IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | D6.0 PHY CR | | | | | | Date: 2020-04-22 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm |  |  | youhank@qti.qualcomm.com | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following comments from the SA1 on P802.11ax D6.0:

24319, 24320, 24171, 24172, 24173, 24174, 24522, 24176, 24177, 24280, 24521, 24189, 24295, 24298, 24282

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

R1: Updates made during conference call on 4/9/2020.

R2: Updated proposed resolution for CID 24522 per suggestion from Robert Stacey.

R3: Updated per feedback from Mark Rison

* Updated Background section of CID 24172
* Updated proposed text changes for CID 24176 (added “NUM\_STS equal to 1 is valid only when STBC is not used”).

# CID 24319

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24319 | 38.19 | 3.1 | Should be clearer that multiple spatial streams used in different RUs do not constitute MU-MIMO | At the referenced location add a "NOTE---STAs simultaneously transmitting to or receiving from a STA with multiple antennas but on different radio frequencies, e.g. on different resource units (RUs), does not constitute MU-MIMO." |

**Discussion**

D6.0 P38

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This reviewer proposes the following simpler change.

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| **multi-user multiple input, multiple output (MU-MIMO):** A technique by which multiple stations (STAs), each with one or more antennas, either simultaneously transmit to a single STA or simultaneously receive from a single STA independent data streams over the same subcarriers. |

**Proposed Resolution: CID 24319**

**Revised**

A simpler text update is proposed to resolve the issue raised by the commenter.

Instruction to Editor:

At D6.0 P38L17, change “same radio frequencies” to “same subcarriers”.

# CID 24320

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24320 | 42.26 | 3.1 | Deleting the word "downlink" in the definition of an MU PPDU is just going to confuse/mislead. UL MU is achieved through use of TB PPDUs, not MU PPDUs | Undelete the word "downlink" |

**Discussion**

D6.0 P42

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Agree with the commenter that the remaining portion of the paragraph is all referring to “downlink” (e.g. DL OFDMA, HE MU PPDU). Also, the deletion of “downlink” was made between D4.3 and D5.0, but this reviewer could not find any CID which resulted in that change, and thus could not find any history/discussion on why the deletion was made. It looks like it could have been an editorial error.

**Proposed Resolution: CID 24320**

**Accepted**

# CID 24171

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24171 | 473.49 | 27.1.1 | Bullet contains two requirements. Split into two bullets (as is done on e.g. page 472) | See comment |

**Background**

D6.0 P473

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**Proposed Resolution: CID 24171**

**Revised**

Proposed text update implements the request from the commenter.

Instruction to Editor:

At D6.0 P473L49, split the bullet items to two lines by re-writing it as

“- HE MU PPDUs with a 2x HE-LTF and 0.8 μs GI duration on the HE-LTF and Data field OFDM symbols (transmit).

- HE MU PPDUs with a 2x HE-LTF and 1.6 μs GI duration on the HE-LTF and Data field OFDM symbols (transmit).”

# CID 24172

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24172 | 474.12 | 27.1.1 | An AP may support: "40 MHz channel width in the 2.4 GHz band (transmit and receive). If it is supported then all RU sizes and locations applicable to 40 MHz channel width are supported in 2.4 GHz band (transmit and receive).".  The second sentence is a conditional mandatory requirement. This should be included under "An HE AP shall support", as is done e.g. for other CM features in the last bullet on page 473, line 60. | Move "support of all RU sizes and locations applicable to 40 MHz channel in 2.4 GHz band" to the bullet list starting at page 473, line 34 with the condition "if 40 MHz channel width in the 2.4 GHz band is supported" |

**Background**

D6.0 P473-474

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Here is a redline version of the proposed text update for easier reading (requested by Mark Rison)

At D6.0 P473L63,

* All RU sizes and locations applicable to 40 MHz channel width in the 2.4 GHz band if 40 MHz channel width is supported in the 2.4 GHz band (transmit and receive).”

At D6.0 P474L12,

* 40 MHz channel width in the 2.4 GHz band (transmit and receive).

**Proposed Resolution: CID 24172**

**Revised**

Proposed text update implements the request from the commenter, but with some editorial updates.

Instruction to Editor:

At D6.0 P473L63, add

“- All RU sizes and locations applicable to 40 MHz channel width in the 2.4 GHz band if 40 MHz channel width is supported in the 2.4 GHz band (transmit and receive).”

At D6.0 P474L12, delete

“If it is supported then all RU sizes and locations applicable to 40 MHz channel width are supported in 2.4 GHz band (transmit and receive).”

# CID 24173

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24173 | 475.08 | 27.1.1 | This paragraph makes it sound like 20 MHz operating STA only needs to comply with the requirements in this (short) paragraph. I assume a 20 MHz operating STA also has to comply with the mandatroy requiremetns of a non-AP STA? | Add: a 20 MHz operating STA shall also support the mandatory features of a non-AP STA |

**Background**

D6.0 P475

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**Proposed Resolution: CID 24173**

**Revised**

A 20 MHz operating non-AP HE STA is a non-AP HE STA, so it is redundant to re-state that a 20 MHz operating non-AP HE STA shall support the mandatory features of a non-AP HE STA. Instead, the proposed resolution by this review moves this paragraph as a conditional mandatory feature for a non-AP HE STA.

Instruction to Editor:

At D6.0 P475L7, add

“- 26-, 52-, and 106-tone RU sizes on locations allowed in 27.3.2.8 in the primary 20 MHz channel within 40 MHz channel width if the non-AP HE STA is a 20 MHz operating non-AP HE STA (transmit and receive).

- 26-, 52-, and 106-tone RU sizes on locations allowed in 27.3.2.8 in the primary 20 MHz channel within 80 MHz channel width if the non-AP HE STA is a 20 MHz operating non-AP HE STA and is operating in the 5 GHz or 6 GHz bands (transmit and receive).”

Delete the paragraph at D6.0 P475L8-11.

# CID 24174

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24174 | 482.23 | 27.2.2 | It states that MCS is an integer in the range 0 to 11. This is not correct for HE\_ER\_SU | Correct: for HE ER SU, MCS is an integer in the range 0 to 2. |

**Background**

D6.0 P482

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**Proposed Resolution: CID 24174**

**Revised**

Proposed text update for this CID creates a separate row for HE\_ER\_SU format for MCS in TXVECTOR/RXVECTOR.

Instruction to Editor: Implement the proposed text updates for CID 24174 in https://mentor.ieee.org/802.11/dcn/20/11-20-0540-02-00ax-d6-0-phy-cr.docx

**Proposed Text Updates: CID 24174**

*Instruction to Editor: Update D6.0 P482L22 (Table 27-1) as shown below.*

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| --- | --- | --- | --- | --- |
| MCS | FORMAT is HE\_SU, HE\_MU or HE\_TB | Indicates the modulation and coding schemes used in the transmission of the PPDU.  Integer: range 0 to 11 | MU | MU |
| FORMAT is HE\_ER\_SU | Indicates the modulation and coding schemes used in the transmission of the PPDU.  Integer: range 0 to 2 | Y | Y |
| Otherwise | See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters). | | |

# CID 24522

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24522 | 484.64 | 27.2.2 | "NOTE--The TXVECTOR parameter CH\_BANDWIDTH  does not represent the channel width of the transmitted PPDU." -- this is rather counter-intuitive, so a reference to what does should be given in this NOTE | Append "This is represented in the TXVECTOR parameter RU\_ALLOCATION.", |

**Background**

D6.0 P484

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**Proposed Resolution: CID 24522**

**Revised**

TXVECTOR parameter RU\_ALLOCATION is an 8 bits variable, whose definition is referred to 9.3.1.22. Even at 9.3.1.22, the RU size is simply specified in terms of number of subcarriers, not by “bandwidth”.

Hence, the proposed resolution instead is to update the text to clarify what CH\_BANDWIDTH means.

Instruction to Editor:

At D6.0 P484L64, change the NOTE to “NOTE - The setting of the CH\_BANDWIDTH parameter is determined by the triggering frame. See 26.5.2.3.3 and 26.5.2.3.4.”.

# CID 24176

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24176 | 486.30 | 27.2.2 | It states that NUM\_STS is in the range 1-2 for HE\_ER\_SU. Note that 2 is only valid when STBC is used. | See comment |

**Background**

D6.0 P486

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**Proposed Resolution: CID 24176**

**Revised**

Proposed resolution adds a NOTE to clarify this.

Instruction to Editor:

At D6.0 P486L31, add

“NOTE – NUM\_STS equal to 1 is valid only when STBC is not used. NUM\_STS equal to 2 is valid only when STBC is used.”

# CID 24177

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24177 | 492.10 | 27.2.2 | Another condition for BEAM\_CHANGE is that NUM\_STS <=2 | Add in "conditions" column |

**Background**

D6.0 P492

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**Proposed Resolution: CID 24177**

**Rejected**

26.11.3 (BEAM\_CHANGE) at D6.0 P429L35 clearly states that “HE STA … shall set the TXVECTOR parameter BEAM\_CHANGE to 1 if … the number of spatial streams is greater than 2”. Hence, there is no need to repeat the condition again in the TXVECTOR table.

# CID 24280

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24280 | 493.19 | 27.2.2 | Move the following into the 26.11 (Setting TXVECTOR parameters for an HE PPDU) because it is provided from the MAC to the PHY and the PHY can't decide the value by itself. .  - Set to true if the non-HT or non-HT duplicate PPDU is sent in response to an MU-RTS Trigger frame.  - Set to false otherwise. | As in the comment. |

**Background**

D6.0 P493

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**Proposed Resolution: CID 24280**

**Revised**

Proposal by the commenter is implemented by this resolution.

Instruction to Editor: Implement the proposed text updates for CID 24280 in https://mentor.ieee.org/802.11/dcn/20/11-20-0540-02-00ax-d6-0-phy-cr.docx

**Proposed Text Updates: CID 24280**

*Instruction to Editor: Add the following subclause after D6.0 P434L65.*

26.11.X1 TRIGGER\_RESPONDING

An HE non-AP STA that transmits a non-HT or non-HT duplicate PPDU shall set the TXVECTOR parameter TRIGGER\_RESPONDING to true if the PPDU is sent in response to an MU-RTS Trigger frame. Otherwise, the HE non-AP STA shall set the TXVECTOR parameter TRIGGER\_RESPONDING to false.

*Instruction to Editor: Update D6.0 P494L19 (Table 27-1) as shown below.*

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| TRIGGER\_RESPONDING | FORMAT is NON\_HT | Boolean value:  true indicates that the MAC entity requests that the PHY entity do synchronization as defined in 27.3.15.3 (Pre-correction accuracy requirements).  false indicates that the MAC entity does not request that the PHY entity do synchronization as defined in 27.3.15.3 (Pre-correction accuracy requirements). | Y | N |
| Otherwise | Not present | N | N |

# CID 24521

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24521 | 494.40 | 27.2.2 | "For an HE TB PPDU, MU in the TXVECTOR column indicates that the parameter is pres-  ent once and MU in the RXVECTOR column indicates the parameter is not present" -- it is not clear why they are not present | Append " (the receiver knows the values since they were specified in the triggering PPDU)" |

**Background**

D6.0 P494

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**Proposed Resolution: CID 24521**

**Accepted**

# CID 24189

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24189 | 558.23 | 27.3.11.7.2 | "Set to 1 if a beamforming steering matrix is applied to the portion of the waveform contributed by the RU that contains this user's allocation and the RU contains no more than one user."  Given this Table is for SU format, this wording is not appropriate. | Change to "Set to 1 if a beamforming steering matrix is applied" |

**Background**

D6.0 P558

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**Proposed Resolution: CID 24521**

**Accepted**

# CID 24295

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24295 | 609.22 | 27.3.11.10 | "HE TB NDP report response" -- no such thing | Change to "HE TB feedback NDP" |

**Background**

D6.0 P609

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**Proposed Resolution: CID 24295**

**Accepted**

# CID 24298

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24298 | 634.65 | 27.3.13 | "single 26-tones RU" should be singular and shouldn't include "single" (not used elsewhere in this kind of context) | Change to "26-tone RU" |

**Background**

D6.0 P634

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**Proposed Resolution: CID 24298**

**Revised**

Agree that “tones” should be “tone”. Regarding “single”, this example is specifically for the case where there is only one 26-tone RU modulated. Hence, the term “single” is appropriate.

Instruction to Editor:

At D6.0 P634L64, change “For example, the Data field an OFDMA HE PPDU using a 26-tones RU” to “For example, the Data field of an OFDMA HE PPDU using a 26-tone RU”.

# CID 24282

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| **CID** | **Page.Line** | **Clause** | **Comment** | **Proposed Change** |
| 24282 | 634.57 | 27.3.13 | "A PE field of duration 4 us, 8 us, 12 us, or 16 us may be present in an HE PPDU."  This is conflicted with the following:  "The duration of the PE field, TPE, may take values of 0, 4, 8, 12 or 16 us."  Please change the as the following:  "A PE field of duration 0 us, 4 us, 8 us, 12 us, or 16 us may be present in an HE PPDU." | As in the comment. |

**Background**

D6.0 P634

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D6.0 P634

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**~~Proposed Resolution: CID 24282~~**

**~~Revised~~**

~~Agree with the commenter. This proposed resolution implements the proposed change by the commenter with some editorial update.~~

~~Instruction to Editor:~~

~~At D6.0 P634L57, change “duration 4 us, 8 us, 12us, or 16 us” to “duration 0, 4, 8, 12 or 16 us”.~~

This CID was transferred to Xiaogang Chen during the conference call on 4/9/2020.

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