IEEE P802.11  
Wireless LANs

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| 11ax Comment Resolutions for Clauses 26.3.2, 26.3.5 and 26.4.3 | | | | |
| Date: 2016-08-23 | | | | |
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Abstract: This document contains proposed resolutions for comments in *Clause 26.3.2, 26.3.5 and 26.4.3* from 11ax D0.2 with the CIDs below.

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| ***Clauses 26.3.2*** |  | |
| * 1927 | |  |
| ***Clauses 26.3.5*** | |  |
| * 2521 * 2522 * 2523 |  | |
| ***Clauses 26.4.3*** |  | |
| * 2107 * 2108 |  | |
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| CID | Commenter | Section | Page | Comment | Proposed Change | Resolution |
| 1927 | Sigurd Schelstraete | 26.3.2 | 74.26 | "HE extended range SU PPDU" should be "HE trigger-based PPDU" | See comment | **Revised.**  Change to as in the resolution of CID1996 in doc IEEE802.11-16/1135r1. |

* On P74L26 (CID #1927): Refer to resolution of CID #1032.

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| 2521 | Youhan Kim | 26.3.5 | 84.42 | There are many equations where the difference between the BCC and LDPC versions are N\_{tail}. Instead of having to write two equations all the time (one for BCC and one for LDPC), let's define N\_{tail} = 0 for LDPC in Table 26-3. | Change the row "N\_{tail} | 6 | Number of tail bits per BCC encoder" to "N\_{tail} | 6 if BCC is used, 0 if LDPC code is used | Number of tail bits per encoder" in Table 26-3. | **Revised.**  Change to as in the resolution of CID2521 in doc IEEE802.11-16/1135r1. |

ax editor: please make the following changes in *Clause 26.3.5*

* On P84L42 (CID #2521): Add a new line in Table 26-3 below  and replace  with . Combine separate equations (26-65) for BCC and (26-66) LDPC into one equation. Combine separate equations (26-69) for BCC and (26-70) LDPC into one equation.

Table 26‑3 – Timing related constants

| **Parameter** | **Values** | **Description** |
| --- | --- | --- |
| *Ntail,BCC* | 6 | Number of tail bits per BCC encoder |
| *Ntail,LDPC* | 0 | Number of tail bits per LDPC encoder |

In an HE SU PPDU transmission, the transmitter first computes the number of excess bits in the last OFDM symbol(s). Specifically, for HE SU PPDU, the number of excess bits is calculated based on Equation (26‑65).

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|  | (26‑65) |

where

is 2 when STBC is used, and 1 otherwise;

APEP\_LENGTH is the TXVECTOR parameter APEP\_LENGTH.



For a HE SU PPDU, the number of pre-FEC pad bits is calculated using Equation (26‑69).

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|  | (26‑69) |

where is defined as in Equation (26‑72) for BCC encoding, and Equation (26‑77) for LDPC encoding.



Modify equations (26-128) and (26-129)

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|  | (26‑128) |

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|  | (26‑129) |

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| 2522 | Youhan Kim | 26.3.5 | 85.49 | RU1992 is missing from Table 26-5. | Add RU size 1992 to Table 26-5. | **Revised.**  Change to as in the resolution of CID2522 in doc IEEE802.11-16/1135r1. |

ax editor: please make the following changes in *Clause 26.3.5*

* On P85L49 (CID #2522): Add one column to Table 26-5 for RU size 1992

Table 26‑5 - Tone allocation related constants for RUs in an OFDMA HE PPDU

| **Parameter** | **RU Size (Tones)** | | | | | | | **Description** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **26** | **52** | **106** | **242** | **484** | **996** | **1992** |
| *NSD* | 24 | 48 | 102 | 234 | 468 | 980 | 1960 | Number of complex data numbers per RU |
| *NSP* | 2 | 4 | 4 | 8 | 16 | 16 | 32 | Number of pilot values per RU |
| *NST* | 26 | 52 | 106 | 242 | 484 | 996 | 1992 | Total number of subcarriers per RU |
| NOTE: *NST* = *NSD* + *NSP* | | | | | | | | |

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| 2523 | Youhan Kim | 26.3.5 | 85.49 | Instead of defining separate variables for SU and MU, let's make SU a special case of MU (using one RU and one user). | In Table 26-6 (and throughout Clause 26), remove N\_CBPS, N\_CBPSS, N\_DBPSS, N\_BPSCS, N\_STS, N\_SS, N\_ES and R. Instead, use N\_{CBPS,0,0} for SU as an example. | **Rejected.**  In 11ac, N\_CBPS and N\_CBPS,u are defined separately for VHT SU and VHT MU PPDU. To keep the same writing style, there is no need to remove the definition of N\_CBPS. Otherwise, it involves a lot of editorial changes throughout the draft. |

**Discussions:**

N\_CBPS,r,u, N\_CBPSS,r,u, N\_DBPSS,r,u and N\_BPSCS,r,u are not used in equations in 26.3.10.4.4 Encoding process for an HE MU PPDU. Instead N\_CBPS,u, N\_CBPSS,u, N\_DBPSS,u and N\_BPSCS,u are used. In addition, it is more convenient to define N\_SS,u beside N\_SS and N\_SS,r,u.

ax editor: please make the following changes in Table 26-6

Replace , ,  and  with , ,  and  in Table 26-6. Remove  and  from Table 26-6 since they are not used in any equations in 11ax spec any more.

Table 26‑6 - Frequently used parameters

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| **Symbol** | **Explanation** |
| *NCBPS, NCBPS,u* | Number of coded bits per symbol for user *u*, *u* = 0, ..., *Nuser\_total* – 1.  For an HE SU PPDU, *NCBPS = NCBPS, 0*  For an HE MU PPDU, *NCBPS* is undefined |
| *NCBPSS, NCBPSS,u* | Number of coded bits per symbol per spatial stream.  For the Data field, *NCBPSS,u* equals the number of coded bits per symbol per spatial stream for user *u*, *u* = 0, ...,  *Nuser\_total* –1.  For the Data field of an HE SU PPDU, *NCBPSS = NCBPSS, 0*  For the Data field of an HE MU PPDU, *NCBPSS* is undefined |
| *NDBPS, NDBPS,u* | Number of data bits per symbol for user *u*, *u* = 0, ..., *Nuser\_total* – 1.  For an HE SU PPDU, *NDBPS = NDBPS, 0*  For an HE MU PPDU, *NDBPS* is undefined |
| *NBPSCS, NBPSCS,u* | Number of coded bits per subcarrier per spatial stream for user *u*, , *u* = 0, ..., *Nuser\_total* – 1.  For an HE SU PPDU, *NBPSCS = NBPSCS, 0*  For an HE MU PPDU, *NBPSCS* is undefined |
|  |  |
| *NSS*, *NSS,r,u*  *NSS,u* | Number of spatial streams. For the Data field, *NSS,r,u* is the number of spatial streams at *r*-th RU for user *u*, *u* = 0,…,*Nuser,r* – 1 ; *NSS,u* is the number of spatial streams for user *u*, *u* = 0,… *Nuser\_total* – 1  For the Data field of an HE SU PPDU, *NSS* = *NSS,0,0*  For the Data field of an HE MU PPDU, |
| *R, Ru* | *R,u* is the coding rate for user *u*, *u* = 0, ...,  *Nuser\_total* – 1.  For an HE SU PPDU, *R = R0*  For an HE MU PPDU, *R* is undefined |

On P145L23: For user *u* in the *r-*th RU of an MU transmission, the interleaver operates in the same way on the output bits for the user from the stream parser by replacing *NSS*, *NCBPSS*, *NCBPS*, and *NBPSCS* with *NSS, u*, *NCBPSS, ,u*, *NCBPS,u*, and *NBPSCS, ,u*, respectively.

On P146L9: For QPSK modulation with DCM, the input stream is broken into groups of *NCBPS or NCBPS, u* bits.

On P165L9: In the case of HE-MCSs for MU transmissions, the parameters, *NSS*, *R*, *NBPSCS*, *NCBPS*, and *NDBPS* are replaced with *NSS, u*, *Ru*, *NBPSCS, u*, *NCBPS,u*, and *NDBPS, u*, , respectively.

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| 2107 | Siguard Schelstraete | 26.4.3 | 163.20 | Are we still using N\_ES? | if N\_ES is always 1, remove it from (26-118) | **Revised.**  Change to as in the resolution of CID2107 in doc IEEE802.11-16/1135r1. |

* On P154L17 (CID #2107): Refer to comment resolution of CID 282.

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| 2108 | Siguard Schelstraete | 26.4.3 | 163.20 | (26-118) duplicates (26-68) | We should not have the same definition in multiple places. | **Revised.**  Change to as in the resolution of CID2108 in doc IEEE802.11-16/1135r1. |

ax editor: please make the following changes in *Clause 26.4.3*:

* On P163L20 (CID #2108):



For an HE SU PPDU and HE extended range SU PPDU using BCC encoding, the total number of OFDM symbols in the Data field is given by Equation (26-72)