IEEE P802.11
Wireless LANs

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| PDT-PHY-Legacy Preamble |
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Abstract

This document contains proposed draft text for UHR legacy preamble.

R0: initial

R1: fix typo

R2: add the email of a TTT member

R3: modification of L-SIG field

### UHR preamble

#### L-STF

The time domain representation of the L-STF field, transmitted on transmit chain *iTX* shall be as specified in [Equation (38-x1)](#_bookmark92). The equation applies to all signals up to 320 MHz bandwidth PPDU with or without preamble puncturing.

 (38-x1)

Where

 is a power scaling factor with the value

 is defined in Equation (38-9) and Equation (38-10) for a UHR ELR PPDU and a UHR TB PPDU, respectively. Otherwise, =1.

 represents the cyclic shift for transmit chain *iTX* with a value given in 38.3.14.2.1 (Cyclic shift for pre-UHR modulated fields).

 is the value given in Table 38-xx (Number of modulated subcarriers and guard interval duration values for UHR PPDU fields).

 is a set of 20 MHz channels where pre-UHR modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to *N*20MHz – 1 for a UHR TB PPDU or a UHR MU PPDU with preamble puncturing, and it contains all values in the range 0 to *N*20MHz – 1 for a UHR MU PPDU format without preamble puncturing. It contains one value, i.e., 0 for UHR ELR PPDU.

*Sk,20* is defined as *Sk*, where *Sk* is an element of *S-26,26* for from Equation (19-8).

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

Other variables in [Equation (38-x1)](#_bookmark92) are defined in [38.3.12 (Timing-related parameters)](#_bookmark62) and [38.3.13](#_bookmark69) [(Mathematical description of signals)](#_bookmark69)

#### L-LTF

The time domain representation of the L-LTF field, transmitted on transmit chain *iTX*, shall be as specified in Equation (38-x2). The equation applies to all signals up to 320 MHz bandwidth PPDU with or without preamble puncturing.

 (38-x2)

 is a power scaling factor with the value

 is defined in Equation (38-9) and Equation (38-10) for a UHR ELR PPDU and a UHR TB PPDU, respectively. Otherwise, =1.

 is given in Table 38-xx (Timing-related constants)

 represents the cyclic shift for transmit chain *iTX* with a value given in 38.3.14.2.1 (Cyclic shift for pre-HE modulated fields).

 has the value given in Table 38-xx (Number of modulated subcarriers and guard interval duration values for UHR PPDU fields).

*Lk,20* is defined as *Lk*, where *Lk* is an element of *L-26,26* for from Equation (17-8).

Other variables in [Equation (38-x2)](#_bookmark92) are defined in [38.3.12 (Timing-related parameters)](#_bookmark62) and [38.3.13](#_bookmark69) [(Mathematical description of signals)](#_bookmark69)

#### 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 a UHR 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 in a UHR PPDU is set to a value satisfying the condition that the remainder is zero when LENGTH is divided by 3. This remainder is used to differentiate a UHR PPDU from an HE PPDU.

For a UHR TB PPDU, the LENGTH field is set to the TXVECTOR parameter L\_LENGTH + 2. For a UHR MU PPDU and for a UHR ELR PPDU, the LENGTH field is set to the value given by [Equation (38-x3)](#_bookmark96)

NOTE—The TXVECTOR parameter L\_LENGTH field of a UHR TB PPDU has the same value as the UL Length subfield of a Trigger frame. The UL Length subfield of a Trigger frame that solicits an HE TB PPDU, an EHT TB PPDU, or a UHR TB PPDU is set following Equation (27-11) with m = 2 as defined in 37.x.x.x.x (Allowed settings of the Trigger frame fields and TRS Control subfield), then the nonzero m is reversed for an EHT TB PPDU or a UHR TB PPDU by adding 2 as above

 (38-x3)

where

TXTIME (in microseconds) is defined in 38.4.3 (TXTIME and PSDU\_LENGTH calculation).

SignalExtension is defined in Table 27-61 (HE PHY characteristics).

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 UHR PPDU. Pilots shall be inserted as described in 17.3.5.9 (Pilot subcarriers).

The time domain waveform of the L-SIG field, transmitted on transmit chain *iTX*, shall be as given by Equation (38-x4).

 (34-x3)

where

 is defined in Equation (38-9) and Equation (38-10) for a UHR ELR PPDU and a UHR TB PPDU, respectively. Otherwise, =1

T*GI*,Pre-UHR is given in Table 38-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 38-xx (Number of modulated subcarriers and guard interval duration values for UHR PPDU fields)

 represents the cyclic shift for transmit chain *iTX* with a value given in 38.3.14.2.1(Cyclic shift for pre-EHT modulated fields).

Other variables in [Equation (38-x3)](#_bookmark92) are defined in [38.3.12 (Timing-related parameters)](#_bookmark62) and [38.3.13](#_bookmark69) [(Mathematical description of signals)](#_bookmark69)

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 a UHR PPDU from a non-HT PPDU, HT PPDU, and VHT PPDU.

The time domain waveform of the RL-SIG field, transmitted on transmit chain *iTX* , shall be as given by [Equation (38-x4)](#_bookmark98).

 (34-x4)

(34-x4)

Where

 is defined in Equation (38-9) and Equation (38-10) for a UHR ELR PPDU and a UHR TB PPDU, respectively. Otherwise, =1

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

Other variables in Equation (38-19) are defined in 38.3.12 (Timing-related parameters) and 38.3.13 (Mathematical description of signals).

All the other parameters are described in the variable list of Equation (38-x1)