IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11ax Comment Resolutions for PHY mathematical descriptions | | | | |
| Date: 2017-12-05 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | Email |
| Yan Zhang | Marvell | 5488 Marvell Ln,  Santa Clara, CA 95054 | 408-222-0975 | [yzhang@marvell.com](mailto:yzhang@marvell.com) |
| Rui Cao | Marvell |  |  | [ruicao@marvell.com](mailto:ruicao@marvell.com) |
| Hongyuan Zhang | Marvell |  |  | [hongyuan@marvell.com](mailto:hongyuan@marvell.com) |

Abstract: This document contains proposed resolutions for comments from 11ax D2.0 with the CIDs below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |  |
| ***Clause 9.42..237.3***   * 11545,11546   ***Clause 27.5.3.2.3***   * 11895   ***Clause 28.3.8***   * 11590,11591,13453   ***Clause 28.3.9***   * 11382,11383,11384,13361,13362,11592,11593,11594,11595,11596   ***Clause 28.3.10.10***   * 11385 | | | | | | | | |  |
|  | | | | | | | | |  |
|  | | | | | | |  |
|  | | | | | | |  |
| 11895 | | Hongyuan Zhang | 27.5.3.2.3 | 248.1 | For accurate timing synchronization at each STA responding a trigger frame, the legacy part preamble (L-STF, L-LTF, ...) of the PPDU carrying trigger frame shall not be beamformed. There are existing implementations that may beamform the legacy preamble or the whole non-HT PPDU, but it is better to be disallowed if the PPDU is carrying a trigger frame. | Add a note: "Beamforming the non-HT preamble of the PPDU carrying a Trigger Frame is not recommended" | **Revised.**  Change to as in the resolution of CID11895 in doc IEEE802.11-18/0109r3. | |

ax editor: please make the following change in D2.0 *Clause 27.5.3.2.3*

* On P248L1 (CID #11895): Please add the following sentence on P248L3.

An HE AP shall not use STBC encoding for a PPDU that carries a Trigger frame. Furthermore, it is not recommended to apply beamforming to the legacy portion preamble of a PPDU that carries a Trigger frame.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11545 | Dorothy Stanley | 9.4.2.237.3 | 142.47 | I can't find a definition or equation for N\_STS,total | as in comment | **Revised.**  Change to as in the resolution of CID11545 in doc IEEE802.11-18/0109r3. |
| 11546 | Dorothy Stanley | 9.4.2.237.3 | 142.56 | I can't find a definition or equation for N\_STS,total | as in comment | **Revised.**  Change to as in the resolution of CID11546 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 9.4.2.237.3*

* On P142L47 (CID #11545): replace  with “the total number of space-time streams”
* On P142L56 (CID #11546): replace  with “the total number of space-time streams”

ax editor: please make the following change in D2.0 *Clause 9.3.1.23*

* On P88L14 (CID #11545, CID #11546): replace  with 

For a non-OFDMA PPDU, the number of HE-LTF symbols is a function of the total number of space-time streams,  defined in Table 28-15, and the encoding of the Number Of HE-LTF Symbols And Midamble Periodicity subfield is defined in Table 21-13.

* On P88L18 (CID #11545, CID #11546): replace  with 

For an OFDMA PPDU, the number of HE-LTF symbols is greater than or equal to the maximum defined in Table 28-15 across all allocated RUs, and the encoding of the Number Of HE-LTF Symbols And Midamble Periodicity subfield is the same as the Number of HE-LTF Symbols field defined in Table 28-19 (HE-SIG-A field of an HE MU PPDU).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11590 | Dorothy Stanley | 28.3.8 | 392.52 | for an HE MU PPDU, N\_STS is a function of N\_STS,r,total. But then on pg 393, line 12 N\_STS,r,total is equal to N\_STS. Something seems wrong with this logic. | as in comment | **Rejected.**  on pg 393, line 12 N\_STS,r,total is equal to N\_STS which only applies pre-HE modulated fields when BEAM\_CHANGE is set to 0. BEAM\_CHANGE does not apply to HE MU PPDU. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11591 | Dorothy Stanley | 28.3.8 | 393.12 | On Pg 346, line 56, BEAM\_CHANGE is "Not present" for formats other than HE\_SU or HE\_EXT\_SU. So how is N\_STS,r,total determined for HE MU PPDU or HE TB PPDU? | as in comment | **Revised.**  Change to as in the resolution of CID11591 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.8*

* On P393L12 (CID #11591):

For pre-HE modulated fields,  is undefined when the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, and when BEAM\_CHANGE is 0.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 13453 | Sigurd Schelstraete | 28.3.8 | 389.42 | pre-HE preamble is not defined. | define | **Revised.**  Change to as in the resolution of CID13453 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.8*

* On P389L42 (CID #13453):

|  |  |  |
| --- | --- | --- |
|  | 0.8 μs | Guard interval duration for the pre-HE modulated fields. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11382 | Bin Tian | 28.3.9 | 396.11 | In equation (28-3) N\_Norm should be N\_Norm,r | as in the comment | **Revised.**  Change to as in the resolution of CID11382 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.9*

* On P396L11 (CID #11382): Please replace  with  in equation (28-3).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 13361 | Ron porat | 28.3.9 | 396.13 | For each field excluding PE, I think even HE-LTF has A involved which might not directly fit here. May be  some clarification will help here | Some clarification if HE-LTF mathematical description fits here  would help | **Revised.**  Change to as in the resolution of CID13361 in doc IEEE802.11-18/0109r3. |
| 13362 | Ron porat | 28.3.9 | 396.13 | The definition of M\_{r,u} is missing and a text to be added referring to Table 28-15 | Add text to refer M\_{r,u} | **Revised.**  Change to as in the resolution of CID13362 in doc IEEE802.11-18/0109r3. |

**Discussions:**

The commentor is right that HE-LTF has A matrix inside its equation. However, Equation (28-3) shown in 28.3.9 is a general equation for each field in HE PPDU. The equations described in the following subclauses for each field cater to the specifics of that field. In the general equation, A matrix is included in . It will only cause more confusions if we add more details for different fields. For details, please refer doc IEEE 802.11-17/0305r3 CR for CID 4868.

ax editor: please make the following change in D2.0 *Clause 28.3.9*

* On P396L4 (CID #13361):

In an HE SU PPDU, HE MU PPDU and HE ER SU PPDU, for each field excluding the PE field,  is defined as the summation of one or more subfields. Each subfield, , is defined to be an inverse discrete Fourier transform in Equation (28-3).

* On P399L1 (CID #13362): Please add the following on P399L1

 is given in Table 28-15 (Frequently used parameters).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11592 | Dorothy Stanley | 28.3.9 | 396.37 | On Pg 346, line 56, BEAM\_CHANGE is "Not present" for formats other than HE\_SU or HE\_EXT\_SU. So how is total power determined for HE MU PPDU or HE TB PPDU? | as in comment | **Revised.**  Change to as in the resolution of CID11592 in doc IEEE802.11-18/0109r3. |
| 11593 | Dorothy Stanley | 28.3.9 | 396.42 | On Pg 346, line 56, BEAM\_CHANGE is "Not present" for formats other than HE\_SU or HE\_EXT\_SU. So how is this determined for HE MU PPDU or HE TB PPDU? | as in comment | **Revised.**  Change to as in the resolution of CID11593 in doc IEEE802.11-18/0109r3. |
| 11596 | Dorothy Stanley | 28.3.9 | 398.47 | On Pg 346, line 56, BEAM\_CHANGE is "Not present" for formats other than HE\_SU or HE\_EXT\_SU. So how is this determined for HE MU PPDU or HE TB PPDU? | as in comment | **Revised.**  Change to as in the resolution of CID11596 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.9*

Please replace “TXVECTOR parameter BEAM\_CHANGE is 1” with “TXVECTOR parameter BEAM\_CHANGE is 1 or not present” throughout the spec text.

* On P396L37 (CID #11592):

The total power of the time domain HE modulated field signals summed over all transmit chains should not exceed the total power of the time domain pre-HE modulated field signals summed over all transmit chains when the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, and power boost in HE modulated fields is not present.

* On P396L42 (CID #11593):

 If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, then for pre-HE modulated fields, .

* On P398L47 (CID #11596):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, then for pre-HE modulated fields  is a column vector with 

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11594 | Dorothy Stanley | 28.3.9 | 396.44 | On Pg 346, line 56, BEAM\_CHANGE is "Not present" for formats other than HE\_SU or HE\_EXT\_SU. So how is this determined for HE MU PPDU or HE TB PPDU? | as in comment | **Rejected.**  BEAM\_CHANGE set to 0 does not apply to HE MU PPDU and HE TB PPDU, there is no need to determine  for pre-HE modulated fields for HE MU PPDU and HE TB PPDU if BEAM\_CHANGE set to 0. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11595 | Dorothy Stanley | 28.3.9 | 396.53 | I went to Table 28-13 and the title is "Tone allocation related constants for the Data field in a non-OFDMA HE PPDU". This does not apply to non-Data fields. | as in comment | **Revised.**  Change to as in the resolution of CID11595 in doc IEEE802.11-18/0109r3. |
| 11658 | Dorothy Stanley | 28.3.10.10 | 452.28 | the reference for K\_r is to 28.3.9. I went to 28.3.9 and the description for K\_r say "For HE modulated fields in a non-OFDMA HE PPDU, Kr is the set of subcarriers indices from -NSR to NSR as defined in Table 28-13". I went to Table 28-13 and the title is "Tone allocation related constants for the Data field in a non-OFDMA HE PPDU". This does not apply to HE-LTF. | as in comment | **Revised.**  Change to as in the resolution of CID11658 in doc IEEE802.11-18/0109r3. |

**Discussions:**

Parameters listed in Table 28-13 not only apply to Data field but aslo apply to other HE-modulated fields in a non-OFDMA HE PPDU. It is more accurate to rename Table 28-13 to “Tone allocation related constants for the HE-modulated fields in a non-OFDMA HE PPDU”

ax editor: please replace Table 28-13 title “Tone allocation related constants for the Data field in a non-OFDMA HE PPDU” with “Tone allocation related constants for the HE-modulated fields in a non-OFDMA HE PPDU” and change the corresponding references throughout the draft.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11383 | Bin Tian | 28.3.9 | 397.13 | Remove "and HE TB PPDU" since alpha\_r doesn't apply to TB PPDU in eq 28-4 | as in the comment | **Revised.**  Change to as in the resolution of CID11383 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.9*

* On P397L13 (CID #11383):

For an HE SU PPDU and HE ER SU PPDU, is always set to 1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11384 | Bin Tian | 28.3.9 | 397.23 | In equation (28-5), it should be |Kr Field| instead of Kr Field | as in the comment | **Revised.**  Change to as in the resolution of CID11383 in doc IEEE802.11-18/0109r3. |

ax editor: please make the following change in D2.0 *Clause 28.3.9*

* On P397L23 (CID #11384): replace “, for HE modulated fields in an HE TB PPDU” with “, for HE modulated fields in an HE TB PPDU” in Equation (28-5).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11385 | Bin Tian | 28.3.9 | 398.43 | It's better to add a subscript r (i.e. RU id) to the spatial mapping matrix Q\_k\_(iseg) and Q\_k,u\_(iseg) since its dimension depends on Nsts\_r,total which varies per RU. | as in the comment | **Rejected.**  Subcarrier index k is a function of RU index r. RU index r can be inferred from subcarrier index k. |