IEEE P802.11
Wireless LANs

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| Comment resolution on CIDs for 28.3.11.5 Coding |
| Date: 2017-02-08 |
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Abstract:

This document contains comment resolution on the following CIDs for 28.3.11.5 Coding:

3251, 3252, 3393, 3395, 3502, 3504, 3834, 3836, 3924, 3926, 4461, 4464, 5041, 5042, 5275, 5276, 5277, 5278,

6197, 7430, 7431, 7432, 7434, 7435, 7437, 7438, 7439, 7440, 7441, 7516, ~~7517,~~ 8565, 8997, 8998, 8999, 9000, 9001, 9002, 9004, 9005 and 9069.

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 3251 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4461 in doc IEEE802.11-17/0329r4. |
| 3393 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4461 in doc IEEE802.11-17/0329r4. |
| 3502 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4461 in doc IEEE802.11-17/0329r4 |
| 3834 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | see resolution for CID 4461 in doc IEEE802.11-17/0329r4 |
| 3924 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | see resolution for CID 4461 in doc IEEE802.11-17/0329r4 |
| 4461 | 28.3.11.5 | 317 | 32 | BCC acronym not defined | Add definition for "BCC = binary convolutional code" in clause 3.4 Definitions, acronyms, and abbreviations | Rejected. In 802.11 2016, BCC acronym has been defined in 3.4. Only new acromnyms need to be defined in 802.11ax. |
| 3252 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4464 in doc IEEE802.11-17/0329r4. |
| 3395 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4464 in doc IEEE802.11-17/0329r4. |
| 3504 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4464 in doc IEEE802.11-17/0329r4. |
| 3836 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4464 in doc IEEE802.11-17/0329r4. |
| 3926 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | See resolution for CID 4464 in doc IEEE802.11-17/0329r4. |
| 4464 | 28.3.11.5 | 317 | 33 | LDPC acronym not defined | Add definition for "LDPC = low density parity check " in clause 3.4 Definitions, acronyms, and abbreviations | Rejected. In 802.11 2016, LDPC acronym has been defined in 3.4. Only new acromnyms need to be defined in 802.11ax. |
| 5041 | 28.3.11.5.1 | 318 | 27 | It is almost 2017 and we are defining a PHY with a binary convolutional code from the 1950s. This is backwards. Let's move on and use LDPC codes exclusively. | Remove this entire sub-clause. | Rejected.LDPC is mandatory in 802.11ax for large size RUs. For small size RUs, BCC has less complexity, maintains back compitable with legacy devices and consumes less power. How long has a technology been invented does not matter.  |
| 5042 | 28.3.11.5.2 | 318 | 27 | The LDPC codes and encoding method (shortening and puncturing) developed in 802.11n are poor performing and obsolete. Remove this reference and allow new codes to be used for 802.11ax. | We need to form an 802.11ax subcomittee for LDPC codes and take new submissions. | Rejected.Without a detailed proposal on proposed LDPC codes. It is not wise to delete the adopted LDPC codes in 802.11ax. Introducing new LDPC codes that is different from 11n/ac increases the complexity and cost significantly because multiple LDPC encoder and decoders need to be supported.  |
| 5275 | 28.3.11.5.1 | 318 | 12 | Is this the same a\_init from Eq 28-61? Please clarify. | as in comment | Revised. The answer to the question is YES. Add some clarification. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 5276 | 28.3.11.5.1 | 318 | 16 | Is this the same N\_dbps,last,init from Eq 28-62? Please clarify. | as in comment | Revised. The answer to the question is YES. Add clarifications. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 5277 | 28.3.11.5.1 | 318 | 23 | Is this the same N\_cbps,short from Eq 28-61? Please clarify. | as in comment | Rejected. The answer is YES. No need to clarify every variable in the spec. If N\_cbps,short here is a different variable, it can not be named the same as N\_cbps,short.  |
| 5278 | 28.3.11.5.1 | 318 | 37 | Is this the same N\_dbps,last,init from Eq 28-62? Please clarify. | as in comment | Rejected. The answer to the question is YES. Clarifications have been added for this variable in this sub-clausee. No need to clarify each time. See resolution for CID 5276 in doc IEEE802.11-17/0329r4..  |
| 6197 | 28.3.11.5 | 317 | 46 | Unknown reference of (#838)". | Please clarify reference or remove it if it's a mistake. | Revised. Remove the reference (#838). 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 7430 | 28.3.11.5 | 317 | 34 | For a HE trigger-based PPDU, the encoder is selected by the Coding Type subfield in User Info field in a Trigger frame. | Change"The encoder is selected by the Coding field in HE-SIG-A in an HE SU PPDU or an HE extended range SU PPDU, or HE-SIG-B per-user subfield(s) in an HE MU PPDU, as defined in 28.3.10.7 (HE-SIG-A) and 28.3.10.8 (HE-SIG-B) respectively."to"The encoder is selected by the Coding field in HE-SIG-A in an HE SU PPDU or an HE extended range SU PPDU, or the Coding field in HE-SIG-B per-user subfield(s) in an HE MU PPDU, or the Coding Type subfield in User Info field in a Trigger frame, as defined in 28.3.10.7 (HE-SIG-A), 28.3.10.8 (HE-SIG-B) and 9.3.1.23 (Trigger frame format), respectively." | Revised.11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 7431 | 28.3.11.5.1 | 317 | 63 | Equation (28-65) to (28-68) are also applicable to HE extended range SU PPDU | Replace "HE SU PPDU" by "HE SU PPDU or HE extended range SU PPDU' throughout whole 28.3.11.5.1 | Revised. The initial number of OFDM symbols in data field of HE extended range SU PPDU is also calculated by equation (28-65) to (28-68). 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 7432 | 28.3.11.5.2 | 318 | 29 | LDPC encoding process is applicable to HE extended range SU PPDU as well | Change"For an HE SU PPDU using LDPC coding to encode the Data field,..."to"For an HE SU PPDU or HE extended range SU PPDU to encode the Data field..." | Revised. LDPC encoding process is applicable to HE extended range SU PPDU as well.11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 7434 | 28.3.11.5.1 | 318 | 19 | Equation (28-68) is not necessary. Similar to N\_DBPS,LAST, we can just say that N\_CBPS,LAST = N\_CBPS,LAST,init, which is defined by (28-62). | 1. Change"The number of coded bits per symbol in the last OFDM symbol(s) of an HE SU PPDU is given by Equation (28-68). "to"The number of coded bits per symbol in the last OFDM symbol(s) of an HE SU PPDU is N\_CBPS,LAST= N\_CBPS,LAST,init."2. delete equation (28-68). | Rejected. The equation (28-68) is correct and there is no confusion.  |
| 7435 | 28.3.11.5.2 | 318 | 31 | Strictly speaking, the PSDU contains pre-FEC MAC pad bits. | Change"all bits in the Data field including the scrambled SERVICE, PSDU, and pre-FEC pad bits are encoded"to"all bits in the Data field including the scrambled SERVICE, PSDU, and pre-FEC PHY pad bits are encoded" | Rejected. There is no definition for pre-FEC MAC pad bits or pre-FEC PHY pad bits. Pre-FEC pad bits are PHY padding bits.  |
| 7437 | 28.3.11.5.2 | 318 | 34 | Equation (20-35) should be changed to Equation (19-35). | As per comment | Revised.11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 7438 | 28.3.11.5.2 | 318 | 47 | Equation (20-36) should be changed to Equation (19-36). | As per comment | Revised.11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 7439 | 28.3.11.5.4 | 319 | 56 | Currently, for an HE MU PPDU, the user with the longest encoded packet duration is derived by Equation (28-77), which requires computing the initial pre-FEC padding factor value and the initial number of OFDM symbol for each user. Actually,a simpler method can be used for this purpose. In more details, first compute initial number of OFDM symbols for each user, and then determine a subset of users which have maximum initial number of OFDM symbols. After that, compute the initial pre-FEC padding factor value only for each user in the subset. Then the user with the longest encoded packet duration is just the user which has maximum initial pre-FEC padding factor among the users in the subset. In other words, compared with the current method, the proposed method does not require computing the initial pre-FEC padding factor values for users which are not in the subset and thus the computational complexity can be reduced. | Change the method for deriving the user with the longest encoded packet duration as per comment. | Rejected. The commenter says a specific implementation. However, the spec just describes the final formats. The spec. does not prevent the specific implementation proposed by the commenter and the spec. shall not exclude other implementations.  |
| 7440 | 28.3.11.5.4 | 320 | 58 | In Equation (28-83), N\_CBPS,last,u should be changed to N\_CBPS,short,u | As per comment | Revised.11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4.  |
| 7441 | 28.3.11.5.4 | 321 | 30 | a\_init=4 should be changed to a=4 | As per comment | Accepted  |
| 7516 | 28.3.11.5.4 | 321 | 18 | "N\_DBPS.LAST.u = N\_DBPS.LAST.init.u" should be changed to "N\_DBPS.last.u = N\_DBPS.last.init.u". | As per comment | Accepted. |
| 7517 | 28.3.11.5.4 | 321 | 47 | "a\_init" should be changed to "a" | As per comment | More time for discussion is required. Revised. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 8565 | 28.3.11.5.4 | 321 |  | Lines 6-13 deal with the case where, in an MU PPDU, either no LDPC user has an extra symbol or all users are BCC encoded. However, the following isn't clear: an MU PPDU has a mixture of LDPC and BCC users and some LDPC users have an extra symbol. Should the BCC users set a,N\_sym based on 28-86 or 28-85? The confusion arises because the 'if' statement on line 6 doesn't have an explicitly specified else clause and it's not clear whether the 'note' on line 14 applies only when the 'if' condition is met or is true universally. | Make it clear that BCC users shall set a,N\_sym based on 28-86.Delete the text on lines 14-15 ("Note that users with .... Equation (28-86)")On line 8, after the words "shall be set to 0, and", add the underlined text: update the common pre-FEC padding factor and NSYM values for all users as follows | Revised. Agreed in principle. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 8997 | 28.3.11.5 | 317 | 41 | "Mandatory/optional support for LDPC is already covered in detail in section 28.1". No need to repeat it here. | Delete paragraph starting at line 41. | Rejected. This paragraph provides more details on usage of LDPC and BCC that are not included in 28.1. |
| 8998 | 28.3.11.5.2 | 318 | 42 | move (28-70) to beginning of section 28.3.11.5.2 (i.e. define N\_sym,init first) | Start section 28.3.10.11.5.2 with "The initial number of OFDM symbols in the Data field with LDPC encoding in an HE SU PPDU is calculated using Equation (28-xx)." Then define N\_sym,init | Rejected. Equation (28-70) is a part of equation (28-69) therefore equation (28-70) should follow equation (28-69). |
| 8999 | 28.3.11.5.2 | 318 | 61 | Change "and increment Navbits by the following Equation (28-72) instead of Equations (19-39)," to "Navbits shall be incremented according to Equation (28-72) instead of Equation (19-39)." | See comment | Revised. Agreed in principle. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 9000 | 28.3.11.5.2 | 318 | 62 | Start new sentence instead of ", followed by recomputing Npunc as inEquation (19-40):" | Replace with "After this, the number of punctured bits N\_punc shall be calculated as in Equation (19-40)." | Revised.Agreed in principle. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 9001 | 28.3.11.5.2 | 319 | 23 | Change "update" to "calculate". No value for N\_CBPS,LAST has been calculated so far. | See comment | Accepted. |
| 9002 | 28.3.11.5.2 | 319 | 30 | Delete "For completeness," | See comment | Revised.Agreed in principle. 11ax editor, please see the discussion for instructions in doc IEEE802.11-17/0329r4. |
| 9004 | 28.3.11.5.4 | 320 | 63 | Change "pre-FEC padding factor" to "pre-FEC padding factor a" | See comment | Accepted. |
| 9005 | 28.3.11.5.4 | 321 | 6 | Change "If among all the users" to "If for none of the users" | See comment | Revised.See resolution of CID 8565 in doc IEEE802.11-17/0329r4. |
| 9069 | 28.3.11.5.4 | 321 | 31 | a\_init used wrongly instead of a | Change a\_init to a | Accepted. See resolution of CID 7441 in doc IEEE802.11-17/0329r4.. |

**Discussions for CIDs 5275:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 14, page 318* *of D1.0***:

where $a\_{init }$is defined in equation (28-61).

**Discussions for CIDs 5276:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 16, page 318* *of D1.0***:

$N\_{DBPS,LAST}=N\_{DBPS,LAST, init}. , $where $N\_{DBPS,LAST, init} $is defined in equation (28-62).

**Discussions for CIDs 6197:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 46, page 317* *of D1.0***:

sizes less than or equal to a 242-tone RU~~(#838).~~

**Discussions for CIDs 7340:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 34, page 317* *of D1.0***:

~~The encoder is selected by the Coding field in HE-SIG-A in an HE SU PPDU or an HE extended range SU PPDU, or HE-SIG-B per-user subfield(s) in an HE MU PPDU, as defined in 28.3.10.7 (HE-SIG-A) and 28.3.10.8 (HE-SIG-B) respectively.~~ The coding type is selected by the Coding field in HE-SIG-A in an HE SU PPDU or an HE extended range SU PPDU, or the Coding field in HE-SIG-B per-user subfield(s) in an HE MU PPDU, or the Coding Type subfield in User Info field in a Trigger frame, as defined in 28.3.10.7 (HE-SIG-A), 28.3.10.8 (HE-SIG-B) and 9.3.1.23 (Trigger frame format), respectively.

**Discussions for CIDs 7431:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 63, page 317* *of D1.0***:

The initial number of OFDM symbols in the Data field with BCC encoding in an HE SU PPDU or an HE extended range SU PPDU is calculated using Equation (28-65).

***TGax Editor: Please make the following text change (changed texts are in red) in the line 14-15, page 318* *of D1.0***:

The number of data bits per symbol in the last OFDM symbol(s) of an HE SU PPDU or an HE extended range SU PPDU is *NDBPS,LAST* = *NDBPS,LAST,init*.

***TGax Editor: Please make the following text change (changed texts are in red) in the line 18-19, page 318* *of D1.0***:

The number of coded bits per symbol in the last OFDM symbol(s) of an HE SU PPDU or an HE extended range SU PPDU is given by Equation (28-68).

**Discussions for CIDs 7432:**

***TGax Editor: Please make the following text change(changed texts are in red) in the line 29, page 318* *of D1.0***:

For an HE SU PPDU or an HE extended range SU PPDU using LDPC coding to encode the Data field, the LDPC code and encoding process described in 19.3.11.7 (LDPC codes) shall be used with the following modifications.

**Discussions for CIDs 7437:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 34, page 318* *of D1.0***:

Equation (28-69) instead of Equation ~~(20-35)~~ (19-35).

**Discussions for CIDs 7438:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 34, page 318* *of D1.0***:

~~(20-36)~~ (19-36).

**Discussions for CIDs 7440:**

***TGax Editor: Please make the following text change (changed texts are in red) the equation (28-83), page 320* *of D1.0***:

$N\_{CBPS, last, u}$ $N\_{CBPS, short, u}$

**Discussions for CIDs 7517:**

***TGax Editor: Please make the following text change (changed texts are in red) theline 47, page 321* *of D1.0***:

represented by *ainit* for users encoded by LDPC, and represented by *a* for users encoded by BCC,

**Discussions for CIDs 8565:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 6-15, page 321* *of D1.0***:

If ~~among all~~ none of the users with LDPC encoding, in step d) of 19.3.11.7.5 (LDPC PPDU encoding process) meets the above mentioned condition, or if all the users in the HE MU PPDU are BCC encoded, then the LDPC Extra Symbol Segment field in HE-SIG-A shall be set to 0, and the common pre-FEC padding factor and *NSYM* values for all users shall be updated by the following equation:

$a=a\_{init}, N\_{SYM}=N\_{SYM, init}$ (28-86)

~~Note that users with BCC encoding shall also use the common~~ *~~NSYM~~* ~~and pre-FEC padding parameters as in Equation (28-86).~~

**Discussions for CIDs 8999 and 9000:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 61-64, page 318* *of D1.0***:

then the LDPC Extra Symbol Segment field of HE-SIG-A shall be set to 1, ~~and increment~~ *Navbits* shall be increased according to ~~by~~ the following Equation (28-72) instead of Equations (19-39), ~~followed by recomputing~~ and *Npunc* shall be recomputed as in Equation (19-40):

**Discussions for CIDs 9002:**

***TGax Editor: Please make the following text change (changed texts are in red) in the line 30, page 319* *of D1.0***:

~~For completeness,~~ ~~t~~The number of data bits of the last symbol is calculated as *NDBPS,LAST* = *NDBPS,LAST,init*.