IEEE P802.11  
Wireless LANs

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| HE Variant HT Control – General | | | | |
| Date: 2016-06-20 | | | | |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D0.1 with the following CIDs (**33 CIDs**):

* 1126, 1127, 1179, 58, 89, 361, 2248, 1877, 1878, 792, 686, 687, 793, 1133, 91, 92, 362, 363, 2296, 1712, 1713, 1250, 1253, 1711, 2204, 2205, 2206, 211, 364, 1231, 134, 1750, 1244

Note: **CID 989** is misplaced and not counted here (should be related to A-MPDU contents)).

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 0 (HE Variant HT Control structure)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1126 | Kwok Shum Au | 12.11 | There is no VHT Middle subfield. | In Table 9-9a, change "VHT Middle" with "VHT Control Middle". | Accepted |
| 1127 | Kwok Shum Au | 12.30 | There is no HE variant HE Control field. | Change "HE variant HE Control field" to "HE variant HT Control field". | Accepted |
| 1179 | Lei Huang | 12.12 | "VHT Middle" is not defined throughout the draft specification. It should be "VHT Control Middle" | Change "VHT Middle" to "VHT Control Middle" | Accepted |
| 58 | Ahmadreza Hedayat | 53.01 | "HE variant HT Control field", "HE A-Control", "HE-Control, or HEC"? There are too mnay names used for the same field. Let's decide on using one throughout the spec. | As in the comment. | Revised –  Agree in principle with the comment. I could only find occurrences of the HE A-Control and HE variant HT Control field. Proposed resolution is to use A-Control field field throughout.  TGax editor: Replace “HE variant HT Control” with “A-Control” throughout the draft and to make the changes shown in 11-16/0798r0 under all headings that include CID 58. |
| 89 | Alfred Asterjadhi | 30.50 | Something went wrong here. Instruction to the editor is shown as part of the draft and the actual text is missing. | Remove "Insert the following after Figure 14 (MFB subfield in the VHT variant HT control field):" | Accepted |
| 361 | Brian Hart | 12.09 | No future proofing for the amendment following HE | In Table 9-9a, reserve a bit in position B2 so B1-B2 is the amendment indicator, use 00 and 01 for 11ax, and so 10 and 11 are available indicators for future amendments that wish to populate the HT Control field differently | Rejected –  Values from 8 to 15 of the Control ID subfield are specified as reserved so that they can be used in the future. In addition HE amendment likely will not use all the other Control IDs in which case those free values will also be allocated for future use. |
| 2248 | Weimin Xing | 11.46 | the value of FORMAT parameter is listed in Table 26-1, there is no value equal to "HE". | change "HE" to "HE\_SU, HE\_MU, HE\_EXT\_SU, HE\_TRIG" | Accepted |
| 1877 | Sigurd Schelstraete | 12.11 | Propose to use the name "VHT Control Middle" for consistency with HT and with usage on e.g. lines 32, 65, ... | See comment | Accepted |
| 1878 | Sigurd Schelstraete | 12.20 | Replace "different" with "three" | See comment | Accepted |
| 792 | Jeongki Kim | 13.17 | Padding is optional because 30bits A-Control subfield can consist of only control field(s). Make 'Padding' subfield optional in Figure 9-14a | Make 'Padding' subfield optional in Figure 9-14a | Revised –  Agree in principle with the comment. Proposed resolution is to indicate that the padding is 0 or more bits.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 792. |
| 686 | Jae Seung Lee | 13.57 | The table is incomplete. | Update the table and remove TBDs and empty colums. | Revised –  Agree in principle with the comment. Proposed resolution is to update the table and populate the empty columns.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 686. |
| 687 | Jae Seung Lee | 14.23 | There are TBDs in the subclause. | Update the figure and the sentences and remove TBDs | Revised –  Agree in principle with the comment. Proposed resolution updates the figure and sentences removing any pending TBDs.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 687. |
| 793 | Jeongki Kim | 14.05 | Because the Padding is included optionally, modify the related texts as follows: "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 is 30 bits." | Change the text related to Padding subfield to the following text: "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 is 30 bits." | Revised –  Agree in principle with the comment. Proposed resolution is to indicate that the padding is 0 or more bits.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 793. |
| 1133 | Kwok Shum Au | 13.43 | It is not clear from the sentence that either the Control ID subfield or the length of the Control Information subfield is fixed. | Delete ", which is fixed and that corresponds to each value of the Control ID subfield". | Revised –  Proposed resolution clarifies this ambiguity.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1133. |
| 91 | Alfred Asterjadhi | 31.59 | The length of the ROMI is TBD, the reference to the subclause where it is defined is missing. | Replace "TBD" with 0, add "See 9.2.4.6.4.3" in the last column of this row. | Revised –  Agree in principle with the comment (though replacing the TBD with 0 is not correct as the field has at least 5 bits). Proposed resolution incorporates the suggested change and defines the TBD accounting for the new additions to the ROMI filed (UL MU Disable (1b), Tx NSS (3b), Max Tx Power (6b) and Reserved (1b), i.e., total length of 16 bits.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 91. |
| 92 | Alfred Asterjadhi | 31.61 | The length of the HE link adaptation is TBD, the reference to the subclause where it is defined is missing. | Replace "TBD" with Z, where Z is whatever the length of the subfield is, add "See 9.2.4.6.4.4" in the last column of this row, and determine all missing fields that are necessary for HE link adaptation (if any) and add them (and their description) in 9.2.4.6.4.4. | Revised –  Agree in principle with the comment. Proposed resolution incorporates the suggested change and defines the TBD.  **Authors Note: This will be concluded when the length of HE link adaptation is finalized.**  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 92. |
| 362 | Brian Hart | 13.65 | Parsing rules for future Control ID values are undefined | In clause 10 or 25, specify behavior upon receipt of an unknown Control Id value (e.g. ignore rest of field) | Revised –  Agree in principle with the comment. Proposed resolution clarifies such behaviors (both for future and not supported Control subfields) in subclause 10.9 (HT Control field operation).  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 362. |
| 363 | Brian Hart | 14.05 | Length of padding is unclear | "sequence of zero or more zeros" | Revised –  Agree in principle with the comment. Proposed resolution is inline with that for CID 793, specifying that the Padding subfield is optionally present.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 363. |
| 2296 | Yasuhiko Inoue | 13.49 | TBDs in Table 9-18a need to be determined. | Please resolve TBDs. | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 2296. |
| 1712 | Osama Aboulmagd | 13.33 | Figure 9-14b, it is not clear where to start counting B0, is it from the start of the HT Control field, or somewhere else. | need to be more precise about the start of the count. Need a better Figure | Rejected –  The figure defines the format of each Control subfield that are present in the Aggregated Control field. Since there can be a plurality of them a relative reference with respect to the HT control field is not possible. Please note that the figure provides the absolute bit positions of the subsubfields of the Control subfield, inline with the IEEE802.11 conventions: “In figures, all bits within fields are numbered, from 0 to k, where the length of the field is k + 1 bits“. |
| 1713 | Osama Aboulmagd | 13.53 | There are many TBDs in this clause that makes hard to estimate how many Control subfields will fit in the HEW variant. Ignoring padding there are 30 bits available for Control Subfields. With a type of 4 bits I doubt it will be possible to pack more that two subfields. It may be more efficient to limit the number of control subfields to 1. | as in comment | Revised –  Proposed resolution is to define the TBDs. Once those TBDs are finalized, it is up to the transmitter to decide how many Control subfields can fit in the available space of the HT Control field sent to a STA supporting their reception.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1713. |
| 1250 | Mark RISON | 13.49 | Does the TBD cover any restrictions on the lengths, so that Control subfields are at some kind of regular boundaries (e.g. nybble boundaries)? | Clarify | Revised –  The control subfields boundaries depend on the sizes of each of the subfields as defined in the next subclauses. While a bit boundary is needed for the current binary technologies the proposal for this design is to have the lengths in multiples of two bits.  The proposed resolution is to replace the TBDs with the actual length values of these fields.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1250. |
| 1253 | Mark RISON | 13.25 | Can there be more than one Control subtype with the same Control ID in an Aggregated Control subfield? | Specify that there is only one at most | Revised –  Agree in principle with the comment. However this requirement has to be normative. As such the proposed resolution is to specify it in subclause 10.9 (HT Control) along with the requirement that Control subfield with value 0 is the first of the sequence.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1253. |
| 1711 | Osama Aboulmagd | 13.15 | Figure 9-14 needs to reworked out. The problem with the current Figure is that it implies Control 1, Control 2, etc are all having length of 1 bit. | need a better Figure | Revised –  Agree in principle with the comment. Proposed resolution modifies the figure to remove this ambiguity. In particular, for each Control subfield the length in bits is provided. Similarly for the Padding subfield.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1711. |
| 2204 | Tomoko Adachi | 13.21 | Figure 9-14a is misleading as it looks like each of the Control subfields has only 1 bit. | Modify Figure 9-14a to give the right image. | Revised –  Agree in principle with the comment. Proposed resolution modifies the figure to remove this ambiguity. In particular, for each Control subfield the length in bits is provided. Similarly for the Padding subfield.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 2204. |
| 2205 | Tomoko Adachi | 13.27 | It says "The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence." The explanation is not enough. Shouldn't the order of the Control ID subfields follow the order in Table 9-18a when they are present? Also, shouldn't a Control ID subfield be present at most? | Delete "The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence." and add "The Control subfields appear in the order of Table 9-18a when they are present. Each Control ID subfield is present once at most." | Rejected –  The Control subfield with the value equal to 0 has to be the first one to avoid ambiguity with the padding field which uses the same sequence of values (zeros).  For the remainder of fields there is no requirement for them to be in order as the parsing of the fields is self-contained. |
| 2206 | Tomoko Adachi | 13.50 | As it is likely that receive operation mode indication and HE link adaptation are option features, an HE STA needs not to recognize all the Control ID subfields. Distinguish which (or all) are optional features in Table 9-18a. Add an explanation that whenever an HE STA does not support a feature related to one of the Control ID subfields, then such Control ID subfield will be ignored by the STA. | As in comment. | Revised –  Agree in principle with the comment. Proposed resolution is inline with that for CID 362.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 2206. |
| 211 | Alfred Asterjadhi | 13.53 | Table 9-18a - Control ID Subfield values There should be a new Control - ID (all 0s or 1s (preferred)) to signal no more Subfields. | As in comment. | Rejected –  There is no need for a new Control ID to indicate that there are no more subfields. The first occurrence of a 4 bit long sequence of zeros already indicates that there are no more Control ID subfields. The only Control ID value that could create a confusion would be that of value 0 but the spec already specifies that that Control ID if present is the first one. |
| 364 | Brian Hart | 14.32 | "nonzero value" .. We're wasting values, or at least adding unnecesasry constraints | Delete "non-zero". The ultimate encoding should be free to use field values of 0..n-1 to signal a length of 1..n | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 364. |
| 1231 | Mark Hamilton | 13.15 | If we ever want to extend the HT Control field again (like we did to create the VHT variant and now the HE variant), we need to make B2 Reserved, so it can be used to indicate the next variant type in the future | Make B2 Reserved, and start the Control subfields at B3. | Rejected –  Values from 8 to 15 of the Control ID subfield are specified as reserved so that they can be used in the future. In addition HE amendment likely will not use all the other Control IDs in which case those free values will also be allocated for future use. |
| 134 | Alfred Asterjadhi |  | There needs to be a statement that ensures that the transmitter does not add a Control field that is not supported by the intended receiver of the HT Control field. Add a statement: The HT Control field shall not carry a Control subfield that is not supported by the intended receiver of the HT Control field. Also this dot11MCSFeedbackOptionImplemented is related to the HE optionl So rename to dot11HEMCS.... and add the mib variable to Annex C. | As in comment. | Revised –  Agree in principle with the comment. Proposed resolution is inline with that for CID 362 and CID 2206.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 134. |
| 1750 | Peter Loc | 11.06 | HE field is un defined | Define HE-Field to be Bit(1) of the HT Control field | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1750. |
| 1244 | Mark RISON | 12.00 | There are references to a "VHT subfield" and an "HE subfield", but no such subfield is actually defined anywhere (now that F9-7 has been deleted) | Either state that b0 of HT Control is the VHT subfield and b1 is the HE subfield (if b0 is 1), or refer to b0 and b1 rather than VHT/HE subfields | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested change.  TGax editor to make the changes shown in 11-16/0798r0 under all headings that include CID 1244. |

**Discussion:** This document accounts for some concepts (in determinining certain field lengths) from motions passed during the IEEE F2F meeting (<https://mentor.ieee.org/802.11/dcn/16/11-16-0643-00-00ax-he-control-scheduling.pptx>, and <https://mentor.ieee.org/802.11/dcn/16/11-16-0657-00-00ax-in-device-multi-radio-coexistence-and-ul-mu-operation.pptx>).

**9.2.4.6 HT Control field**

**9.2.4.6.1 General**

***Remove Figure 9-7 (HT Control field).***

**TGax Editor: *Change the table below as follows (#CID 1126, 1179, 1877):***

**Table 9‑9a – 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*(#1126, 1179, 1877)* | AC Constraint | RDG/More PPDU |
| HE variant | VHT(1) | HE (1) | Aggregated Control | | |

**TGax Editor: *Change the paragraph below as follows (#CID 1878, 1127, 1750, 1244):***

The HT Control field has ~~two~~ three*(#1878)* forms, the HT variant, ~~and~~ the VHT variant, and the HE variant. These forms differ in the values of the VHT and/or 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.

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. *(#1750, 1244)* The VHT subfield is set to 0 to indicate a 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 a HE variant HT Control field*(#1127)*.

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 (A-Control) subfield is defined in 9.2.4.6.4 (A-Control)*(#58)*.

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.

**9.2.4.6.3 VHT variant**

**TGax Editor: *Change the paragraph below as follows (#CID 89):***

The format of the VHT Control Middle subfield of the VHT variant HT Control field is shown in Figure 9-12 (VHT Control Middle subfield of the VHT variant HT Control field).*(#89)*

***Change Figure 9-12 as follows (remove Reserved field and change title):***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ~~B1~~ | B2 | B3 B5 | B6 B8 | B9 B23 | B24 B26 | B27 | B28 | B29 |
|  | ~~Reserved~~ | MRQ | MSI/STBC | MFSI/ GID-L | MFB | GID-H | Coding Type | FB Tx Type | Unsolicited MFB |
| Bits: | ~~1~~ | 1 | 3 | 3 | 15 | 3 | 1 | 1 | 1 |

**Figure 9‑12 — VHT Control Middle subfield of the VHT variant HT Control field**

***Insert a new subclause 9.2.4.6.4 following 9.2.4.6.3:***

**9.2.4.6.4 A-Control**

**9.2.4.6.4.1 General**

The format of the Aggregated Control (A-Control) subfield of the HE variant HT Control is shown in Figure 9.14a (HE variant HT Control field format).

**TGax Editor: *Change the figure below as follows (#CID 792, 1711, 2204):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Aggregated Control | | | |
|  | Control 1 | … | Control N | Padding |
| Bits: | 4 or more |  | 4 or more | 0 or more |

**Figure 9‑14a - Aggregated Control subfield of the HE variant HT Control field***(#792, 1711, 2204)*

The A Control subfield contains a sequence of one or more Control subfields. The format of each Control subfield is defined in Figure 9.14b (Control subfield format). The Control subfield with Control ID subfield equal to 0, if present, is the first subfield of the sequence.

|  |  |  |
| --- | --- | --- |
|  | B0 B3 |  |
|  | Control ID | Control Information |
| Bits: | 4 | variable |

**Figure 9‑14b - Control subfield format**

**TGax Editor: *Change the paragraph below as follows (#CID 1133):***

The Control ID subfield indicates the type of information carried in the Control Information subfield, and the length of the Control Information subfield. The length of the Control Information subfield is fixed and its value depends on the *(#1133)* value of the Control ID subfield. 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 686, 687, 91, 92, 2296, 1250, 1713):***

**Table 9‑18a - Control ID subfield values***(#686, 687, 91, 92, 2296, 1713, 1250)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Control ID value** | **Meaning** | **Length, in bits, of the**  **Control Information subfield** | **Contents of the**  **Control Information subfield** |
| 0 | UL MU response scheduling | *26* | See 9.2.4.6.4.2 (UL MU response scheduling) |
| 1 | Operation mode indication | *16* | See 9.2.4.6.4.3 (Operation mode indication) |
| 2 | HE link adaptation | *TBD* | See 9.2.4.6.4.4 (HE link adaptation) |
| 3-15 | Reserved |  |  |

The Control Information subfield carries control information that depends on the Control ID value, as defined in Table 9-18a (Control ID subfield values).

**TGax Editor: *Change the paragraph below as follows (#CID 793, 363, 792):***

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.*(#792, 793, 363)*

**9.2.4.6.4.2 UL MU response scheduling**

**TGax Editor: *Change the paragraph below as follows (#CID 364):***

The UL PPDU Length subfield indicates the length of the HE trigger-based PPDU response and is set to a *(#364)* value that is TBD.

**TGax Editor: *Change the subclause heading as follows:***

**9.2.4.6.4.3 Operation mode indication**

## 10.9 HT Control field operation

**TGax Editor: *Insert a new paragraph before the last paragraph of this subclause (#CID 362, 2206, 1253, 134):***

If an A-Control field is present in a frame then it shall contain at least one Control subfield, and the Control subfield shall be present in the A-Control field only if it is supported by the receiving STA; otherwise it shall not be present. At most one Control subfield with a given Control ID value shall be present in the A-Control field of QoS Data or Management frames carried in an (A-) MPDU.*(#1253, 134)*

NOTE--An A-Control field that is present in a frame cannot contain only the Padding subfield.

An HE STA that receives an A-Control field shall ignore the remainder of the A-Control field that follows a Control ID subfield whose value is not recognized or is not supported by the STA.*(#362, 2206)*