For *n* SS subfield (*n* = NSS) in each Rx HE-MCS Map For *b* subfield for *b*  { 80 MHz, 160 MHz, 80+80 MHz} indicates support and neither the Operating Mode field nor the OM Control subfield is received from the first HE STA, then the <HE-MCS, NSS> tuple at that ~~bandwidth bandwidth~~ <operating channel width, PPDU bandwidth> combination is supported by the first STA on receive as defined in 9.4.2.242.4 (Supported HE-MCS And NSS Set field).
* Otherwise,
* If the Operating Mode field is received from the first HE STA, the <HE-MCS, NSS> tuple at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is supported by the first STA on receive as defined 9.4.2.242.4 (Supported HE-MCS And NSS Set field) and by Equation (9-ax2).
* If the OM Control subfield is received from the first HE STA, the <HE-MCS, NSS> tuple at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is supported by the first STA on receive as defined 9.4.2.242.4 (Supported HE-MCS And NSS Set field) and by Equation (9-ax2).
* Otherwise, the <HE-MCS, NSS> tuple at that ~~bandwidth bandwidth~~ <operating channel width, PPDU bandwidth> combination is not supported by the first STA on receive.

The <HE-MCS, NSS> tuples excluded by 26.15.4.3 (Additional rate selection constraints for HE PPDUs) can also be eliminated from the Rx supported HE-MCS and NSS set.An HE STA shall not, unless explicitly stated otherwise, transmit an HE PPDU unless the <HE-MCS, NSS> tuple and ~~bandwidth bandwidth~~ <operating channel width, PPDU bandwidth> combination used are in the Rx supported HE-MCS and NSS set of the receiving STA(s).* Tx Supported HE-MCS and NSS Set

The Tx supported HE-MCS and NSS set of a first HE STA is determined by a second STA for each <HE-MCS, NSS> tuple NSS = 1, …, 8 and ~~bandwidth bandwidth~~ <operating channel width, PPDU bandwidth> combinations as defined in Table 9-321c (Subfields of the Supported HE-MCS And NSS Set field) ~~( 80 MHz, and 160 MHz or 80+80 MHz)~~ from the Supported HE-MCS And NSS Set field received from the first STA as follows:* If support for the <HE-MCS, NSS> tuple at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is mandatory (see 27.1.1 (Introduction to the HE PHY)), then the <HE-MCS, NSS> tuple at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is supported by the first STA on transmit.
* Otherwise, if the Max HE-MCS For *n* SS subfield (*n* = NSS) in each Tx HE-MCS Map For *b* subfield for *b*  { 80 MHz, 160 MHz, 80+80 MHz} indicates support, then the <HE-MCS, NSS> tuple at that <operating channel width, PPDU bandwidth> combination is supported by the first STA on transmit as defined in 9.4.2.242.4 (Supported HE-MCS And NSS Set field).
* Otherwise, the <HE-MCS, NSS> tuple at that ~~bandwidth~~ <operating channel width, PPDU bandwidth> combination is not supported by the first STA on transmit.

A non-AP STA may exclude certain numbers of space-time streams, *NSTS*, as defined in 26.9.3 (Transmit operating mode (TOM) indication) from its Tx supported HE-MCS and NSS set. |
| 21138 | 418.45 | 26.15.2 | An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carrya Control frame that is not solicited by other frame. The sentence does not appear to be understandable. | Please clarify (by avoiding double negation, or at least providing an example). | Revised-“An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carry a Control frame that is not solicited by other frame.”This is “may” statement. And, if-condition is not a requirement to send an HE SU PPDU.The RTS frame that is not solicited by other frame can be sent in an HE SU PPDU. So, the cited sentence is meaningless.The suggestion is to removes the second sentence (i.e., An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carry a Control frame that is not solicited by other frame.) of the first paragraph of 26.15.2 (PPDU format selection).TGax editor to make the changes shown in 11-19/0964r3 under all headings that include CID 21523. (But, since the suggested change has been already applied to TGax Draft 4.3. TGax editor needs no change). |
| 21361 | 418.47 | 26.15.2 | An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carry a Control frame that is not solicited by other frame | Not very clear. Request to add more details | Revised-“An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carry a Control frame that is not solicited by other frame.”This is “may” statement. And, if-condition is not a requirement to send an HE SU PPDU.The RTS frame that is not solicited by other frame can be sent in an HE SU PPDU. So, the cited sentence is meaningless.The suggestion is to removes the second sentence (i.e., An HE STA may transmit an HE SU PPDU to a peer HE STA if the HE SU PPDU does not carry a Control frame that is not solicited by other frame.) of the first paragraph of 26.15.2 (PPDU format selection).TGax editor to make the changes shown in 11-19/0964r3 under all headings that include CID 21523. (But, since the suggested change has been already applied to TGax Draft 4.3. TGax editor needs no change). |
| 21362 | 419.53 | 26.15.2 | A Control frame that is not solicited by another frame shall be carried in an HT PPDU, VHT PPDU, HE SU PPDU or HE ER SU PPDU if the PPDU is encoded using STBC | Not very clear. Request to add more details | Revised- Since the cited sentence is a subset of “A Control frame shall be carried in an HT PPDU, VHT PPDU, HE ER SU PPDU or HE SU PPDU when the Control frame is sent using an STBC frame”, it should be removed. TGax editor remove “A Control frame that is not solicited by another frame shall be carried in an HT PPDU, VHT PPDU, HE SU PPDU or HE ER SU PPDU if the PPDU is encoded using STBC.” in 26.15.2 (PPDU format selection).  |