IEEE P802.11
Wireless LANs

|  |
| --- |
| PDT-EHT-Preamble-L-STF,L-LTF,L-SIG, and RL-SIG |
| Date: 2020-09-02 |
| Author(s): |
| Name | Company | Address | Phone | email |
| Dongguk Lim | LGE |  |  | Dongguk.lim@lge.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This document contains proposed draft text for EHT-preamble-L-STF, L-LTF, L-SIG, and RL-SIG.

R0: initial version

R1: Text modification to reflect comments

* Replace the with
* Insert the in each equation
* Insert the equeation for calculation of Length field

### EHT preamble

#### Introduction

The EHT preamble consists of pre-EHT modulated fields and EHT modulated fields. The pre-EHT modulated fields for the two EHT PPDU formats are the following:

* L-STF, L-LTF, L-SIG, RL-SIG, and U-SIG fields of an EHT TB PPDU
* L-STF, L-LTF, L-SIG, RL-SIG, U-SIG and EHT-SIG fields of an EHT MU PPDU

The EHT modulated fields in the preamble for all EHT PPDU formats are the EHT-STF and EHT-LTF fields.

#### Cyclic shift

##### Cyclic shift for pre-EHT modulated fields

##### Cyclic shift for EHT modulated fields

#### L-STF

The time domain representation of the L-STF field, transmitted on frequency segment *iSeg* and transmit chain *iTX*, shall be as specified in Equation (34-x1). The equation applies to all contiguous signals up to 320 MHz and non contiguous 160+160 MHz.

(34-x1)

Where

 is a power scaling factor with the value

 is a PPDU format dependent scaling factor for the L-STF field on subcarrier index *k* with the following value

 represents the cyclic shift for transmit chain *iTX* with a value given in 34.3.11.2.1 (Cyclic shift for pre-EHT modulated fields).

 has the value given in Table 34-3.9.3 (Number of modulated subcarriers and guard interval duration values for EHT PPDU fields).

 is a set of 20 MHz channels where pre-EHT modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to *N*20MHz – 1 for an EHT TB PPDU or EHT MU PPDU with preamble puncturing, and it contains all values in the range 0 to *N*20MHz – 1 for other EHT PPDU formats.

*Sk,20* is defined as *S-26,26* in Equation (19-8).

*iBW* is the index of 20 MHz channels, 0 ≤ *iBW* ≤ *N*20MHz – 1.

#### L-LTF

The time domain representation of the L-LTF field, transmitted on frequency segment *iSeg* and transmit chain *iTX*, shall be as specified in Equation (34-x2). The equation applies to all contiguous signals up to 320 MHz and non contiguous 160+160 MHz.

(34-x2)

 is a PPDU format dependent scaling factor for the L-LTF field on subcarrier index *k* with the same value as

 is a power scaling factor with the value

 is given in Tablexx-xx (Timing-related constants)

 represents the cyclic shift for transmit chain *iTX* with a value given in 34.3.11.2.1 (Cyclic shift for pre-HE modulated fields).

 has the value given in Table 34-3.9.3 (Number of modulated subcarriers and guard interval duration values for EHT PPDU fields).

*Lk,20* is defined as *L-26,26* in Equation (17-8).

#### L-SIG

The L-SIG field is used to communicate rate and length information. The structure of the L-SIG field is defined in Figure 17-5 (SIGNAL field bit assignment).

In an EHT PPDU, the RATE field shall be set to the value representing 6 Mb/s in the 20 MHz channel spacing column of Table 17-6 (Contents of the SIGNAL field). In a non-HT duplicate PPDU, the RATE field is defined in 17.3.4.2 (RATE field) using the L\_DATARATE parameter in the TXVECTOR.

The LENGTH field is set to a value satisfying the condition that the remainder is zero when LENGTH is divided by 3. And this remainder is used to differentiate an EHT-PPDU from a HE-PPDU.

For an EHT TB PPDU, the LENGTH field is set to the TXVECTOR parameter L\_LENGTH. For an EHT MU PPDU, the LENGTH field is set to the value given by the Equation (34-x3).

 (34-x3)

Where

TXTIME (in µs) is defined in 34.x.x (TXTIME and PSDU\_LENGTH calculation).

*SignalExtension* is TBD

In a non-HT duplicate PPDU, the LENGTH field is defined in 17.3.4.3 (LENGTH field) using the L\_LENGTH parameter in the TXVECTOR.

The Reserved (R) field shall be set to 0.

The Parity (P) field has the even parity of bits 0-16.

The SIGNAL TAIL field shall be set to 0.

The L-SIG field shall be encoded, interleaved, and mapped following the steps described in 17.3.5.6 (Convolutional encoder), 17.3.5.7 (Data interleaving), and 17.3.5.8 (Subcarrier modulation mapping). The stream of 48 complex numbers generated by these steps is denoted by and are mapped to subcarriers [–26, 26]. In addition, values [–1, –1, –1, 1] are mapped to the extra subcarriers [–28, –27, 27, 28] of the L-SIG field of a 20 MHz EHT PPDU. Subcarriers [–28, –27, 27, 28] are also BPSK modulated. Pilots shall be inserted as described in 17.3.5.9 (Pilot subcarriers).

The time domain waveform of the L-SIG field, transmitted on frequency segment *iSeg* and transmit chain *iTX*, shall be as given by Equation (34-x4).

(34-x4)

Where

 is a PPDU dependent scaling factor for the L-SIG field on the subcarrier *k* defined as follows:

T*GI*,Pre-EHT is given in Table xx-xx (Timing-related constants)

 is defined in 17.3.5.10 (OFDM modulation)

 is the first pilot value in the sequence defined in 17.3.5.10 (OFDM modulation)

 is defined in Table 34-xx (Number of modulated subcarriers and guard interval duration values for EHT PPDU fields)

 represents the cyclic shift for transmit chain *iTX* with a value given in 34.3.11.2.1(Cyclic shift for pre-EHT modulated fields).

NOTE— is a “reverse” function of the function *M*(*k*) defined in 17.3.5.10 (OFDM modulation).

#### RL-SIG

The RL-SIG field is a repeat of the L-SIG field and is used to differentiate an EHT PPDU from a non-HT PPDU, HT PPDU, and VHT PPDU.

The time domain waveform of the RL-SIG field, transmitted on frequency segment *iSeg* and transmit chain *iTX*, shall be as given by Equation (34-x5).

(34-x5)

where

*p*1 is the second pilot value in the sequence defined in 17.3.5.10 (OFDM modulation)