IEEE P802.11
Wireless LANs

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| LB279 Comment Resolution EHT MAC/PHY Part 5 |
| Date: 2024-01-08 |
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Abstract

This submission proposes to address the following CIDs 1323, 1329, 1332, 1333, 1337, 1395, 1396, and 1340, changes are relative to Draft P802.11be\_D4.0, Draft P802.11REVme\_D4.2, and Draft P802.11bk D1.0.

Revisions:

1. Incorporate comments during presentation

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbk Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbk Editor: Editing instructions preceded by “TGbk Editor” are instructions to the TGbk editor to modify existing material in the TGaz draft. As a result of adopting the changes, the TGbk editor will execute the instructions rather than copy them to the TGbk Draft.***

**The text preceded by “Discussion” is not part of the adopted changes.**

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| **1323** | 86 | 36.3.4.1 | "NTx" is not defined. Ditto page 89 | Define this variable | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1329** | 87.16 | 36.3.4.1 | "The construction of the EHT-LTFs in an EHT Ranging NDP is done by repeating the steps in 17 Subclause 36.3.12.10 (EHT-LTF) LTF\_REP times, i.e., a value of LTF\_REP equal to 1 indicates 18 a single EHT-LTF Repetition Block, and a value of LTF\_REP greater than 1 indicates the use of 19 repetitions, i.e., multiple EHT-LTF Repetition Blocks are included in an EHT-LTF User Block." -- this is saying the same thing about 5 times | Change to "The construction of the EHT-LTFs in an EHT Ranging NDP is done by repeating the steps in Subclause 36.3.12.10 (EHT-LTF) LTF\_REP times, i.e., the value of LTF\_REP is the number of EHT-LTF Repetition Blocks in the EHT-LTF User Block." | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1330** | 87.19 | 36.3.4.1 | " If the TXVECTOR parameter SECURE\_LTF\_FLAG is equal to 0, the TXVECTOR parameter NUM\_USERS is not present which is then assumed to be 1, and all the EHT-LTF symbols belong to a single EHT-LTF User Block. " seems to be an important normative statement hiding as an aside | Change to "If the TXVECTOR parameter NUM\_USERS is not present (e.g. if the TXVECTOR parameter SECURE\_LTF\_FLAG is equal to 0), this is treated as if it were 1. " | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1332** | 87.25 | 36.3.4.1 | "Figure 36.4.D " -- no such figure | As it says in the comment | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1333** | 88.04 | 36.3.4.1 | "For secure EHT-LTF transmissions, the number of EHT-LTF repetitions given in LTF\_REP shall be greater than 1, and there are a minimum of two EHT-LTF Repetition Blocks in each EHT-LTF User Block" is saying the same thing twice | Delete everything from the second comma onwards | **Accept**TGbk editor, see the changes identified in document for illustrative purposes.<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1337** | 88.22 | 36.3.4.1 | "the number of Tx antennas should match the first EHT-LTF User Block" -- I don't understand how a number of antennas can match a block | Clarify | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |
| **1395** | 84.04 | 36.3.4.1 | It is better to place the specification of two new NDPs next to the clause of EHT Sounding NDP, which is also consistent with clause 27. | Move this clause right after clause 36.3.18 (EHT sounding NDP) | **Accept**TGbk editor, changes were already made as part of resolution to CID 1085, see DCN11/24-0225.No further action required. |
| **1396** | 88.31 | 36.3.4.2 | It is better to place the specification of two new NDPs next to the clause of EHT Sounding NDP, which is also consistent with clause 27. | Move this clause right after clause 36.3.18 (EHT sounding NDP) | **Accept**TGbk editor, changes were already made as part of resolution to CID 1085, see DCN11/24-0225.No further action required. |
| **1340** |  | 36.3.4.2 | Same comments as for 36.3.4.1 | As it says in the comment | **Revised**TGbk editor, make the changes identified in document<https://mentor.ieee.org/802.11/dcn/24/11-24-0225-01-00bk-lb279-comment-resolution-eht-mac-phy-part-5.docx> |

1. ***Discussion:***
2. ***TGbk Editor: Change Clause 36.3.4.1 (p.86, line 7 in 11bk D1.0) as follows:***
* No beamforming steering matrix is applied to the waveform. The Beamformed field in EHT-SIG of an EHT Ranging NDP is always set to 0.
* (#1323) For transmission of EHT-STFs and EHT-LTFs, if *NSS* = *NTX*, the Q matrix shall be an Identity matrix, and if *NSS* < *NTX*, the Q matrix shall be based on an antenna selection matrix with no antenna swapping. The Q matrix becomes an Identity matrix when all 0 rows are removed.
* Has a Packet Extension (PE) field that is 8 µs in duration. No energy is transmitted during the first 1.6 µs of the PE field, if the EHT-LTF field is using the secure EHT-LTF, similar to no energy being transmitted during the GI of EHT-LTF symbols.
* For decoding the EHT-LTF fields, a PHY-RXLTFSEQUENCE.request primitive issued from the MAC provides the LTF\_REP, LTF\_NSTS, and LTF\_OFFSET parameters, which are not encoded in the EHT-SIG, but included in the preceding Ranging NDP Announcement frame. The LTF\_OFFSET parameter indicates the number of secure EHT-LTF symbols to skip for receiving the corresponding user’s EHT-LTF User Block.
* When the TXVECTOR parameter NUM\_USERS is greater than 1, the TXVECTOR parameter NUM\_STS[1] is used to set the NSS subfield and the Number of EHT-LTF Symbols subfield within the Common field of the EHT-SIG, as defined in Table 36-37 (Common field for the EHT sounding NDP and for the EHT Ranging NDP). The Number of EHT-LTF Symbols subfield is set according to Table 21-13 (Number of VHT-LTFs required for different numbers of space-time streams). Otherwise, the TXVECTOR parameter NUM\_STS is used to set the NSS subfield and the Number of EHT-LTF Symbols subfield within the Common field of the EHT-SIG, as defined in Table 36-37 (Common field for the EHT sounding NDP and for the EHT Ranging NDP). The Number of EHT-LTF Symbols subfield is set according to Table 21-13 (Number of VHT-LTFs required for different numbers of space-time streams).
1. ***TGbk Editor: Change Clause 36.3.4.1 (p.87, line 16 in 11bk D1.0) as follows:***

(#1329) The construction of the EHT-LTFs in an EHT Ranging NDP is done by repeating the steps in Subclause 36.3.12.10 (EHT-LTF) LTF\_REP times, i.e., the value of LTF\_REP is the number of EHT-LTF Repetition Blocks in the EHT-LTF User Block. (#1330) If the TXVECTOR parameter SECURE\_LTF\_FLAG is equal to 0, the TXVECTOR parameter NUM\_USERS is equal to 1, and all the EHT-LTF symbols belong to a single EHT-LTF User Block.

When the TXVECTOR parameter SECURE\_LTF\_FLAG is equal to 1, secure EHT-LTFs as defined in 36.3.12.10a (EHT-LTF field using secure EHT-LTF), are used and the Packet Extension field will be partially replaced by a zero power GI in its first 1.6 µs, (#1332) see Figure 36-18d (EHT Ranging NDP format with secure EHT-LTFs). For the secure EHT-LTF symbol or Packet Extension field with zero power GI, the time domain signal has zero power during the period of the GI. The TXVECTOR parameters LTF\_KEY, NUM\_STS and LTF\_REP will be in array form with NUM\_USERS entries. The repetitions of the EHT-LTF symbols are repetitions of the EHT-LTF Repetition Block. The randomized EHT-LTF sequences are different in each of the EHT-LTF Repetition Blocks. The total number of EHT-LTF symbols in an EHT-LTF User Block is the product of the number of symbols in an EHT-LTF Repetition Block, $N\_{EHT-LTF}$, and the number of EHT-LTF repetitions given in LTF\_REP.

(#1333) For secure EHT-LTF transmissions, the number of EHT-LTF repetitions given in LTF\_REP shall be greater than 1.

1. ***TGbk Editor: Change Clause 36.3.4.1 (p.88, line 20 in 11bk D1.0) as follows:***

(#1337) In each EHT-LTF User Block within the EHT-LTF field, the number of transmit antennas shall be equal to the number indicated in NUM\_STS for the corresponding EHT-LTF User Block and may vary from one EHT-LTF User Block to another. Within the EHT-STF field, the number of transmit antennas should match the number of transmit antennas in the first EHT-LTF User Block. In the pre-EHT modulated fields, the number of transmit antennas shall be no less than the minimum number of transmit antennas in any of the EHT modulated fields. The sum of the Tx power across all transmit antennas shall remain constant throughout the entire EHT Ranging NDP.

1. ***TGbk Editor: Change Clause 36.3.4.2 (p.89, line 20 in 11bk D1.0) as follows:***
* The EHT-LTF field of an EHT TB Ranging NDP consists of a single EHT-LTF User Block. The EHT-LTF User Block contains one or more EHT-LTF Repetition Blocks, and the number of EHT-LTF Repetition Blocks is equal to LTF\_REP. Each EHT-LTF Repetition Block in the EHT-LTF User Block comprises of one or more EHT-LTF symbols, *NEHT-LTF* specified in the Common Info field within the Sounding Ranging Trigger frame.
* No energy is transmitted during the GI of the EHT-LTF symbols when secure EHT-LTF are used, which is referred to as a zero-power GI.
* Has a Packet Extension (PE) field that is 8 µs in duration. No energy is transmitted during the first 1.6 µs of the PE field if the EHT-LTF field is using the secure EHT-LTF, similar to no energy being transmitted during the GI of EHT-LTF symbols.
* No beamforming steering matrix is applied to the waveform.
* (#1340) For transmission of EHT-LTFs, if *NSS* = *NTX* , the Q matrix shall be an Identity matrix, and if *NSS* < *NTX*, the Q matrix shall be an antenna selection matrix with no antenna swapping. The Q matrix becomes an Identity matrix when all 0 rows are removed.

(#1340) The number of EHT-LTF symbols in an EHT TB Ranging NDP is the product of the number of EHT-LTF symbols in an EHT-LTF Repetition Block, *NEHT-LTF*and the number of EHT-LTF repetitions, given in LTF\_REP. A value of LTF\_REP equal to 1 indicates no repetition, i.e., a single EHT-LTF Repetition Block is included in the EHT-LTF User Block, and a value of LTF\_REP greater than 1 indicates the use of repetitions, i.e., multiple ETH-LTF Repetition Blocks are included in the EHT-LTF User Block. The sum of Tx power shall remain constant throughout the entire EHT TB Ranging NDP.