IEEE P802.11  
Wireless LANs

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| --- | --- | --- | --- | --- |
| Comment resolutions for HT Control field (9.2.4.6.X and 10.1) – Block 1 | | | | |
| 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 (41 CIDs):

* 3004, 4725, 5436, 7715, 8175 (5 CIDs)
* 3378, 3483, 3812, 3896, 4358, 4425, 4727, 5025, 5438, 7471, 7713, 7714, 8176, 8643, 8644, 9801, 9984 (17 CIDs)
* 3153, 3381, 3487, 3817, 3902, 4365, 4433, 4734, 5051, 5122, 5123, 5439, 8177, 8645, 8646, 10334, 10335, 10336, 10337 (19 CIDs)

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updated the resolutins to be inline with IEEE802.11ax D1.1 (changes in green).
* Rev 2: Comments incorporated during discussion (changes in this color).

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 I (9.2.4.6.1 and 9.2.4.6.2)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3004 | Abhishek Patil | 22 | 59 | Add a sentence in the description that says the combined size shall not exceed 30 bits. | Update sentence as follows: "The A-Control subfield contains a sequence of one or more Control subfields whose combined length does not exceed 30 bits." | Revised –  The HT Control field is 32 bits long, of which 2 bits are used for HT/VHT/HE differentiation, and the other 30 bits are used for A-Control. It is already clear that the length of the A-Control field cannot exceed 30 bits, due to the 4-byte length of the HT Control field carrying it.  Proposed resolution is located in Pars II of the document.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 3004. |
| 4725 | Alfred Asterjadhi | 21 | 60 | Table 9-9a already shows what this paragraph is defining as such it is redundant. | Remove the paragraph in P21L60-65. | Revised –  This paragraph describes the setting of the VHT and HE subfields of the HT Control field, as such not all of it is redundant. The proposed resolution is to remove any redundancy (i.e., bit locations that are already provided in the table).  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 4725. |
| 5436 | Graham Smith | 21 | 60 | "The VHT subfield, which is B0 of the HT Control field, and the HE subfield, which is B1 of the HT Control field, indicate the variant of the HT Control field." The HE subfield is not present in the HT variant, therefore this 'further' indicates the varaint. | Replace ", indicate" with ",further indicates" | Revised –  Agree in principle. Proposed resolution is to specify “if present”.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 5436. |
| 7715 | Mark Hamilton | 24 | 24 | Can refers to normative permission, not appropriate in this note | Change "can not satisfy" to "is unable to satisfy" | Accepted  Proposed resolution is located in Pars III of the document. |
| 8175 | Osama Aboulmagd | 21 | 62 | The rule at the end of page 21, "The VHT subfield is set to 1 and the HE subfield is set to 0 to indicate VHT variant...". Actually a VHT device wouldn't care what the value of the so called "HE subfield" is since it is a reserved bit. Therefore it seems to me that any VHT device will always interpret the HT control field as a VHT variant as long as VHT field is set to 1. | need to define precisely the behaviour of a VHT device in this case, espcially when bit 0 and bit 1 are set to 1 and 1. Does this rle requires changing VHT devices already deployed? | Rejected –  The commenters reasoning is correct. However all these behaviors are already defined in clause 10.9 (HT Control field operation) where, among other things, it is specified that a particular variant of HT Control field is included in MPDUs intended to recipients that support reception of that particular variant.  Quoting from 10.9:  “A VHT variant HT Control field shall not be present in a frame addressed to a STA unless that STA declares support for +HTC-VHT in the VHT Capabilities Information field of its VHT Capabilities element.”  …  “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.”  No further changes are needed to the draft. |

## Discussion: *None.*

* HT Control field
* General

Remove Figure 9-8 (HT Control field).

Insert Table 9-9a as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| * HT Control field | | | | | |
| Variant | Bit 0 (value) | Bit 1 (value) | Bit 2-29 | Bit 30 | Bit 31 |
| HT variant | VHT (0) | HT Control Middle | | AC Constraint | RDG/More PPDU |
| VHT variant | VHT (1) | HE (0) | VHT Control Middle | AC Constraint | RDG/More PPDU |
| HE variant | VHT (1) | HE (1) | Aggregated Control | | |

Change the paragraphs below of 9.2.4.6.1 as follows:

The HT Control field has ~~two~~ three forms~~,~~: the HT variant, ~~and~~ the VHT variant, and the HE variant. These forms differ in the values of the VHT and HE subfields and in their formats, which are shown in Table 9-9a (HT Control field). ~~The two forms differ in the format of the HT Control Middle subfield, described in 9.2.4.6.2 (HT variant) for the HT variant and in 9.2.4.6.3 (VHT variant) for the VHT variant and in the value of the VHT subfield.~~

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 4725, 5436):***

The VHT subfield together with the HE subfield, if present,*(#4725, 5436)* indicate the variant of the HT Control field. The VHT subfield is set to 0 to indicate an HT variant HT Control field. The VHT subfield is set to 1 and the HE subfield is set to 0 to indicate a VHT variant HT Control field. The VHT subfield is set to 1 and the HE subfield is set to 1 to indicate an HE variant HT Control field.

The HT Control Middle subfield is defined in 9.2.4.6.2 (HT variant) and the VHT Control Middle subfield is defined in 9.2.4.6.3 (VHT variant).

The Aggregated Control subfield is defined in 9.2.4.6.4 (A-Control).

~~The VHT subfield of the HT Control field indicates whether the HT Control Middle subfield is the VHT Variant or the HT Variant. The VHT subfield is set to 1 to indicate that the HT Control Middle subfield is the VHT Variant and is set to 0 to indicate that the HT Control Middle subfield is the HT Variant.~~

# PARS II (9.2.4.6.4 and 9.2.4.6.4.1)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3378 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is (DELETE defined) [ADD TEXT: shown] in Figure 9-15b (Control subfield format). [DELETE SENTENCE: The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.]  The Control ID subfield [ADD TEXT: as shown in Figure 9-15b (Control subfield format) is 4-bits in length and] indicates the type of information carried in the Control Information subfield. The [ADD TEXT: bit] length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values).[ADD SENTENCE: There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2.] | Revised –  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 3378. |
| 3483 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following underlined text (without the underline), and remove the strikethrough text from lines 59 to 65 on page 22 and lines 11 - 12 to read as follows:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined shown in Figure 9-15b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.  The Control ID subfield as shown in Figure 9-15b (Control subfield format) is 4-bits in length and indicates the type of information carried in the Control Information subfield. The bit length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values). There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2. | Revised –  Duplicate of CID 3378.  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 3483. |
| 3812 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following underlined text (without the underline), and remove the strikethrough text from lines 59 to 65 on page 22 and lines 11 - 12 to read as follows:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined shown in Figure 9-15b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.  The Control ID subfield as shown in Figure 9-15b (Control subfield format) is 4-bits in length and indicates the type of information carried in the Control Information subfield. The bit length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values). There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2. | Revised –  Duplicate of CID 3378.  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 3812. |
| 3896 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following underlined text (without the underline), and remove the strikethrough text from lines 59 to 65 on page 22 and lines 11 - 12 to read as follows:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined shown in Figure 9-15b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.  The Control ID subfield as shown in Figure 9-15b (Control subfield format) is 4-bits in length and indicates the type of information carried in the Control Information subfield. The bit length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values). There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2. | Revised –  Duplicate of CID 3378.  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 3896. |
| 4358 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following underlined text (without the underline), and remove the strikethrough text from lines 59 to 65 on page 22 and lines 11 - 12 to read as follows:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined shown in Figure 9-15b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.  The Control ID subfield as shown in Figure 9-15b (Control subfield format) is 4-bits in length and indicates the type of information carried in the Control Information subfield. The bit length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values). There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2. | Revised –  Duplicate of CID 3378.  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 4358. |
| 4425 | Albert Petrick | 22 | 59 | In clause A-Control 9.2.6.4 the text needs to clarify the bit length in the Control ID subfields, describe the sequence ordering and state how many Control IDs are defined and reserved. The text should flow with Table 9-15b, and Table 9-18a. | Add the following underlined text (without the underline), and remove the strikethrough text from lines 59 to 65 on page 22 and lines 11 - 12 to read as follows:  The A-Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined shown in Figure 9-15b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.  The Control ID subfield as shown in Figure 9-15b (Control subfield format) is 4-bits in length and indicates the type of information carried in the Control Information subfield. The bit length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values). There are 7 Control ID value sequences defined and 8 are reserved. For example, with Control ID subfield equal to 0, if present is the first subfield of the sequence corresponding to UL MU response scheduling as described in 9.2.4.6.4.2. | Revised –  Duplicate of CID 3378.  Disagree in principle with the comment. The length, and bit positions of the subfields are already provided in the Figures and Tables of this subclause, as such their addition is redundant. Also there is no need to specify unknown lengths, locations, or how many reserved combinations are since these are continually evolving, depending on the amendment development. Agree to remove the sentence related to the Control subfield with Control ID equal to 0. And also incorporated some editorial changes suggested by the comment.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 4425. |
| 4727 | Alfred Asterjadhi | 23 | 24 | Add acronyms for each of these Control fields so that it is easy to refer to them. 1) "UL MU Response Scheduling" => T"rigger-based Response Scheduling (TRS)", 2) Operating Mode (OM)", "HE Link Adaptation" => Link Adaptation (LA), 3) UL Power Headroom (UPH)". Use these acronyms, followed by "A-Control" throughout once defined here. | As in comment. | Revised –  Agree with comment. Proposed resolution is inline with the suggested changes.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 4727. |
| 5025 | Chittabrata Ghosh | 25 | 18 | Table 9-18a, Page 25, Line 18: Control ID value for RDP A-Control and corresponding content for control information is missing | Please add a Control ID for RDP A-Control | Revised –  The control ID is already present in the Table 9-18a. However the reference to the subclaue where it is defined is missing. Proposed resolution is to add the reference in the column.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 5025. |
| 5438 | Graham Smith | 23 | 44 | "The Padding subfield, if present, follows the last Control subfield and is set to a sequence of zeros so that the length of the A-Control subfield carried in the HT Control field is 30 bits." This is only carried in the HT Control field and the length is fixed to 30 bits. A look at the individual Control Information shows that they have reserved bits. Hence, surely each should simply have the necessary number of reserved bits to make them 30 bits in length. Then we use reserved bits in place of padding bits which is cleaner and also more flexible. | Remove the "Length..." column from Table 9-18a. Delete cited text. Note that for each of the Control information subfields the number of reserved bits is increased so tat the subfield is 30 bits. | 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. Padding is needed to fill in the rest of the HT control field, when the length of the added Control fields does not fill it. |
| 7471 | Lei Huang | 23 | 37 | The content for Control ID value of 6 is missing in Table 9-18a. | Add "See 9.2.4.6.4.8 (Reverse direction protocol (RDP))" for Control ID value of 6. | Accepted |
| 7713 | Mark Hamilton | 22 | 60 | Unnecessary constraint. If a Control subfield with Control ID equal to 0 (UL MU response scheduling) is present, then the entire Aggregated Control field is filled, so "first" is meaningless. | Delete the sentence "The Control subfield with Control ID subfield equal to 0, if present, is fhte first subfield of the sequence. | Accepted  Note to Editor: Already part of 802.11ax D1.1. |
| 7714 | Mark Hamilton | 22 | 60 | There is no clear constraint that all the Control subfields must have total length of 26 bits or less. | Add a sentence, "The total length of all Control subfields contained in the Aggregate Control subfield must be 26 bits or less." | Revised –  Agree in principle. Thought the length must be not more than 30 bits. Proposed resolution adds a sentence along the lines suggested by the commenter and CID 3004.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 7714. |
| 8176 | Osama Aboulmagd | 22 |  | A-Control needs to be defined | as in comment | Revised –  The A-Control is the acronym of the name of a field and needs not be defined. Proposed resolution is to add the acronym in subclause 3.4.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8176. |
| 8643 | Sigurd Schelstraete | 22 | 61 | "The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence." Are there restriction if the Control subfield with Control ID subfield equal to 0 is not present or is no specific ordering required in that case. If not, mention this explicitly. | See comment | Revised –  There is no explicit ordering required. However, the sentence is not needed because if this Contorl field is present it already occupies the whole HT control field, so it is redundant. Proposed resolution is to remove the sentence to avoid confusion.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8643. |
| 8644 | Sigurd Schelstraete | 22 | 61 | "The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence." If the Control subfield with Control ID subfield equal to 0 is present, there is no room for a second subfield. What's the point of this requirement? | Clarify | Revised –  Agree in principle with the comment. Proposed resolution is to remove the sentence.  Note to Editor: Already part of 802.11ax D1.1.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8644. |
| 9801 | Young Hoon Kwon | 22 | 60 | Control subfield with Control ID subfield equal to 0 implies UL MU response scheduling, where the length of the Control information subfield is 26 bits, which is the maximum available. Therefore, in case Control ID subfield equalt to 0, there can be one and only one Control subfield in the A-Control subfield. So, the sentence "Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence." is meaningless. | Delete the sentence "Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.". | Accepted  Note to Editor: Already part of 802.11ax D1.1. |
| 9984 | Yuichi Morioka | 22 | 52 | The smallest Aggregated Control subfield is 4(Control ID)+8 (Control Info)= 12 bits. | Change "4 or more" to "12 or more". | Rejected –  The smallest length cited by the comment is from the Control fields that are currently defined. However there are 8 reserved values, any of which, when and if defined in future amendments, may have a smaller length, potentially 0, making the value 4 a possible option. |

## Discussion: *None.*

Insert a new subclause 9.2.4.6.4 following 9.2.4.6.3:

* A-Control
* General

The format of the Aggregated Control (A-Control) subfield of the HE variant HT Control field is shown in Figure 9-15a (Aggregated Control subfield of the HE variant HT Control field).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Aggregate Control | | | |
|  | Control 1 | ... | Control N | Padding |
| Bits: | 4 or more |  | 4 or more | 0 or more |
| * Aggregated Control subfield of the HE variant HT Control field | | | | |

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 3004, 7714, 3378, 3483, 3812, 3896, 4358, 4425, 8643, 8644, 7713, 9801):***

The A-Control subfield contains a sequence of one or more Control subfields. The length of the A-Control subfield is equal to 30 bits.*(#3004, 7714)* The format of each Control subfield is shown in Figure 9-15b (Control subfield format). *(#3378, 3483, 3812, 3896, 4358, 4425, 8643, 8644, 7713, 9801)*

|  |  |  |
| --- | --- | --- |
|  | B0            B3 |  |
|  | Control ID | Control Information |
| Bits: | 4 | variable |
| * Control subfield format | | |

The Control ID subfield indicates the type of information carried in the Control Information subfield. The length of the Control Information subfield is fixed for each value of the Control ID subfield that is not reserved. The values of the Control ID subfield and the associated length of the Control Information subfield are defined in Table 9-18a (Control ID subfield values).

**TGax Editor: *Change the table below as follows (#CID 5025, 7471, 4727):***

|  |  |  |  |
| --- | --- | --- | --- |
| * 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 (UMRS) *(#4727)* | 26 | See 9.2.4.6.4.2 (UL MU response scheduling) |
| 1 | Operating Mode (OMI) *(#4727)* | 12 | See 9.2.4.6.4.3 (Operating Mode) |
| 2 | HE link adaptation (LA) *(#4727)* | 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 (UPH) | 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) | 8 | See 9.2.4.6.4.8 (Reverse direction protocol (RDP))*(#5025, 7471)* |
| 7-15 | Reserved |  |  |

The Padding subfield, if present, follows the last Control subfield and is set to a sequence of zeros so that the length of the A-Control subfield carried in the HT Control field is 30 bits.

**3.4 Abbreviations and acronyms**

**TGax Editor: *Insert the following acronym definition (#CID 8176, 4727):***

A-Control Aggregated control*(#8176)*

UMRS UL MU response scheduling*(#4727)*

LA Link adaptation*(#4727)*

UPH Uplink power headroom*(#4727)*

BSR Buffer status report*(#4727)*

BQR Bandwidth query report*(#4727)*

RDP Reverse direction protocol*(#4727)*

**TGax Editor: *Change the headings below as follows (#CID 4727):***

**9.2.4.6.4.2 UL MU response scheduling (UMRS) Control**

**9.2.4.6.4.3 Operating mode indication (OMI) Control**

**9.2.4.6.4.4 HE link adaptation (HLA) Control**

**9.2.4.6.4.6 UL power headroom (UPH) Control**

**9.2.4.6.4.7 Bandwidth query report (BQR) Control**

**9.2.4.6.4.8 Reverse direction protocol (RDP) Control**

**TGax Editor: *Make the following changes throughout the draft(#CID 4727):***

* ***Replace “UL MU Response Scheduling Support” with “UMRS Control Support” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “UL MU Response Scheduling A-Control” with “UMRS Control” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “UL MU Response Scheduling in the A-Control” with “UMRS Control” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “Link adaptation using the HE variant HT Control field” with “Link adaptation using the HLA Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “Link adaptation using the HE variant HT Control field” with “Link adaptation using the HLA Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “HE link adaptation field” with “HLA Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “A-BSR Support” with “BSR Control Support” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “BSR in the A-Control subfield” with “BSR Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “BSR A-Control [sub] field” with “BSR Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “BQR A-Control [sub] field” with “BQR Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “A-BQR Support [sub] field” with “BQR Support field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “BQR in the A-Control subfield” with “BQR Control field” throught the draft, starting from subclause 9.4.2.218.2.***
* ***Replace “RDP A-Control [sub] field” with “RDP Control field” throught the draft, starting from subclause 9.4.2.218.2.***

# PARS III (9.2.4.6.4.2)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P** | **L** | **Comment** | **Proposed Change** | **Resolution** |
| 3153 | Ahmadreza Hedayat | 24 | 21 | In 28.3.14.2, instead of TRSSI, Target\_{RSSI} is used. Suggest to use the same notation here and there. | As in the comment | Accepted |
| 3381 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  The length of the field (and bit locations) are already shown in the figure. |
| 3487 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  Duplicate of 3487.  The length of the field (and bit locations) are already shown in the figure. |
| 3817 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  Duplicate of 3487.  The length of the field (and bit locations) are already shown in the figure. |
| 3902 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  Duplicate of 3487.  The length of the field (and bit locations) are already shown in the figure. |
| 4365 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  Duplicate of 3487.  The length of the field (and bit locations) are already shown in the figure. |
| 4433 | Albert Petrick | 23 | 59 | Provide more clarity: UL PPDU subfield. The text should reference the "5-bits" for UL PPDU Length field in Figure 9-15c. | Insert text "is 5-bits (B0-B4) that" after the word subfield. | Rejected –  Duplicate of 3487.  The length of the field (and bit locations) are already shown in the figure. |
| 4734 | Alfred Asterjadhi | 24 | 27 | "The UL MCS subfield indicates the MCS, from MCS0 to MCS3, to be used by the receiving STA for the HE trigger-based PPDU (see 28.5 (Parameters for HE-MCSs))." needs to specify the encoding of the field | Add prior to "(see 28.5 (Parameters for HE-MCSs))." the following: ". The UL MCS subfield contains the 2 LSBs of the HE MCS Index field, and 2 MSBs of the MCS is set to 0". | Revised –  Agree in principle. Proposed resolution accoutns for the suggested change (made some editorial changes, to map the values explicitly).  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 4734. |
| 5051 | Chunyu Hu | 50 |  | When AP uses a-control field (control ID = 0) to request UL OFDMA response, AP specifies only specifies MCS and RU allocation info. It's assumed that BCC will be used. However, as stated in 28.3.11.5, LDPC is the only encoding schemem for RU 484/996/2x996. This implies that the AP cannot solicit UL-OFDMA response using a-control/RSP field when the RU allocated to the non-AP exceeds RU484. | Should amend state clearly the limitation of using UL MU response scheduling; or amend to allow using MCS0-3/BCC for RU484/996/2x996 size to make this schedule flexible. Prefer the latter. | Revised –  Agree in principle that there is an inconsistency between the statement in MAC subclaus on the use of BCC for any RU and the PHY subclause that states that LDPC is used for greater than 262RU. The proposed resolution is inline with PHY where LDPC kicks in for greater than 262RUs. The proposed change is located in the normative behavior subclause 27.5.2.3. In addition a note is added in this subclause for informative purposes.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 5051. |
| 5122 | Dorothy Stanley | 24 | 11 | Is DL TX Power conducted power or EIRP? Please clarify. | As in comment | Revised –  Agree with the comment. Proposed resolution is to clarify that it is the TX PWR reference to the antenna connector.  Same changes are applied to Trigger frame format and a subclause in 28.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 5122. |
| 5123 | Dorothy Stanley | 24 | 27 | Why is UL MCS limited to MCS 0-3? In dense deployments, we will want higher MCS's. Please clarify. | As in comment | Rejected –  The commenter is asking a question. The UL MCS is limited to the lower MCSs, because the Trigger-based PPDU sent in response to the UL MU Response Schedulign A-Control field is going to carry Acks/BAs which have short payloads. Using low MCSs for control response frames increases robustness of the PPDU. The AP can use higher MCSs and in that case the aggregation of Trigger frame itself achieves this. |
| 5439 | Graham Smith | 24 | 6 | Increase Reserved bit number to make length 30 bits | Figure 9-15c change Reserved bits from 1 to 5 | 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. |
| 8177 | Osama Aboulmagd | 23 | 51 | It is not clear what variant of the trigger frame carries an immediate ack? Is it the baic trigger variant? | indicate the variant trigger frame explicitly | Revised –  The UL MU response scheduling is a substitute of the Trigger. The sentence simply states that the field contains the scheduling information for the HE Trigger-based PPDU (not related to Trigger variant but to the PPDU format of the response). Proposed resolution is to arrange the sentence to provide some more clarity.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8177. |
| 8645 | Sigurd Schelstraete | 24 | 13 | Change "for the soliciting frame" to "for the Trigger Frame preceding the UL MU response" | See comment | Revised –  Disagree in principle with the comment. The soliciting frame does not contain a Trigger frame (the UL MU response scheduling replaces its functionality in this case). The soliting frame refers to the HE MU PPDU that contains the UL MU response scheduling. Proposed resolution is to replace frame with HE MU PPDU and specify that solicits the HE Trigger-Based PPDU.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8645. |
| 8646 | Sigurd Schelstraete | 24 | 21 | What is F\_val? | Clarify | Revised –  Agree with comment. Proposed resolution clarifies that it is the value of the field.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 8646. |
| 10334 | Oghenekome Oteri | 23 | 50 | If the Control ID subfield is 0, the Control Information subfield contains(#1257) scheduling information for an HE trigger-based PPDU that carries an immediate acknowledgment and follows the HE MU PPDU containing the Control Information subfield (see 27.5.2.2 (Rules for soliciting UL MU frames)).(#2208) : Does this carry only one immediate ACK or more than one immediate ACK. Can the control ID subfield schedule data ? | Clarify if can schedule more than one ACK .e.g. If the Control ID subfield is 0, the Control Information subfield contains(#1257) scheduling information for an HE trigger-based PPDU that carries {one or more} immediate acknowledgment(S) and follows the HE MU PPDU containing the Control Information subfield (see 27.5.2.2 (Rules for soliciting UL MU frames)) {and the data it is acknowledging}.(#2208). {Note that the control ID subfield may simultaneously schedule data on other resources}. | Revised –  The contents of the A-MPDU carried in the HE Trigger-based PPDU are defined in subclause 27.5.2.3 (STA behavior). The proposed resolution is to add a note in this subclause that refers to that subclause and also remove that carries an immediate acknowledgment because that is not always the case.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 10334. |
| 10335 | Oghenekome Oteri | 24 | 12 | The DL TX Power subfield indicates the AP transmit power, combined over all TX antennas and averaged in 20 MHz BW, used for the soliciting frame, in units of dBm. This sentence | Add text to clarify specification when transmit power is greater than 20 MHz. | Revised –  The comment is incomplete. However from the proposed change it seems the commenter seeks clarification on the transmit power for greater than 20 MHz. The statement actually applies to all BWs, and the value is normalized to the 20 MHz case. There seems to be some ambiguity in the wording used and the proposed resolution is to use same language that is used in P341L4.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 10335. |
| 10336 | Oghenekome Oteri | 24 | 24 | NOTE—It is possible that a STA can not satisfy the target RSSI due to its hardware or regulatory limitation : What happens in this scenario ? There is no recourse ? | STA does not transmit in this mode. STA waits and switches to extended mode range and informs AP that was unable to respond to the trigger frame. | Revised –  The note cited by the comment states that the STA might not be able to satisfy the target RSSI set by the AP due to its HW or regulatory limitations. This note is inline with other parts of the spec (see P341L46) where the limitations are referenced to subclause 11.8.5). The proposed resolution is to add a reference to the subclause that contains this statement for providing more clarifications to the reader.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 10336. |
| 10337 | Oghenekome Oteri | 24 | 27 | The UL MCS subfield indicates the MCS, from MCS0 to MCS3, to be used by the receiving STA for the HE trigger-based PPDU (see 28.5 (Parameters for HE-MCSs(#552))). : Not clear why it is limited to MCS0 to MCS3 ? | change reference to show why limited to MCS0 to MCS3. | Revised –  The limitation is because only 2 bits are allocated to this field, and the mapping is designed to indicate MCS0 to MCS3 which are robust MCSs for PPDUs that contain control responses. The proposed resolution does not change the reference, and is inline with that of CID 4734 where the mapping is specified explicitly.  TGax editor to make the changes shown in 11-17/0238r2 under all headings that include CID 10337. |

## Discussion: *None.*

* UL MU response scheduling

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 4740, 8177, 10334):***

If the Control ID subfield is 0, the Control Information subfield contains UL MU response scheduling (UMRS) information for the HE Trigger-based PPDU that follows the HE MU PPDU containing this*(#8177)* Control Information subfield (see 27.5.2.2 (Rules for soliciting UL MU frames)). The format of the subfield is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 0). *(#4740)*

NOTE—The A-MPDU contained in the HE Trigger-based PPDU carries one immediate acknowledgment, if the preceding PPDU solicits an acknowledgment, and it might additionally contain other frames that do not solicit immediate responses, such as QoS Null frames with Ack Policy of No Ack, Action No Ack frames, as defined in 27.5.2.3 (STA behavior). *(#10334)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0            B4 | B5            B12 | B13          B17 | B18                 B22 | B23      B24 | B25 |
|  | UL PPDU Length | RU Allocation | DL Tx Power | UL Target RSSI | UL MCS | Reserved |
| Bits: | 5 | 8 | 5 | 5 | 2 | 1 |
| * Control Information subfield format when Control ID subfield is 0 | | | | | | |

The UL PPDU Length subfield indicates the length of the HE Trigger-based PPDU response and is set to the number of OFDM symbols of the Data field of the HE Trigger-based*(#Ed)* PPDU minus 1. The duration of the HE trigger-based PPDU is calculated as defined in 28.4.2 (TXTIME and PSDU\_LENGTH calculation).

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 5122):***

The RU Allocation subfield indicates the resource unit (RU) assigned for transmitting the HE Trigger-based PPDU response and is defined in 9.3.1.23 (Trigger frame format).

NOTE—Use of BCC encoding is required if the RU Allocation subfield indicates an RU that is less than 484-tone RU; use of LDPC encoding is required if RU is greater than or equal to 484-tone RU (see 27.5.2.3 (STA behavior)). *(#5122)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 8645, 10335, 5122):***

The DL TX Power subfield indicates the AP transmit power referenced to the antenna connector*(#5122)*, combined over all TX antennas and normalized to 20 MHz bandwidth*(#10335)*, used for the HE MU PPDU that solicits the HE Trigger-based PPDU*(#8645)*, in units of dBm. The transmit power, *PTX*, is calculated as *PTX* = 20 + 2×*FVal*, where *FVal* is the value of the DL TX Power subfield, except for the value 31, which is reserved.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7715, 8646, 10336):***

The UL Target RSSI subfield indicates the AP target receive power, i.e., averaged RSSI over all AP's antennas, for the responding STA when transmitting the HE Trigger-based PPDU, in units of dBm. The target receive power, *TargetRSSI*, is calculated as *TargetRSSI* = 90 + 2×*FVal(#3153)*, where *FVal* is the value of the UL Target RSSI subfield, *(#8646)* except for the value 31 that indicates to the STA to transmit at maximum power for the assigned MCS.

NOTE—It is possible that a STA is unable to*(#7715)* satisfy the target RSSI due to its hardware or regulatory limitation (see 28.3.14.2 (Power pre-correction)) *(#10336)*.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 4734, 10337):***

The UL MCS subfield indicates the MCS, from MCS0 to MCS3, to be used by the receiving STA for the HE trigger-based PPDU. The UL MCS subfield is set to 0 for indicating HE-MCS 0, to 1 for HE-MCS 1, to 2 for HE-MCS 2, and to 3 for HE-MCS 3 (see 28.5 (Parameters for HE-MCSs)).*(#4734, 10337)*

**28.3.14.2 Power pre-correction**

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 5122):***

An AP indicates in the AP Tx Power subfield of the Common Info field in Trigger frame the combined transmit power, referenced to the antenna connector*(#5122)*, of all the transmit antennas used to transmit the Trigger frame normalized to 20 MHz bandwidth. An AP indicates in the Target RSSI subfield of the User Info field in Trigger frame the target receive signal power averaged over the AP's antennas for the HE trigger-based PPDU.

**9.3.1.23 Trigger frame format**

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 5122):***

The AP Tx Power subfield of the Common Info field indicates the combined average power per 20 MHz bandwidth, referenced to the antenna connector*(#5122)*, of all transmit antennas used to transmit the trigger frame at the HE AP. The resolution for the transmit power reported in the Common Info field is 1 dB. The AP Tx Power subfield encoding is defined in Table 9-25e (AP Tx Power subfield encoding).

**27.5.2.3 STA behavior**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 5051):***

A STA transmitting an HE trigger-based PPDU in response to soliciting MPDU(s), containing an UL MU Response Scheduling A-Control subfield, shall set the TXVECTOR parameters as follows:

* *NSYM* shall be set to the *FVAL* + 1, where *FVAL* is the value of the UL PPDU Length subfield of the UL MU Response Scheduling subfield
* UL\_TARGET\_RSSI, DL\_TX\_POWER, RU\_ALLOCATION, and MCS parameters shall be set to the values of UL Target RSSI, DL TX Power, RU Allocation, and UL MCS subfields of the UL MU Response Scheduling subfield, respectively.
* BW shall be equal to the bandwidth of the soliciting DL MU PPDU
* BSS\_COLOR, and DCM shall be set to the values of the RXVECTOR parameters BSS\_COLOR, and DCM of the soliciting DL MU PPDU, respectively
* MU\_MIMO\_LTF\_MODE, NSTS, STBC*(#5051)* SS\_ALLOCATION shall all be set to 0
* CODING\_TYPE shall be set to 0 if the RU Allocation subfield indicates less than 484-tone RU; otherwise shall be set to 1*(#5051)*
* LDPC\_EXTRA\_SYMBOL shall not be present if the RU Allocation subfield indicates less than 484-tone RU; otherwise shall be set to 1*(#5051)*
* SPATIAL\_REUSE shall be set to the value indicating SR\_Disallowed
* PE\_DURATION shall be set to the default PE duration value for UL MU response scheduling, which is indicated by the AP in the Default\_PE Duration subfield of the HE Operation element it transmits, and the pre-FEC padding factor shall be set to 4 (see 28.3.12 (Packet extension))
* TXOP\_DURATION parameter shall be set according the rules defined in 27.2.2 (Updating two NAVs)
* CP\_LTF\_TYPE parameter shall be set to indicate 4x LTF + 3.2 s CP if the RXVECTOR parameter CP\_LTF\_TYPE is 4x LTF + 3.2 s CP or 2x LTF + 1.6 s CP ; otherwise shall be set to indicate 2x LTF + 1.6 s CP

NOTE 1—The HE trigger-based PPDU in this case is only sent in UL OFDMA format and CS is not required prior to its transmission (see 27.5.2.4 (UL MU CS mechanism)).

*(#5051)*