IEEE P802.11  
Wireless LANs

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| Comment resolutions for 27.16.1 not related to 6 GHz band | | | | |
| Date: 2018-09-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| Abhishek Patil | Qualcomm Inc. |  |  |  |
| George Cherian | Qualcomm Inc. |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGax D3.0 with the following CIDs (9 CIDs):

* 15414, 15415, 15416, 16039, 16074, 16227, 16251 16690, 17090

Revisions:

* Rev 0: Initial version of the document. Inherits all CIDs from 11-18/1211r0 that are not related to 6 GHz band. And incorporates suggestions and feedback received during the presentation in July F2F meeting and via e-mail. Changes compared to 1211r0’s counterparts are highlighted in green.

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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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 15414 | Amelia Andersdotter | 370.24 | "when either B0 or B1 of the Channel Width Set subfield of the HE Capabilities element is 1," should be "when either B0 or B1 of the Channel Width Set subfield of the HE Capabilities element is equal to 1," | As in comment. | Accepted |
| 15415 | Amelia Andersdotter | 370.26 | " the Supported Channel Width Set subfield of the HT Capabilities element is 0" should be " the Supported Channel Width Set subfield of the HT Capabilities element is set to 0" | As in comment. | Accepted |
| 15416 | Amelia Andersdotter | 370.30 | Conditional | Change "When" to "if" | Accepted |
| 16039 | Mark RISON | 370.41 | " MCSs 8(n - 1) to 8(n - 1) + 7" should have explicit multiplication symbols | Insert a multiplication glyph after each "8" in the cited text at the referenced location | Accepted |
| 16074 | Mark RISON | 371.51 | The HE feedback fragmentation rules are in 27.6.3:  The HE compressed beamforming feedback shall be transmitted in a single HE Compressed Beamforming And CQI frame unless the size of the feedback results in an HE Compressed Beamforming And CQI frame that would exceed 11 454 octets, in which case the feedback shall be segmented as defined in 27.6.4 (Rules for generating segmented feedback).  An HE beamformer shall support a maximum MPDU length for HE Compressed beamforming feedback which is the minimum between 11 454 octets and the maximum length of the HE compressed beamforming feedback that the HE beamformer intends to solicit from its HE beamformees.  i.e. you fragment only if it's more than 11k, irrespective of the MPDU length capability of the BFer.  But it also says in 27.16.1:  An HE STA shall not transmit an MPDU in an HE PPDU to a STA that exceeds the maximum MPDU length capability indicated in the VHT Capabilities element received from the recipient STA  which contradicts this, in the case the max MPDU len is <11k and the feedback is >8k | At the end of the sentence containing the cited text in the referenced location insert ", excepf if it is an HE Compressed Beamforming And CQI frame" | Revised –  Agree with the comment. Added the exception as suggested.  TGax editor to make the changes shown in 11-18/1467r0 under all headings that include CID 16074. |
| 16227 | Mark RISON | 369.47 | The VHT Operation Information field is not needed as a VHT Operation element will always be present in the same frame (Beacon etc.), per "A STA that sets dot11HEOptionImplemented to true shall set dot11VeryHighThroughputOptionImplemented and dot11HighThroughputOptionImplemented to true when operating in the 5 GHz band." | Delete all the text and figure components related to "VHT Operation Information" (including "VHT Operation Information Present) (14 instances) | Revised –  Agree in principle with the comment. An HE AP can decide to not accept VHT STAs even if it implements VHT. To do so the HE AP can omit from including the VHT Operation element in the Beacon frames, in which case it needs to signal the Channel Width, Segment 0 and Segment 1 to its HE STAs. Having the VHT Operation Information present in the HE Operation element allows to do so. Proposed resolution clarifies this aspect for when this field is present in the MGMT frames that would contain it.  TGax editor to make the changes shown in 11-18/1467r0 under all headings that include CID 16227. |
| 16251 | Mark RISON | 371.56 | "An HE STA shall not transmit an A-MPDU in an HE PPDU to a STA that exceeds the maximum A-MPDU length capability indicated in the HE Capabilities, VHT Capabilities, and HT Capabilities element received from the recipient STA. The maximum A-MPDU length capability is obtained as a combination of the Max- imum A-MPDU Length Exponent subfields in the HE Capabilities and VHT Capabilities element if the recipient STA has transmitted the VHT Capabilities; otherwise it is obtained from a combination of the Maximum A-MPDU Length Exponent subfields in the HE Capabilities and the HT Capabilities element." has forgotten about the Maximum A-MPDU Length Exponent Extension field | Add a reference to the Maximum A-MPDU Length Exponent Extension field | Revised –  Agree with the comment. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-18/1467r0 under all headings that include CID 16251. |
| 16690 | Robert Stacey | 369.49 | The statement "A BSS started by an HE STA is an HE BSS" is not accurate and not aligned with definition of HE BSS in 3.2. The definition in 3.2 also has problems: remove "transmited by an HE STA" since it is not relavant (how does another device know whether or not the transmitter is an HE STA?) | Change statement to "An HE BSS is a BSS in which the Beacon frames include an HE Operation element" and remove the definition from 3.2 | Revised –  Agree in principle with the comment. Proposed resolution is to include a statement as suggested. However, keeping the statement that an HE BSS is started by an HE STA. Also keeping the definition, since it was requested by a commenter in the past CR, and amended it as suggested in the comment.  TGax editor to make the changes shown in 11-18/1467r0 under all headings that include CID 16690. |
| 17090 | Youhan Kim | 370.46 | "An HE AP or an HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 0 if dot11VeryHighThroughputOptionImplemented is false". But VHT Operation element must be used to signal the channel center frequency even if VHT is not implemented. | Clarify that VHT Operation element must always be present (whether inside or outside of HE Operation element) for HE operations. | Revised –  Agree in principle with the comment. Proposed resolution clarifies these two cases. In general, the VHT Operation element is not present in the 2.4 and 6 GHz case. And the VHT Operation Information field is present only in the 5 GHz when the VHT Operation element is not present in the frame carrying the HE Operation element.  TGax editor to make the changes shown in 11-18/11467r0 under all headings that include CID 17090. |

**Discussion: *…***

**3.2 Definitions specific to IEEE 802.11**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16690):***

**high Efficiency (HE) basic service set (BSS):** A BSS in which the transmitted Beacon frames contain an HE Operation element. *(#16690)*

* HE Operation element

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 17090)):***

The VHT Operation Information Present subfield is set to 1 to indicate that the VHT Operation Information field is present in the HE Operation element and set to 0 otherwise. The VHT Operation Information Present subfield is set as defined in 27.16 (HE BSS operation). *(#17090)*

* HE BSS operation
* Basic HE BSS functionality

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16690):***

An HE BSS is a BSS started by an HE STA. The Beacon frames generated within an HE BSS contain an HE Operation element. *(#16690)* (#13670)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 15416, 15415, 15414):***

A STA transmitting an HT Capabilities element and HE Capabilities element shall set the Supported Channel Width Set subfield of the HT Capabilities element to 1 when either B0 or B1 of the Channel Width Set subfield of the HE Capabilities element is equal to 1, except when the STA is a 20 MHz-only non-AP HE STA in which case the Supported Channel Width Set subfield of the HT Capabilities element is set to 0. A STA transmitting a VHT Capabilities element and HE Capabilities element shall set the Supported Channel Width Set subfield of the VHT Capabilities element to a value that indicates the same channel width capability as the channel width capability indicated in the HE Capabilities element, except if the STA is a 20 MHz-only non-AP HE STA in which case the Supported Channel Width Set subfield of the VHT Capabilities element is reserved.*(#15416, 15415, 15414)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 16039):***

At a minimum, an HE STA sets the Rx MCS Bitmask subfield of the Supported MCS Set field of its HT Capabilities element according to the setting of each Rx HE-MCS Map For *b* subfield, *b*  { 80 MHz, 160 MHz, 80+80 MHz}, of the Supported HE-MCS And NSS Set field of its HE Capabilities element as follows: for each Max HE-MCS For *n* SS subfield, 1  *n*  4, of each Rx HE-MCS Map For *b* subfield, *b*  { 80 MHz, 160 MHz, 80+80 MHz}, with a value other than 3 (no support for that number of spatial streams), the STA shall indicate support for MCSs 8x(*n*– 1) to 8x(*n*– 1) + 7 in the Rx MCS Bitmask subfield, where *n* is the number of spatial streams, except for those MCSs marked as unsupported as described in 27.15.4.3 (Additional rate selection constraints for HE PPDUs).*(#16039)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 17090, 16227):***

An HE AP or an HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 0 if a VHT Operation element is present in the frame that carries the HE Operation element or if the frame that carries the HE Operation element is sent in the 2.4 GHz or 6 GHz band. An HE AP or an HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 1 if a VHT Operation element is not present in the frame that carries the HE Operation element and the frame is sent in the 5 GHz band.*(#17090, 16227)*

…

An HE AP or an HE mesh STA that transmits an HT Operation element shall set the Secondary Channel Offset subfield in the HT Operation Information field in the HT Operation element to indicate the secondary 20 MHz channel as defined in Table 9-168 (HT Operation element fields and subfields), if the BSS bandwidth is more than 20 MHz.

An HE STA that is a member of an HE BSS shall follow the same rules that are defined in 11.40.1 (Basic VHT BSS functionality) when transmitting a 20 MHz, 40 MHz, 80 MHz, 160 MHz or 80+80 MHz HE PPDUs with the following exceptions:

* An HE TB PPDU sent in response to a Trigger frame or a frame with a TRS Control subfield(#13136)(#14137) follows the rules defined in 27.5.3.3 (STA behavior for UL MU operation).
* An 80 MHz, 160 MHz or 80+80 MHz DL HE MU PPDU with preamble puncturing may be transmitted if the primary 20 MHz or the primary 40 MHz are occupied by the transmission and certain 20 MHz subchannels of the secondary channel are idle (see Table 28-19 (HE-SIG-A field of an HE MU PPDU) and 10.22.2.5 (EDCA channel access in VHT, HE, or TVHT BSS)).(#12581)

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16074):***

An HE STA shall not transmit an MPDU in an HE PPDU to a STA that exceeds the maximum MPDU length capability indicated in the VHT Capabilities element received from the recipient STA or that exceeds the Maximum A-MSDU Length in the HT Capabilities element received from the recipient STA unless the MPDU is an HE Compressed Beamforming And CQI frame. *(#16074)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16251):***

An HE STA shall not transmit an A-MPDU in an HE PPDU to a STA that exceeds the maximum A-MPDU length capability indicated in the HE Capabilities, VHT Capabilities, and HT Capabilities element received from the recipient STA. The maximum A-MPDU length capability is obtained as a combination of the Maximum A-MPDU Length Exponent Extension subfield in the HE Capabilities element and the Maximum A-MPDU Length Exponent subfield in the VHT Capabilities element if the recipient STA has transmitted the VHT Capabilities element; otherwise it is obtained from a combination of the Maximum A-MPDU Length Exponent Extension subfield in the HE Capabilities element and the Maximum A-MPDU Length Exponent subfield in the HT Capabilities element.*(#16251)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16227, 17090):***

An HE AP shall set the RIFS Mode field in the HT Operation element it transmits to 0.*(#16227, 17090)*

***TGax Editor: Change the third column of all the rows that contain VHT Operation in Table 9-27 (Beacon frame body), Table 9-30 (Association Response frame body), Table 9-32 (ReAssociation Response frame body), and Table 9-34 (Probe Response frame body) as follows(#16227, 17090):***

The VHT Operation element is present when the dot11VHTOptionImplemented is true and is optionally present if dot11HEOptionImplemented is true; otherwise, it is not present.*(#16227, 17090)*

**27.6.3 Rules for HE sounding protocol sequences**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16227, 17090):***

The HE beamformer shall use a lowest 26-tone RU, which is the lower bound of the starting 26-tone in the RU Start Index subfield of a STA Info field that is equal to the maximum of:

* The minimum 26-tone RU located within the operating channel width of the HE BSS*(#16227, 17090)*
* The minimum 26-tone RU located within the channel width in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OM Control subfield sent by the corresponding HE beamformee (see 27.8 (Operating mode indication))

The HE beamformer shall use a highest 26-tone RU, which is the upper bound of the ending 26-tone RU in the RU End Index subfield of a STA Info field that is equal to the minimum of:

* The maximum 26-tone RU located within the operating channel width of the HE BSS *(#16227, 17090)*
* The maximum 26-tone RU located within the channel width in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OMI Control field sent by the corresponding HE beamformee (see 27.8 (Operating mode indication))

**27.8 Operating mode indication**

**27.8.1 General**

**TGax Editor: *Change the last row of the table below as follows (#CID 16227, 17090):***

**Table 27-9—Setting of the VHT Channel Width and VHT NSS at an HE STA transmitting the OM Control subfield**

NOTE 1—Max VHT NSS as indicated by the value of the Rx NSS field. The Rx NSS field indicates the same Max HE NSS and Max VHT NSS. Max VHT NSS is at the bandwidth indicated in the VHT Capabilities element. For all allowed MCS values, the Max VHT NSS values are same, but the supported NSS can be different. NOTE 2—1/2 × or 3/4 × Max VHT NSS support might end up being 0, indicating no support. NOTE 3—Any other combination than the ones listed in this table is reserved. NOTE 4—CCFS1 refers to the value of the Channel Center Frequency Segment 1 field of the most recently transmitted VHT Operation element (if any) or HE Operation element. NOTE 5—CCFS2 refers to the value of the Channel Center Frequency Segment 2 field of the most recently transmitted HT Operation element (if any). NOTE 6—CCFS1 is nonzero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is at least Max VHT NSS. CCFS2 is zero in this case. NOTE 7—CCFS2 is nonzero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is less than Max VHT NSS. CCFS1 is zero in this case. NOTE 8—At most one of CCFS1 and CCFS2 is nonzero. NOTE 9—A supported multiple of Max VHT NSS applies to both transmit and receive. A supported multiple of Max HE NSS applies to receive NOTE 10—Some combinations of Supported Channel Width Set Pand Extended NSS BW support might not occur in practice.*(#16227, 17090)*