IEEE P802.11  
Wireless LANs

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| 11ax Comment Resolutions for PHY Preamble | | | | |
| Date: 2017-12-05 | | | | |
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Abstract: This document contains proposed resolutions for comments from 11ax D2.0 with the CIDs below.

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| ***Clause 28.3.10.2***   * 11404,11597,11598,11599   ***Clause 28.3.10.3***   * 11600,11601,11602,11603,11604,11605,11606,11607,11608,11609,14066   ***Clause 28.3.10.4***   * 11610,11611,11612,11613,11614,11615,11616,11617,11618,14067   ***Clause 28.3.10.5***   * 11619,11620,11621,11622,11623,11624,11625,11626,11627,12880,13455,14068   ***Clause 28.3.10.6***   * 11403,11404,11518,11628,11629,11630, 11631,11632,11633,11635, 13456,14069   ***Clause 28.3.10.7***   * 11517,11519,,11520,11521,11522,11523,11524,11525,11526,11527,11639,11640,11641,13458,13459,12463,14073,14174,14175   ***Clause 28.3.10.8***   * 11528,11529,,12565.13471,13472,14074   ***Clause 28.3.10.9***   * 11413,11414,11533,11534,11535,11642,11643,11644,11645,11646,11647,11648,13363,13367,13377,13479,13480,13481, 13634   ***Clause 28.3.10.10***   * 11415,11416,11417,11649,11650,11651,11652,11653,11656,11657,11658,13372,13373,13484,13602,13606,13774 | |  |
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| 11401 | Bin Tian | 28.3.10.2.1 | 400.7 | "the cyclic shift value for the L-STF, L-LTF,  L-SIG, RL-SIG and HE-SIG-A fields of the PPDU". CSD is also applied to the HE-SIGB for MU PPDU | as in the comment | **Revised.**  Change to as in the resolution of CID11401 in doc IEEE802.11-18/0110r0. |
| 11597 | Dorothy Stanley | 28.3.10.2.1 | 400.6 | 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 CID11597 in doc IEEE802.11-18/0110r0. |
| 11599 | Dorothy Stanley | 28.3.10.2.2 | 400.21 | 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 CID11599 in doc IEEE802.11-18/0110r0. |
| 11600 | Dorothy Stanley | 28.3.10.3 | 400.34 | 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 CID11600 in doc IEEE802.11-18/0110r0. |
| 11610 | Dorothy Stanley | 28.3.10.4 | 401.47 | 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 CID11610 in doc IEEE802.11-18/0110r0. |
| 11619 | Dorothy Stanley | 28.3.10.5 | 403.21 | 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 CID11619 in doc IEEE802.11-18/0110r0. |
| 11628 | Dorothy Stanley | 28.3.10.6 | 404.40 | 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 CID11628 in doc IEEE802.11-18/0110r0. |
| 11640 | Dorothy Stanley | 28.3.10.7.4 | 419.19 | 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 CID11640 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.2.1*

* On P400L7 (CID #11401,CID #11597):

When the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the cyclic shift value  for the L-STF, L-LTF, L-SIG, RL-SIG -, HE-SIG-A and HE-SIG-B fields of the PPDU for transmit chain  out of a total of are defined in Table 21-10 (Cyclic shift values for L-STF, L-LTF, L-SIG, and VHT-SIG-A fields of the PPDU).

* On P400L19 (CID #11599):

The cyclic shift values defined in this subclause apply to the HE-STF, HE-LTF and Data fields of the HE PPDU when the TXVECTOR parameter BEAM\_CHANGE is 1 or not present,

* On P400L34 (CID #11600):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the time domain representation of the L-STF field

* On P401L47 (CID #11610):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the time domain representation of the L-LTF field

* On P403L21 (CID #11619):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the time domain representation of the L-SIG field

* On P404L40 (CID #11628):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the time domain representation of the RL-SIG field

* On P419L19(CID #11640):

If the TXVECTOR parameter BEAM\_CHANGE is 1 or not present, the time waveform for the HE-SIG-A field

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| 11598 | Dorothy Stanley | 28.3.10.2.1 | 400.12 | 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. |
| 11605 | Dorothy Stanley | 28.3.10.3 | 401.16 | 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.**  Reason as above |
| 11614 | Dorothy Stanley | 28.3.10.4 | 402.12 | 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.**  Reason as above |
| 11623 | Dorothy Stanley | 28.3.10.5 | 404.11 | 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.**  Reason as above |
| 11631 | Dorothy Stanley | 28.3.10.6 | 404.53 | 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.**  Reasons as above |
| 11518 | Dorothy Stanley | 28.3.10.6 | 419.64 | 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.**  Reasons as above |

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| 11601 | Dorothy Stanley | 28.3.10.3 | 400.40 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Revised.**  Change to as in the resolution of CID11601 in doc IEEE802.11-18/xxxxr0. |
| 11602 | Dorothy Stanley | 28.3.10.3 | 400.40 | its not clear in an HE TB PPDU for a user with an RU <=242 in a 40, 80, or 160/80+80MHz bandwidth, whether L-STF is transmitted in the user's 20 MHz or the entire PPDU BW. Something in this equation needs to be indexed on a per-user basis, perhaps i\_BW or Omega\_20MHz? | as in comment | **Revised.**  Change to as in the resolution of CID11602 in doc IEEE802.11-18/xxxxr0. |

**Discussions:**

It is not necessary to have a separate equation for UL MU. With correct definition of, the specific 20MHz channels on which L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields are transmitted for a user in an HE TB PPDU can be determined.  should be defined as “a set of 20 MHz channels where HE modulated fields are located” instead of “a set of 20 MHz channels that contains the channels where pre-HE modulated fields are located.” The latter definition is not meaningful.

ax editor: please make the following change in D2.0 *Clause 28.3.10*

* On P401L8 (CID #11601, CID #11602):

 is a set of 20 MHz channels where HE modulated fields are located.

* On P419L33 (CID #11517, CID #11641): Please add the following definition on P419L33

 is a set of 20 MHz channels where HE modulated fields are located.

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| 11603 | Dorothy Stanley | 28.3.10.3 | 400.40 | some of the variables are defined below Eq 28-6, and some are not. Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11603 in doc IEEE802.11-18/0110r0. |

Ax editor: please make the following change in D2.0 *Clause 28.3.10.3*

* On P401L14 (CID #11603): Please add the following to P401L14

 is a power scaling factor with the value ~~~~ 

 is defined in 28.3.9 (Mathematical description of signals).

 is given in Table 28-12 (Timing related constants).

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| 11604 | Dorothy Stanley | 28.3.10.3 | 400.63 | “N20MHz” is not defined for 20 MHz. | as in comment | **Revised.**  Change to as in the resolution of CID11604 in doc IEEE802.11-18/0110r0. |

**Discussions:**

The commentor is right that  is not defined for 20MHz bandwidth in 21.3.7.3.

ax editor: please make the following change in D2.0 *Clause 28.3.10.3*

* On P400L63 (CID #11604): Please change the definition of  as shown below throughout the spec.

 is the number of 20MHz channels contained in bandwidth indicated by dot11CurrentChannelWidth.

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| 11606 | Dorothy Stanley | 28.3.10.3 | 401.25 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11606 in doc IEEE802.11-18/0110r0. |
| 11615 | Dorothy Stanley | 28.3.10.4 | 402.20 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11615 in doc IEEE802.11-18/0110r0. |
| 11624 | Dorothy Stanley | 28.3.10.5 | 404.16 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11624 in doc IEEE802.11-18/0110r0. |
| 11632 | Dorothy Stanley | 28.3.10.6 | 404.59 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11632 in doc IEEE802.11-18/0110r0. |
| 11519 | Dorothy Stanley | 28.3.10.7.4 | 420.3 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11519 in doc IEEE802.11-18/0110r0. |
| 11525 | Dorothy Stanley | 28.3.10.7.4 | 421.22 | N\_STS seems undefined in Table 28-15 for HE TB PPDU and HE ER SU PPDU. Is it per-user or total over all users with HE TB PPDU? | As in comment | **Revises.**  Change to as in the resolution of CID11525 in doc IEEE802.11-18/0110r0. |

**Discussions:**

BEAM\_CHANGE value set to 0 does not apply to HE MU or HE TB PPDU. Hence  definition is not needed for HE MU or HE TB PPDU. The commentor is right that  should be defined for HE ER SU PPDU since BEAM\_CHANGE value set to 0 does apply to HE ER PPDU.

ax editor: please make the following change in D2.0 *Clause 28.3.10*

* On P392L50 (CID #11606, CID #11615, CID #11624, CID #11632, CID #11519, CID #11525):

For an HE SU PPDU and HE ER PPDU,.

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| 11608 | Dorothy Stanley | 28.3.10.3 | 401.25 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11608 in doc IEEE802.11-18/0110r0. |
| 14066 | Youhan Kim | 28.3.10.3 | 401.23 | Nsts is undefined. | Define Nsts used in Equation (28-8) | **Revises.**  Change to as in the resolution of CID14066 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.2.3*

* On P401L25 (CID #11608, CID #14066): Please add the following to P401L31

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

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| 11612 | Dorothy Stanley | 28.3.10.4 | 401.53 | some of the variables are defined below Eq 28-9, and some are not. Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11612 in doc IEEE802.11-18/0110r0. |
| 11613 | Dorothy Stanley | 28.3.10.4 | 401.53 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Revised.**  Change to as in the resolution of CID11613 in doc IEEE802.11-18/0110r0. |
| 11611 | Dorothy Stanley | 28.3.10.4 | 401.53 | its not clear in an HE TB PPDU for a user with an RU <=242 in a 40, 80, or 160/80+80MHz bandwidth, whether L-STF is transmitted in the user's 20 MHz or the entire PPDU BW. Something in this equation needs to be indexed on a per-user basis, perhaps i\_BW or Omega\_20MHz? | as in comment | **Revised.**  Change to as in the resolution of CID11611 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.4*

* On P401L53 (CID #11611,CID #11612,CID #11613): Please add the following to P401L61

ε is a power scaling factor with the value .

 is a set of 20 MHz channels where HE modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to  for an HE TB PPDU or HE MU PPDU with preamble puncturing, and it contains all values in the range 0 to  for other HE PPDU formats.

 is the number of 20MHz channels contained in bandwidth indicated by dot11CurrentChannelWidth.

 is given in Table 28-12 (Timing-related constants). is defined in 28.3.9 (Mathematical description of signals).

 is given in Table 28-12 (Timing related constants).

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| 11617 | Dorothy Stanley | 28.3.10.4 | 402.20 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11617 in doc IEEE802.11-18/0110r0. |
| 14067 | Youhan Kim | 28.3.10.4 | 402.20 | Nsts is undefined. | Define Nsts used in Equation (28-10) | **Revises.**  Change to as in the resolution of CID14067 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.4*

* On P402L20 (CID #11617,CID #14067): Please add the following to P402L29

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

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| 11621 | Dorothy Stanley | 28.3.10.5 | 403.37 | some of the variables are defined below Eq 28-9, and some are not. Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11612 in doc IEEE802.11-18/0110r0. |
| 11620 | Dorothy Stanley | 28.3.10.5 | 403.27 | its not clear in an HE TB PPDU for a user with an RU <=242 in a 40, 80, or 160/80+80MHz bandwidth, whether L-STF is transmitted in the user's 20 MHz or the entire PPDU BW. Something in this equation needs to be indexed on a per-user basis, perhaps i\_BW or Omega\_20MHz? | as in comment | **Revised.**  Change to as in the resolution of CID11620 in doc IEEE802.11-18/0110r0. |
| 11622 | Dorothy Stanley | 28.3.10.5 | 403.27 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Revised.**  Change to as in the resolution of CID11622 in doc IEEE802.11-18/0110r0. |
| 11629 | Dorothy Stanley | 28.3.10.6 | 404.45 | its not clear in an HE TB PPDU for a user with an RU <=242 in a 40, 80, or 160/80+80MHz bandwidth, whether L-STF is transmitted in the user's 20 MHz or the entire PPDU BW. Something in this equation needs to be indexed on a per-user basis, perhaps i\_BW or Omega\_20MHz? | as in comment | **Revised.**  Change to as in the resolution of CID11629 in doc IEEE802.11-18/0110r0. |
| 11630 | Dorothy Stanley | 28.3.10.6 | 404.45 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Revised.**  Change to as in the resolution of CID11630 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.5 and Clause 28.3.10.6*

On P403L41 (CID #11620, CID #11621, CID #11622, CID #11629, CID #11630): Please add the following to P403L41

 is a set of 20 MHz channels where HE modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to  for an HE TB PPDU or HE MU PPDU with preamble puncturing, and it contains all values in the range 0 to  for other HE PPDU formats.

 is the number of 20MHz channels contained in bandwidth indicated by dot11CurrentChannelWidth.

 is given in Table 28-12 (Timing-related constants). is defined in 28.3.9 (Mathematical description of signals).

 is given in Table 28-12 (Timing related constants).

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| 11626 | Dorothy Stanley | 28.3.10.5 | 404.16 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11626 in doc IEEE802.11-18/0110r0. |
| 14068 | Youhan Kim | 28.3.10.5 | 402.20 | Nsts is undefined. | Define Nsts used in Equation (28-13) | **Revises.**  Change to as in the resolution of CID14068 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.5*

* On P404L16 (CID #11612): Please add the following to P404L26

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

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| 11521 | Dorothy Stanley | 28.3.10.7.4 | 420.3 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11521 in doc IEEE802.11-18/0110r0. |
| 11641 | Dorothy Stanley | 28.3.10.7.4 | 419.25 | its not clear in an HE TB PPDU for a user with an RU <=242 in a 40, 80, or 160/80+80MHz bandwidth, whether L-STF is transmitted in the user's 20 MHz or the entire PPDU BW. Something in this equation needs to be indexed on a per-user basis, perhaps i\_BW or Omega\_20MHz? | as in comment | **Revised.**  Change to as in the resolution of CID11640 in doc IEEE802.11-18/0110r0. |
| 11517 | Dorothy Stanley | 28.3.10.7.4 | 419.25 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Revised.**  Change to as in the resolution of CID11657 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.7.4*

* On P419L33 (CID #11521, CID #11517, CID #11641): Please add the following to P419L33

 is a set of 20 MHz channels where HE modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to  for an HE TB PPDU or HE MU PPDU with preamble puncturing, and it contains all values in the range 0 to  for other HE PPDU formats.

 is the number of 20MHz channels contained in bandwidth indicated by dot11CurrentChannelWidth.

 is given in Table 28-12 (Timing-related constants).

 is given in Table 28-12 (Timing-related constants). is defined in 28.3.9 (Mathematical description of signals).

 is given in Table 28-12 (Timing related constants).

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| 14073 | Youhan Kim | 28.3.10.7.4 | 420.4 | Nsts is undefined. | Define Nsts used in Equation (28-17) | **Revised.**  Change to as in the resolution of CID14073 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.7.4*

* On P420L13 (CID #14073): Please add the following to P420L13

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

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| 11607 | Dorothy Stanley | 28.3.10.3 | 401.25 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE TB PPDU format. |
| 11616 | Dorothy Stanley | 28.3.10.4 | 402.20 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE TB PPDU format. |
| 11625 | Dorothy Stanley | 28.3.10.5 | 404.16 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE TB PPDU format. |
| 11633 | Dorothy Stanley | 28.3.10.6 | 404.59 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE TB PPDU format. |
| 11520 | Dorothy Stanley | 28.3.10.7.4 | 420.3 | In Clause 28.3.4 says: "In the HE TB PPDU, the pre-HE modulated fields, which include L-STF, L-LTF, L-SIG, RL-SIG and HESIGA fields, are sent only on the 20 MHz channels where the STA's HE modulated fields are located." I don't see how this equation matches this statement for UL MU. There needs to be a per-user component for UL MU. This equation needs to be modeled like Eq 28-4. Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE TB PPDU format. |

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| 11609 | Dorothy Stanley | 28.3.10.3 | 401.25 | how is preamble puncturing performed? i\_BW is a series, not part of a set as in BEAM\_CHANGE=1 equation.Best would be to create separate equations for UL MU. | as in comment | **Rejected.**  BEAM\_CHANGE value set to 0 does not apply to HE MU or HE TB PPDU format. Preamble puncturing only applies to HE MU PPDU. The equation does not apply to either HE MU or HE TB PPDU. |
| 11618 | Dorothy Stanley | 28.3.10.4 | 402.20 | how is preamble puncturing performed? i\_BW is a series, not part of a set as in BEAM\_CHANGE=1 equation. | as in comment | **Rejected.**  Reasons as above |
| 11627 | Dorothy Stanley | 28.3.10.5 | 404.16 | how is preamble puncturing performed? i\_BW is a series, not part of a set as in BEAM\_CHANGE=1 equation. | as in comment | **Rejected.**  Reasons as above |
| 11635 | Dorothy Stanley | 28.3.10.6 | 404.59 | how is preamble puncturing performed? i\_BW is a series, not part of a set as in BEAM\_CHANGE=1 equation. | as in comment | **Rejected.**  Reasons as above |
| 11522 | Dorothy Stanley | 28.3.10.7.4 | 420.03 | how is preamble puncturing performed? i\_BW is a series, not part of a set as in BEAM\_CHANGE=1 equation. | as in comment | **Rejected.**  Reasons as above |

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| 12880 | Mark RISON | 28.3.10.5 | 403.1 | "The LSB of the binary expression of the Length value shall be mapped to B5." is confusing (why is this being stated?) duplication of the baseline | Delete the cited text | **Revised.**  Change to as in the resolution of CID11626 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.5*

* On P403L1 (CID #12880):

In a non-HT duplicate PPDU, the LENGTH field is defined in 17.3.4.3 (LENGTH field) using the L\_LENGTH parameter in the TXVEC-TOR.

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| 13455 | Sigurd Schelstraete | 28.3.10.5 | 403.22 | "the time domain waveform of the L-SIG field". Add "on chain i\_TX and segment i\_Seg" | See also line 10, page 404 | **Revised.**  Change to as in the resolution of CID13455 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.5*

* On P403L21 (CID #13455):

the time domain waveform of the L-SIG field transmitted on frequency segment  and transmit chain  shall be as given by Equation (28-12).

* On P404L11 (CID #13455):

the time domain waveform of the L-SIG field transmitted on frequency segment  and transmit chain  shall be as given by Equation (28-13).

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| 13456 | Sigurd Schelstraete | 28.3.10.6 | 404.40 | "the time domain waveform of the L-SIG field". Add "on chain i\_TX and segment i\_Seg" | See also line 53 | **Revised.**  Change to as in the resolution of CID13455 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.6*

* On P404L40 (CID #13456):

the time domain waveform of the RL-SIG field transmitted on frequency segment  and transmit chain  shall be as given by Equation (28-14).

* On P404L53 (CID #13456):

the time domain waveform of the RL-SIG field transmitted on frequency segment  and transmit chain  shall be as given by Equation (28-15).

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| 11403 | Bin Tian | 28.3.10.6 | 404.45 | w\_T\_L-SIG (t) should be w\_T\_RL-SIG (t) | as in the comment | **Revised.**  Change to as in the resolution of CID11403 in doc IEEE802.11-18/0110r0. |
| 11404 | Bin Tian | 28.3.10.6 | 404.59 | w\_T\_L-SIG (t) should be w\_T\_RL-SIG (t) | as in the comment | **Revised.**  Change to as in the resolution of CID11403 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.6*

* On P403L21 (CID #11403, CID #11404): Please replace  with  in Equations (28-14) and (28-15).

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| 14069 | Youhan Kim | 28.3.10.6 | 404.60 | Nsts is undefined. | Define Nsts used in Equation (28-15) | **Rejected.**  Parameters identical to L-SIG and RL-SIG are defined in L-SIG subclause. No need to duplicate definitions in RL-SIG. |

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| 11639 | Dorothy Stanley | 28.3.10.7.2 | 412.47 | The title of Table 28-18 is "HE-SIG-A field of an HE TB PPDU", so why would B0 of HE-SIG-A1 ever be "set to 0 for HE SU PPDU"? You probably just want to say "set to 0 for HE TB PPDU", and not say anything about HE SU PPDU. | As in comment | **Revised.**  Change to as in the resolution of CID11639 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.7.2*

* On P405L26 (CID #11639): Please remove “Set to 0 for HE TB PPDU “ from description of HE-SIG-A1 B0 in Table 28-18.
* On P412L47 (CID #11639): Please remove “Set to 1 for HE SU PPDU “ from description of HE-SIG-A1 B0 in Table 28-20.

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| 13458 | Sigurd Schelstraete | 28.3.10.7.2 | 408.34 | "Channel Doppler is high" is not a meaningful criterion. Replace with more generic "Midamble is recommended in the reverse direction" | See comment or provide objective criterion to establish "high Doppler" | **Revised.**  Change to as in the resolution of CID13458 in doc IEEE802.11-18/0110r0. |
| 13459 | Sigurd Schelstraete | 28.3.10.7.2 | 410.44 | "Channel Doppler is high" is not a meaningful criterion. Replace with more generic "Midamble is recommended in the reverse direction" | See comment or provide objective criterion to establish "high Doppler" | **Revised.**  Change to as in the resolution of CID13458 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.7.2*

* On P408L34 (CID #13458): B15 of HE-SIGA-2 Doppler Field in Table 28-18

The number of OFDM symbols in the HE Data field is less than or equal to the signaled midamble periodicity plus 1 (see 28.3.11.16 Midamble), the midamble is not present, but it recommends that midamble may be used for the PPDUs of the reverse link.

* On P410L44 (CID #13459): B25 of HE-SIGA-1 Doppler Field in Table 28-19

The number of OFDM symbols in the HE Data field is less than or equal to the signaled midamble periodicity plus 1 (see 28.3.11.16 Midamble), the midamble is not present, but it recommends that midamble may be used for the PPDUs of the reverse link.

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| 13463 | Sigurd Schelstraete | 28.3.10.7.4 | 418.10 | The term symbol is not correct here ("HE-SIG-A symbols shall be BCC encoded ..."), since symbol is later used to represent the final 52 output symbols (see lines 17 and 18) | Replace "symbols" with "parts" | **Rejected.**  The following sentences refered final 52 output as 52 complex numbers instead of symbols. It referes HE-SIG-A1 as the first symbol of HE-SIG-A, and HE-SIG-A2 as the second symbol of HE-SIG-A. “The first and second half of the stream of 104 complex numbers generated by these steps (before pilot insertion) is divided into two groups of 52 complex numbers, where respectively, the first 52 complex numbers form the first symbol of HE-SIG-A and the sec-ond 52 complex numbers form the second symbol of HE-SIG-A.” |

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| 11523 | Dorothy Stanley | 28.3.10.7.4 | 421.3 | Lets define or provide references to definitions of all the variables. | As in comment | **Rejected.**  Equations (28-18) and (28-19) are extensions of equation (28-16) and (28-17), describing HE ER PPU HE-SIG-A field time domain waveforms. All variables common to equations (28-16)-(28-19) are already defined after equations (28-16) and (28-17). The variables unique to equations (28-18) and (28-19) are defined for each equation. |
| 11526 | Dorothy Stanley | 28.3.10.7.4 | 421.22 | Lets define or provide references to definitions of all the variables. | As in comment | **Rejected.**  Reasons as above. |

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| 11524 | Dorothy Stanley | 28.3.10.7.4 | 421.3 | instead of defining N\_20MHz=1, remove i\_BW and K\_shift from the equation | As in comment | **Revised.**  Change to as in the resolution of CID11524 in doc IEEE802.11-18/0110r0. |
| 11527 | Dorothy Stanley | 28.3.10.7.4 | 421.22 | instead of defining N\_20MHz=1, remove i\_BW and K\_shift from the equation | As in comment | **Revised.**  Change to as in the resolution of CID11527 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.7.4*

* On P421L3 (CID #11524): Please remove  on P421L12 and  on P421L32.

 (28-18)

 (28-19)

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| 14174 | yujin noh | 28.3.10.7.4 | 419.24 | wTSYML needs to be modified with wHE-SIG-A | As in comment | **Rejected.**  is defined in Table 28-12 as the duration of entire HE-SIG-A field, which consists of two OFDM symbols. is defined as the OFDM symbol duration for Pre-HE modulated fields. So it is correct to use . |
| 14175 | yujin noh | 28.3.10.7.4 | 420.3 | wTSYML needs to be modified with wHE-SIG-A | As in comment | **Rejected.**  Reasons as above. |

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| 12565 | Lochan Verma | 28.3.10.8 | 428.28 | When '242-tone Empty' is signaled by RU Allocation Table in the Common Field of HE-SIG-B, no User field is present corresponding to this RU Allocation Table . Please clarify in spec. | As in comment | **Revised.**  Change to as in the resolution of CID12565 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.8*

* On P428L28 (CID #12565): Please “replace 242-tone RU empty” in Table 28-24 corresponding to value ‘01110001’ entry with the following.

242-tone RU with no User fields in the HE-SIG-B content channel containing this RU Allocation subfield.

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| 14074 | Youhan Kim | 28.3.10.8.2 | 421.48 | Common field is not always present | Clarify that Common field is not always present | **Rejected.**  It is stated in the spec in the following paragraph that “When the SIGB Compression field in the HE-SIG-A field of an HE MU PPDU is set to 1 (indicating full bandwidth MU-MIMO transmission), the Common field is not present and the HE-SIG-B content channel consists of only the User Specific field.” |

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| 11528 | Dorothy Stanley | 28.3.10.8.4 | 425.41 | what is N\_SR? Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11528 in doc IEEE802.11-18/0110r0. |
| 11529 | Dorothy Stanley | 28.3.10.8.4 | 425.58 | I don't see N\_20MHz used in Eq. 28-20. | As in comment | **Revised.**  Change to as in the resolution of CID11529 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.8.4*

* On P426L14 (CID #11528): Please add the following on P426L14

 is given in Table 28-16 (Number of modulated subcarriers and guard interval duration values for HE PPDU fields).

 is given in Table 21-5 (Timing-related constants).

 is a set of 20 MHz channels where HE modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to  for an HE MU PPDU with preamble puncturing, and it contains all values in the range 0 to  for an HE MU PPDU without preamble puncturing.

 is the number of 20MHz channels contained in bandwidth indicated by dot11CurrentChannelWidth.

 is given in Table 28-12 (Timing-related constants). is given in Table 28-12 (Timing-related constants).

 is given in Table 28-12 (Timing-related constants). is defined in 28.3.9 (Mathematical description of signals).

 is given in Table 28-12 (Timing related constants).

 represents the cyclic shift for transmit chain  with a value given in 28.3.10.2.1 (Cyclic shift for pre-HE modulated fields).

* On P425L34 (CID #11529): Please remove “N20MHz is defined in 21.3.7.3 (Channel frequencies)”.

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| 13471 | Sigurd Schelstraete | 28.3.10.8.4 | 425.29 | What is meant by "the sample on the k-th data subcarrier" | Clarify | **Revised.**  Change to as in the resolution of CID13471 in doc IEEE802.11-18/0110r0. |
| 13472 | Sigurd Schelstraete | 28.3.10.8.4 | 425.30 | Add "for transmit chain i\_TX and segment i\_seg" | See comment | **Revised.**  Change to as in the resolution of CID13472 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.8.4*

* On P425L29 (CID #13471, CID #13472):

For the *c*-th content channel (c = 1 or 2), denote the complex number assigned to the *k*-th subcarrier of the *n*-th symbol by . The time domain waveform for the HE-SIG-B transmitted on frequency segment  and transmit chain  follows Equation (28-20).

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| 13479 | Sigurd Schelstraete | 28.3.10.9 | 433.62 | Add reference to Table 28-12 when using "T\_HE-STF-NT" | See comment | **Revised.**  Change to as in the resolution of CID13479 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P433L62 (CID #13479):

The duration of the HE-STF field for HE PPDUs that are not HE TB PPDUs is (periodicity of 0.8 μs with 5 periods as given in Table 28-12) and the duration of the HE-STF field for an HE TB PPDU is  (periodicity of 1.6 μs with 5 periods as given in Table 28-12).

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| 11413 | Bin Tian | 28.3.10.9 | 434.7 | "and extra coefficients selected out of or at tone indices which are null but shall have the HE-STF coefficients after mapping M sequences to each 20 MHz subchannel." What does this sentece mean? | as in the comment | **Revised.**  Change to as in the resolution of CID11413 in doc IEEE802.11-18/0110r0. |
| 13480 | Sigurd Schelstraete | 28.3.10.9 | 434.7 | Unclear sentence: "...at tone indices which are null but shall have  the HE-STF coefficients after mapping M sequences to each 20 MHz subchannel.." | Clarify | **Revised.**  Change to as in the resolution of CID13480 in doc IEEE802.11-18/0110r0. |

**Discussions:**

The extra coefficients selected out of or  at tone indices which are null but shall have the HE-STF coefficients after mapping M sequences to each 20 MHz subchannel referes to the HE-STF sequence values assigned to tones inside center 26-tone RUs for 80MHz, 160MHz or 80+80MHz transmission. The sentence can be improved for better readability.

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P434L7 (CID #11413,CID #13480)

The HE-STF field is constructed by mapping the M sequence(s) multiplied by or  to each 242-tone RU. For transmission bandwidth greater than 40MHz, or  is assigned to tone indices which are inside the center 26-tone RUs.

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| 11414 | Bin Tian | 28.3.10.9 | 435.49 | Please use more accurate description of alpha\_r in P397L8 | as in the comment | **Revised.**  Change to as in the resolution of CID11414 in doc IEEE802.11-18/0110r0. |
| 13377 | Yan Zhang | 28.3.10.9 | 435.49 | The statement " alpha\_r is the power boost factor for the r-th RU. A STA shall support alpha\_r in the range [0.7, sqrt(2) ]. A STA may support in the range [0.5, 2]. "  is inconsistent with the definition in 28.3.9 (Mathematical description of signals). | Change to " alpha\_r is defined in 28.3.9 (Mathematical description of signals)." | **Revised.**  Change to as in the resolution of CID13377 in doc IEEE802.11-18/0110r0. |
| 13481 | Sigurd Schelstraete | 28.3.10.9 | 435.49 | Note that the power "boost" of alpha\_r is still normalized by beta\_r. As such, is it correct to state that alpha\_r is the value of the power boost? Do the ranges apply to alpha\_r or to the normalized value of alpha\_r? | Clarify | **Revised.**  Change to as in the resolution of CID13481 in doc IEEE802.11-18/0110r0. |
| 13363 | Ron porat | 28.3.10.9 | 435.49 | The max to minimum alllowed is 2 but in page 435 if sqrt(2)/0.7 is slightly greater than 2. May be better to define  it as [1/sqrt2, sqr(2)] | Change line 49 as "A STA shall support aalpha\_r in the range  [1/sqrt(2),\sqrt(2)] | **Revised.**  Change to as in the resolution of CID13363 in doc IEEE802.11-18/0110r0. |

**Discussions:**

Although  is still normalized by, the term  is common to all RUs. Hence, it is correct to say that  is the power boost factor for the *r-th* RU. The correct definition of  is givein in 28.3.9.

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P435L49 (CID #11414)

 is defined in 28.3.9 (Mathematical description of signals).

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| 11533 | Dorothy Stanley | 28.3.10.9 | 434.15 | Eq 28-22 is not clear. Both equations have a value at HES\_0. The top equation has the value (1+j)/sqrt(2), but bottom equation has the value 0. Which is it? | As in comment | **Revised.**  Change to as in the resolution of CID11533 in doc IEEE802.11-18/0110r0. |
| 11534 | Dorothy Stanley | 28.3.10.9 | 434.64 | Eq 28-28 is not clear. Both equations have a value at HES\_248 and HES\_-248. The top equation has the value (1+j)/sqrt(2) and (-1-j)/sqrt(2), but bottom equation has the value 0. Which is it? | As in comment | **Revised.**  Change to as in the resolution of CID11534 in doc IEEE802.11-18/0110r0. |
| 11535 | Dorothy Stanley | 28.3.10.9 | 435.01 | Eq 28-29 is not clear. Both equations have a value at HES\_504 and HES\_-504. Which is it? | As in comment | **Revised.**  Change to as in the resolution of CID11535 in doc IEEE802.11-18/0110r0. |
| 11642 | Dorothy Stanley | 28.3.10.9 | 435.14 | Eq 28-30 is not clear. Both equations have a value at HES\_1016 and HES\_-1016 and HES\_8 and HES\_-8. Which is it? | As in comment | **Revised.**  Change to as in the resolution of CID11642 in doc IEEE802.11-18/0110r0. |
| 11643 | Dorothy Stanley | 28.3.10.9 | 435.27 | Eq 28-31 is not clear. Both equations have a value at HES\_504 and HES\_-504. Which is it? | As in comment | **Revised.**  Change to as in the resolution of CID11643 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

On P434L15 (CID #11533): Please add the following on P434L16

The value of HE-STF sequence at null tone index 0 is set as 

On P434L64 (CID #11534): Please add the following on P434L64

The values of HE-STF sequence at edge tone indices -/+248 are set as 

On P435L7 (CID #11535): Please add the following on P435L7

The values of HE-STF sequence at edge tone indices -/+504 are set as 

On P435L16 (CID #11642): Please add the following on P435L16

The values of HE-STF sequence at edge tone indices -/+8 and -/+1016 are set as,

On P435L28 (CID #11643): Please add the following on P435L7

The values of HE-STF sequence at edge tone indices -/+504 are set as 

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| 11644 | Dorothy Stanley | 28.3.10.9 | 435.31 | Regarding "For an OFDMA transmission, the coefficients in Equation (28-22) to Equation (28-31) are set to zero if those values are corresponding to tone indices that fall within RUs that have no users assigned to them." Please provide analysis that not assigning values to tone indices with blank RU's will not degrade correlation performance, as there will effectively be a different sequence/pattern for each combination of blank RU's. Do all sequences have good correlation properties? | As in comment | **Rejected.**  The main purpose of the HE-STF field is to improve automatic gain control estimation in a MIMO transmission. The HE-STF sequence is not designed for correlation purpose. |

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| 11645 | Dorothy Stanley | 28.3.10.9 | 435.48 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11645 in doc IEEE802.11-18/0110r0. |
| 11648 | Dorothy Stanley | 28.3.10.9 | 436.21 | Lets define or provide references to definitions of all the variables. | As in comment | **Revised.**  Change to as in the resolution of CID11648 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P436L8 (CID #11645,CID #11648): Please add the following on P436L8

 is the cardinality of the set of subcarriers 

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

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

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

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

 is given in Table 28-12 (Timing related constants).

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| 11646 | Dorothy Stanley | 28.3.10.9 | 435.63 | What is the difference between K\_r and K\_r^HE-STF? | As in comment | **Revised.**  Change to as in the resolution of CID11646 in doc IEEE802.11-18/0110r0. |

**Discussions:**

It is stated on P435L65 that  is the set of subcarriers that have non-zero values within  in the HE-STF field”. It could be better to refer the definition of  in 28.3.9 in this subclause.

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P435L64 (CID #11413)

 is the cardinality of the set of subcarriers  as defined in 28.3.9 (Mathematical description of signals).

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| 11647 | Dorothy Stanley | 28.3.10.9 | 436.15 | Provide an equation to compute N\_STS,r,total based on information from the Trigger. | As in comment | **Rejected.**  The calucuation of  is provided in Table 28-15. The equation applies to both HE MU PPDU and HE TB PPDU. |

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| 13367 | Ron porat | 28.3.10.9 | 435.60 | Need consistent indexing here for the definition of beta\_r.(r=1 to N\_{RU}) is not consitent with usage in other places | The indexing should go from r=0 to N\_{RU}-1 | **Revised.**  Change to as in the resolution of CID13367 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.9*

* On P435L60 (CID #13367)



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| 13634 | Tianyu Wu | 28.3.10.9 | 436.28 | For 1x/2x LTF, the transmitter shall be mandate to select spatial mapping matrices to preserve the smoothness of the physical channel otherwise the channel estimation accuracy will be very bad at receiver side. | Add a note to emphasis that for 1x/2x LTF, bad smoothness may lead to significant performance loss. | **Rejected.**  Smoothing spatial mapping matrices is a recommendation. It is up to the implementation. There is no metrics to measure what is good smoothness or bad smoothness. |
| 11415 | Bin Tian | 28.3.10.10 | 437.12 | For TB PPDU, 2x LTF + 0.8us support is not mandatory. | as in the comment | **Revised.**  Change to as in the resolution of CID11415 in doc IEEE802.11-18/0110r0. |

**Discussions:**

It is stated on P437L3 that “In an HE TB PPDU, the combination of HE-LTF modes and GI duration is indicated in the Trigger frame that triggers the transmission of the PPDU.” However, the order of the sentences cause some confusions on the mandatory combinations of HELTF mode and GI duration for different HE PPDU formats.

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P435L64(CID #11413)

Move “In an HE SU PPDU, HE MU PPDU and HE ER SU PPDU, the combination of HE-LTF modes and GI duration is indicated in HE-SIG-A field. In an HE TB PPDU, the combination of HE-LTF modes and GI duration is indicated in the Trigger frame that triggers the transmission of the PPDU. “ to the next paragraph before “If an HE PPDU is an HE NDP PPDU, the combinations of HE-LTF modes and GI durations are listed in 28.3.16 (HE sounding NDP PPDU). If an HE PPDU is an HE TB NDP feedback PPDU, the combinations of HE-LTF modes and GI durations are listed in 28.3.17.”

Move the following texts to the a new paragraph

In Summary, the mandatory combinations of HE-LTF modes and GI duration are:

— 2x HE-LTF,  in an HE SU PPDU, HE MU PPDU or HE ER SU PPDU

— 2x HE-LTF, 

— 4x HE-LTF, 

— 1x HE-LTF,  in a non-OFDMA, MU-MIMO HE TB PPDU

The optional combinations of HE-LTF mode and GI duration are:

— 1x HE-LTF,  in an HE SU PPDU or HE ER SU PPDU

— 2x HE-LTF,  in an HE TB PPDU

— 4x HE-LTF, in an HE SU PPDU, HE ER SU PPDU, or HE MU PPDU

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| 11416 | Bin Tian | 28.3.10.10 | 437.24 | The end of Line 24 to Line 28 is excat duplication of Line 1 to line 5 | remove the duplication in line 24 to 28 | **Revised.**  Change to as in the resolution of CID11416 in doc IEEE802.11-18/0110r0. |
| 13484 | Sigurd Schelstraete | 28.3.10.10 | 437.01 | Lines 1-5 are a deplication of lines 24-28 | Remove one of the instances | **Revised.**  Change to as in the resolution of CID13484 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P437L24 (CID #11416,CID #13484): Please remove the following sentences

The duration of each HE-LTF symbol excluding GI is THE-LTF, defined in Equation (28-34).

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| 11417 | Bin Tian | 28.3.10.10 | 446.23 | What's the definition of m? Change to "corresponding to the mth spatial time stream..." | as in the comment | **Revised.**  Change to as in the resolution of CID11417 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P446L23 (CID #11417):

 is the row index of the corresponding to the m*th* spatial time stream of user u in the r-th RU.

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| 11649 | Dorothy Stanley | 28.3.10.10 | 436.36 | "In an HE SU PPDU, HE ER SU PPDU and HE MU PPDU, the transmitter provides training for NSTS,r,total space-time streams (spatial mapper inputs) used for the transmission of the PSDU(s) in the r-th RU." I interpret this as HE-LTFs are only transmitted based on the N\_STS for the specific RU. I don't believe this is correct, so what is the point of this sentence? | as in comment | **Rejected.**  This sentence means that the transmitter use HELTF as training sequence to facilitate receiver to estimate the MIMO channel for rth RU which can be estimated as an  matrix. As for the number of transmitted HE-LTF symbols for each RU is described in the following texts for each type of HE PPDU. I don’t think this sentence alone indicates that HE-LTFs are only transmitted based on the N\_STS for the specific RU. |
| 11650 | Dorothy Stanley | 28.3.10.10 | 436.39 | "In an HE TB PPDU, the transmitter of user u in the r-th RU provides training for NSTS,r,u space-time streams used for the transmission of the PSDU." I interpret this as user u only transmits HE-LTFs for its STS's. I don't believe this is correct, so what is the point of this sentence? | as in comment | **Rejected.**  Reason is the same as above |

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| 11651 | Dorothy Stanley | 28.3.10.10 | 436.55 | "In an HE MU PPDU with more than one RU and in an HE TB PPDU, NHE-LTF may take any..." there needs to be a shall and a specific equation on how to calculate the number of HE-LTFs for PPDU's with more than one RU and with OFDMA. | as in comment | **Rejected.**  The text clearly states that “In an HE MU PPDU with more than one RU and in an HE TB PPDU, NHE-LTF may take any value among one, two, four, six or eight, which is greater than or equal to the maximum value of the initial number of HE-LTF symbols for each RU r, which is calculated as a function of NSTS,r,total, separately based on Table 21-13 (Number of VHT-LTFs required for different numbers of space-time streams) in 21.3.8.3.5 (VHT-LTF definition), replacing NVHT-LTF by NHE-LTF.” The equation is not needed since mapping NHE-LTF from NSTS,r,total is defined in 21.3.8.3.5 with NHE-LTF replacing NVHT-LTF, and NSTS,r,total replacing NSTS,total in Table 21-13. The actual NHE-LTF can be a vaild value greater than or equal to the mapped value from Table 21-13. Hence, shall cannot be used here. |

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| 11652 | Dorothy Stanley | 28.3.10.10 | 449.38 | How are HE-LTF symbols generated for HE NDP PPDU? | as in comment | **Rejected.**  In 28.3.16, it is stated that “The HE NDP PPDU has the following properties: — Uses the HE SU PPDU format but without the Data field”. Since HE NDP PPDU is a special case of HE SU PPDU, the HELTF generation for HE SU PPDU applies to HE NDP PPDU. There is no need to have a separate HELTF generation for HE NDP PPDU. |
| 11653 | Dorothy Stanley | 28.3.10.10 | 451.34 | Which equation is used for HE NDP PPDU? | as in comment | **Rejected.**  Reason is the same as above. There is no need to have a separate HELTF equation for HE NDP PPDU. |

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| 11656 | Dorothy Stanley | 28.3.10.10 | 451.55 | provide definitions or references for all variables in Eq 28-54. | as in comment | **Revised.**  Change to as in the resolution of CID11656 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10*.10

* On P451L55 (CID #11656):

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

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

 is the cardinality of the set of modulated subcarriers within Kr for HE-LTF field, as defined in 28.3.9 (Mathematical description of signals).

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| 11657 | Dorothy Stanley | 28.3.10.10 | 452.16 | N^Tone\_HE-LTF is not used in the equation. I believe N\_HE-LTF is used, which has a completely different meaning | as in comment | **Revised.**  Change to as in the resolution of CID11657 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10*.10

* On P452L16 (CID #11657):

 is the number of OFDM symbols in the HE-LTF field.

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| 13372 | ron porat | 28.3.10.10 | 454.37 | The row subscript for A^k\_HELTF is not general enough to cover HE TB PPDU. | Make it right. | **Revised.**  Change to as in the resolution of CID13372 in doc IEEE802.11-18/0110r0. |

**Discussions:**

The commentor is right that  row index is not always right for HE TB PPDU since the u*th* user spatial stream may not start from 1, or end with. It is better to have a separate HE LTF generation figure for HE TB PPDU.

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P454L37 (CID #13372): Please change the title of Figure 28-31 to “Generation of HE-LTF symbols per frequency segment in an HE SU PPDU, HE MU PPDU, and HE ER SU PPDU”. Please add figure 28-xx after 28-31.

The generation of the time domain HE-LTF symbols per frequency segment in an HE SU PPDU, HE MU PPDU, and HE ER SU PPDU, is shown in Figure 28-31 (Generation of HE-LTF symbols per frequency segment in an HE SU PPDU, HE MU PPDU, and HE ER SU PPDU) where  is given by Equation (28-50). The generation of the time domain HE-LTF symbols per frequency segment in and HE TB PPDU is shown in Figure 28-xx (Generation of HE-LTF symbols per frequency segment in and HE TB PPDU).



Figure 28-xx – Generation of HE-LTF symbols per frequency segment in an HE TB PPDU (u*th* user in r*th* RU)

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| 13373 | ron porat | 28.3.10.10 | 451.64 | Mr,u for HE TB PPDU is passed from AP and it cannot be derived on the STA side as suggested in Table 28-15. It is better to explicitly link it to the trigger frame parameter defined for both regular HE TB PPDU and HE TB NDP feedback PPDU. The concept of multiplexing users in frequency domain is highlighted. Multiplexing in code (time-domain spreading) should get similar level of treatment. | Revise as suggested | **Revised.**  Change to as in the resolution of CID13373 in doc IEEE802.11-18/0110r0. |

**Discussions:**

The commentor is right that in Equation (28-54) is passed from AP to STA in Trigger frame User info field instead of being derived as in Table 28-15. It is better to define separately for HE TB PPDU and other PPDU formats.

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

On P451L64 (CID #13373):

 is given in Table 28-15 for HE SU PPDU, HE ER PPDU and HE MU PPDU. It is defined as STARTING\_SS\_NUM-1 in SS Allocation / Random Access RU Information subfield of Trigger frame User info field for u*th* user in r*th* RU in Figure 9-52h.

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| 13602 | SUNGEUN LEE | 28.3.10.10 | 436.50 | N\_STS which is the parameter used in 11ax is not defined in 11ac Table 21-13. | Add the sentence 'and replacing N\_STS,total by N\_STS' at the end of the sentence to reuse 11ac Table 21-13 | **Revised.**  Change to as in the resolution of CID13602 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P436L50 (CID #13602):

In an HE SU PPDU, HE ER SU PPDU and HE MU PPDU with a single RU (the RU having an MU-MIMO allocation or an SU allocation), the number of HE-LTF symbols,, is a function of the total number of space-time streams  as shown in Table 21- 13 (Number of VHT-LTFs required for different numbers of space-time streams) in 21.3.8.3.5 (VHT-LTF definition), replacing  by, and replacing  by .

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| 13606 | SUNGEUN LEE | 28.3.10.10 | 451.28 | Equation number for P matrix is wrong based on IEEE 802.11-2016 | Change (22-45) to (21-45) | **Revised.**  Change to as in the resolution of CID13606 in doc IEEE802.11-18/0110r0. |

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P451L28 (CID #13606):

where  is defined in Equation (19-27),  is defined in Equation (21-44), and  is defined in Equation (21-45).

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| 13774 | Yan Zhang | 28.3.10.10 | 451.47 | THE-LTF in Equations (28-53) and (28-54) should be THE-LTF-SYM | As in comment | **Revised.**  Change to as in the resolution of CID13774 in doc IEEE802.11-18/0110r0. |

**Discussions:**

In Table 28-12 Timing-related constants,  is defined as Duration of each OFDM symbol without GI in the HE-LTF field, while  is defined as Duration of each OFDM symbol including GI in the HE-LTF field, In Equations (28-53) and (28-54), OFDM symbol duration should include GI.

ax editor: please make the following change in D2.0 *Clause 28.3.10.10*

* On P451L47 (CID #13774): Please replace  with  in Equations (28-53) and (28-54).