IEEE P802.11
Wireless LANs

|  |
| --- |
| Comment resolutions for 27.16.1 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. |  |  |  |
| Matthew Fischer | Broadcom LTD. |  |  |  |
| Yongho Seok | Mediatek |  |  |  |
| Sai Shankar | Cypress |  |  |  |
| Ming Gan | Huawei |  |  |  |
| Jason Guo | Huawei |  |  |  |
| Pooya Monajemi | Cisco |  |  |  |
| Liwen Chu | Marvell |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGax D3.0 with the following CIDs (11 CIDs):

* 15120, 15166, 15829, 15832, 16446, 15023, 15177,

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Inherits all CIDs from 11-18/1211r0 that are 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. Summary of the changes with respect to 11-18/1211r0 based on received feedback
	+ CIDs related to EDCA control are not included in this document and are covered in separate documents.
	+ Provided bulleted list of selective presence of HT Operation, VHT Operation, HE Operation depending on the band
	+ 6G STA does not transmit HT Capabilities and VHT Capabilities elements in the 6 GHz band. It rather includes those bits that are needed for its functionality in a newly created element, a.k.a., MPDU and A-MPDU Parameters element.
	+ 6 G STA shall not transmit other PPDUs formats except HE PPDUs and non-HT PPDUs.
	+ Used the same signalling as for VHT related to CCFS0, CCFS1.
	+ Added allowance of some elements in Neighbor Report.

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** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 15120 | Abhishek Patil | 369.47 | Spec covers details on 2.4GHz and 5GHz operation but doesn't provide any guidance on the BSS operation in 6GHz | As in comment | Revised –Agree in principle with the comment. Proposed resolution is to provide operation details for the 6 GHz band.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15120. |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| 15166 | Alfred Asterjadhi | 369.47 | HE BSS Operation needs some changes to enable 6 Ghz setup, operation, and everything that comes with it. Same consideration for the HE Operation element. And the HE Capabilities. | Will submit a proposal. | Revised –Agree in principle with the comment. Proposed resolution is to provide operation details on how the non-AP STA can discover and associate with a 6 GHz AP, by either using passive scanning or active scanning, in either the 2.4/5 GHz band, or in the 6 GHz band when certain conditions are satisfied. And also provides additional details on the BSS setup, operation, and signaling for 6 GHz operation.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15166. |
| 15829 | Laurent Cariou | 369.47 | An HE BSS can operate at 6GHz. The description is missing in this subclause. | Specify how a STA determines channelization when operating at 6GHz | Revised –Agree in principle with the comment. Proposed resolution is to provide operation details on how the non-AP STA can discover and associate with a 6 GHz AP, by either using passive scanning or active scanning, in either the 2.4/5 GHz band, or in the 6 GHz band when certain conditions are satisfied. And also provides additional details on the BSS setup, operation, and signaling for 6 GHz operation.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15829. |
| 15832 | Laurent Cariou | 371.22 | a multi-band non-AP STA should be able to provide more capabilities about its collocated non-AP STA in another band (6GHz). The multi-band element is the current solution in 802.11 specification to describe a collocated STA, so this would be the natural solution. The multi-band element should however be modified to include an optional subelement field to be able to include capabilities and other information on 6GHz operation. | Modify multi-band element to include optional subelements field and defines normative text associated to its usage in 27.16.1 | Revised –Agree in principle with the comment that the STA (both non-AP STA and AP) should be able to provide more capabilities of its co-located STA in the other band (6GHz in this case). This applies to other information as well, operation, restrictions, statistics etc). The use of multi-band IE is perpendicular to the 11ax spec (since it is used by multi-band operation) since both APs and STAs in the 6 GHz band can be single band as well. In 11ax we have been using the neighbor report element which is naturally extensible for providing the list of elements for the additional band of operation (by simply adding the HE Operation element of the co-located AP). The Neighbor Report also addresses the neighbor signaling case and has already defined the operation on how to include these elements. The only change needed for the case of co-location is to add a bit specifying that the report is for a co-located AP.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15832. |
| 16446 | Matthew Fischer | 371.27 | Missing a reference to 6 GHz operation. | Change "5 GHz" to "5 GHz or 6 GHz" | Revised –Agree in principle with the comment. Proposed resolution is to include a statement that refers the reader to the subclause 27.16.2 where the channelization rules for the 6 GHz operation are defined.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 16446. |
|  |  |  |  |  |  |
| 15023 | Abhishek Patil | 134.01 | 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 | Revised –Agree in principle with the comment. Proposed resolution incorporates the suggested change.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15023. |
| 15177 | Alfred Asterjadhi | 242.00 | TPC is missing to the list. Please add it. Also for the 6 GHz case please ensure that the STAs have mandatory support for it. | Will submit a proposal. | Revised –Agree in principle with the comment. Proposed resolution amended TPC subclause and specified that TPC is mandatory for a STA operating in the 6 GHz band.TGax editor to make the changes shown in 11-18/1211r1 under all headings that include CID 15177. |
|  |  |  |  |  |  |

**Discussion: *The document covers these main aspects:***

* ***6 GHz BSS Setup and operation***
* ***Active and passive scanning using 2.4/5 Ghz bands***
* ***Fast passive scanning in the 6 GHz band***

**9.4.2.237.3 HE PHY Capabilities Information field**

**TGax Editor: *Replace “Reserved” with “6 GHz Support” in bit B0 of the HE PHY Capabilities Information field.***

**TGax Editor: *Insert the following row as the first row of Table 9-262aa:***

|  |  |  |
| --- | --- | --- |
| 6 GHz Support | Indicates support for 6 GHz operation. | Set to 0 if not supported(#12674).Set to 1 if supported.*(#15120)* |

* HE Operation element

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 15120, 15166, 15829, 15832)):***

The operation of HE STAs in an HE BSS is controlled by:

1. The HT Operation element and the HE Operation element when operating in the 2.4 GHz band,
2. The HT Operation element, the VHT Operation element (if present), and the HE Operation element when operating in the 5 GHz band, and
3. The HE Operation element when operating in the 6 GHz band.

 The format of the HE Operation element is defined in Figure 9- 589cq (HE Operation element format).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | HE Operation Parameters | BSS Color Information | Basic HE-MCS And NSS Set | VHT Operation Information | Max Co-Located BSSID Indicator(#11742) | 6 GHz Operation Information |
| Octets: | 1 | 1 | 1 | 3(#11374) | 1(#11374) | 2 | 0 or 3 | 0 or 1 | 0 or 6 or 12 |
| HE Operation element format |

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

The format of the HE Operation Parameters field is defined in Figure 9-589cr (HE Operation Parameters field format).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0       B2 | B3 | B4      B13 | B14 | B15 | B16 | B17 | B18     B23 |
|  | Default PE Duration | TWT Required | TXOP Duration RTS Threshold | VHT Operation Information Present | Co-Located BSS(#11742) | ER SU Disable(#11261) | 6 GHz Present | Reserved |
| Bits: | 3 | 1 | 10 | 1 | 1 | 1 | 1 | 6(#11374) |
| * HE Operation Parameters field format
 |

**TGax Editor: *Insert the paragraph below after the 9th paragraph (#CID 15120, 15166, 15829, 15832)):***

The 6 GHz Present field indicates whether 6 GHz operation is enabled at the AP transmitting this element. The 6 GHz Present field is set to 1 if 6 GHz operation is enabled and set to 0 if 6 Ghz operation is disabled or not supported.*(#15120, 15166, 15829, 15832)*

**TGax Editor: *Insert the paragraphs below at the end of this subclause (#CID 15120, 15166, 15829, 15832)):***

The 6 GHz Operation Information field is present when the 6 GHz Present field is 1 and provides channel and bandwidth information related to 6 GHz operation (see X.Y (6 GHz channelization)). The structure of the 6 GHz Operation Information field is defined in Figure 9-XXX (6 GHz Operation Information field).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Primary Channel | Operating Class | Control | Channel Center Frequency Segment 0 | Channel Center Frequency Segment 1 | BSSID |
| Octets: | 1 | 1 | 2 | 1 | 1 | 0 or 6 |

The Primary Channel field indicates the channel number of the primary channel in the 6 GHz band.The Operating Class field indicates the Channel starting frequency and Channel set for which the 6 GHz band applies. The Operating Class field, together with the Primary Channel field, the Channel Center Frequency Segment 0 field and the Channel Center Frequency Segment 1 field, specify the center frequency of the channels in the 6GHz band.

The Control field is defined in Figure 9-XXX (Channel Control field).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0         B3 | B4 | B5 | B6 | B7 B15 |
|  | Channel Width | Reserved | Reserved | BSSID Present | Reserved |
| Bits: | 4 | 1 | 1 | 1 | 9 |
| Figure 9-XXX Control field |

The Channel Width field is 4 bits in length and indicates the BSS bandwidth and is set to 0 for 20 MHz, 1 for 40 MHz, 2 for 80 MHz, and 3 for 80+80 or 160 MHz; other values of this field are reserved.

The BSSID Present is set to 1 to indicate that the BSSID field is present in the 6 GHz Operation Information field; otherwise set to 0.

The Channel Center Frequency Segment 0 field has the same encoding as the Channel Center Frequency Segment 0 field defined in Table 9-266 (VHT Operation Information fields), except that the channelization is as defined in X.Y (6 GHz channelization) and applies to an HE BSS operating in the 6 GHz band.

The Channel Center Frequency Segment 1 field has the same encoding as the Channel Center Frequency Segment 1 field defined in Table 9-266 (VHT Operation Information fields), except that the channelization is as defined in X.Y (6 GHz channelization) and applies to an HE BSS operating in the 6 GHz band.

The BSSID field is present when the BSSID Present field in the Control field is 1 and specifies the BSSID of the BSS operating on the channel indicated by Primary Channel field in 6 GHz band. If the AP operating on the channel indicated by Primary Channel field in 6GHz band is a member of a multiple BSSID set with two or more members, the BSSID field is set to the transmitted BSSID. The BSSID field is not present if the BSSID Present field in the Control field is 0.*(#15120, 15166, 15829, 15832)*

* HE BSS operation
	+ 1. Basic HE BSS functionality

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16446):***

A STA that sets dot11HEOptionImplemented to true shall set dot11HighThroughputOptionImplemented to true when operating in the 2.4 GHz band. A STA that sets dot11HEOptionImplemented to true shall set dot11VeryHighThroughputOptionImplemented and dot11HighThroughputOptionImplemented to true when operating in the 5 GHz band. A non-AP STA that sets dot11HEOptionImplemented to true shall set dot11MultiBSSIDImplemented to true. A STA that sets dot11HEOptionImplemented to true shall set dot11VeryHighThroughputOptionImplemented and dot11HighThroughputOptionImplemented to false when operating in the 6 GHz band.*(#16446)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16446):***

An HE STA shall determine the channelization using the information in the Primary Channel field of the HT Operation element when operating in 2.4 GHz and the combination of the information in the Primary Channel field in the HT Operation element and the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the VHT Operation Information field in the VHT Operation element when operating in 5 GHz (see 21.3.14 (Channelization. An HE STA determines the channelization as defined in 27.16.2 when operating in 6 GHz.*(#16446)*

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 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.

An HE STA shall follow the rules defined in 11.40 (VHT BSS operation) for channel selection, determining scanning requirements, channel switching, NAV assertion and antenna indication when operating in 5 GHz unless explicitly stated otherwise in Clause 27.

**TGax Editor: *Insert a new subclause as follows (#CID 15120, 15166, 15829, 15832, 15122, 15177):***

27.16.1a HE BSS functionality in 6 GHz band

A BSS started by an HE STA in the 6 GHz band is a 6G HE BSS.

A STA that is starting a 6G HE BSS shall be able to receive and transmit at each of the <HE-MCS, NSS> tuple values defined in 27.16.1.

 (#13670)A HE STA that has a value of true for dot11HE6GOptionImplemented shall be capable of operating in the 6 GHz band. An HE STA that has a value of true for dot11HE6GOptionImplemented shall set the 6 GHz Support subfield to 1 in the HE Capabilities elements it transmits; otherwise the subfield shall be set to 0.

An HE STA with dot11HE6GOptionImplemented equal to true and is operating in the 6 GHz band is a 6G STA.

A 6G STA shall not attempt to join (MLME-JOIN.request primitive) a 6G HE BSS unless it supports (i.e., is able to both transmit and receive using) all of the <HE-MCS, NSS> tuples indicated by the 6G AP in the basic HE-MCS and NSS set.

A 6G AP shall indicate support for at least 80 MHz channel width if it is operating in the 6 GHz band.

A 6G AP operating in 6GHz shall set the Co-Located BSS subfield in HE Operation element it transmits to 0.

A 6G STA shall not transmit any of the HT Capabilities, VHT Capabilities, HT Operation, VHT Operation elements or the VHT Operation Information fields while operating in the 6 GHz band. The 6G STA shall include an MPDU and A-MPDU Parameters element in Probe Request/Response, Beacon, (Re)Association Request/Response frames that it transmits.

A 6G HE STA shall not transmit to another 6G STA an MPDU in an HE PPDU that exceeds the maximum MPDU length capability indicated in the MPDU and A-MPDU Parameters element received from the receiving STA.

An HE AP or an HE mesh STA that operates in the 6 GHz band shall set the 6 GHz Present field to 1 in the HE Operation elements it transmits. The HE AP or HE mesh STA shall set the Channel Width subfield, the Channel Center Frequency Segment 0, and the Channel Center Frequency Segment 1 subfields of the 6 GHz Operation Information field as defined in Table XX-YY (6 GHz HE BSS bandwidth), based on the Rx HE-MCS Map  80 MHz, Rx HE-MCS Map 160 MHz, and Rx HE-MCS Map 80+80 MHz fields.

|  |
| --- |
| Table XX-YY--6 GHz HE (#6508)BSS bandwidth(11ac) |
| 6 GHz Operation Information Channel Width field | 6 GHz Operation Information Center Frequency Segment 1 subfield (Ed)(M188) | (#6508)BSS bandwidth |
| 0 | 0 | 20 MHz |
| 1 | 0 | 40 MHz |
| 2 | 0 | 80 MHz |
|  (M188)3 | CCFS1 > 0 and| CCFS1 - CCFS0 | = 8 | 160 MHz |
|  (M188)3 | CCFS1 > 0 and| CCFS1 - CCFS0 | > 16 | 80+80 MHz |
| NOTE 1—CCFS0 represents the value of the Channel Center Frequency Segment 0 subfield.NOTE 2—CCFS1 represents the value of the Channel Center Frequency Segment 1 subfield. |

A 6G STA shall determine the BSS channelization using the information in the Primary Channel field in the 6 GHz Operation Information field in the HE Operation element when operating in 6 GHz band (see 28.3.22.2 (Channel allocation in the 6 GHz band)).

A 6G AP should schedule for transmission of FILS Discovery frames as described in 11.47.2.1 (FILS Discovery frame transmission) at regular intervals within a beacon period to assist an unassociated STA in the discovery its 6GHz BSS and its operating parameter.

An HE STA shall not transmit HT PPDUs in the 6 GHz band. An HE STA shall not transmit VHT PPDUs in the 6 GHz band. An HE STA shall not transmit DSSS, HR/DSSS, ERP-OFDM PPDUs in the 6 GHz band.

An HE STA that supports 6 GHz operation shall set the 6 GHz Support field to 1 in the HE Capabilities element contained in Management frames that it transmits in the 2.4, 5, or 6 GHz bands.

An HE AP which transmits a value of 1 in the 6 GHz Enabled field in the HE Operation element and that receives a Management frame in the 2.4 and/or 5 GHz band that contains an HE Capabilities element with the 6 GHz Support field equal to 1, shall include in the Management frame that it transmits in response in the 2.4 and/or 5 GHz band, at least one Neighbor Report element that contains information regarding 6 GHz operation if the request contained an HE Capabilities element with the 6 GHz Support field equal to 1. The AP shall set the Co-Located field to 1 in the Neighbor Report element if the 6 GHz AP is a co-located AP, and otherwise shall set it to 0. Elements specific to the 6 GHz AP may be carried in the Optional Subelements field of the Neighbor Report element (see Table 9-151).

An HE STA may perform passive scanning in the 6 GHz band. The HE STA should scan channels that are indicated in the Primary Channel subfield of the 6 GHz Operation Information field in received HE Operation elements.

An HE STA that intends to operate in the 6 GHz band shall set dot11SpectrumManagementRequired to true and shall operate according to the rules defined in 11.7 (TPC procedures).*(#15120, 15166, 15829, 15832, 15177)*

* **Neighbor Report element**

**TGax Editor: *Change the figure below of this subclause as follows (#CID 15120, 15166, 15829, 15832, 15023):***

Change Figure 9-296 (BSSID Information field) as follows:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 | B3 | B4 B9 | B10 | B11 | B12 | B13 | B14 | B15 | B16 | B1~~4~~7 B31 |
|  | AP Reachability | Security | Key Scope | Capabilities | Mobility Domain | High Throughput | Very High Throughput | FTM | High Efficiency | ER BSS | Co-Located | Reserved |
| Bits: | 2 | 1 | 1 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 15 |
|  | **Figure 9-296 – BSSID Information field** |

***TGax Editor: Insert the following after the paragraph beginning “The FTM field...”:***

The Co-Located subfield is set to 1 to indicate the AP represented by this BSSID is co-located with the reporting AP. Otherwise the Co-Located subfield is set to 0.*(#15120, 15166, 15829, 15832, 15023)*

***TGax Editor: Insert new rows for subelement IDs 195-198 in Table 9-151 as follows and update the reserved row:***

|  |
| --- |
| * Optional subelement IDs for Neighbor report
 |
| Subelement ID | Name | Extensible |
| … |  |  |
| 195 | Country element |  |
| 196 | Power Constraint element |  |
| 197 | Transmit Power Envelope element | Yes |
| 198 | TWT element  | Yes |
| 199 | UORA Parameter Set element | Yes |

**TGax Editor: *Change the following paragraphs of this subclause (#YS):***

The HE Capabilities subelement is the same as the HE Capabilities element as defined in 9.4.2.237 (HE Capabilities element), excluding the Element ID Extension field.

The HE Operation subelement is the same as the HE Operation element as defined in 9.4.2.238 (HE Opera-tion element), excluding the Element ID Extension field.

**TGax Editor: *Insert the following at the end of the subclause (#CID 15120, 15166, 15829, 15832):***

The Country subelement is the same as the Country element as defined in 9.4.2.13 (Power Constraint element).

The Power Constraint subelement is the same as the Power Constraint element as defined in 9.4.2.13 (Power Constraint element).

The Transmit Power Envelope subelement is the same as the Transmit Power Envelope element as defined in 9.4.2.160 (Transmit Power Envelope element.

The UORA Parameter Set subelement is the same as the UORA Parameter Set element as defined in 9.4.2.239 (UORA Parameter Set element), excluding the Element ID Extension field.

The TWT subelement is the same as the TWT element as defined in 9.4.2.198 (TWT element).

**TGax Editor: *Insert the following subclause (#CID 15120, 15166, 15829, 15832):***

**9.4.2.xxx MPDU and A-MPDU Parameters**

An HE STA in 6GHz band declares its MPDU and A-MPDU capabilities by transmitting the MPDU and A-MPDU Parameters element. The MPDU And A-MPDU Parameters element is defined in Table 9-xxx1 (MPDU and A-MPDU Parameters element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | (A-)MPDU Parameters |
| Octets: | 1 | 1 | 1 | 2 |

**Table 9-xxx1 MPDU and A-MPDU Parameters element format**

The structure of the (A-)MPDU Parameters field is defined in Figure 9-xxx2 (Parameters field format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B2 | B3 B5 | B6 B8 | B9 B10 | B11 B15 |
|  | Minimum MPDU Start Spacing | Maximum A-MPDU Length Exponent | Maximum MPDU Length | Reserved | Reserved |
| Bits: | 3 | 3 | 3 | 2 | 2 |

**Figure 9-xxx2 (A-)MPDU Parameters field format**

The Minimum MPDU Start Spacing subfield is the same as the Minimum MPDU Start Spacing subfield defined in 9.4.2.55.3 (A-MPDU Parameters field).

The Maximum A-MPDU Length Exponent subfield is the same as the Maximum A-MPDU Length Exponent subfield defined in Figure 9-589 (VHT Capabilities Information field).

The Maximum MPDU Length subfield is the same as the Maximum MPDU Length subfield defined in Figure 9-589 (VHT Capabilities Information field). *(#15120, 15166, 15829, 15832)*

**11.7 TPC procedures**

**TGax Editor: Change the paragraphs below of this subclause as follows (#CID 15177):**

Regulations that apply to the 5 GHz and 6 GHz band in most regulatory domains require RLANs operating in the 5 GHz and 6 GHz band to use transmitter power control, involving specification of a regulatory maximum transmit power and a mitigation requirement for each allowed channel. This standard describes such a mechanism, referred to as transmit power control (TPC).*(#15177)*

This subclause describes TPC procedures intended to satisfy needs in many regulatory domains and other frequency bands. These procedures might be useful for other purposes (e.g., reduction of interference, range control, reduction of power consumption).

**10.11 A-MSDU operation**

**TGax Editor: *Change the following paragraph (#CID 15120, 15166, 15829, 15832):***

The length of an A-MSDU transmitted in a VHT PPDU or an HE PPDU is limited by the maximum MPDU size supported by the recipient STA (see 10.12.5 (Transport of A-MPDU by the PHY data service)).

NOTE 1—An A-MSDU that meets the A-MSDU length limit for transmission in a VHT PPDU or an HE PPDU might exceed the A-MSDU length limit for an HT PPDU, in which case it cannot be retransmitted in an HT PPDU.*(#15120, 15166, 15829, 15832)*

NOTE 2—Support for A-MSDU aggregation does not affect the maximum size of MSDU transported by the MA-UNITDATA primitives.

* HE PHY Capabilities Information field

The subfields of the HE PHY Capabilities Information field are defined in Table 9-262aa (Subfields of the HE PHY Capabilities Information field).

**TGax Editor: *Change the table below as follows(#CID 15120, 15166, 15829, 15832):***

|  |
| --- |
| * Subfields of the HE PHY Capabilities Information field(#11466)
 |
| Subfield | Definition | Encoding |
| Supported Channel Width Set | B0 indicates support for a 40 MHz channel width in the 2.4 GHz band.B1 indicates support for a 40 MHz and 80 MHz channel width in the 5 GHz band and in the 6 GHz band if the 6 GHz Supported subfield is 1.B2 indicates support for a 160 MHz channel width in the 5 GHz band and in the 6 GHz band if the 6 GHz Supported subfield is 1.B3 indicates support for a 160/80+80 MHz channel width in the 5 GHz band and in the 6 GHz band if the 6 GHz Supported subfield is 1.If a non-AP STA operates with 20 MHz channel width and 20 MHz In 40 MHz HE PPDU In 2.4 GHz subfield is 1, then B4 indicates support of 242-tone RUs in a 40 MHz HE MU PPDU in the 2.4 GHz band. Otherwise, B4 is reserved.If a non-AP STA operates with 20 MHz channel width and 20 MHz In 160/80+80 MHz HE PPDU subfield is set to 0, then B5 indicates support of 242-tone RUs in a 40 MHz and 80 MHz HE MU PPDU in the 5 GHz band and in the 6 GHz band if the 6 GHz Supported subfield is 1. If a non-AP STA operates with 20 MHz channel width and 20 MHz In 160/80+80 MHz HE PPDU subfield is set to 1, then B5 indicates support of 242-tone RUs in a 40 MHz, 80 MHz, 160 MHz, and 80+80 MHz HE MU PPDU in the 5 GHz band and in the 6 GHz band if the 6 GHz Supported subfield is 1. Otherwise, B5 is reserved.B6 is reserved.B0 and B4 are applicable to 2.4 GHz band operation and reserved for 5 GHz and 6 GHz band operation.B1, B2, B3 and B5 are applicable to 5 GHz and 6 GHz band operation and reserved for 2.4 GHz band operation. | B0 is set to 0 if not supported. B0 set to 1 if supported.B1 is set to 0 if not supported, i.e., it indicates a 20 MHz-only non-AP HE STA in 5 GHz band or 6 GHz band. B1 set to 1 if supported. NOTE 1—For an AP, B1 is set to 1.B2 is set to 0 if not supported. B2 set to 1 if supported. If B2 set to 1 then B1 is set to 1.B3 is set to 0 if not supported. B3 is set to 1 if supported. If B3 set to 1 then B2 is set to 1.B4 is set to 0 if not supported. B4 set to 1 if supported.B5 set to 0 if not supported. B5 set to 1 if supported.NOTE 2—B4 is set to 0, if a non-AP STA operates with 20 MHz channel width and the 20 MHz In 40 MHz HE PPDU In 2.4 GHz subfield is 0.NOTE 3—If a non-AP STA operates with 20 MHz channel width and the 20 MHz In 160/80+80 MHz HE PPDU subfield is set to 0, then the 242-tone RU in a 160 MHz and 80+80 MHz HE MU PPDU in the 5 GHz band or 6 GHz band is not supported. |
| … |  |  |