IEEE P802.11
Wireless LANs

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| LB233 CR MAC Miscellaneous |
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Abstract

This submission proposes resolutions of comments received from TGax LB233.

(The proposed change is based on TGax Draft 3.0.)

* CIDs: 16176, 16223, ~~15023,~~ 15628, 15024, 15225, 16395, 15940, 15062, 16465, 17046, 15939, 16448 (12 CIDs)

NOTE- The resolution of CID 15225 is changed since the cited sentence of CID 15225 is removed from CID15024.

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** |
| --- | --- | --- | --- | --- | --- |
| 16176 | 130.02 | 9.4.2.3 | It should be made clear with a NOTE that you must not include the 126 membership selector (VHT) if you want to allow 20-MHz-only HE STAs, only 125 (HE) and 127 (HT) | As it says in the comment | Revised- When the BSS membership selector value is set to 126 (VHT), the association of a 20 MHz-only non-AP HE STA is exceptionally allowed. TGax editor makes changes as shown in the as specified in 11-18/1780r4.  |
| 16223 | 130.20 | 9.4.2.3 | Should make it clear that an AP must not include the 126 membership selector (VHT) if it wants to allow 20-MHz-only HE STAs | Add a "NOTE---To allow association of 20 MHz-only STAs, an HE AP omits the VHT PHY BSS membership selector and only includes the HT PHY and HE PHY membership selectors." | Revised- When the BSS membership selector value is set to 126 (VHT), the association of a 20 MHz-only non-AP HE STA is exceptionally allowed. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| ***TGax Editor: Modify the following row in Table 9-96(BSS membership selector value encoding):***

|  |  |  |
| --- | --- | --- |
| **Value** | **Feature** | **Interpretation** |
| 126 | VHT PHY | Support for the mandatory features of Clause 21 (Very highthroughput (VHT) PHY specification) is required in order to join the BSS that was the source of the Supported Rates and BSSMembership Selectors element or Extended Supported Rates and BSS Membership Selectors element containing this value, except when 20 MHz-only non-AP HE STA joins the HE BSS.  |

 |
| ~~15023~~ | ~~134.01~~ | ~~9.4.2.37~~ | ~~Add a bit to indicate that the reported neighbor is a co-located BSS. This will be useful for discovery of a co-located ER BSS or 6GHz BSS~~ | ~~As in comment~~ | ~~The resolution is provided in 11-18/1211.~~ |
| 15628 | 136.00 | 9.4.2.68.1 | contradictory statements - Event USF and Event Report fields are both listed as only present when Event type is neither 4 or 5 and only present when the Event Type is 4 or 5. | reword to resolve contradiction | Revised- Agree in principle. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| **9.4.2.68.1 Event Report Definition** ***TGax Editor: Change the subclause 9.4.2.68.1 as follows:*** ~~The Event TSF, UTC Offset, Event Time Error, and Event Report fields are present only when the Event Report Status field is 0.~~ When the Event Report Status field is 0 (Successful) and Event Type field is neither 4 (BSS Color Collision) nor 5 (BSS Color In Use), the Event Report element contains the Event TSF, UTC Offset, Event Time Error, and Event Report fields. When the Event Report Status field is 0 (Successful) and Event Type field is either 4 (BSS Color Collision) or 5 (BSS Color In Use), the Event Report element contains only the Event TSF and Event Report fields. In all other cases, the Event Report element does not contain the Event TSF, UTC Offset, Event Time Error, or Event Report fields.  |
| 15024 | 137.27 | 9.4.2.139 | A receiving non-HE STA will interpret B1-B2 as reserved so the first sentence in the 2nd paragraph should cover both transmitter and receiver case. Currently it covers only the transmitter case. | Change the first sentence of the second paragraph as follows:"The HE Fragmentation Operation subfield is reserved when either the transmitter or the receiver is a non-HE STA." | Revised-“The HE Fragmentation Operation subfield is reserved when transmitted by a non-HE STA.”This sentence is not needed because a new field defined in following amendment can be ued only for the new device. TGax editor removes the following sentence (subclause 9.4.2.139, P144 L1) from TGax Draft 3.2. “If transmitted by a non-HE STA, the HE Fragmentation Operation subfield is reserved.” |
| 15225 | 137.27 | 9.4.2.139 | Conditional | Change "When" to "if" | Revised-See the resolution of CID 15024. TGax editor removes the following sentence (subclause 9.4.2.139, P144 L1) from TGax Draft 3.2. “If transmitted by a non-HE STA, the HE Fragmentation Operation subfield is reserved.” |
| 16395 | 136.17 | 9.4.2.67.1 | I may have missed the submission between 2.0 and 3.0, but what is the purpose of asking a non-AP HE STA its color in use? It makes no sense for an associated STA and it can be inferred by its HE transmission (PHY part)? Subclause 11.24.2.8 does not give a clear and useful use case of when or why this event occurs. Is this in case of a d2d communication within a BSS? Please provide a clarification in the dedicated subclause (most likely 11.24.2.8) or remove this event. | As in comment. | Revised- Please refer the following submission for the background of the BSS color in use event report. https://mentor.ieee.org/802.11/dcn/18/11-18-0456-01-00ax-lb230-cr-txvector-parameter-bss-color.docxWhen a non-AP STA that is associated with an AP is communicating (e.g., Soft AP, P2P, mesh network) with a peer STA that uses the different BSS color with its associated AP, the non-AP STA uses the BSS color in use even report for avoiding an interference from the SR. But, for more background information, some clarification texts are added in 11.24.2.8. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 15940 | 243.24 | 11.24.2.8 | The "color in use" (report) mechanism is not well described. How does this differ from (or relate to) "color collision"? How can a non-AP STA be using a color, if that color is not in collision? And, clearly, the non-AP STA should not report the associated AP's own color to it, even thought the non-AP STA is using that color to talk to it. | This is confusing, and should be clarified. | Revised- Please refer the following submission for the background of the BSS color in use event report. https://mentor.ieee.org/802.11/dcn/18/11-18-0456-01-00ax-lb230-cr-txvector-parameter-bss-color.docxWhen a non-AP STA that is associated with an AP is communicating (e.g., Soft AP, P2P, mesh network) with a peer STA that uses the different BSS color with its associated AP, the non-AP STA uses the BSS color in use even report for avoiding an interference from the SR. But, for more background information, some clarification texts are added in 11.24.2.8. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 15062 | 243.24 | 11.24.2.8 | Spec should define rules to prevent abuse. For example, define rules to prevent a STA from sending frequent event report frames and/or blocking all 63 colors. Also clarify if a STA can cancel its previous report and enable SR on the reported color | As in comment | Revised- Agree in principle. The AP uses only the most recently received BSS color in use event report. And, use the BSS color value 0 to cancel the previously sent BSS color in use event report. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 16465 | 243.26 | 11.24.2.8 | According to DCN456r1, a HE STA can have two BSS colors. In this subcluause, it says "The BSS color in use event report enables a non-AP HE STA to inform a BSS color in use by the non-AP HE STA to its associated AP." It is not clear whether the BSS color in use event report is the same as that of the accocitated AP or not. | Change it to "The BSS color in use event report enables a non-AP HE STA to inform a BSS color in use by the non-APHE STA to its associated AP, which is different from the BSS color used by its associated AP" | Revised- The BSS color in use event report provides the different BSS color as that of its associated AP. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 17046 | 243.31 | 11.24.2.8 | "..., it shall not transmit frames to the non-AP HE STA."The restriction shall be applied only in the valid timer (e.g., OBSS PD SR transmit power restriction period). | As in comment. | Revised- The restriction in the BSS color un use event report shall be applied only in the TXOP.TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 15939 | 243.26 | 11.24.2.8 | Parse problemThe first sentence of 11.24.2.8 does not parse properly. | Change to "... to inform its associated AP that a BSS color is in use by the non-AP HE STA." | Revised- Agree in principle. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| **11.24.2.8 BSS color in use event** ***TGax Editor: Change the subclause 11.24.2.8 as follows:*** ~~The BSS color in use event report enables a non-AP HE STA to inform a BSS color in use by the non-AP HE STA to its associated AP.~~ When a non-AP HE STA communicates with a peer STA with a BSS color that is different from the BSS color used by its associated AP, the non-AP HE STA may send a BSS color in use event report to its associated AP in which the Event Report field has the BSS color used in the communication with the peer STA. (#16465, 16395, 15940, 15939) A non-AP HE STA shall send a BSS color in use event report to its associated AP with the Event Report field set to 0 to cancel a previously sent BSS Color In Use event report. (#15062)When an AP has received a BSS color in use event report from a non-AP HE STA, the ~~AP~~ most recently ~~that~~ received ~~the~~ BSS color in use event report from the non-AP HE STA contains a nonzero BSS color value in the Event Report field, and the AP (#15062) ignores an inter-BSS PPDU with the BSS color value carried in the BSS color in use event report to obtain a TXOP by (#17046) following the procedure in 27.9.2.2 (General operation with non-SRG OBSS PD level) and 27.9.2.3 (Gen-eral operation with SRG OBSS PD level), ~~it~~ the AP shall not transmit frames to the non-AP HE STA during that TXOP duration. (#17046).**9.4.2.67.8 BSS Color In Use event report** ***TGax Editor: Change the subclause 9.4.2.67.8 as follows:*** The Event Report field for a BSS Color In Use event report is 1 octet in length ~~and indicates the BSS color value in the range 1 to 63 which is in use by the reporting non-AP HE STA~~.When a reporting non-AP HE STA communicates with a peer STA with a BSS color that is different from the BSS color used by its associated AP, the Event Report field is set to the BSS color used in the communication with the peer STA. (#16465, 16395, 15940, 15939) When a reporting non-AP HE STA cancels the previously sent BSS color in use event report, the Event Report field is set to 0. See 11.24.2.8 (BSS color in use event). (#15062) |
| 17046 | 243.31 | 11.24.2.8 | "..., it shall not transmit frames to the non-AP HE STA."The restriction shall be applied only in the valid timer (e.g., OBSS PD SR transmit power restriction period). | As in comment. | Revised- The restriction in the BSS color un use event report shall be applied only in the TXOP.TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 15939 | 243.26 | 11.24.2.8 | Parse problemThe first sentence of 11.24.2.8 does not parse properly. | Change to "... to inform its associated AP that a BSS color is in use by the non-AP HE STA." | Revised- Agree in principle. TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| 16448 | 78.44 | 9.2.4.6a.5 | The draft needs a mechanism that provides per MCS link transmit power information so that closed loop transmit power adjustments can be made which reduce the excess margin introduced by the use of conservative estimates for various, unknown link components and allow higher throughputs to be achieved. Also note that UPH value is not useful without knowledge of the UPH sender's TX PA settings per MCS. If a value of 3 is given for UPH at MCS7, does this mean that the transmitted TX Power is 3 dB from the maximum that the PA can output, or does it mean that the power is 3 dB from where the transmitter thinks that TXEVM will be exceeded for this MCS? And how does this 3 dB relate to any other MCS? Probably need to refine the meaning of the UPH value to answer some of these questions. Note that by providing a complete list of TX power values per MCS, a single UPH response can indicate to the AP what values of MCS and Target RSSI are appropriate for each non-AP STA. | At a minimum, refine the meaning of "available power headroom" - with reference to what? To max PA power? To the point when TX EVM is expected to be exceeded? Or to what? Best to also include a link transmit power signaling mechanism to provide a reference value for the UPH parameter. | Revised- Agree in principle. Please refer the discussion part in 11-18/1780r4.TGax editor makes changes as shown in the as specified in 11-18/1780r4. |
| **Discussion:** The Power Capability element in IEEE 802.11 REVmd 1.4 specifies the minimum and maximum transmit powers with which a STA is capable of transmitting in the current channel. The usage of the the minimum and maximum transmit power capability is the beyond of this standard. *9.4.2.14 Power Capability element**The Power Capability element specifies the minimum and maximum transmit powers with which a STA is capable of transmitting in the current channel. The format of the Power Capability element is shown in Figure 9-172 (Power Capability element format).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Element ID* | *Length* | *Minimum Transmit Power Capability* | *Maximum Transmit Power Capability* |
| *Octets:* | *1* | *1* | *1* | *1* |

***Figure 9-172—Power Capability element format****The Element ID and Length fields are defined in 9.4.2.1 (General).**The Minimum Transmit Power Capability field is set to the nominal minimum transmit power with which the STA is capable of transmitting in the current channel, with a tolerance ± 5 dB. The field is coded as a 2s complement(#124) signed integer in units of decibels relative to 1 mW. Further interpretation of this field is defined in 11.7.4 (Interpretation of transmit power capability).**The Maximum Transmit Power Capability field is set to the nominal maximum transmit power with which the STA is capable of transmitting in the current channel, with a tolerance ± 5 dB. The field is coded as a 2s complement(#125) signed integer in units of decibels relative to 1 mW. Further interpretation of this field is defined in 11.7.4 (Interpretation of transmit power capability).**The Power Capability element is included in Association Request frames, as described in 9.3.3.6 (Association Request frame format); Reassociation Request frames, as described in 9.3.3.8 (Reassociation Request frame format); and Mesh Peering Open frame, as described in 9.6.15.2.2 (Mesh Peering Open frame details). The use of Power Capability elements is described in 11.7.2 (Association based on transmit power capability).*But, the maximum transmit power can be varied depending on the MCS, as mentioned by CID 16448. Providing the more exact power capability information of the STA can be helpful to improve the performance (e.g., the uplink power control for the HE TB PPDU). Please also refer the following submissions, 11-17/112r5 and 11-17/123r2. ***TGax Editor: Insert the following new subclause after 9.4.2.14 (Power Capability element):*** **9.4.2.14a Extended Power Capability element** The Extended Power Capability element specifies the maximum transmit powers with which a STA is capable of transmitting an HE TB PPDU per MCS in the current channel when using RU size greater than or equal to 242 tones. The format of the Extended Power Capability element is shown in Figure 9-172a (Extended Power Capability element format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | MCI Bitmap | Maximum Transmit Power Capability List |
| Octets: | 1 | 1 | 1 | 2 | variable |

**Figure 9-172a—** **Extended Power Capability element format**The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).The MCI Bitmap indicates which maximum transmit power capability values are present in the element. A value of 1 in bit position B0 of the MCI Bitmap field means that the Maximum Transmit Power Capability valuefor the constellation and encoding corresponding to the MCI Value 0 in Table 9-bbb (MCI Encoding) is present in the Maximum Transmit Power Capability List field of the element. A value of 1 in bit position B1 of the MCI Bitmap field means that the Maximum Transmit Power Capability value for the constellation and encoding corresponding to the MCI Value 1 in Table 9-bbb (MCI Encoding) is present in the Maximum Transmit Power Capability List field of the element. Bit positions B12 through B15 are reserved. **Table 9-bbb—MCI Encoding**

|  |  |
| --- | --- |
| **MCI Value** | **Constellation, Encoding** |
| 0 | BPSK, ½ |
| 1 | QPSK, ½ |
| 2 | QPSK, ¾ |
| 3 | 16QAM, ½ |
| 4 | 16QAM, ¾ |
| 5 | 64QAM, 2/3 |
| 6 | 64QAM, ¾ |
| 7 | 64QAM, 5/6 |
| 8 | 256QAM, ¾ |
| 9 | 256QAM, 5/6 |
| 10 | 1024QAM, ¾ |
| 11 | 1024QAM, 5/6 |
| 12-15 | Reserved |

The Maximum Transmit Power Capability List field contains N octets, each of which is Maximum Transmit Power Capability field as defined in 9.4.2.14 (Power Capability element). The value of N is equal to the number of bits that are set to 1 in the MCI Bitmap. The first Maximum Transmit Power field in the Maximum Transmit Power Capability List field corresponds to the MCS represented by the lowest numbered bit that is set to 1 in the MCI bitmap subfield and indicates the nominal maximum transmit power for an HE TB PPDU using RU size greater than or equal to 242 tones, and MCS that employs the constellation and encoding values that correspond to the MCI corresponding to the position of the bit in the MCI bitmap as indicated in Table 9-bbb (MCI Encoding). The Extended Power Capability element is included in (Re)-Association Request frames. **9.3.3.6 Association Request frame format** ***TGax Editor: Insert the following new row into Table 9-29 (Association Request frame body):*** **Table 9-29—Association Request frame body**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 44 | Extended Power Capability | The HE Capabilities element is optionally present if dot11HEOptionImplemented is true; otherwise it is not present. |

**9.3.3.8 Reassociation Request frame format** ***TGax Editor: Insert the following rows in Table 9-31 (Reassociation Request frame body):*** **Table 9-31—Reassociation Request frame body**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 49 | Extended Power Capability | The HE Capabilities element is optionally present if dot11HEOptionImplemented is true; otherwise it is not present. |

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