IEEE P802.11  
Wireless LANs

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| Comment resolutions for HT Control field (9.2.4.6.X and 10.1) – Block 3 | | | | |
| Date: 2017-02-22 | | | | |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (60 CIDs):

* 3155, 3382, 3489, 3819, 3905, 4368, 4436, 5443, 7887, 8162, 8647 (11 CIDs)
* 3005, 3147, 3157, 3158, 3159, 4738, 5013, 5014, 5127, 5444, 6191, 7015, 7016, 7017, 7018, 7019, 7380, 7472, 7570, 7720, 8182, 8183, 8184, 8250, 8334, 8374, 9397, 9807, 9808, 10339 (30 CIDs)
* 3156, 3160, 3384, 3491, 3822, 3907, 4371, 4439, 4740, 5445, 7020, 7473, 8185, 8375, 9809, 9810, 9811, 9812 (18 CIDs)
* 6965 (1 CIDs)

Revisions:

* Rev 0: Initial version of the document.

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.***

# PARS VII (9.2.4.6.4.6)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3155 | Ahmadreza Hedayat | 27 | 15 | Why there is a 2-bit rsereved subfield in UL power headroom? If it is for the purpose of byte-alignment, then need to consider that there is a Control ID of 4 bits for the UL power headroom, leading to total of 12 bits. | Either remove the reserved bits, or update the reserved subfield for what it was intended for. | Rejected –  There is no byte alignment requirement for the Control fields. This 6-bit long Reserved field may allow enhanced signaling for future amendments. The allocation of a small number of bits of a field as Reserved is common in any amendment for future use. |
| 3382 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 3489 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  Duplicate of 3382.  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 3819 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  Duplicate of 3382.  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 3905 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  Duplicate of 3382.  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 4368 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  Duplicate of 3382.  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 4436 | Albert Petrick | 27 | 39 | No reference to the bits in the Reserve subfield In 9.2.4.6.4.6. | Add the following sentence "Bits (B6-B7) are reserved." after the sentence on line 39. | Rejected –  Duplicate of 3382.  The bit location and ordering is already provided in the figure. It is not necessary to add redundant information. |
| 5443 | Graham Smith | 27 | 27 | Increase Reserved bit number to make length 30 bits | Figure 9-15g change Reserved bits from 2 to 24 | Rejected –  The comment fails to identify a technical issue. Increasing the number of reserved bits to 30 bits eliminates the possibility of aggregating more than one Control field and reduces the amount of useful information that can be carried by the HT Control field for different features, consequently reducing the flexibility and usefulness. It also causes to exceed the length of the HT Control field. |
| 7887 | Mark RISON | 27 | 14 | There is no behavioural MAC specification of UL power headroom Control subfields | Move the text at the end of 28.3.14.2 to a new subclause in 27 | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes, appropriately changing the declarative statements to normative behavior statements to clearly indicate the rules that govern the responses by a STA that sends a UL power headroom in the HE Trigger-based PPDU.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7887. |
| 8162 | Ming Gan | 29 | 19 | See 26.3.13.2 (Power pre-correction), the reference is wrong | change 26.3.13.2 to 28.3.14.2 | Revised –  Agree in principle with the comment. The correct reference due to the proposed resolutions of other CIDs is in clause 27.5.2. Used the updated reference.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8162. |
| 8647 | Sigurd Schelstraete | 27 | 37 | "B5 of the UL Power Headroom subfield is set to 1 to indicate ...". Make this a separate field if this bit serves a specific purpose. | See comment | Revised –  Agree with commenter. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8647. |

## Discussion: *None.*

* UL power headroom

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 4740, 8647, 8162):***

The Control Information subfield, when the Control ID subfield is 4, contains the UL power headroom used for power pre-correction (see 27.5.2.3 (STA behavior)). The format of the subfield is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 4).*(#4740, 8162)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B4 | B5 | B6            B7 |
|  | UL Power Headroom | Minimum Transmit Power Flag | Reserved |
| Bits: | 5 | 1 | 2 |
| * Control Information subfield format when the Control ID subfield is 4*(#8647)* | | | |

The UL Power Headroom subfield indicates the available power headroom in units of dB, for the current MCS. The resolution for the UL power headroom reported in UL Power Headroom subfield is 1 dB. The UL Power Headroom subfield carries a value 0 to 31 that maps to 0 dB to 31 dB.*(#8647)*

The Minimum Transmit Power Flag subfield indicates that the minimum transmit power for the current MCS is reached by the STA. The Minimum Transmit Power Flag subfield is set to 1 to indicate that the minimum transmit power for the current MCS is reached by the STA and set to 0 otherwise.*(#8647)*

**27.5.2 UL MU operation**

**27.5.2.3 STA behavior**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7887, 5013, 5014):***

A STA that is an intended receiver of a Trigger frame that is not a Basic Trigger frame shall construct the A-MPDU carried in the HE trigger-based PPDU as defined in 9-428 (A-MPDU contents MPDUs in the control response context). A STA that is an intended receiver of a Basic Trigger frame may include MPDUs with any TID in the HE trigger-based PPDU sent in response to a Trigger frame subject the rules of 27.10.4 (A-MPDU with multiple TIDs).

NOTE 1—An AP can include other MPDUs in a soliciting DL MU PPDU that contains Trigger frames as specified in 9.7.3 (A-MPDU contents).

NOTE 2—The frame type of MPDUs may be different across A-MPDUs within a same HE trigger-based PPDU..

Aaor is the intended receiver of an UMRS Control field the dB value of its p,, Tsent in response 7xx

(27-xx)

the the Tthe the TThe STA shall indicate its in the UL Power Headroom subfield of the UPH Control field included the T (see)The STA shall set Minimum Transmit Power Flag subfieldif it intends to it T

The STA shall include an HT Control field containing the UPH Control field in MPDUs carried in the A-MPDU of the HE Trigger-based PPDU except when:

* The remaining space in the A-MPDU, after inclusion of solicited MPDUs that cannot contain an HE Control field, is not sufficient to contain MPDU(s) that contain an HT Control field
* The STA includes other Control fields in the HT Control field and the available space in the HT Control field is not sufficient to contain an additional UPH Control field.*(#7887, 5013, 5014)*
* Transmit requirements for an HE trigger-based PPDU
* Power pre-correction

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7887, 5013, 5014):***

The UL transmit power of HE trigger-based PPDU is further subject to a STA's minimum and maximum transmit power limit due to hardware capability, regulatory requirements and local maximum transmit power levels (see 11.8.5 (Specification of regulatory and local maximum transmit power levels)) as well as non-802.11 in-device coexistence requirements.

Each STA that is scheduled in a Trigger frame includes its UL power headroom in the HE Trigger-based PPDU following the rules defined in 27.5.2.3 (STA behavior).



*(#7887, 5013, 5014)*

**10.9 HT Control field operation**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 8162):***

An HE variant HT Control field shall not be present in a frame addressed to a STA unless that STA declares support for +HTC-HE in the HE Capabilities Information field of its HE Capabilities element. The HE variant HT Control field carried in the frame may contain a Control subfield supported by the intended receiver that has:

* A value of 0 in the Control ID subfield when the transmitting STA expects an HE trigger-based PPDU that carries an immediate acknowledgement, as described in 27.5.2 (UL MU operation).
* A value of 1 in the Control ID subfield when the transmitting STA changes the receive operating mode, as described in 27.8 (Operating mode indication). — A value of 2 in the Control ID subfield when the transmitting STA follows the HE link adaptation procedure, as described in 10.31.4 (Link adaptation using the HE variant HT Control field).
* A value of 3 in the Control ID subfield when the transmitting STA follows the corresponding buffer status report procedure, as described in 27.5.2.5 (HE buffer status feedback operation for UL MU)
* A value of 4 in the Control ID subfield when the transmitting STA follows the UL MU operation procedure, as described in 27.5.2.2.3 (STA behavior). *(#8162)*

**9.2.4.1.10 +HTC/Order subfield**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7887, 5013, 5014):***

The +HTC/Order subfield is 1 bit in length. It is used for two purposes:

* It is set to 1 in a non-QoS Data frame transmitted by a non-QoS STA to indicate that the frame contains an MSDU, or fragment thereof, that is being transferred using the StrictlyOrdered service class.
* It is set to 1 in a QoS Data, QoS Null, or Management frame transmitted with a value of HT\_GF, HT\_MF, or VHT for the FORMAT parameter of the TXVECTOR to indicate that the frame contains an HT Control field. .*(#7887, 5013, 5014)*

# PARS VIII (9.2.4.6.4.7)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3005 | Abhishek Patil | 28 | 6 | From the Table it is not clear if only Bit 0 can be set to 1 to indicate 20 MHz is available or any one of the bits can be set to indicate that that 20 MHz is available. Same is true for 40 and 80 MHz. | Presentation to be provided which would provide a mechanism to either consolidate the bits or provide more functionality and granularity. | Revised –  Agree in principle with the comment. Proposed resolution indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3005. |
| 3147 | Adrian Stephens | 28 | 53 | "may not" is ambiguous | Replace "may" with "might" | Revised –  Agree with commenter. Removed the note as part of the rearrangement of the table, as suggested by other CIDs. The “may not” is now removed.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3147. |
| 3157 | Ahmadreza Hedayat | 27 | 45 | Need to specify whether the BQR is reported based on PD or ED, or e.g. current OBSS-PD or its min defalut value etc. | Specify for what thershold and for what type of channel sensing the BQR report is mesured and reported. | Revised –  Agree in principle with the comment. Proposed resolution indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3157. |
| 3158 | Ahmadreza Hedayat | 27 | 64 | The BQR could help both UL MU and DL MU, so the following need to be revised: "Bandwidth Query Report used for bandwidth query report operation to assist DL HE MU transmission" | "Bandwidth Query Report used for bandwidth query report operation to assist DL HE MU transmission and scheduling of UL MU transmission" | Revised –  Agree in principle that the information provided by the STA in the BQR can be used by the AP to schedule both DL and UL MU transmissions. Incorporated the suggested changes.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3158. |
| 3159 | Ahmadreza Hedayat | 28 | 6 | Table 9-18d is too verbose. The content of this table can be described in a simpler way such as: "Set B\_i to 1 if the i\_th lower frequency 20MHz channel is available, set to 0 if the 20MHz channel is not available or if its channel availability is not measured". | Suggest to use a simpler description of the content of this table | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3159. |
| 4738 | Alfred Asterjadhi | 28 | 6 | Having the mapping as a table didn't actually help in removing the redundancy and providiing a concise definition of this field. Perhaps better to specify the bit locations settings as a function of the operating channel width. In any case think of finding a way to put this in a more concise way. Also remove the "may" in the note as normative verbs cannot be placed in clause 9. Also remove "section", and add full subclause, and figure titles to the references in the note. | As in comment. | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 4738. |
| 5013 | Chao Chun Wang |  |  | For BSR, trigger frame can using the type of BSRP to query the necessary information by AP itself. However, there is no trigger type for "UL power headroom" | Spec should define a new type for "UL power headroom". With this type, AP can decide when to query A-Control with this value by itself, rather than event-driven report by STA. | Revised –  While buffer status report can be an event driven report, the reporting of the UL power headroom is expected to be done by the STA as often as possible. In fact in 28.3.14.2 (Power pre-correction) it is specified that the STA transmits the UPH in the HE Trigger-based PPDUs (essentially in every of them). In order to clearly indicate when and how often (in terms of normative behavior) the proposed resolution is to clearly state the rules that the STA follows to deliver UPH in the MAC subclause.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 5013. |
| 5014 | Chao Chun Wang |  |  | For BQR, trigger frame can using the type of BQRP to query the necessary information by AP itself. However, there is no trigger type for "UL power headroom" 1) Spec should define a new type for "UL power headroom". With this type, AP can decide when to query A-Control with this value by itself, rather than event-driven report by STA. | Spec should define a new type for "UL power headroom". With this type, AP can decide when to query A-Control with this value by itself, rather than event-driven report by STA. | Revised –  While bandwidth query report is an event driven report, the reporting of the UL power headroom is expected to be done by the STA as often as possible. In fact in 28.3.14.2 (Power pre-correction) it is specified that the STA transmits the UPH in the HE Trigger-based PPDUs (essentially in every of them). In order to clearly indicate when and how often (in terms of normative behavior) the proposed resolution is to clearly state the rules that the STA follows to deliver UPH in the MAC subclause.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 5014. |
| 5127 | Dorothy Stanley | 27 | 47 | Regarding "Bandwidth Query report operation to assist HE DL HE MU transmission", why is this report for DL only? When the AP schedules RUs to clients in uplink, wouldn't it be important to know uplink 20 MHz sub-channel availability around the client? | Modify BQR accordingly | Revised –  Agree in principle that the information provided by the STA in the BQR can be used by the AP to schedule both DL and UL MU transmissions. Incorporated the suggested changes.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 5127. |
| 5444 | Graham Smith | 27 | 57 | Increase Reserved bit number to make length 30 bits | Figure 9-15h change Reserved bits from 2 to 22 | Rejected –  The comment fails to identify a technical issue. Increasing the number of reserved bits to 30 bits eliminates the possibility of aggregating more than one Control field and reduces the amount of useful information that can be carried by the HT Control field for different features, consequently reducing the flexibility and usefulness. It also causes to exceed the length of the HT Control field. |
| 6191 | Jin-Sam Kwak | 28 | 1 | How an non-AP STA chooses each available channel bitmap subfield encoding (20/40/80/160) when reporting BQR in solicited/unsolicited modes? There should be a rule for BQR's BW bitmap selection. | As in comment. | Revised –  Agree in principle with the comment. Proposed resolution indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 6191. |
| 7015 | Ju-Hyung Son | 28 | 1 | In Table 9-18d, need to specify the meaning of the bandwidth column (20MHz, 40MHz, 80MHz, 160MHz and 80+80MHz). How a non-AP STA choose each BW column when transmitting BQR in solicited and unsolicited mode respectively? | As per comment. | Revised –  Agree in principle with the comment. Proposed resolution indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7015. |
| 7016 | Ju-Hyung Son | 28 | 27 | The currrent PHY-CCA.indication primitive only provides CCA results of primary, secondary, secondary40 within Primary 80MHz. In order to support individual 20MHz CCA results within secondary40, additional PHY-CCA.indication primitives should be defined. | Please specify the additional PHY-CCA.indication primitives indicating channel availability of each 20MHz channel in secondary40 for BQR. | Revised –  Agree in principle with the comment. Proposed resolution removes dependency from primary/secondary concept, indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7016. |
| 7017 | Ju-Hyung Son | 28 | 38 | The currrent PHY-CCA.indication primitive only provides CCA results of primary, secondary, secondary40, secondary80 within Primary 160MHz(80+80MHz). In order to support individual 20MHz CCA results within secondary40 and secondary80, additional PHY-CCA.indication primitives should be defined. | Please specify the additional PHY-CCA.indication primitives indicating channel availability of each 20MHz channel in secondary40 and secondary80 for BQR. | Revised –  Agree in principle with the comment. Proposed resolution removes dependency from primary/secondary concept, indicates dependency to the operating channel width at the STA and adds reference to CCA-ED rules for availability determination. The 20MHz bitmap in the primitive is already defined in 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7017. |
| 7018 | Ju-Hyung Son | 28 | 1 | When a non-AP STA transmits BQR in HE SU PPDU, BQR would be useful only if the Available Channel Bitmap indicates larger BW than the BW of the transmitted HE SU PPDU. For example, if a non-AP STA trasmits BQR in 40MHz PPDU (40MHz is idle), BQR would be useful only if the Bitmap indicates 80MHz or 160MHz channel availability. | Please clarify the BW of Available Channel Bitmap setting in unsolicited BQR. | Revised –  Agree in principle with the comment that need clarification. Proposed resolution specifies that depends on the operating channel width of the STA transmitting BQR.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7018. |
| 7019 | Ju-Hyung Son | 28 | 1 | How a non-AP STA chooses the type of available CH bitmap in Table 9-18d when sending BQR in HE Trigger-based PPDU? Is it based on the BW of HE Trigger-based PPDU that contains BQR? Is it based on the allocated RU for each STA in HE Trigger-based PPDU? | Please clarify the BW of Available Channel Bitmap setting in solicited BQR. | Revised –  Agree in principle with the comment that need clarification. Proposed resolution specifies that depends on the operating channel width of the STA transmitting BQR.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7019. |
| 7380 | Laurent Cariou | 27 | 47 | "HE DL HE MU transmission" should be "HE DL MU transmission | Same as comment | Accepted |
| 7472 | Lei Huang | 28 | 53 | "Figure 8-1" and "Figure 8-2" in section 8.3.5.12.2 cannot be found. Please provide the correct reference. | As per comment | Revised –  Proposed resolution is to remove the table and references therein.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7472. |
| 7570 | Liwen Chu | 27 | 63 | Change "assist HE DL HE MU transmission" to "assist HE DL and UL HE MU transmission" | As in comment | Revised –  Replaced with “HE MU transmission” so that it is generic enough in this subclause; the explicit indication of DL MU and UL MU operation can be found in subclause 27.5.1.3, quoting:  “A non-AP STA with A-BQR Support subfield of its HE Capabilities element equal to 1 delivers bandwidth  query reports (BQRs) to assist the AP in allocating DL MU and UL MU resources in an efficient way.”  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7570. |
| 7720 | Mark Hamilton | 28 | 53 | Use of "may" in a NOTE | Change "may" to "might" | Revised –  Agree with comment. The table is deleted, including the note.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 7720. |
| 8182 | Osama Aboulmagd | 28 | 8 | In table 9-18d, what does it mean "channel is available"? Does it mean the STA is capable of receiving PPDU at the specified BW? Or does it mean the channel was sensed to be free using carrier sensing? | clarify | Revised –  Agree in principle with the comment. Proposed resolution is to clarify the intention, inline with second observation of the comment, using carrier sensing, (ED) and as proposed by 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8182. |
| 8183 | Osama Aboulmagd | 27 | 42 | The operation of the BQR is not clear as described later in the draft. Does this operation intended to replace the dynamic BW operation in VHT? | clarify | Rejected –  The comment fails to provide sufficient details regarding changes that would satisfy the comment. Normative behavior for BQR operation is provided in 27.5.1.3 (HE bandwidth query report operating for DL MU), and expectation is that comment resolution of CIDs located in that subclaus will clarify any ambiguity on the operation. Also the BQR operation is not intended to replace dynamic BW operation. |
| 8184 | Osama Aboulmagd | 28 | 8 | The channel indications in table 9-18d, is there a relationship to primary and secondary channels? The language is all over the place. | clarify | Revised –  Agree in principle with the comment. Proposed resolution is to clarify that there is no relationship with the primary/secondary (removed the Table), but rather on the operating channel width at the STA transmitting the BQR (added in description). Also the description is made such that it is inline with another approved document that relates to this subject 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8184. |
| 8250 | Pascal VIGER | 28 | 10 | HE STA may report the channel availability information in the BQR A-Control subfield of frames it transmits if the AP. Is it possible to inform of the un-availability of the primary 20MHz channel ? In other words, is first row named '20 MHz' effective ? | need clarification | Revised –  Yes, it is possible to inform unavailability of the primary 20MHz channel. The AP can determine that the primary 20MHz channel is unavailable for one STA, for which it allocates the DL RU in a non-primary 20Mhz. And it can allocate other STAs in that primary 20Mhz. Proposed resolution reorganizes the definition of this field to make it clearer.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8250. |
| 8334 | Peter Khoury | 28 |  | There should be some objective measure of whether a channel is available or not in the Bandwidth Query Report. | State either that the channel power should be less than -72dBm or make a reference to a preexisting level specified in the baseline. | Revised –  Agree in principle with the comment. The CCA rules were added to the draft as part of comment resolutions provided by 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing. Proposed resolution is to add a reference to the subclause where these rules are defined.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8334. |
| 8374 | Po-Kai Huang | 28 | 6 | It is not clear what does the first row of Table 9-18d represent. The bandwidth shall be the operating bandwidth of the STA. | Add "based on the operating bandwidth of the STA" at the end of "The Available Channel Bitmap subfield encoding is defined in Table 9-18d (Available Channel Bitmap subfield encoding)." | Revised –  Agree in principle. Proposed resolution is to clarify that the subchannels are a function of the operating channel width at the STA that transmitted the BQR, as suggested by the comment.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 8374. |
| 9397 | Woojin Ahn | 28 | 5 | When a non-AP STA transmits unsolicited BQR A-control, what kind of encoding type should the STA select? All encoding types other than 160 and 80+80 doesn't seem necessary. | Please clarify | Revised –  Agree in principle. Proposed resolution is to clarify that the subchannels are a function of the operating channel width at the STA that transmitted the BQR.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 9397. |
| 9807 | Young Hoon Kwon | 27 | 64 | Duplicated sentence. | Delete the sentence "Bandwidth Query Report used for bandwidth query report operation to assist DL HE MU transmission (see 25.5.1.3. (Bandwidth query report operation).". | Accepted |
| 9808 | Young Hoon Kwon | 28 | 6 | In Table 9-18d, each bit is set to 1 when corresponding channel is available. However, there's no clear definition in which case the channel is available. For example, it is not clear which CCA rule is applied in determining the channel availability. (ED, SD, Mid-Pkt detection, OBSS-PD based SR, etc). Also, it is not clear the measurement period for the decision on this. (E.g., Use of ED results measured during SIFS before transmitting a PPDU that contains this A-Control field.) | Per comment, please clarify how to determine the channel availability. | Revised –  Agree in principle with the comment. The CCA rules were added to the draft as part of comment resolutions provided by 11-17-0060-03-00ax-comment-resolution-for-the-cca-of-preamble-puncturing. Proposed resolution is to add a reference to the subclause where these rules are defined.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 9808. |
| 10339 | Oghenekome Oteri | 27 | 64 | Statement: (see 25.5.1.3 (Bandwidth Query report operation for HE DL MU) is not found | Update specification to add reference. | Revised –  Agree with commenter. The cited sentence is removed due to redundancy with preceding paragraph. As a consequence the reference is also removed.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 10339. |

**Discussion: *None.***

* Bandwidth Query Report (BQR)

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

The Control Information subfield, when the Control ID subfield is 5, contains the Bandwidth Query Report used for Bandwidth Query report operation to assist HE MU transmission*(#7570, 7380, 5127, 3158)* (see 27.5.1.3 (HE bandwidth query report operation for MU)). The format of the subfield is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 5). *(#4740)*

|  |  |  |
| --- | --- | --- |
|  | B0 B7 | B8            B9 |
|  | Available Channel Bitmap | Reserved |
| Bits: | 8 | 2 |
| * Control Information subfield format when the Control ID subfield is 5 | | |

The Available Channel Bitmap subfield contains a bitmap indicating which subchannels from the operating channel width are available at the STA transmitting the BQR*(#9397, 8374, 7019, 7018)*. Each bit in the bitmap corresponds to a 20 MHz subchannel for the band of the BSS that the STA is associated with, with the LSB corresponding to the lowest numbered operating subchannel of the BSS. The bit in position *X* in the bitmap is set to 1 to indicate that the subchannel *X+1* is idle; otherwise it is set to 0 to indicate that the subchannel is busy or unavailable. Availability of each 20 MHz subchannel is based on CCA-ED rules which are defined in 28.3.17.6.2 (CCA sensitivity for operating classes requiring CCA-ED).*(#9808, 8334, 8250, 8184, 8182, 7017, 7016, 7015, 6191, 4738, 3159, 3157, 3005)*

*(#9807, 10339)*



*(#8184, 7720, 7472, 4738, 3159, 3147)*

**TGax Editor: *Change the heading below of this subclause as follows (3158, 5127):***

**27.5.1.3 HE bandwidth query report operation for MU***(#3158, 5127)*

# PARS IX (9.2.4.6.4.8)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3156 | Ahmadreza Hedayat | 28 | 58 | Why there is a 6-bit rsereved subfield in RDP? If it is for the purpose of byte-alignment, then need to consider that there is a Control ID of 4 bits for RDP, leading to total of 10 bits. | Either remove the reserved bits, or update the reserved subfield for what it was intended for. | Revised –  Having 6 bits is indeed an overkill (credit to Young Hoon for the fancy term (CID 9812). Generally we leave a couple of bits reserved for a particular feature unless the feature is unstable (see HE Link Adaptation), which is not the case for RDP operation. The proposed resolution is to leave 3 bits reserved, so that there is sufficient bits for future use but also limit the size of this control field to a reasonable level.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 3156. |
| 3160 | Ahmadreza Hedayat | 28 | 58 | In HE, a STA may grant a RD to its AP and the AP may use it to schedule UL MU transmission, which may include the STA or not. So there should be additional indications where a STA can indicate whether RD grant shall not be used for UL MU transmission, and if so whether the UL MU transmissions shall include the STA (i.e. the AP shall serve the STA during UL MU). | As in the comment | Rejected –  The comment fails to identify a technical issue. Allowing the AP to take over the TXOP for allocating resources to other STAs (in UL MU allocations) may cause issues as it additionally increases unfairness (AP unfairly uses a TXOP gained by a STA to serve other STAs, while STAs in the STA’s surrounding are waiting for the STA to finish its exchange), and also it would burden the STA itself, as it is the TXOP owner but need to be awake while the AP transmts to other STAs, wasting power. |
| 3384 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 3491 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Duplicate of 3384.  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 3822 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Duplicate of 3384.  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 3907 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Duplicate of 3384.  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 4371 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Duplicate of 3384.  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 4439 | Albert Petrick | 28 | 60 | The bits in Table 9-15i should be called in the text for clarification. | Add the following underlined text. The Control Information 8-bit subfield for the RDP Trigger frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6), 6-bits (B2-B7) are reserved. The AC Constraint subfield bit (B0) of the RDP field indicates whether the mapped AC of an RD Data frame is constrained to a single AC, and is defined in Table 9-10 (AC Constraint subfield values), except that if B0 equals a value of 1 indicates that the response from an HE STA contains Data frames from the same AC or higher AC as defined in 10.28.4 (Rules for RD responder). The RDG/More PPDU subfield bit (B1) is defined in Table 9-11 (RDG/More PPDU subfield values). | Rejected –  Duplicate of 3384.  Disagree with the comment. The Frame format depicted in Figure 9-15i (Control Information subfield format) already shows the length of each subfield. Adding it to the sentences would add unnecessary redundancy. Same observation for the bit locations, which are also shown in the Figure. |
| 4740 | Alfred Asterjadhi | 28 | 60 | Suggest to rephase the first two paragraphs of this subclause as follows: "The Control Information subfield, when the Control ID subfield is 6, contains reverse direction information used by HE STAs for RDP operation (see 10.28 (Reverse direction protocol)).  The AC Constraint subfield is defined in Table 9-10 (AC Constraint subfield values), except that a value of 1 indicates to an HE STA that the response can contain RD Data frames from the same or higher AC(s), as defined in 10.28.4 (Rules for RD responder). | As in comment. | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes. In addition the resolution is to keep a sentence that refers the subfield format (for all these subfields).  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 4740. |
| 5445 | Graham Smith | 29 | 6 | Increase Reserved bit number to make length 30 bits | Figure 9-15i change Reserved bits from 6 to 28 | Rejected –  The comment fails to identify a technical issue. Increasing the number of reserved bits to 30 bits eliminates the possibility of aggregating more than one Control field and reduces the amount of useful information that can be carried by the HT Control field for different features, consequently reducing the flexibility and usefulness. It also causes to exceed the length of the HT Control field. |
| 7020 | Ju-Hyung Son | 28 | 60 | RDP Trigger frame is not exist | Change from "RDP Trigger frame" to "RDP" | Accepted |
| 7473 | Lei Huang | 28 | 60 | "RDP Trigger frame" should be changed to "RDP Control subfield". | As per comment | Revised –  Agree. Same resolution as proposed by CID 7020.  Change “RDP Trigger frame” to “RDP”. |
| 8185 | Osama Aboulmagd | 28 | 60 | What an RDP Trigger frame is? It doesn't seem to be defined | Define if needed | Revised –  Agree. Same resolution as proposed by CID 7020.  Change “RDP Trigger frame” to “RDP”. |
| 8375 | Po-Kai Huang | 28 | 60 | RDP Trigger frame is not defined anywhere in the spec. The term Trigger frame may also be misleading because the response from RDP responder is not carried in HE TB PPDU. | Simply use "for the RDP" and delete "Trigger frame." | Revised –  Agree. Same resolution as proposed by CID 7020.  Change “RDP Trigger frame” to “RDP”. |
| 9809 | Young Hoon Kwon | 28 | 60 | This is not for a Trigger frame. | Modify the sentence to "The Control Information subfield for Reverse Direction Protocol (RDP) is shown in Figure 9-15i ...". | Revised –  Agree. Same resolution as proposed by CID 7020.  Change “RDP Trigger frame” to “RDP”. |
| 9810 | Young Hoon Kwon | 29 | 12 | It is not clear how to decide the AC for response frame if the last Data frames are from multiple TIDs. Need to clarify how to decide the available ACs when the last data frame is multi-TID frame. | Per comment. | Revised –  Agree in principle with the commenter. This part has been clarified in the normative behavior subclause in the comment resolution document 11-17/0191r5. Proposed resolution is the same as the one proposed by that document, quoting:  “If the AC Constraint subfield is equal to 1 in the last frame received from the RD initiator;  -The non-HE RD responder shall transmit same Data frames of only the AC as the last frame received from the RD initiator, while the.  -The HE RD responder may transmit an A-MPDU or multi-TID A-MPDU with MPDUs from one or more ACs that have a priority that is equal to or higher than the lowest priority AC of the MPDU(s) carried in the last PPDU received from the RD initiator (see 10.13(A-MPDU operation) and when the RD initiator is an HE STA subject to the additional rules defined in 27.10.4(A-MPDU with multiple TID).”  NOTE TO EDITOR: This is a reference to an external document. No changes are included in this resolution.  TGax editor to make the changes shown in 11-17/0191r5 under all headings that include CID 6981, 673, 9866. |
| 9811 | Young Hoon Kwon | 29 | 15 | In legacy RDG case, as RDG/More PPDU subfield is included in every HT Control field, so it is needed to explicitly indicate RDG status. However, for 11ax device, RDP variant A-Control field does not need to exist in every A-Control field. Therefore, having RDP variant A-Control field itselt can implicitly indicate. For example, if RDP variant A-Control field is included in the A-Control field from an RD initiator can indicate that "An RDG is present." Otherwise, "No reverse grant.". In this sense, having additional bit for "RDG/More PPDU" is not helpful. | Per comment. | Revised –  Agree with comment. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 9811. |
| 9812 | Young Hoon Kwon | 29 | 8 | It is not clear why this field needs 6 reserved bits. This field only has 2 meaningful bits. And having 6 bits of reserved bits is somewhat overkill. Also, as is shown in other variant A-Control field, byte-matching is not needed. | Per comment. | Revised –  Having 6 bits is indeed an overkill. Generally we leave a couple of bits reserved for a particular feature unless the feature is unstable (see HE Link Adaptation), which is not the case for RDP operation. The proposed resolution is to leave 3 bits reserved, so that there is sufficient bits for future use but also limit the size of this control field to a reasonable level.  TGax editor to make the changes shown in 11-17/0240r0 under all headings that include CID 9812. |

## Discussion: *None.*

* General

**TGax Editor: *Change the table below as follows (#CID 9812):***

|  |  |  |  |
| --- | --- | --- | --- |
| * Control ID subfield values | | | |
| Control ID value | Meaning | Length of the Control Information subfield (bits) | Content of the Control Information subfield |
| 0 | UL MU response scheduling | 26 | See 9.2.4.6.4.2 (UL MU response scheduling) |
| 1 | Operating Mode | 12 | See 9.2.4.6.4.3 (Operating Mode) |
| 2 | HE link adaptation | 16 | See 9.2.4.6.4.4 (HE link adaptation) |
| 3 | Buffer Status Report (BSR) | 26 | See 9.2.4.6.4.5 (Buffer Status Report (BSR)) |
| 4 | UL Power Headroom | 8 | See 9.2.4.6.4.6 (UL power headroom) |
| 5 | Bandwidth Query Report (BQR) | 10 | See 9.2.4.6.4.7 (Bandwidth Query Report (BQR)) |
| 6 | Reverse Direction Protocol (RDP) | 4*(#9812, 3156)* | See 9.2.4.6.4.8 (Reverse direction protocol (RDP)) |
| 7-15 | Reserved |  |  |

* Reverse direction protocol (RDP)

**TGax Editor: *Change the paragraphs below as follows (#CID 7020, 7473, 8185, 8375, 9809, 4740, 9811, 9812, 3156):***

The Control Information subfield, when the Control ID subfield is 6, contains reverse direction information used by HE STAs for RDP*(#7020, 7473, 8185, 8375, 9809)* operation (see 10.28 (Reverse direction protocol)). The format of the subfield is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6). *(#4740)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 B3 |  |
|  | AC Constraint | Reserved |  |
| Bits: | 1 | 3 |  |
| * Control Information subfield format when the Control ID subfield is 6*(#9811, 9812, 3156)* | | | |

The AC Constraint subfield is defined in Table 9-10 (AC Constraint subfield values), , except that a value of 1 indicates to an HE STA that the response can contain RD Data frames from the same AC or higher AC(s), as defined in 10.28.4 (Rules for RD responder).*(#4740)*

*(#9811)*

**10.28.3 Rules for RD initiator**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 9811):***

Transmission of a +HTC or DMG frame by an RD initiator with the RDG/More PPDU subfield equal to 1 (either transmitted as a non-A-MPDU frame, as a VHT single MPDU, or within an A-MPDU) indicates that the duration indicated by the Duration/ID field is available for the RD response burst and RD initiator final PPDU (if present). Transmission of an MPDU by an HE RD initiator that contains an RDP Control field indicates that the duration indicated by the Duration/ID field is available for the RD resposnse burst and RD initiator final PPDU (if present).

*(#9811)*

An RD initiator that sets the RDG/More PPDU field to 1 in a +HTC or DMG frame transmitted during a TXOP shall set the AC Constraint subfield to 1 in that frame if the TXOP was gained through the EDCA channel access mechanism and shall otherwise set it to 0. An RD initiator that sets the RDG/More PPDU field to 1 in a DMG frame transmitted during an SP can set the AC Constraint subfield to 1 to limit the Data frames transmitted by the RD responder. An HE non-AP STA RD initiator that includes an RDP Control field in a frame transmitted during a TXOP shall set the AC Constraint subfield of the RDP Control field to 1, while an HE AP RD initiator may set the AC Constraint subfield to 1.*(#9811)*

# PARS X (10.1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6965 | Joseph Levy | 127.64 | Why is it a requirement that an HE STA not send a Control Wrapper frame to another ED STA? Since most HE STAs will also be HT and VHT STAs and can process a Control Wrapper frame, why the restriction? | Remove this requirement: "An HE STA shall not send a Control Wrapper frame to another HE STA." | Rejected –  Control wrapper frames for HT and VHT STAs were sent as part of the link adaptation operation which was optional in RX. As such HT and VHT STAs are not expected to process +HTC Control frames. Due to increased complexity in processing this frames (A1, A2 location in the frame is not inline with other frames), and limited benefit, the intention is to not allow the generation of these +HTC frames from an HE STA. an HE STA can always generate other types of frames that carry it such as Qos Data, QoS Null, Management, and this covers all cases of interest for 11ax. |

## Discussion: *None.*