sIEEE P802.11  
Wireless LANs

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| Clause 22.2.2 TXVECTOR and RXVECTOR Parameters Comments Resolution for D2.0 | | | | |
| Date: 14 March 2012 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Sun, Bo | ZTE Corporation |  |  | Sun.bo1@zte.com.cn |
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Abstract

This document provides resolutions for CIDs: 4072, 4074~4076, 4236, 4237, 5108~5116, 5287, 5288, 5290 and 5291.

**Comments:**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5287 | 163.9 | 22.2.2 | Condition missing | As in comment | Disagree. |

**Discussion:**

Leaving the Condition column blank means the corresponding parameter shall be presented in all conditions, i.e. no condition limitation. Thus there should be no confusion here.

**Comment Status: Rejected**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5108 | 164.50 | 22.2.2 | Wrong parameter label | The parameter name in the first column should be "EXPANSION\_MAT\_TYPE" instead of "EXPANSION\_MAT" | Agree |

**Comment Status: Accepted**

**TGac editor: please modify the first column in section 22.2.2 pg164/ln50 as following.**

EXPANSION\_MAT\_TYPE

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5109 | 165.10 | 22.2.2 | Wrong parameter label | The parameter name in the first column should be "EXPANSION\_MAT" instead of "EXPANSION\_MAT\_TYPE" | Agree |

**Comment Status: Accepted**

**TGac editor: please modify the first column in section 22.2.2 pg165/ln10 as following.**

EXPANSION\_MAT~~\_TYPE~~

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5110 | 165.10 | 22.2.2 | Improve definition of EXPANSION\_MAT | The third column states that this parameter contains "compressed beamforming feedback matrices". This looks like a copy-paste error from "CHAN\_MAT". In fact, it should contain either a spatial mapping matrix, a BF steering matrix or a MU steering matrix. These matrices are all implementation specific. Change defintion accordingly. | Revised |

**Commenter supplementary statement:**

Original text in third column: “Contains a set of compressed beamforming feedback matrices as defined in 22.3.11.2 (Beamforming Feedback Matrix V). The number of elements depends on the number of space-time streams and the number of users.

Note that implementations are not restricted to the spatial mapping matrix examples listed in 20.3.11.11.2 (Spatial mapping). For MU packets, it is the MU-MIMO steering matrix which is implementation specific.”

New proposed text: “Contains the spatial mapping matrix or BF steering matrix. For MU packets, it contains the MU-MIMO steering matrix. The dimensions of the matrices depend on the number of space-time streams, the number of antennas and the number of users.

Note that implementations are not restricted to the spatial mapping matrix examples listed in 20.3.11.11.2 (Spatial mapping). The spatial mapping matrices and steering matrices are implementation specific.”

**Discussion:**

The Value explanation is following the same conception as used in 11n, when EXPANSION\_MAT\_TYPE equals to COMPRESSED\_SV. The description “a set of compressed beamforming feedback matrices…” implies the content of the parameter could be one specific matrix as defined in 22.3.11.2 in implementation.

While the Note on the second paragraph is leading confusion since for SU-MIMO this parameter is specifically used for compressed beamforming.

**Comment Status: Revised.**

**TGac editor: please remove the “Note” paragraph in Value column, section 22.2.2 pg165/ln15.**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5288 | 165.12 | 22.2.2 | define "number of elements" | As in comment | Revised |

**Discussion:**

To follow the same logic as defined in 11n, the “number of elements” here refers to the number of basic matrix element defined in 20.3.11.2, i.e. measurement on one transmit chain at one space-time stream . While in current description the element refers to a vector describing one user’s measurement on one space-time stream Thus it’s worthy to add one note to explain that one element is a vector that refers to the feedback of one user at one space-time stream and at all transmit chain.

**Comment Status: Revised**

**TGac editor please add a note at Value column, section 22.2.2 pg165/ln15 as following:**

Note, the element mentioned above is a vector with the element as one user’s feedback at one space-time stream and all reported transmit chains.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5111 | 165.49 | 22.2.2 | Redundant condition | The second column lists the condition "FORMAT is VHT and CHAN\_MAT\_TYPE is COMPRESSED\_SV". This is redundant since CHAN\_MAT\_TYPE only takes the value COMPRESSED\_SV when FORMAT is VHT.  Replace condition with "FORMAT is VHT" | Agree |

**Comment Status: Accepted**

**TGac editor: please modify the condition column in section 22.2.2 pg165/ln49 as following.**

FORMAT is VHT ~~and CHAN\_MAT\_TYPE is COMPRESSED\_SV~~.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4072 | 165.57 | 22.2.2 | NO\_SIG\_EXTN  There is no signal extension in 5GHz, and therefore no need to control it. | Remove this row. | Rejected |

**Discussion:**

The comment addresses the issue that in current TX/RXVECTOR list, NO\_SIG\_EXTN is not presented in either TXVECTOR nor RXVECTOR. That means it’s not used in VHT case at all. Therefore it could be removed.

While as explained by Brian, this parameter is used by a VHT device to handle HT PPDU or NON\_HT PPDU, as described in 22.2.4. In this case, VHT TX/RXVECTOR will be mapped to HT TX/RXVECTOR thus the corresponding items must be kept in VHT TX/RXVECTOR to avoid blank mapping.

***Brian’s further comment:*** as shown in fig 22-1, a VHT STA may transmit a HT PPDU, and NO\_SIG\_EXTN is a required parameter of the HT TXVECTOR so NO\_SIG\_EXTN must also be passed into the VHT TXVECTOR. Although it is certainly true that a VHT PHY could set NO\_SIG\_EXTN to true, this goes against the layering arch, where it is the MAC’s job to know whether there is a signal extension or not. Consider, for instance, the HT case, where the HT PHY could set NO\_SIG\_EXTN to true/false based on its knowledge of which band it is operating in; but HT chose that the MAC would pass this information into the PHY.

**Comment Status: Rejected**

**TGac editor: please remove NO\_SIG\_EXTN item from section 22.2.2 pg165/ln57.**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4074 | 167.31 | 22.2.2 | "Y / N / O"  If traffic lights obeyed these semantics, we'd have lots of crashes.  These are mutually exclusive, from the PHY's point of view, and the correct value is "O", meaning that the PHY permits, but does not require this parameter to be present.  Also the NOTE "This is mandatory ..." is expressing behaviour that lies wholly in the MAC layer, and is adquately described there." | Change to "O".  Ditto at line 48.  Consider removing note at line 41. Ditto at line 58. | Agree |

**Comment Status: Accepted**

**TGac editor:**

**1). change the values in TXVECTOR column of DYN\_BANDWIDTH\_IN\_NON\_HT item to “O”;**

**2). change the values in TXVECTOR column of CH\_BANDWIDTH\_IN\_NON\_HT item to “O”;**

**3). Remove the NOTE paragraph from Value column of DYN\_BANDWIDTH\_IN\_NON\_HT item;**

**4). Remove the NOTE paragraph from Value column of CH\_BANDWIDTH\_IN\_NON\_HT item.**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4236 | 167.48 | 22.2.2 | The parameters in Table 22-1 are defined as part of the TXVECTOR parameter list in the PHY-TXSTART.request primitive and/or as part of the RXVECTOR parameter list in the PHY-RXSTART.indication primitive. And the PHY-RXSTART.indication primitive is sent immediately afer SIG-A is decoded while the service field is not decoded yet, so the CH\_BANDWIDTH\_IN\_NON\_HT parameter can not be get when the primitive is being sent. | clarify how CH\_BANDWIDTH\_IN\_NON\_HT is achieved and used in PHY-RXSTART.indication primitive. | N/A |

**Discussion:**

The CH\_BANDWIDTH\_IN\_NON\_HT parameter is signalled via scrambling sequence which can only be decoded after PHY-RXSTART.ind(RXVECTOR) is issued. So this parameter is not likely to be included in the RXVECTOR used in a PHY-RXSTART.ind() primary. To address this situation, it’s worthy to add some words in NOTE 2 in Table 22-1.

**Comment Status: N/A**

**TGac editor: please modify section 22.2.2 pg167/ln48 as following in 11/12-0340.**

NOTE2 – This parameter is not included in a RXVECTOR used by PHY-RXSTART.indicate() primary.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5112 | 167.52 | 22.2.2 | RXVECTOR indicates received PPDU | Replace "channel width of the transmitted PPDU" with "channel width of the received PPDU" | Agree |

**Comment Status: Accepted**

**TGac editor: please modify section 22.2.2 pg167/ln52 as following.**

“In RXVECTOR, if valid, indicates the channel width of the ~~transmitted~~received PPDU which is signalled via the scrambling sequence.”

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5115 | 168.24 | 22.2.2 | Ambiguity in use of field "BEAMFORMED" | It is not clear what qualifies as a "beamforming steering matrix". Where is the boundary between a spatial mapping matrix and a beamforming steering matrix?  Is there an underlying requirement here that can be captured better? What was the initial intent of this BEAMFORMED field? | Revised (Actually the commented context is located at L24/P169) |

**Discussion:**

The background of this BEAMFORMED parameter is to imply if smoothing could be applied or not. Thus it’s clearly to identify beamforming steering matrix rather than others.

**Comment Status: Revised.**

**TGac editor: please modify the content of Value column in Table 22-1, section 22.2.2 pg169/ln24 as following.**

“Set to 1 if a beamforming steering matrix is applied. Set to 0 otherwise.

Note – when BEAMFORMED is set to 1, smoothing is not recommended.”

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5113 | 168.30 | 22.2.2 | Specify value of APEP\_LENGTH for NDP in RXVECTOR | Add sentence "For an NDP, this value is set to zero in RXVECTOR" | Revised |

**Discussion:**

In the first paragraph of the Value column, it’s stated “If equal to zero, indicates a VHT NDP PPDU”. And this intends to describe a general request for both TXVECTOR and RXVECTOR cases.

Besides, the receiver can identify an NDP by SIG-A length field. Therefore it can set APEP\_LENGTH to zero in RXVECTOR.

**Comment Status: Revised**

**TGac editor: please modify the sentence at pg168/ln15 in Value column in Table 22-1 as following.**

“If equal to zero, it indicates a VHT NDP PPDU for both TXVECTOR and RXVECTOR cases.”

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4075 | 168.44 | 22.2.2 | USER\_POSITION  This parameter is not needed on transmission, because those parameters that are "MU" in the TXVECTOR already are implicitly indexed by user position.  What the existence of this parameter does is to allow the interface to support "user=1 goes in user position 3", i.e. to reorder the TXVECTOR's understanding of indexing by MU and the transmission order. However, this achieves no purpose, as it doesn't affect the OTA signalling. | Change "MU" to "N" for TXVECTOR | Revised |

**Discussion:**

Contrary to the comment, the MU parameters are compressed in positions 0 to NUM\_USERS-1 (see NOTE 1 at the end of the TX/RXVECTOR). The USER\_POSITION then “unpacks” these parameters into 0 through 3 which then affects VHT-SIG-A. However, in private discussions the commenter points out that the equations presume/require that USER\_POSITION is ascending.

Then we have 2 alternatives: a) rewrite many PHY equations to allow for sparse u or b) leave the equations unchanged and add an extra requirement that USER\_POSITION be sent in ascending order. The former one introduces high risk of error to the spec; the latter one can be addressed via one new sentence.

**Comment Status: Revised**

**TGac editor: please add following sentence as second paragraph in Value column after pg168/ln44.**

NOTE – When a STA transmits a VHT MU PPDU, the entries in the USER\_POSITION array is set in ascending order.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4237 | 168.52 | 22.2.2 | The value of NUM\_STS for MU is ranged from 0-4 and it's an array of length NUM\_USER. While it's not clear why NUM\_STS is set to 0 for a MU transmission. | Change the value of NUM\_STS for MU to "1-4". | Agree |

**Comment Status: Accepted.**

**TGac editor: please modify section 22.2.2 pg168/ln52 as comment CID4237 proposed.**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5114 | 168.52 | 22.2.2 | Valid range of NUM\_STS for MU | Add conditions to valid range of NUM\_STS for MU: - total should be <=8 - total should be > 0 | Revised |

**Discussion**

Basically the current definition is described per user. But to make the condition of valid range complete, we could add a note to describe the limitation to totally value in MU case.

**Comment Status: Revised**

**TGac editor: please modify the text in Value column at section 22.2.2 pg168/ln52 as following:**

Integer: range 1-8 for SU, ~~0~~1-4 per user for MU. When NUM\_STS is summed over all users, it can range from 1 through 8.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 4076 | 168.60 | 22.2.2 | "A value of 0 or 63 indicates an SU PPDU. Otherwise, indicates an MU PPDU."  This is possibly true on receive, (what else can indicate MU), but the primary indication of MU/SU on transmit is surely NUM\_USERS > 1. | Insert: "On receive ... " | Rejected. MU PPDU can have NUM\_USERS=1 |

**Comment Status: Rejected.**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5290 | 168.61 | 22.2.2 | Please define "Otherwise" | As in comment | Revised |

**Discussion**

We could modify the text to “A value among 1~62 indicates a MU PPDU”.

**Comment Status: Revised.**

**TGac editor: please modify section 22.2.2 pg168/ln61 as following.**

A value of 0 or 63 indicates an SU PPDU. ~~Otherwise,~~ A value among 1~62 indicates an MU PPDU.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5291 | 170.29 | 22.2.2 | Please modify, not clear sentence: "MU indicates that the parameter is present for one user if an SU PPDU and present per user for an MU PPDU. | As in comment | Revised |

**Discussion:**

“MU” actually means nothing in SU PPDU case. We could modify the text to “’MU’ indicates that the parameter is present per user in MU PPDU case”.

**Comment Status: Revised.**

**TGac editor: please modify section 22.2.2 pg170/ln29 as following:**

MU indicates that the parameter is present ~~for one user if~~ for an SU PPDU and present per user for an MU PPDU.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5116 | 171.09 | 22.2.2 | CBW20, CBW40, ... are not defined for HT\_MF, HT\_GF | Clause 20 uses HT\_CBW20, HT\_CBW40, ... to label the various bandwidth values. Use of terminology should be harmonized between clause 20 and clause 22. This applies to the first two rows of Table 22-2. | Disagree |

**Discussion**

Even in the case the PPDU format is HT\_MF or HT\_GF, it will be understood in a scope of VHT device. Thus the VHT definition for CBW20, CBW40 should apply for the purpose here.

**Comment Status: Withdrawn by commenter.**