IEEE P802.11
Wireless LANs

|  |
| --- |
| Miscellaneous 11mc comment resolutions (Initial Sponsor Ballot) |
| Date: 2015-09-14 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Sigurd Schelstraete | Quantenna Communications | 3450 W. Warren AveFremont, CA 94538 |  | sigurd@quantenna.com  |

Abstract

This document contains the discussion of and proposed resolutions to CIDs 5900, 5914, 5916, 5922, 5932, 5934, 5935 and 5936.

The following CIDs have been agreed and resolution is contained in r1 of the document:

5892, 5913, 5915, 5919, 5920, 5923, 5926, 5927, 5929, 5931, 5937, 5928

**CID 5900**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5900 | 9.32.3 | 1424 | 63 | This section should not have requirements on VHT beamformee. Delete paragraph or move to appropriate section. | See comment |

Subclause 9.32.3 deals with Explicit Feedback beamforming for HT transmissions, as is clear from the first sentence of the subclause:



Within the subclause, the following text appears on Page 1424, Line 63:



Given that 9.32.3 is explicitly about HT PPDUs, it’s not clear why this statement is needed. Every VHT STA is an HT STA, so the requirements when operating in HT mode should be fully covered by the HT clauses.

Also, the statement seems to have it backwards. By design, the feedback can not exceed the number of streams that was sounded in the sounding frame. In VHT, the maximum number of streams in a sounding frame is indeed limited by the Beamformee STS Capability subfield of the VHT Capabilities element. As such, the statement on Page 1424, Line 63 would be trivially met.

However, HT has its own field to indicate the maximum number of streams in an NDP. That field is the Channel Estimation Capability subfield in the Transmit Beamforming Capabilities field (HT Capabilities field). It would appear that that field is the relevant number. However, again, the requirement would be trivially met since the sounding PPDU will never provide an opportunity to provide feedback for more streams.

Update: During the F2F meeting, it was acknowledged that the text is out of place and should be removed. Durinf discussion, the question was asked whether a requirement on Nr was present for HT, as it is for VHT.

The correct sequence of requirements is:

1. A beamformer should never send a sounding frame with more streams than can be received by the beamformee (as indicated by “Channel Estimation Capability” and “Beamformee STS Capability” for HT and VHT respectively)
2. A beamformee should not send back feedback for more than the number of streams in the sounding frame

The issue here is that the two requirements are mixed up into one. Also, it uses non-applicable VHT terminology in an HT section.

For VHT we clearly have both requirements separately, namely:

1. 

And:

1. 

for HT, we have:

1. 

There appears to be no restriction on the number of spatial streams contained in a compressed BF frame however.

In conclusion:

The original sentence on page 1424, line 63 is definitely out of place, since it references VHT in an HT section. As such, the proposed resolution remains to delete it. As part of the discussion, it looks like some constraint on the value of Nr (number of streams) is missing for HT.

**Proposed resolution:**

Revised

1. Remove the lines 63-64 on Page 1424:
2. Add the following text at the end of subclause 9.32.3:

An HT beamformee that transmits a feedback frame of type Compressed Beamforming in response to a sounding PPDU sent by an HT beamformer shall set the value of Nr in the MIMO Control field of the feedback frame to be the same value as the number of streams in the sounding PPDU.

**CID 5914**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5914 | 22.2.2 | 2458 | 40 | In Table 22-1, sometimes reference is made to Table 20-1 for HT-related values, while sometimes content of Table 20-1 is copied explicitly. | Propose to consistently refer to Table 20-1 when appropriate rather than duplicating text in both Table 22-1 and Table 20-1. |

Table 22-1 extends to definition of TXVECTOR and RXVECTOR from HT to VHT. Some fields of TXVECTOR and/or RXVECTOR exist for both HT and VHT. The way these are handled in the table is not consistent however. In some cases, all the HT information is duplicated, while in other cases, reference is made to Table 20-1 for HT-related values.

For example, L\_LENGTH in Table 22-1 is defined as follows:



This copies most of the definition for Table 20-1:



Other definitions only specify only the changes that affect VHT. For example:



It’s always better to avoid duplication of text from one clause in another and instead reference the relevant text. The proposal is to clean up Table 22-1 to apply this consistently throughout the table.

No final text proposal is included in this submission. This can be done in a separate document if the the group agrees with the proposed way forward.

**Proposed resolution**

The group expressed a preference for not duplicating the content of the Tables.

**CID 5916**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5916 | 22.2.2 | 2465 | 20 | "for non-HT or non-HT duplicate frames, CH\_BANDWIDTH is a receiver estimate of the bandwidth". I can't find any requirement on how the receiver is supposed to determine the value of CH\_BANDWIDTH for these cases, so this statement may not be supported by the spec. | Clarify |

Propose to withdraw this comment. The CH\_BANDWIDTH entry in the Table does mention the estimate. However, the NOTE may be more useful directly in the CH\_BANDWIDTH\_IN\_NON\_HT entry of Table 22-1. Most NOTEs in Table 22-1 that pertain to specific parameters are inserted in the table, rather than collected at the end.

Update: During discussion at F2F meeting, it was suggested to move the NOTE at the end of the table to a more appropriate place.

**Proposed resolution**

Revised

Move NOTE 2 from the end of Table 22-1 to the row corresponding to the field CH\_BANDWIDTH:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| CH\_BANDWIDTH | FORMAT is HT\_MF orHT\_GF | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| FORMAT is VHT | Indicates the channel width of the transmitted PPDU:Enumerated type:CBW20 for 20 MHzCBW40 for 40 MHzCBW80 for 80 MHzCBW160 for 160 MHzCBW80+80 for 80+80 MHz | Y | Y |
| FORMAT is NON\_HT | In TXVECTOR, indicates the channel width of the transmittedPPDU.In RXVECTOR, indicates the estimated channel width of thereceived PPDU.Enumerated type:CBW40, CBW80, CBW160, or CBW80+80 ifNON\_HT\_MODULATION equalsNON\_HT\_DUP\_OFDMCBW20 if NON\_HT\_MODULATION equals OFDMNOTE — On reception, where valid, the CH\_BANDWIDTH\_IN\_NON\_HT parameter is likely to be a more reliable indication of subformat and channel width than the NON\_HT\_MODULATION and CH\_BANDWIDTH parameters, since for non-HT or non-HT duplicate frames, CH\_BANDWIDTH is a receiver estimate of the bandwidth, whereas CH\_BANDWIDTH\_IN\_NON\_HT is the signaled bandwidth. | Y | Y |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| NOTE 1—In the “TXVECTOR” and “RXVECTOR” columns, the following apply:Y = Present;N = Not present;O = Optional;MU indicates that the parameter is present once for a VHT SU PPDU and present per user for a VHT MU PPDU.Parameters specified to be present per user are conceptually supplied as an array of values indexed by *u*, where *u*takes values 0 to NUM\_USERS-1. |

**CID 5922**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5922 | 22.3.6 | 2488 | 57 | Refer to NOTE 1 for definition of "pre-modulated fields" | See comment |



Up until this point, no definition is given for the “pre-VHT modulated fields”. The term isn’t introduced until later. A proper reference is in order.

Update: During discussion at the F2F meeting, it was pointed out that there are several instance of the use of “pre-VHT modulated fields” before the definition is introduced.

**Proposed resolution**

Revised.

Change text as follows:

Page 2473, Line 10:

Figure 22-5 (Transmitter block diagram for the L-SIG and VHT-SIG-A fields) to Figure 22-16 (Transmitter block diagram for the Data field of an 80+80 MHz VHT SU PPDU with LDPC encoding) show example transmitter block diagrams. The actual structure of the transmitter is implementation dependent. In particular, Figure 22-5 (Transmitter block diagram for the L-SIG and VHT-SIG-A fields) shows the transmit process for the L-SIG and VHT-SIG-A fields of a VHT PPDU using one frequency segment. These transmit blocks are also used to generate L-STF and L-LTF, except that the BCC encoder and interleaver are not used for these fields.

On Page 2488, Line 57:

|  |  |
| --- | --- |
| *Nuser* | For pre-VHT modulated fields (see NOTE 1), *Nuser* = 1. For VHT modulated fields, *Nuser* represents the number of users in the transmission (equal to the TXVECTOR parameter NUM\_USERS). |

On Page 2489, Line 6

|  |  |
| --- | --- |
| *NSTS, NSTS,u* | For pre-VHT modulated fields (see NOTE 1), *NSTS,u* = 1 (see NOTE 2). For VHT modulatedfields, *NSTS,u* is the number of space-time streams for user *u*, *u =* 0*,…, Nuser*–1.For a VHT SU PPDU, *NSTS = NSTS,0*.For a VHT MU PPDU, *NSTS* is undefined. |

On Page 2489, Line 19

|  |  |
| --- | --- |
| *NSTS,total* | For VHT modulated fields, *NSTS,total* is the total number of space-time streams in aPPDU.For pre-VHT modulated fields (see NOTE 1), *NSTS,total* is undefined.Note that *NSTS,total* = *NSTS* for a VHT SU PPDU. |

On Page 2489, Line 50

|  |  |
| --- | --- |
| *Mu* | For pre-VHT modulated fields (see NOTE 1), *Mu* = 0. For VHT modulated fields (see NOTE 1),*M0* for *u* = 0 and  for *u =* 1*, …Nuser*–1. |

**CID 5932**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5932 | 22.3.8.3.6 | 2511 | 56 | The note is wrong. PSDU\_LENGTH can be very different from APEP\_LENGTH. As such, the number of octets represented by VHT-SIG-B will not be within 3 bytes of PSDU\_LENGTH. | Delete Note |



Update: It was pointed out in private conversation that the NOTE states that “The number of octets represented by the VHT-SIG-B Length field will not exceed the PSDU\_LENGTH (…)”. It could be misread as saying that VHT-SIG-B Length and PSDU\_LENGTH don’t differ by more than three bytes. That statement would be incorrect. However, the strict reading of the NOTE is correct. The question remains whether the NOTE really adds something of value …

**Proposed resolution**

Revise. Change text on Page 2511, Line 56 as follows:

**CID 5934**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5934 | 22.3.10.5.3 | 2519 | 5 | Tortured English: replace "each is encoded" with "are each separately encoded" | See comment |



**Proposed resolution**

Revise. Change text on Page 2519, Line 4 as follows:

The BCC encoder parser output sequences of user *u *are each separately encoded by a rate R = ½ convolutional encoder defined in 18.3.5.6 (Convolutional encoder).

**CID 5935**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5935 | 22.3.10.7 | 2523 | 39 | Error in Equation (22-76) | Replace N\_CBPSS with N\_CBPSS-1 |



The index k runs over all coded bits per spatial stream (*NCBPSS*). The correct range is from 0 to *NCBPSS* -1.

**Proposed resolution**

Accept. Change text on Page 2523, Line 39 as follows:

*Yk,l* = *xk*, *k* = 0, 1,…, *NCBPSS-1*

**CID 5936**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5936 | 22.3.10.9.2 | 2531 | 37 | "will be transmitted on two data tones that are separated by at least D\_TM -1 from other data tones" doesn't make sense. Replace with "will be transmitted on two data tones that are separated by at least D\_TM -1 other data tones" (delete "from") | See comment |



The LDPC tone mapping is in essence a block interleaving operation. Tone that were initially adjacent will be separated by D\_TM -1 tone after the LDPC tone mapping operation – meaning there are D\_TM -1 other data tones between them. The current text states that the tones are separated from other data tones. This is not correct.

**Proposed resolution**

Accept. Change text on Page 2531, Line 35 as follows:

As a result of the LDPC tone mapping operation above, each two consecutively generated complex constellation numbers *d*'*k*,*i*, *n*,*l*,*u* and *d*'*k* + 1,*i*,*n*,*l*,*u* will be transmitted on two data tones that are separated by at least *DTM* – 1 other data tones.