IEEE P802.11
Wireless LANs

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| Resolution for comments received for CC on D0.1 for subclause 38.3.15.12 and 38.3.16.1 |
| Date: 2025-03-09 |
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Abstract

This submission contains proposed comment resolutions to comments on P802.11bn D0.1. The changes are based on P802.11bn D0.2.

The submission provides resolutions to the following 39 CIDs in the ELR-SIG subclause 38.3.15.12 and coding subclause 38.3.16.1

31,32,33,117,180,345,346,347,766,950,1180,1181,1182, 1356,1358,1359,1360,1361,

1362,1363,1364,1365,1644,1761, 2072,2073,2074,2314,2315, 2318, 2320,2321,

2702,2781,2782,2783, 3545,3546,3558,

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Fix one typo
* Rev 2: update some equations to show the changes.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
|  |  |  |  |  |  |  |
| 117 | Der-Zheng Liu | 38.3.15.12.2 | 191.39 | Number of bits for ELR Version Identifier subfiled in Table 38-35 = 1, not 3. | Change to be 1 from 3. | RevisedAgreed with the change, but the table number is 38-36 in D0.2.Instruction to editor: Apply the change in table 38-36 marked as [#117] in 11-25/0546r3 |
| 180 | You-Wei Chen | 38.3.15.12.2 | 191.39 | Number of bit of ELR Version Identifier should be 1 | change number of bit to 1 | AcceptedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 345 | Sigurd Schelstraete | 38.3.15.12.2 | 191.54 | Replace "BPSK with coding rate 1/2" with UHR MCS 0 | See comment | Accepted |
| 346 | Sigurd Schelstraete | 38.3.15.12.2 | 191.57 | Replace "QPSK with coding rate 1/2" with UHR MCS 1 | See comment | Accepted |
| 347 | Sigurd Schelstraete | 38.3.15.12.2 | 192.28 | Replace "U-SIG-2" with "ELR-SIG-2" | See comment | AcceptedInstruction to editor: Apply the change in Table 38-36 |
| 766 | Junbin Chen | 38.3.15.12.2 | 192.28 | The "ELR-SIG-2" in "Table 38-35--ELR-SIG field of a UHR ELR PPDU" has been miswrited as "U-SIG-2", please revise it. | as commented | AcceptedInstruction to editor:no change is needed, it is resolved in CID 347 |
| 950 | Wookbong Lee | 38.3.15.12.2 | 191.39 | ELR Version Identifier is one bit | Change "3" to "1" for ELR Version Identifier in table 38-35. | AcceptedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 1180 | Dong Guk Lim | 38.3.15.12.2 | 192.12 | Change the font size of " LDPC Extra OFDM Symbol" | As the comment. | Accepted |
| 1181 | Dong Guk Lim | 38.3.15.12.2 | 192.28 | Typo, change "U-SIG-2" with "ELR-SIG2" | As the comment. | AcceptedInstruction to editor:no change is needed, it is resolved in CID 347 |
| 1182 | Dong Guk Lim | 38.3.15.12.2 | 192.31 | B11-13 is Disregard bit. So, modify the description of this field as follows : "Set to all 1s and treat as Disregard" | As the comment. | Accepted |
| 1761 | Yapu Li | 38.3.15.12.2 | 191.41 | The ELR Version Identifier is totally 3 bits, so value 1-7 is Validate. | As in comment | RevisedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 1762 | Yapu Li | 38.3.15.12.2 | 192.08 | The number of data symbols indicated by the current Length field may cause the length of the PPDU to exceed aPPDUMaxTime=5.484ms. The value indicated by Length field needs to be further restricted | Propose add the following text in the description of Length field.Note: Any Length selection that results in a number of ELR-Data symbols that is larger than 374 symbols is not allowed. |  |
| 2072 | Bo Sun | 38.3.15.12.2 | 191.39 | The value of "Number of bits" for "ELR Version Identifier" field in Table 38-35 shoudl be 1 instead of 3. | Replace "3" with "1" | AcceptedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 2073 | Bo Sun | 38.3.15.12.2 | 192.28 | It's strange that the 1st part of ELR-SIG is named "ELR-SIG-1" but the 2nd part of ELR-SIG is named "U-SIG-2". | Unify the naming rule, either "U-SIG-X" or "ELR-SIG-X". | RevisedInstruction to editor:no change is needed, it is resolved in CID 347 |
| 2074 | Bo Sun | 38.3.15.12.2 | 192.31 | The value of the "Number of bits" for Disregard field in Table 38-35 should be 3 instead of 1. | Replace "1" with "3" | RevisedAgree with the change, but the table number is changed to be table 38-36.Instruction to editor:Apply the change in Table 38-36 |
| 2314 | Yan Zhang | 38.3.15.12.2 | 191.39 | Number of bits is 1 not 3 for ELR Version Identifier in Table 38-35. Change 3 to 1. | As in comment | RevisedAgree with the change, but the table number is changed to be table 38-36.Instruction to editor: No change is needed. It’s been resolved in CID #117 |
| 2315 | Yan Zhang | 38.3.15.12.2 | 192.31 | Number of bits is 3 for "Disregard" subfield in Table 38-35. Please change 1 to 3. | As in comment | Revised.Instruction to editor:no change is needed, it is resolved in CID 2074 |
| 2316 | Yan Zhang | 38.3.15.12.2 | 192.29 | Change "see 35.11.1.1 (STA\_ID)" to "(see 37.z (TBD) (STA\_ID))." to be consistent with other subclauses. | As in comment |  \deferred |
| 2317 | Yan Zhang | 38.3.15.12.2 | 192.53 | Please change "tone rotation" to "phase rotation" to be consistent with the text in 38.3.16.7. "Tone rotation" can be confused with one defined for pre-UHR modulated fields. | As in comment |  |
| 2318 | Yan Zhang | 38.3.15.12.2 | 193.15 | TSYM is not defined in Table 38-15, either define it in Tabel 38-15, or use TSYM,ELR-SIG which is defined in the Table. | As in comment | Revised Agree with the comment but the table number is changed to 38-16 in D0.2Instruction to editor:Change "" with "" on P203L14 and equation (38-37) in D0.2 |
| 2319 | Yan Zhang | 38.3.15.12.2 | 193.17 | N\_ELR-SIG^Tone is not defined in Table 38-16, and it is not used in the equation. Please delete the sentence. | As in comment |  |
| 2320 | Yan Zhang | 38.3.15.12.2 | 193.36 | Rephrase "is the transmitted constellation in the r-th 52-tone RU at subcarrier k and ELR-SIG field OFDM symbol n" to "is the transmitted constellation at subcarrier k in the r-th 52-tone RU of the n-th OFDM symbol" | As in comment | RevisedAgree with the comment, but the subclause is in 38.3.15.12.3 Instruction to editor:Apply the change in 38.3.15.12.3 on P203L36 D0.2 marked as [#2320] in in 11-25/0546r3 |
| 2321 | Yan Zhang | 38.3.15.12.2 | 194.01 | In Equation (38-39), what does ? mean? It is very confusing. . Please rewrite the equation . | As in comment | RejectedIt is revised in D0.2 already.  |
| 2322 | Yan Zhang | 38.3.15.12.2 | 194.18 | "The subcarrier index k for the data subcarrier is first offset by theminimum value of subcarrier index (for the lower edge subcarrier) in this RU and number of the unoccupied tones, and then subtracted by the number of pilot subcarriers falling in between the data subcarrier and the edge subcarrier." What is the number of unoccupied tones within each 52 tone RRU? Please remove number of the unoccupied tones in the sentence. edge subcarrier can be either side of RRU52, please clarify it is the lower edge subcarrier. | As in comment |  |
| 2781 | Rong Zhang | 38.3.15.12.2 | 191.40 | Table 38-35 change number of bits from 3 to 1 in B0 | see comments | RevisedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 2782 | Rong Zhang | 38.3.15.12.2 | 192.28 | Table 38-35 change U-SIG-2 to ELR-SIG-2 | see comments | Revised Instruction to editor:no change is needed, it is resolved in CID 347 |
| 2783 | Rong Zhang | 38.3.15.12.2 | 192.31 | Table 38-35 change number of bits from 1 to 3 in B11-B13 | see comments | Revised Instruction to editor:no change is needed, it is resolved in CID 2074 |
| 2787 | Rong Zhang | 38.3.15.12.2 | 193.06 | The factor 1/sqrt(|K\_RU52r|) should be put after the summation across "r" of Eq 38-37 | see comments |  |
| 2788 | Rong Zhang | 38.3.15.12.2 | 193.10 | Change Q\_k,u to Q\_k,0 of Eq 38-37 | see comments |  |
| 3558 | ron porat | 38.3.15.12.2 | 0.00 | Incorrect table contents | ELR-SIG-1 B0 - ELR Version Identifier - Number of bits should be 1ELR-SIG-2 B11-B13 - Disregard - Number of bits should be 3 | AcceptedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 29 | Zheng Guo | 38.3.15.12.3 | 193.06 | need to correct the formulas in Eq (38-37) for the first term before summation. Please see "11-24-1968-00-00bn-detailed-text-proposal-on-enhanced-long-range-feature" page 18 for detailed correction. | need to correct the formulas in Eq (38-37) for the first term before summation. Please see "11-24-1968-00-00bn-detailed-text-proposal-on-enhanced-long-range-feature" page 18 for detailed correction. |  |
| 30 | Zheng Guo | 38.3.15.12.3 | 193.06 | need to add description of Q\_{k,u} followng Eq (38-37). | need to add description of Q\_{k,u} following Eq (38-37). |  |
| 31 | Zheng Guo | 38.3.15.12.3 | 194.01 | a typo following k'. Need to replace the question mark "?" with ":". | a typo following k'. Need to replace the question mark "?" with ":". | RejectedIt is revised in D0.2 already.  |
| 1183 | Dong Guk Lim | 38.3.15.12.3 | 193.03 | In eq(38-37), add the eta\_field term and related description. | As the comment. |  |
| 1644 | Jian Yu | 38.3.15.12.3 | 194.02 | Remove the question mark in the equation | as in comment | RejectedIt is revised in D0.2 already.  |
| 3545 | ron porat | 38.3.15.12.3 | 193.33 | TGI2,Data entry missing in Table 38-15 | only reference to TGI2,Data (=1.6us) at the end of section 38.3.11 | RevisedT\_GI,ELR-SIG is defined in table 38-16 in D0.2. so suggest to delete “with T\_GI, ELR-SIG = T\_GI2, Data” at the end of the sentence.Instruction to editor:Delete “with T\_GI, ELR-SIG = T\_GI2, Data” at the end of the sentence On P203L32 marked as[#3545] in 11-25/0546r3. |
| 3546 | ron porat | 38.3.15.12.3 | 194.02 | A "?" showing after "k' " in the equation | needs to be a colon ":" , i.e.  |{k' : (KRU52r,min ...  |; two instances | RejectedIt is revised in D0.2 already.  |
| 32 | Zheng Guo | 38.3.16.1.7 | 196.14 | eq (38-11), suggest to remove the subscript "u" in "N\_SYM,int,u", since user index "u" doesn't apply to ELR. Same comment apply for later ELR sections, such as page 199 eq (38-50.) | eq (38-11), suggest to remove the subscript "u" in "N\_SYM,int,u", since user index "u" doesn't apply to ELR. Same comment apply for later ELR sections, such as page 199 eq (38-50.) | revisedInstruction to editor: remove the subscript "u" in P206L9 in D0.2, eq (38-41), eq (38-48) and eq(38-49) in D0.2 |
| 33 | Zheng Guo | 38.3.16.1.7 | 197.14 | it should be "bits is". | it should be "bits is". | Revised Agree with the change, but the page number is changed in D0.2.Instruction to editor: Replace “bitsis” with “bits is” marked as [#33] in 11-25/0546r3 and located on P207L14 in D0.2 |
| 1359 | Juan Fang | 38.3.16.1.7 | 196.10 | ELR PPDU is for SU only, suggest to change "SYM,Init,u" and "DBPS, u" to " SYM,init" and "DBPS" as that in the PDT document | see comment | RevisedInstruction to editor:no change is needed, it is resolved in CID 32 |
| 1360 | Juan Fang | 38.3.16.1.7 | 196.21 | change "Table 38-15" to "Table 36-18" or add this paramater in Table 38-15 | see comment | RevisedAgree with the comment, but the table is updated to be 38-16 in D0.2Instruction to editor:Change "Table 38-16" to "Table 36-18"P206L21 |
| 1361 | Juan Fang | 38.3.16.1.7 | 196.24 | change "Table 38-15" to "Table 36-18" or add this paramater in Table 38-15 | see comment | RevisedAgree with the comment, but the table is updated to be 38-16 in D0.2Instruction to editor:Change "Table 38-16" to "Table 36-18"P206L24 |
| 1362 | Juan Fang | 38.3.16.1.7 | 196.28 | change "Table 38-15" to Table"38-17" and add this paramater in Table 38-17( Frequently used parameters) | see comment | RevisedAgree with the cmment but the table number is updated in D0.2 Instruction to editor: Change "Table 38-16 (Timing-related constants)" to "Table 38-18 (Frequently used parameters)" P206L28 of D0.2 and add the parameter (: number of data bits per OFDM symbol ) in Table 38-18 ( Frequently used parameters)  |
| 1363 | Juan Fang | 38.3.16.1.7 | 197.07 | ELR is for SU only, suggest to delete "for all user" | see comment | Revised Instruction to editor: Remove “s for all users” at P207L7 of D0.2 |
| 1364 | Juan Fang | 38.3.16.1.7 | 197.14 | change "bitsis" to " bits is" | see comment | Accepted Instruction to editor:no change is needed, it is resolved in CID 33 |
| 1365 | Juan Fang | 38.3.16.1.7 | 197.20 | LDPC case is missed in this part, change "toward the end of last OFDM symbol represented by encoded by BCC. " to "toward the end of initial last OFDM symbol represented by N\_(SYM,init) encoded by LDPC, and toward the end of last OFDM symbol represented by N\_SYM encoded by BCC" | see comment | Accepted Instruction to editor: Apply the change according to the comment and marked as [#1365] in 11-25/0546r3 and located on P207L21 in D0.2 |
| 1356 | Juan Fang | 38.3.15.12 | 192.40 | change the number of bits for ELR version Identifier from "3" to "1" | see comment | AcceptedInstruction to editor: No change is needed. It’s been resolved in CID #117 |
| 1357 | Juan Fang | 38.3.15.12 | 193.17 | since N tone\_ELR-SIG is not shown in Equation 38-37, this setence can be deleted | see comment |  |
| 1358 | Juan Fang | 38.3.15.12 | 193.38 | change " byEquation" to "by Equation" | see comment | Accpeted  |
| 2702 | Genadiy Tsodik | 38.3.15.12 | 192.28 | Should be ELR-SIG-2 instead of U-SIG-2 | Replace U-SIG-2 by ELR-SIG-2 | AcceptedIInstruction to editor:no change is needed, it is resolved in CID 347 |

**Note to editor:**

Please apply the following changes in the 38.3.15.12.2.

* Replace "3" (the value of "Number of bits" for "ELR Version Identifier" field in Table 38-36) with "1"
* Replace "U-SIG-2" with "ELR-SIG-2" in Table 38-36
* Replace "BPSK with coding rate 1/2" with UHR MCS 0 and "QPSK with coding rate 1/2" with UHR MCS 1
* Change the font size of " LDPC Extra OFDM Symbol"
* Replace "Set to all 1s " with "Set to all 1s and treat as Disregard"
* Replace "1" (the value of "Number of bits" for "Disregard" field) with "3"
* Content

The ELR-SIG field for a UHR ELR PPDU contains the fields listed in Table 38-36 (ELR-SIG field of a UHR ELR PPDU).

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| --- |
| Table 38-36—ELR-SIG field of a UHR ELR PPDU (continued) |
| Two parts of ELR-SIG | Bit | Field | Number of bits | Description |
| ELR-SIG-1 | B0 | ELR Version Identifier | 1[#117, #180, #950,#1356, #1761, #2072,#2314,#2781,#3558] | Differentiate between different ELR versions. Set to 0 for UHR ELR PPDU.Value 1 is Validate. |
|  | B1 | UL/DL | 1 | Indicates whether the UHR ELR PPDU is sent in UL or DL. Set to the TXVECTOR parameter UPLINK\_FLAG.A value of 1 indicates the UHR ELR PPDU is addressed to an AP. A value of 0 indicates the UHR ELR PPDU is addressed to a non-AP STA.  |
|  | B2 | MCS | 1 | Indicates the MCS used for modulating the ELR-Data field:Set to 0 for UHR MCS 0 [#345]Set to 1 for UHR MCS 1 [#346]  |
|  | B3 | Coding | 1 | Indicates whether BCC or LDPC is used:Set to 0 for BCC.Set to 1 for LDPC with nominal codeword length of 648,1296 or 1944 |
|  | B4–B12 | Length | 9 | Indicates the number of ELR-Data symbols. Set to a value that is the number of ELR-Data symbols minus 1. |
|  | B13 | LDPC Extra OFDM Symbol[#1180] | 1 | Indicates the presence of the LDPC extra symbol: Set to 1 if an LDPC extra symbol is present.Set to 0 if an LDPC extra symbol is not present |
|  | B14–B17 | CRC | 4 | CRC for bits 0–13 of the ELR-SIG-1 field. The CRC computation uses the same polynomial as that in 27.3.11.7.3 (CRC computation). |
|  | B18–B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder. Set to 0. |
| ELR-SIG-2[#347,#766,#1181,#2073,#2702,#2782] | B0–B10 | STA-ID | 11 | Set to a value of the TXVECTOR parameter STA-ID (see 35.11.1.1 (STA\_ID)). |
|  | B11-B13 | Disregard | 3[#2074, #2315, #2785] | Set to all 1s and treat as Disregard. [#1182] |
|  | B14–B17 | CRC | 4 | CRC for bits 0–13 of the ELR-SIG-2 field. The CRC computation uses the same polynomial as that in 27.3.11.7.3 (CRC computation). |
|  | B18–B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder. Set to 0. |

**Note to editor:**

Please apply the following changes in 38.3.15.12.3.

* Replace “” with “” on P203L14 and equation (38-37) in D0.2 [#2318]
* Delete “with T\_GI, ELR-SIG = T\_GI2, Data” at the end of the sentence On P203L32 D0.2 [#3545].
* Rephrase "is the transmitted constellation in the *r*-th 52-tone RU at subcarrier *k* and ELR-SIG field OFDM symbol *n*" to "is the transmitted constellation at subcarrier *k* in the *r*-th 52-tone RU of the *n*-th OFDM symbol" on P203L36 D0.2 [#2320]
* Change " byEquation" to "by Equation" on P203L38 D0.2 [#1358]
* Encoding and modulation

For a UHR ELR PPDU, the ELR-SIG field is composed of two parts, the ELR-SIG-1 and ELR-SIG-2 subfields, each containing 24 uncoded data bits as described in Table38.3.15.12.2 (Content). The ELR-SIG-1 field is transmitted before the ELR-SIG-2 field. The data bits of the ELR-SIG OFDM symbols shall be BCC encoded separately for each of the OFDM symbols at rate R=1/2, interleaved, mapped to a BPSK constellation, and have pilots inserted following steps described in 38.3.10.11 (Construction of ELR-SIG).

ELR-SIG is transmitted using the same tone plan, same frequency domain duplication, and tone rotation as the Data field in UHR ELR PPDU, as shown in 38.3.16.7 (Frequency domain duplication).

The time domain waveform for the ELR-SIG field of a UHR ELR PPDU, transmitted on transmit chain , , shall be as specified in Equation (38-37).

*

where

 [#2318] is defined in Table 38-16 (Timing-related constants)

 is defined in Table38-16 (Subcarrier allocation related constants for the UHR ELR PPDU)

 is the data and pilot subcarrier index sets for the *r*-th 52-tone RU and is defined in Table 27-8 (Data and pilot subcarrier indices for RUs in a 20 MHz HE PPDU and in a non-OFDMA 20 MHz HE PPDU(11ax)) based on the PPDU BW, which is 20 MHz.

 is defined in 17.3.5.10 (OFDM modulation)

 is the pilot mapping for subcarrier *k* for symbol *n* as defined in Equation (27-102).

 is the guard interval duration as defined in Table 38-16 (Timing-related constants)[#3545].

 is the transmitted constellation at subcarrier *k* in the *r*-th 52-tone RU of the *n*-th OFDM symbol[#2320] and is defined by Equation[#1358] (38-38)

*

where  is defined in Table 27-40 (Pilot indices for 52-tone RU transmission) based on the PPDU BW, which is 20 MHz.







where 

 is defined in Equation (38-39)



*

where

* 

NOTE—  translates a subcarrier index () into the index of data symbols in a transmission over r-th 52-tone RU, (). The subcarrier index *k* for the data subcarrier is first offset by the minimum value of subcarrier index (for the lower edge subcarrier) in this RU and number of the unoccupied tones, and then subtracted by the number of pilot subcarriers falling in between the data subcarrier and the edge subcarrier.

**Note to editor:**

Please apply the following changes in 38.3.16.1.7

* Remove the subscript "u" in the following sentence P206L10 of D0.2 and eq (38-41), eq (38-48) and eq(38-49) marked as yellow [#32, #1359]
* Change “38-16” to “35-18” P206L21 P206L24 of D0.2 [#1360, #1361]
* Change "Table 38-16 (Timing-related constants)" to "Table 38-18 (Frequently used parameters)" and add the parameter (: number of data bits per OFDM symbol) in Table 38-18 ( Frequently used parameters) P206L28 of D0.2 [#1362]
* Remove “s for all users” at P207L7 of D0.2 [#1363]
* Replace “bitsis” with “bits is” P207L14 of D0.2 [#33, #1364].
* Replace "toward the end of last OFDM symbol represented by encoded by BCC. " with "toward the end of initial last OFDM symbol represented by N\_(SYM,init) encoded by LDPC, and toward the end of last OFDM symbol represented by N\_SYM encoded by BCC"P207L21 of D0.2 [#1365]
* Encoding process for a UHR ELR PPDU

In a UHR ELR PPDU transmission, the transmitter first computes the initial number of OFDM symbols, , using Equation (38-41).

*

where

 is the number oftails bits per encoder as defined in Table 36-18[#1360] (Timing-related constants).

 is the number oftails bits in the SERVICE field as defined in Table 36-18[#1361] (Timing-related constants).

 is the number ofdata bits per OFDM symbol as defined in Table 38-18 (Frequently used parameters)[#1362].

When LDPC encoding is used, the parameters  and  are computed using Equation(38-42) and Equation(38-43), respectively.

 

*



*

When LDPC encoding is used, continue LDPC encoding process as in 19.3.11.7.5 (LDPC PPDU encoding process) starting with the parameters  and . If the following condition in step d) of LDPC encoding process as described in 19.3.11.7.5 (LDPC PPDU encoding process) is met:



where , , , and  are the LDPC encoding parameters as defined in 19.3.11.7.5 (LDPC PPDU encoding process), and  is the coding rate, then the LDPC Extra Symbol Segment field of ELR-SIG-1 shall be set to 1,  shall be increased according to Equation(38-44), and shall be recomputed as Equation (19-40).



*

Then update the  values using Equation (38-45).

 

*

If the condition mentioned above in step d) of LDPC encoding process as described in 19.3.11.7.5 (LDPC PPDU encoding process) is not met when LDPC encoding is used, or the UHR ELR PPDU is BCC encoded, then the LDPC Extra Symbol Segment field of ELR-SIG-1 shall be set to 0, and  value[#1363] shall be updated by Equation(38-46).



*

The number of pre-FEC padding bits is[#33, #1364] computed as in Equation (38-47).



*

Among the pre-FEC padding bits, the MAC delivers a PSDU that fills the available octets in the Data field of the UHR ELR PPDU, toward the end of initial last OFDM symbol represented by encoded by LDPC, and toward the end of last OFDM symbol represented by encoded by BCC[#1365]. The PHY then determines the number of padding bits to add and appends them to the PSDU. The number of pre-FEC padding bits added by PHY will always be 0 to 7. The procedure is defined in Equation (38-48) and Equation (38-49).

*
*