IEEE P802.11  
Wireless LANs

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| --- | --- | --- | --- | --- |
| 11ac HT Control field | | | | |
| Date: 2011-03-xx | | | | |
| Author(s): | | | | |
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Abstract

* This document provides resolution for the comments listed below. Comments mainly refer to section 7.1.3.5a, but modification also involve section 7.1.3.1.9, 9.7a, 7.3.2.56, 3.3. Minor suggested changes also refer to other sections.
* Comments are from: 11-11-0276-00-00ac-tgac-d0-1-comments.xls.
* Comments refer to: Draft P802.11ac\_D0.1.pdf.
* In providing instruction for spec editing, the following conventions are used.
  + Red text indicates changes to be applied to existing text in Draft P802.11ac\_D0.1.pdf.
  + Text in blue is text copied from the 802.11n-2009 baseline that was not shown in the 11ac draft and that need be added to the draft, with the modifications shown in green.
  + Text in black is unmodified text from Draft P802.11ac\_D0.1.pdf.
  + Italic light gray text indicates instruction to the editor.

Comments from 11-11-0276-00-00ac-tgac-d0-1-comments.xls

Comments referred to clarification in the description

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 7.1.3.5a | 5 | 37 | TR | This modified row of Table 7-6a should be removed, because MFB subfield in VHT control field is defined by Table 7-6h. | As in comment. | Agree. As in comment | MAC |
| 906 | 7.1.3.5a | 5 | 19 | ER | HT and VHT control fields should have two independent descriptions. For instance, referring to this row of the table, in VHT case MFB (as shown in the picture below) includes the SNR, hence HT MFB and VHT MFB are different. Also, MAI is not defined for the VHT case | Suggest to introduce a definition for an HT control field in 'HT format' and one for a HT control field in 'VHT format'; HT control field is defined as [B0=HT/VHT, B1-B31=depending on HT/VHT format]; HT format description for B1-B31 reflects 11n-2009 and simply add text specifying that this is the meaning when B0 is set to 0. VHT format has an independent description for B1-B31 which uses the current one in table 7-6h and is valid only when B0 is set to 1; The denomination +HTC is intended to mean that an HT control field is included (either in HT or VHT format); When relevant, the HT or VHT format is explicitly indicated with additional text; | Agree. As in comment | Ed |
| 1344 | 7.1.3.5a | 5 | 36-56 | TR | Don't need to re-interpret MFB/ASELC field in Table 7-6a, because when HT/VHT field is 1, subsequent text, figures and tables already explain the re-define HTC field in details, therefore this table is redundant. | Remove the mentioned text and table 7-6a. | Agree. As in comment | MAC |
| 1473 | 7.1.3.5a | 5 | 42 | TR | the definition of MFB/ASELC subfield is not accurate when it is as a subfield of VHT control field. | if the HT/VHT subfield is set to the value 0, this subfield contains recommended MFB expressed as an HT MCS, and if the HT/VHT subfield is set to the value 1, the 4 highest numbered bits of this subfield contains a recommended VHT MCS ,and the lowest numbered 3 bits of this subfield contain a recommended VHT NSTS is interpreted as defined in Figure7-4f . | Modified. Description for HT and VHT format have been placed in separate sections | MAC |
| 1120 | 7.1.3.5a | 5 | 11 | TR | This section does not make a lot of sense as amended. Essentially two formats for this field are described: HT Control and VHT Control, distinguished by the setting of B0. Elsewhere, the field alternately referred to as HT Control and VHT Control depending on context. What is meant by the name should be explicitly state here. This section could be reworked to more clearly describe the two formats. | Rename the field "HT/VHT Control". Define meaning to "HT Control" and "VHT Control" (i.e. format dependent on B0 setting). Rework format description for clarity. | Modified. proposed new description account for this comment | MAC |
| 1472 | 7.1.3.5a | 5 | 10 | TR | wrong location of the section 7.1.3.5a HT Control field | move the section 7.1.3.5a HT Control field to page 8 line 40 | EDITOR TO APPLY CHANGE | MAC |
| 100 | 7.1.3.5a | 6 | 1~5 | TR | Figure 7-4e only contains B1-B31. For the integrality of VHT Control field, we propose to add B0 in the figure. | Add B0 in the Figure 7-4e. The content can be "HT/VHT = 1". | Agree. As in comment, Name is VHT | MAC |

Comments referred to Signalling of HTC

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 908 | 7.1.3.1.9 | 5 | 4 | TR | from 11n-2009 specs "7.1.3.1.9 Order field The Order field is 1 bit in length. It is used for two purposes: — When set to 1 in a non-QoS data frame transmitted by a non-QoS STA, it indicates that the frame contains an MSDU, or fragment thereof, which is being transferred using the StrictlyOrdered service class. — When set to 1 in a QoS data or management frame transmitted with a value of HT\_GF or HT\_MF for the FORMAT parameter of the TXVECTOR, it indicates that the frame contains an HT Control field. Otherwise, the Order field is set to 0." This does not alllow for HT control frame in a VHT PPDU | change last bullet including the VHT case: "When set to 1 in a QoS data or management frame transmitted with a value of HT\_GF, HT\_MF or VHT for the FORMAT parameter of the TXVECTOR, it indicates that the frame contains an HT Control field. Otherwise, the Order field is set to 0. | Agree. As in comment | MAC |
| 233 | 7.1.3.5a | 5 | 27 | TR | Why have a VHT bit when a frame transmission is either VHT or HT as indicated by the SIGNAL field in the PHY preamble? Suggest removing this redundant bit. After VHT-SIG/HT-SIG auto-detection the information about whether the frame is HT or VHT may be passed through RXVECTOR from PHY to MAC. Also Change "Figure 7-1--MAC frame format" accordingly. | Suggest removing this redundant HT/VHT bit. Change "Figure 7-1--MAC frame format" showing HT/VHT control field. Insert text indicating "HT/VHT control field is a HT control field or a VHT control field depending on whether the MPDU is a HT MPDU or VHT MPDU respectively." | Reject the removal of B0; The bit B0 is needed in case of control wrapper. Control wrapper can be sent with non-HT PPDUs, in which case B0 defines the type of the field.  Discussion on whether the VHTC can be in HT PPDU and vice versa; | MAC |

Comments referred to capability indications

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 907 | 7.1.3.5a | 5 | 10 | TR | There is no capability indication for the HT Control field in the new VHT format. A STA may support HTC but not in the new VHT format, or vice versa, but that cannot be indicated | Add a new capability indication for the HT control field in the new VHT format; When enabled, the capability indicates that STA is capable of receiving a HT control field with the new VHT format; A STA shall not receive frames with HT control field in the VHT format, unless it declares the capability in VHT capabilities info element; A STA shall not receive frames with HT control field in the HT format, unless it declares the capability in HT Extended capabilities element (currently called +HTC capable); VHT format Capability in VHT capabilities info can be indicated with 1 bit in position B22; Section 9.7a HT Control field operation need be updated accordingly; | Agree. As in proposed resolution | MAC |

Comments referred to frame/fields format

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1234 | 7.1.3.5a | 6 | 5 | TR | Fields such as AC Contstraint are not defined. | Add them to table 7-6h, perhaps with "see table 7-6a" as a definition | Agree. Added in the table; description points to the HT case | MAC |
| 1345 | 7.1.3.5a | 7 | 58~64 | TR | Need to describe how to set Nsts, MCS and SNR fields in table7-6i. | Insert in table 7-6i: Nsts field is set to true Nsts-1, MCS field is set to MCS, SNR field refer to (9-1) in 9.18.3. | Agree. Added reference to section 9.18.3 (Link Adaptation using the VHT control field), where more details are provided | MAC |
| 885 | 7.1.3.5a | 7 | 38 | TR | The unsolicited feedback should refer to SU or MU VHT PPDU | If the Unsolicited MFB subfield is set to 1 and the FB Tx Type subfield is set to 1, the unsolicited MFB refers to a beamformed SU-MIMO or MU-MIMO VHT PPDU. | Reject. According to description in 9.18.3, FB Tx Type subfield is set according to the Beamformed indication in SIG-A2, which only refers to SU case. The receiver of unsolicited feedback can use the GID(L and H) to determine if feedback is referred to an SU or MU PPDU | MAC |
| 24 | 7.1.3.5a | 7 | 58 | TR | "Nsts" should be defined in section 3.2 as well as "MCS". | Insert the following definitions in section 3.2: Nsts: The number of space-time streams. | Agree | MAC |
| 966 | 12.3.5.10.2 | 65 | 1 | TR | in figure 7-4e, the only reserved bit is in position 29; For helping the receiver parsing in case of future extensions, the posistion of the reserved bit should be within the first byte; | Move the 'Solicited/unsolicited' bit in position 29 and have B1 to be reserved; modify table 7-6h accordingly; | Agree. As suggested. Note: Section of comment was wrong. Comment refers to 7.1.3.5a. | COEX |

**Some Editorial comments**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1004 | 7.1.3.5a | 7 | 38 | ER | Grammer: "If the Unsolicited MFB subfield is set to 1 and FB Tx Type subfield is set to 0, the unsolicited MFB refers to either unbeamformed VHT PPDU, transmit diversity utilizing Alamouti coding VHT PPDU." | Change the sentence to "If the Unsolicited MFB subfield is set to 1 and FB Tx Type subfield is set to 0, the unsolicited MFB refers to either unbeamformed VHT PPDU or VHT PPDU with STBC." | Agree. As suggested. | Ed |
| 1005 | 7.1.3.5a | 7 | 40 | ER | The terminology 'Alamouti coding' is not used in REVmb 4.01. | Change 'Alamouti coding' to 'STBC' | Agree. Modified to "using an STBC VHT PPDU". | Ed |
| 1353 | 7.1.3.5a | 7 | 40 | ER | "….. refers to either unbeamformed VHT PPDU, transmit diversity utilizing ….." What's the grammar there? Shouldn't be "either….or……"? | change to ""….. Refers to either unbeamformed VHT PPDU or transmit diversity utilizing ….." | Agree. See #1004 | Ed |
| 1401 | 7.1.3.5a | 7 | 40 | ER | The terminology 'Alamouti coding' is not used in spec | modify 'Alamouti coding' to 'STBC' | Agree. See #1005. | Ed |
| 1578 | 7.1.3.5a | 7 | 40 | ER | For the Definition of FB Tx Type, seems missing "or" | change to "...either unbeamformed VHT PPDU, or transmit diversity utilizing Alamouti coding VHT PPDU. | Agree. See #1004. | Ed |

**Proposed changes to the P802.11ac\_D0.1 text**

*Instructions to the Editor:*

*Red text indicates changes to be applied to existing text in Draft P802.11ac\_D0.1.pdf.*

*Text in blue is text copied from the 802.11n-2009 baseline that was not shown in the 11ac draft and that need be added to the draft, with the modifications shown in green.*

***Text in black is unmodified text from Draft P802.11ac\_D0.1.pdf***

***Italic light gray text indicates instruction to the editor***

***Include in the draft the following section, with the specified changes:***

**7.1.3.1.9 Order field**

***Change 7.1.3.1.9 as follows:***

The Order field is 1 bit in length. and is set to 1 in any non-QoS data frame that contains an MSDU, or

fragment thereof, which is being transferred using the StrictlyOrdered service class. This field is set to 0 in all other frames. All QoS STAs set this subfield to 0. It is used for two purposes:

— When set to 1 in a non-QoS data frame transmitted by a non-QoS STA, it indicates that the frame

contains an MSDU, or fragment thereof, which is being transferred using the StrictlyOrdered service

class.

— When set to 1 in a QoS data or management frame transmitted with a value of HT\_GF, ~~or~~ HT\_MF or VHT for the FORMAT parameter of the TXVECTOR, it indicates that the frame contains an HT Control

field.

Otherwise, the Order field is set to 0.

***Modify section 7.1.3.5a as follows:***

#### 7.1.3.5a HT Control field

The HT Control field is always present in a Control Wrapper frame and is present in QoS Data and

management frames as determined by the Order bit of the Frame Control field as defined in 7.1.3.1.9.

NOTE—The only Control frame subtype for which HT Control field is present is the Control Wrapper frame. A control frame that is described as +HTC (e.g., RTS+HTC, CTS+HTC, BlockAck+HTC or BlockAckReq+HTC) implies the use of the Control Wrapper frame to carry that control frame.

The format of the 4-octet HT Control field is shown in Figure 7-4aa.

|  |  |  |
| --- | --- | --- |
| Bits: | B0 | B1-B31 |
|  | VHT | HT or VHT format |

Figure 7-4aa HT control field

The HT control field can have two formats, the HT format and the VHT format.

VHT field set to 0 indicates that bits B1-B31 are in HT format (Section 7.1.3.5a.1 )

VHT field set to 1 indicates that bits B1-B31 are in VHT format (Section 7.1.3.5a.2 )

***The following subsection need be created:***

**7.1.3.5a.1 HT Control field in the HT format**

When HT format is used, B1-B31 are defined as shown in figure 7-4a.

***~~Modify Figure 7-4b – Link Adaptation Control subfield, changing the reserved bit B0 from “reserved” to~~***

***~~“HT/VHT”.~~***

***Replace figures 7-4a and 7-4b with the following:***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1-B15 | B16-B17 | B18-B19 | B20-B21 | B22-B23 | B24 | B25-B29 | B30 | B31 |
|  | VHT=0 | Link  Adaptation  Control | Calibration  Position | Calibration  Sequence | Reserved | CSI/  Steering | NDP  Announce-  Ment | Reserved | AC  Constraint | RDG/  More  PPDU |
| Bits | 1 | 15 | 2 | 2 | 2 | 2 | 1 | 5 | 1 | 1 |

**Figure 7-4a—HT Control Field in HT format**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B1 | B2-B5 | B6-B8 | B9-B15 |
|  | TRQ | MAI | MFSI | MFSI MFB/ASELC |
| Bits | 1 | 4 | 3 | 7 |

**Figure 7-4b—Link Adaptation subfield**

***~~Modify Table 7-6a – Subfields of Link Adaptation Control subfield, adding a new row before the row containing the value “TRQ” in the column “Subfield” with the contents of the new row as shown below (header row shown only for reference):~~***

~~Table 7-6aX — Changes to Table 7-6a~~

|  |  |  |
| --- | --- | --- |
| **~~Subfield~~** | **~~Meaning~~** | **~~Definition~~** |
| ~~HT/VHT~~ | ~~HT/VHT format indication~~ | ~~Set to 0 to indicate that the HT Control field uses the HT format. Set to 1 to indicate that the HT Control field uses the VHT format.~~ |

***~~Modify Table 7-6a – Subfields of Link Adaptation Control subfield, by changing the Definition column entry in the last row of the table as shown:~~***

|  |  |  |
| --- | --- | --- |
| ~~MFB/ASELC~~ | ~~MCS feedback and antenna selection command/data~~ | ~~When the MAI subfield is set to the value ASELI, this subfield is interpreted as defined in Figure 7-4d (ASELC subfield) and Table 7-6c (ASEL Command and ASEL Data subfields).~~  ~~Otherwise, if the HT/VHT subfield is set to the value 0, this subfield contains recommended MFB expressed as an HT MCS, and if the HT/VHT subfield is set to the value 1, the 4 highest numbered bits of this subfield contain a recommended VHT MCS and the lowest numbered 3 bits of this subfield contain a recommended VHT N~~~~STS~~~~.~~  ~~A value of 127 indicates that no feedback is present.~~ |

***Insert the remaining text and figures after Table 7-6g:***

***The following subsection need be created:***

**7.1.3.5a.2 HT Control field in the VHT format**

~~If the HT/VHT subfield of the HT/VHT Control field is set to 1, then the format of the HT/VHT control field is shown in~~ When the VHT format is used, B1-B31 are defined as shown in Figure 7-4e.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3-B5 | B6-B8 | B9-B23 | B24-B26 | B27 | B28 | B29 | B30 | B31 |
|  | VHT=1 | ~~Unsolicited MFB~~  Reserved | MRQ | MSI | MFSI/  GID-L | MFB | GID-H | Coding Type | FB Tx Type | ~~Reserved~~  Unsolicited MFB | AC Constraint | RDG/More PPDU |
| Bits | 1 | 1 | 1 | 3 | 3 | 15 | 3 | 1 | 1 | 1 | 1 | 1 |

Figure 7-4e—~~V~~HT Control field in the VHT format

The format of the MFB of VHT Control field are defined in Figure 7-4f.

|  |  |  |
| --- | --- | --- |
| B9-B11 | B12-B15 | B16-B23 |
| Nsts | MCS | SNR |
| 3 | 4 | 8 |

Figure 7-4f—MFB subfield in ~~V~~HT Control field in the VHT format

The subfields of VHT Control field are defined in Table 7-6h.

Table 7-6h—VHT Control subfields

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Meaning** | **Definition** |
| VHT | HT Control field format | Set to 1 if the field is in VHT format  Set to 0 if the field is in HT format |
| ~~Unsolicited MFB~~ | ~~Unsolicited MCS feedback indicator~~ | ~~Set to 1 if the MFB is not a response to an MRQ.~~  ~~Set to 0 if the MFB is a response to an MRQ.~~ |
| MRQ | MCS request | Set to 1 to request MCS feedback (solicited MFB), otherwise set to 0. |
| MSI | MRQ sequence identifier | When the MRQ subfield is set to 1, the MSI subfield contains a sequence number in the range 0 to 6 that identifies the specific request. When the MRQ subfield is set to 0, the MSI subfield is reserved. |
| MFSI/GID-L | MFB sequence identifier/LSB of Group ID | If the Unsolicited MFB subfield is set to 0, the MFSI/GID-L subfield contains the received value of MSI contained in the frame to which the MFB information refers.  If the Unsolicited MFB subfield is set to 1, the MFSI/GID-L subfield contains the lowest 3 bits of Group ID of the PPDU to which the unsolicited MFB refers. |
| MFB | NSTS, MCS and SNR feedback | MFB subfield is interpreted as defined in Table 7-6i. This subfield contains the recommended MFB. Value of 127, it indicates that no feedback is present. |
| GID-H | MSB of Group ID | If the Unsolicited MFB subfield is set to 1, the GID-H subfield contains the highest 3 bits of Group ID of the PPDU to which the unsolicited MFB refers.  Otherwise this subfield is reserved. |
| Coding Type | Coding type of MFB response | If the Unsolicited MFB subfield is set to 1, Coding Type subfield contains the Coding information (set to 0 for BCC and set to 1 for LDPC) in which the unsolicited MFB refers.  Otherwise this subfield is reserved. |
| FB Tx Type | Transmission type of MFB response | If the Unsolicited MFB subfield is set to 1 and  FB Tx Type subfield is set to 0, the unsolicited MFB refers to ~~either~~ an unbeamformed VHT PPDU~~, transmit diversity utilizing Alamouti coding VHT PPDU~~.  If the Unsolicited MFB subfield is set to 1 and the FB Tx Type subfield is set to 1, the unsolicited MFB refers to a beamformed SUMIMO  VHT PPDU.  Otherwise this subfield is reserved. |
| Unsolicited MFB | Unsolicited MCS feedback indicator | Set to 1 if the MFB is not a response to an MRQ.  Set to 0 if the MFB is a response to an MRQ. |
| AC Constraint |  | As in description of AC Constraint field in section 7.1.3.5a.1 |
| RDG/More PPDU |  | As in description of RDG/More PPDU field in section 7.1.3.5a.1 |

The MFB subfields of VHT Control field are defined in Table 7-6i.

Table 7-6i—MFB subfield in VHT Control

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Meaning** | **Definition** |
| NSTS | Recommended VHT NSTS | NSTS subfield contains the recommended VHT NSTS as defined in **9.18.3.** |
| MCS | Recommended MCS feedback | MCS subfield contains the recommended VHT MCS as defined in **9.18.3**. |
| SNR | Average SNR | SNR subfield contains the average SNR, which is a SNR  averaged over data subcarriers and spatial streams as defined in 9.18.3. |

***Include in the draft the following section, with the specified changes:***

**9.7a HT Control field operation**

***Modify section 9.7a as follows***

If the value of its MIB variable dot11HTControlFieldSupported is TRUE, a STA shall set the +HTC-HT Support subfield of the HT Extended Capabilities field of the HT Capabilities element to 1 in HT Capabilities elements that it transmits.

If the value of its MIB variable dot11VHTControlFieldSupported is TRUE, a STA shall set the +HTC-VHT Support subfield of the VHT Capabilities info field of the VHT Capabilities element to 1 in VHT Capabilities elements that it transmits.

A STA that has a value of TRUE for at least one of its MIB variables dot11RDResponderOption-

Implemented and dot11MCSFeedbackOptionImplemented shall set either dot11HTControlFieldSupported , dot11VHTControlFieldSupported, or both, toTRUE.

An HT Control field in the HT format shall not be present in a frame addressed to a STA unless that STA declares support for +HTC-HT in the HT Extended Capabilities field of its HT Capabilities element (see 7.3.2.56)

An HT Control field in the VHT format shall not be present in a frame addressed to a STA unless that STA declares support for +HTC-VHT in the VHT Capabilities info field of its VHT Capabilities element.

NOTE—An HT STA that does not support +HTC (neither in HT nor in VHT format) that receives a +HTC frame addressed to another STA still performs the CRC on the actual length of the MPDU and uses the Duration/ID field to update the NAV, as described in 9.2.5.4.

If the HT Control field is present in an MPDU aggregated in an A-MPDU, then all MPDUs of the same

frame type (i.e., having the same value for the Type subfield of the Frame Control field) aggregated in

the same A-MPDU shall contain an HT Control field. The HT Control field of all MPDUs containing the

HT Control field aggregated in the same A-MPDU shall be set to the same value

**7.3.2.56.5 HT Extended Capabilities field**

***In Table 7-43m—Subfields of the HT Extended Capabilities field, modify row 4 as:***

|  |  |  |
| --- | --- | --- |
| +HTC-HT Support | Indicates support of the HT Control field in the HT format .See 9.7a | Set to 0 if not supported  Set to 1 if supported |

***In Figure 7-95o21—HT Extended Capabilities field change the “+HTC Support” to “+HTC-HT Support”***

##### 7.3.2.61.2 VHT Capabilities Info field

The VHT Capabilities Info field is 4 octets in length. The structure of this field is defined in .

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0-B1 | B2-B3 | B4 | B5-B6 | B7 | B8 | B9 | B10 |
|  | Maximum MPDU Length | Supported Channel Width Set | LDPC Coding Capability | Short GI for 20/40/80/160 | Tx STBC | Rx STBC | SU Beamformer Capable | SU Beamformee Capable |
| Bits: | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| B11-B12 | B13-B15 | B16-B18 | B19 | B20 |
| Grouping Set | Compressed Steering Number of Beamformer Antennas Supported | Number Of Sounding Dimensions | MU Tx Capable | MU Rx Capable |
| 2 | 3 | 3 | 1 | 1 |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| B21 | B22 | ~~B22~~B23-B31 |
| VHT TXOP PS | +HTC-VHT Capable | Reserved |
| 1 | 1 | ~~13~~ 12 |

Figure ‑--VHT Capabilities Info field

The subfields of the VHT Capabilities Info field are defined in .

Table ‑--Subfields of the VHT Capabilities Info field

***Add the following row after the last row of Table 7-16***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| +HTC-VHT | Capable of receiving a HT Control field in the VHT format | Set to 0 if not supported  Set to 1 if supported |

*Note—A STA that sets MU Rx Capable to 0 is not able to demodulate an MU VHT PPDU with only one non-zero Nsts subfield.*

*Note—The Compressed Steering Number of Beamformer Antennas Supported field also indicates the maximum number of space time streams in the NDP packet that the STA can support as a beamformee.*

***Include in the draft the following sections, with the specified changes:***

**9.17 Sounding PPDUs**

***Add before first paragraph***

This section assume HT control field in the HT format.

**9.18.2 Link adaptation using the HT Control field**

***Add before first paragraph***

This section assume HT control field in the HT format.

#### 9.19.2.2 Unidirectional implicit transmit beamforming

***Add before first paragraph***

This section assume HT control field in the HT format.

**9.19.2.3 Bidirectional implicit transmit beamforming**

***Add before first paragraph***

This section assume HT control field in the HT format.

**9.19.2.4.3 Sounding exchange for calibration**

***Add before first paragraph***

This section assume HT control field in the HT format.

9.19.2.4.4 CSI reporting for calibration

***Add before first paragraph***

This section assume HT control field in the HT format.

**9.19.2.4.4 CSI reporting for calibration**

***Add before first paragraph***

This section assume HT control field in the HT format.

## 3.3 Abbreviations and acronyms

***Insert the following acronym definitions:***

MU Multi-user

SU Single user

VHT Very high throughput

MU-MIMO Multi-user, multiple input, multiple output

DL MU-MIMO Downlink MU-MIMO

NDPA Null Data Packet Announcement

NSTS Number of space time streams