IEEE P802.11
Wireless LANs

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| Completion of EHT-LTF field using secure EHT-LTF  |
| Date: 2023-11-13 |
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Abstract

This submission proposes amendment text to complete the subclause 36.3.12.10a EHT-LTF field using secure EHT-LTF, changes are relative to Draft P802.11bk\_D0.8, Draft P802.11be\_D4.0 and IEEE802.11az-2022

Revisions:

1. Included feedback and corrections 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.**

**Discussion:**

Add subclause describing secure EHT-LTF to EHT PHY similar to additions to HE PY in IEEE802.11az-2022.

1. 36.3.12.10a EHT-LTF field using secure EHT-LTF
2. ***TGbk Editor: Insert the following subclause:***
3. 36.3.12.10a.1 Introduction

The EHT-LTF field using secure EHT-LTF is similar to the EHT-LTF field, see 36.3.12.10 (EHT-LTF), with the following differences:

* The EHT-LTF sequence is replaced by the randomized LTF sequence described in 36.3.12.10a.12 (Generation of a randomized secure EHT-LTF sequence for the 320 MHz secure NDP).
* The conventional GI is replaced by a zero power GI.
* There are no single stream pilot subcarriers in the secure EHT-LTFs, all subcarriers are mapped using the matrix.
* No CSD is applied to the space-time streams.
* Each spatial stream has a per stream pseudorandom and deterministic phase rotation applied to all the subcarriers.
* A frequency domain flat top window is applied to the secure EHT-LTF when configured.
* Only 2x EHT-LTF and 1.6 µs GI is supported.
* No beamforming is applied; Q is a square identity matrix.
1. ***TGbk Editor: Change the following subclause by renaming to 36.3.12.10a.2:***
2. 36.3.12.10a.2 Generation of a randomized secure EHT-LTF sequence for the 320 MHz secure NDP
3. The secure EHT-LTF sequence is constructed using pseudorandom 64-QAM modulation. Pseudorandom octets defined in [11.21.6.4.5.4](#H11o21o6o4o5o4) (Overview of secure LTF octet stream generation) are used in the construction of the pseudorandom 64-QAM values.
4. The first seven pseudorandom octets (-) in the secure NDP are used for per stream phase rotations see [27.3.18b.3](#H27o3o18bo3) (Pseudorandom and deterministic per spatial stream phase rotations). Starting with these pseudorandom octets are used for construction of pseudorandom 64-QAM values in the secure EHT-LTF sequences.

***TGbk Editor: Change the following subclause by merging it to 36.3.12.10a.2:***

This subclause describes the mapping of pseudorandom octets to the nonzero entries of the 320 MHz secure 2x EHT-LTF sequence, and then the construction of the 64-QAM values for each nonzero entry of the secure EHT-LTF sequence.

The construction of the 320 MHz secure EHT-LTF sequence uses a segment parser to divide the pseudorandom octets between the four sequences for each of the 80 MHz subblocks. The subblocks are enumerated first to last starting at the lowest frequencies to the highest. Figure 36-G (Segment parser distributing pseudorandom octets to the sequences for each of the four 80 MHz subblocks in the 320 MHz secure EHT-LTF) illustrates the segment parser distribution of pseudorandom octets between the sequences for each of the 80 MHz subblocks.



1. Figure 36-G—Segment parser distributing pseudorandom octets to the sequences for each of the four 80 MHz subblocks in the 320 MHz secure EHT-LTF.

The indices of the nonzero entries of each 80 MHz subblock’s secure 2x EHT-LTF sequence are given by the nonzero entries of the 2x EHT-LTF sequence in Equation (36-39).

There are up to sixty four secure EHT-LTF sequences in an NDP. For notational convenience we indicate the LTF sequence number with the integer , which is an integer between one and sixty four. Since each secure EHT-LTF sequence is used to generate each of the EHT-LTF symbols, also indicates the EHT-LTF symbol number. Table 36-A (Pseudorandom octet index for each nonzero subcarrier index in the -th quadruplet of 80 MHz subblocks) provides the pseudorandom octet index for each nonzero subcarrier index for the -th quadruplet of 80 MHz subblocks.

1. Table 36-A—Pseudorandom octet index for each nonzero subcarrier index in the n-th quadruplet of 80 MHz segments

|  |  |  |
| --- | --- | --- |
| **80 MHz subblocks** | **Secure EHT-LTF tone index** | **Pseudorandom octet index** |
| First | -500 |  |
| Second | -500 |  |
| Third | -500 |  |
| Fourth | -500 |  |
| First | -498 |  |
| Second | -498 |  |
|  |  |  |
| First | -4 |  |
| Second | -4 |  |
| Third | -4 |  |
| Fourth | -4 |  |
| First | 4 |  |
| Second | 4 |  |
| Third | 4 |  |
| Fourth | 4 |  |
|  |  |  |
| Third | 498 |  |
| Fourth | 498 |  |
| First | 500 |  |
| Second | 500 |  |
| Third | 500 |  |
| Fourth | 500 |  |

All entries in the 320 MHz secure EHT-LTF sequence corresponding to indices of values set to 0 in Equation (36-39) shall be set to 0.

The six least significant bits () of an octet are used in the construction of the 64-QAM value, as specified in Table 17-15 (64-QAM Encoding Table).

1. ***TGbk Editor: Insert the following subclause:***
2. 36.3.12.10a.3 Frequency domain windowing in EHT-LTF field using secure EHT-LTF

The frequency domain windowing function is applied to the subcarriers modulated with the secure EHT-LTF sequence , it follows the definition in subclause 27.3.18b.4 (Frequency domain windowing in HE-LTF field using secure HE-LTF), with the addition of

for the bandwidth of 320 MHz.

1. ***TGbk Editor: Insert the following subclause:***
2. 36.3.12.10a.4 Construction of secure EHT-LTF symbols

The construction of the n-th secure EHT-LTF symbol is achieved as follows:

1. Sequence generation: Construct the n-th randomized EHT-LTF sequence in the frequency domain over the bandwidth indicated by CH\_BANDWIDTH as described in 36.3.12.10a.2 (Generation of a randomized secure EHT-LTF sequence for the 320 MHz secure NDP).
2. Apply frequency domain window function to all the tones of the secure EHT-LTF sequence. The frequency domain window can be the Rectangular window or flat top window, when the TXVECTOR parameter TX\_WINDOW\_FLAG is set to 0 or 1 respectively.
3. Apply the matrix to all tones of the secure EHT-LTF sequence.
4. Apply per spatial stream phase rotation: Generate the pseudorandom phase rotation for each spatial stream. Apply the pseudorandom phase rotation along with the deterministic phase rotation to the spatial streams as described in [27.3.18b.3](#H27o3o18bo3) (Pseudorandom and deterministic per spatial stream phase rotations).
5. Appy a zero CSD on each space-time stream, which is equivalent to no CSD per space-time stream.
6. There is no spatial mapping, the Q matrix is a block identity matrix.
7. IDFT: Compute the inverse discrete Fourier transform.
8. Insert zero power GI: Prepend values of zero of length indicated by the TXVECTOR parameter GI\_TYPE.
9. Analog and RF: Upconvert the resulting complex baseband waveform associated with each transmit chain to an RF signal according to the center frequency of the desired channel and transmit.