IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CC36 CR for Clause 36.3.13.3 coding | | | | |
| Date: 2021-07-22 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | Email |
| Yan Zhang | NXP | 350 Holger Way, San Jose, CA, |  | [yan.zhang\_5@nxp.com](mailto:yan.zhang_5@nxp.com) |

Abstract: This document contains proposed resolutions for comments in *Clause 36.3.13.3* from 11be D1.1 with 21 CIDs below

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Clause 36.3.13.3***  4631,4696,4958,5489,5490,6804,6805,6906,7242,7243,7244,7245,7246,7247,7398,7742,7754,7755,8027,8131,8132,8133,8134  Version tracking:  v2: CID 7398 resolution is changed from rejected to revised; CID 7755 is reassigned to Edward. CID 7242 and 5490 resolution are agreed after offline check. | | | |  | | |
|  | | | | | |  |
|  | | | | | |  |
|  | | | |  | | |
| 4631 | 36.3.13.3.3 | | 529.37 | This para has the 802.11 arch back to front, and leads to circular logic. What should happen: Step 1) PHY declares its capabilities via a MIB variable. Step 2) MLME reads the PHY's capabilities. Step 3) MLME may opt to prune PHY capabilities according to policy; Step 4: the MLE/MAC advertises this (pruned) list as this STA's PHY capabilities to peer STAs. What is happening here: the MAC is magically discovers what the PHY is capable of, and then magically lets the PHY know. | 1) Define a MIB variable so the PHY can express if the PHY is capable of this particular feature or not. (dot11HELDPCCodingInPayloadImplemented probably suffices). 2) If we really think that the MLME may want the PHY to disable this particular feature(!?), then give the MAC a MIB variable to use to control the PHY to disable/enable this particular feature. Or not. Do this for both "Capabilities" in this clause. Add language connecting the dots. | | **Revised.**  The text in 36.3.13.3.3 is an description of “LDPC Coding In Payload subfield of the HE Capabilities element” to indicate PHY support of LDPC coding for transmission and reception. The actual transmission procedure involving LDPC operations is described in 10.15 LDPC operation.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx). | | |
| 4696 | 36.3.13.3.3 | | 529.44 | "as defined in 9.4.2.248 (HE Capabilities element)" shall be 9.4.2.295c (EHT Capabilities element) | As in comment | | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) | | |
| 6804 | 36.3.13.3.3 | | 529.43 | Fix typo as: "..LDPC Coding In Payload subfield of the EHT HE Capabilities element as defined in 9.4.2.248 (HE Capabilities element)." | As in comment | | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) | | |
| 7243 | 36.3.13.3.3 | | 529.43 | "LDPC coding in payload" is in HE Capabilities element not EHT Capabilities element. | See comment | | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) | | |
| 7754 | 36.3.13.3.3 | | 529.42 | Repeated text since it has been defined in the same paragraph that "LDPC is the only FEC coding scheme in the EHT PPDU Data field for EHT-MCSs 10 to 14" | Remove the repeated text | | **Rejected.**  The sentence “Support for LDPC coding … ” states LDPC mandatory support condition. It does not exclude the possibility that BCC can be optional coding scheme for those conditions.  The first two sentences emphasize LDPC is the only FEC coding scheme for MCS10-14, or RU size greater than 242. So the first two sentences are not just repeated contents. | | |
| 8027 | 36.3.13.3.3 | | 529.44 | Incorrect reference | Change "9.4.2.248" to "9.4.2.295c" | | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) | | |

be editor: please add new *Clause 10.15 in D1.1*

* On P201L4 (CID #4631):

**10.15 LDPC operation**

***Insert the following at the end of the subclause:***

An EHT STA shall not transmit a frame in an EHT PPDU with TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the frame is addressed to an EHT STA for which the LDPC Coding in Payload subfield in the HE Capabilities element received from that STA contained a value of 1 and dot 11HELDPCCodingInPayloadImplemented is true.

* On P529L43 (CID #4631, CID #4696, CID #6804, CID #7243, CID #7754, CID #8027):

LDPC is the only FEC coding scheme in the EHT PPDU Data field for RUs or MRUs with more than 242 tones. LDPC is the only FEC coding scheme in the EHT PPDU Data field for EHT-MCSs 10 to 14.

Support for LDPC coding (for both transmit and receive) is mandatory for EHT STAs declaring support for at least one of EHT 40/80/160/320 MHz PPDU bandwidths for SU transmission, for EHT STAs declaring support for more than four spatial streams, for EHT STAs declaring support for EHT-MCSs 10 and 11, or for EHT STAs declaring support for EHT-MCS 14, according to the LDPC Coding In Payload subfield of the HE Capabilities element as defined in 9.4.2.248 (HE Capabilities element).

NOTE - The LDPC Coding In Payload subfield of the HE Capabilities element indicates support for the transmission and reception of the LDPC encoded PPDUs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4958 | 36.3.13.3.5 | 534.5 | If the spec. does not specify how to set the post-FEC values, it is easy to think that the padding values are all zeros. In the 11ax spec., it is specified as "The values of the post-FEC padding bits are not specified and are left up to implementation". This means the post-FEC padding value can be random. So, it would be better if 11be spec. also specifies that post-FEC padding can be any values by adding similar sentence. | 1 Add following sentence to clarify how to set the post-FEC padding values: "The values of the post-FEC padding bits are not specified and are left up to implementation". | **Revised.**  Agreed with comment regarding post-FEC padding values.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.5*

* On P534L5 (CID #4958):

For each user with either LDPC or BCC encoding, the number of post-FEC padding bits in the last symbol is computed as in Equation (36-65). The values of the post-FEC padding bits are not specified and are left up to implementation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5489 | 36.3.13.3.1 | 529.03 | The coding type when BCC is used also relates to QAM, NSS etc. | make it complete or remove the description as it is included in the BCC coding subclause already | **Revised.**  The intention of the sentence is about the RU size requirement for LDPC mandatory support. Since the following subclauses described detailed requirements of BCC/LDPC support, this sentence can be removed to eliminate the confusion.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the following changes in D1.1 *Clause 36.3.13.3.1*:

* On P529L3 (CID #5489):

The Data field shall be encoded using either BCC defined in 36.3.13.3.2 (BCC coding) or the LDPC code defined in 36.3.13.3.3 (LDPC coding).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7242 | 36.3.13.3.1 | 529.11 | "When conducting FEC encoding for multi-link operation, one FEC encoder is applied to one PSDU per STA for each link, and the FEC encoding process is done independently for each PSDU per STA per link.". Is this text still needed? Sounds like a remnant of early ML discussions. It's now clear that each link generates its own A-MPDUs, PSDUs, ... so the encoding follows from there. | Delete paragraph | **Revised.**  Agree with the commentor this sentence is not needed since each link generates PSDUs independently.    TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |
| 5490 | 36.3.13.3.1 | 529.11 | Move the description regarding ML to a more general palce regarding PSDU/PPDU, not restricted to FEC coding. | as in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the following changes in D1.1 *Clause 36.3.13.3.5*:

* On P529L11 (CID #7242, CID #5490):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 6805 | 36.3.13.3.5 | 530.40 | In equations (36-47) and (36-49), "N\_tail" should be "N\_tail,u" since user 'u' could be LDPC or BCC, and the corresponding values are different. | As in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |
| 7398 | 36.3.13.3.5 | 530.39 | In equation 36-47, there appears to be a missing term on the left hand side of the "mod" function. | Add a term (e.g. NSYM) to the left hand side of the "mod" function in equation 36-47. | **Revised.**  Agree that mod operation format should be aligned with definition in 11me clause 1.5.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the following changes in D1.1 *Clause 36.3.13.3.5*:

* On P530L40 (CID #6805, CID #7398):

(36-47)

is the number of tails bits per encoder for user as defined in Table 36-18 (Timing-related constants).

* On P531L2 (CID #6805):

(36-49)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 6906 | 36.3.13.3.5 | 532.17 | Per definition, "arg max" function returns a set of indices. | Change "u\_max =" to "For an u\_max in " | **Revised.**  Agreed with comment the function returns a set ot indices.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.5*

* On P532L17 (CID #6906):

Among all the users, derive the set of the user indices , with the longest encoded packet duration as in Equation (36-50), and select one value from the set as .

(36-50)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7244 | 36.3.13.3.5 | 530.35 | Change "the number of bits left" to "the number of data bits left" | See comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.5*

* On P530L35 (CID #7244):

In an EHT MU PPDU transmission, the transmitter first computes the number of data bits left in the last OFDM symbol for user *u* as in Equation (36-47).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7245 | 36.3.13.3.5 | 532.44 | Suggest to move the paragraph on lines 44-49 to before or after the paragraph starting on page 483, line 61. That way, pre-FEC padding for BCC and LDPC are defined in adjacent paragraphs. There appears to be no reason for the current separation. | See comment | **Revised.**  Agree that the two equations can be put in the same place to make the text more organized.  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.5*

* On P532L44 (CID #7245): Move sentence “For each user … Equation (36-54)” and Equation (36-54) to P533L62 before the sentence “For the users with BCC … Equation (36-64)”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7246 | 36.3.13.3.5 | 532.60 | Add comma between "encoding" and "continue" | Change to "For each user with LDPC encoding, continue LDPC ..." | **Accepted.** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7247 | 36.3.13.3.5 | 533.22  533.35 | Change "by Equation" to "using Equation" | See comment. Also on line 35. | **Accepted.** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7398 | 36.3.13.3.5 | 530.39 | In equation 36-47, there appears to be a missing term on the left hand side of the "mod" function. | Add a term (e.g. NSYM) to the left hand side of the "mod" function in equation 36-47. | **Revised.**  The two variables for mod operations are inside the parenthesis. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 8131 | 36.3.13.3.4 | 529.58 | add "a" at the end of a pre-FEC padding factor parameter before showing the Figure including a = 1. | as in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.4*

* On P529L58 (CID #8131):

The four pre-FEC padding boundaries are represented by a pre-FEC padding factor parameter .

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 8132 | 36.3.13.3.6 | 534.32 | add ,respectively at the end of sentence .... Equation (36-92) and Equation (36-93). | as in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.6*

* On P534L32 (CID #8132):

The common values and are derived by non-AP STAs as shown in Equation (36-92) and Equation (36-93), respectively.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 8133 | 36.3.13.3.6 | 534.33 | "the calculations described in the EHT MU PPDU encoding process" is not clear. Add the reference such as 36.3.13.3.5 (Encoding process for an EHT MU PPDU) or add the equation number at P483L3 and use this equation number to refer how to calculate. | as in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |
| 8134 | 36.3.13.3.6 | 534.39 | add the reference such as 36.3.13.3.5 (Encoding process for an EHT MU PPDU) at the end of sentence ( ... described in the EHT MU encoding process) to improve the text | as in comment | **Revised.**  TGbe editor: Incorporate the changes in [https://mentor.ieee.org/802.11/dcn/21/11-21-1266-02-00be-CC36-CR-for-coding.docx](https://mentor.ieee.org/802.11/dcn/21/11-21-xxxx-00-00be-CC36-CR-for-coding.docx) |

be editor: please make the changes in D1.1 *Clause 36.3.13.3.6*

* On P534L32 (CID #8133):

The AP shall set the LDPC Extra Symbol Segment field in the Common Info field of the Trigger frame to 1 if the condition in step d) of LDPC encoding process described in 36.3.13.3.5 (Encoding process for an EHT MU PPDU) is met for at least one LDPC encoded user solicited by the AP for an EHT TB PPDU transmission.

NOTE—The AP might set the LDPC Extra Symbol Segment field to 1 regardless of the value derived from the calculations. The AP might select a value for the Pre-FEC Padding Factor field that differs from that derived from the calculations described in 36.3.13.3.5 (Encoding process for an EHT MU PPDU).