### IEEE P802.11Wireless LANs

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| Proposed Spec Text on the construction of the BPSK Mark |
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Abstract

This document proposes two options for the draft spec text on the construction of the BPSK-Mark field. The baseline spec draft used is 802.11ba Draft 0.3.

Revision History:

* Rev 0: Initial version of the document

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

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

Option 1: Pre-defined BPSK Mark Sequence

**TGba Editor: *Instruction*: *Modify Section 32.2.4.5 as follows:***

32.2.4.5 Construction of BPSK-Mark

Construct the BPSK-Mark defined in 32.2.8.2.1 (BPSK-Mark definition) with the following highlights:

1. Channel bandwidth: Determine CH\_BANDWIDTH from the TXVECTOR.
2. Sequence generation: Generate BPSK-Mark sequence over the CH\_BANDWIDTH as described in 32.3.8.2.1
3. Phase rotation: Apply appropriate phase rotation for each 20 MHz subchannel as described in 21.3.7.4 and 21.3.7.5.
4. IDFT: Compute the inverse discrete Fourier transform.
5. CSD: Apply CSD for each transmit chain and frequency segment as described in 21.3.8.2.1.
6. GI and windowing: Insert GI and apply windowing: Prepend a GI and apply windowing as described in 21.3.7.4.
7. 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. Refer to 21.3.7.4 and 21.3.8 for details.

**TGba Editor: *Instruction*: *Modify*** ***32.2.8.2*** ***as follows:***

**32.2.8.2 Non-WUR portion of WUR PHY preamble**

The Non-WUR portion of the WUR PHY preamble consists of four fields: L-STF, L-LTF, L-SIG and BPSK-Mark. All of these fields are 20 MHz channel width.

The L-STF field is constructed according to 21.3.4.2 (Construction of L-STF).

The L-LTF field is constructed according to 21.3.4.3 (Construction of L-LTF).

The L-SIG field is constructed according to 21.3.4.4 (Construction of L-SIG) and 21.3.8.2.4 (L-SIG definition). The value of TXTIME used in 21.3.8.2.4 (L-SIG definition) is described in 32.3.2 (TXTIME and PSDU length calculation).

The BPSK-Mark field is a single OFDM symbol with BPSK modulation. It is constructed according to 32.2.4.5 (Construction of BPSK-Mark) and 32.2.8.2.1 (BPSK-Mark Definition).

**TGba Editor: *Instruction*: *Add*** ***32.2.8.2.1*** ***as follows:***

**32.2.8.2.1 BPSK-Mark Definition**

The BPSK-Mark field for a 20 MHz transmission is defined by Equation (31-X).

 (31-X)

where is a BPSK-Mark sequence with and

 TBD.

The BPSK-Mark field for a 40 MHz transmission is defined by Equation (31-Y). Note that this equation does not include the phase rotation per 40 MHz subchannel specified in Equation (21-15).

 (31-Y)

The BPSK-Mark field for a 80 MHz transmission is defined by Equation (31-Z). Note that this equation does not include the phase rotation per 20 MHz subchannel specified in Equation (21-16)

 (31-Z)

The time domain representation of the signal on transmit chain shall be as specified in Equation (31-W).

 (31-W)

where

 is equal to given in Table 21-8

 is the number of transmit chains as described in Table 21-6

 is a windowing function, where the suggested function is described in 17.3.2.5

 represents the cyclic shift for transmitter chain with a value given in Table 21-10

 is defined by Equation (21-14), Equation (21-15), and Equation (21-16) for 20 MHz, 40 MHz, and 80 MHz, respectively

, , and are given in Table 21-5

Option 2: Encoded Mark

**TGba Editor: *Instruction*: *Modify Section 32.2.4.5 as follows:***

32.2.4.5 Construction of BPSK-Mark

Construct the BPSK-Mark defined in 32.2.8.2.1 (BPSK-Mark definition) with the following highlights:

1. In a WUR PPDU set the MARK field as described in 32.2.8.2.1
2. BCC encoder: Encode the MARK field by a convolutional encoder at the rate of R=1/2 as described in 21.3.10.5.3.
3. BCC interleaver: Interleave as described in 21.3.10.8.
4. Constellation Mapper: BPSK modulate as described in 21.3.10.9.
5. Pilot insertion: Insert pilots as described in 21.3.10.11.
6. Duplication and phase rotation: Duplicate the BPSK-Mark field over each 20 MHz of the CH\_BANDWIDTH. Apply appropriate phase rotation for each 20 MHz subchannel as described in 21.3.7.4 and 21.3.7.5.
7. IDFT: Compute the inverse discrete Fourier transform.
8. CSD: Apply CSD for each transmit chain and frequency segment as described in 21.3.8.2.1.
9. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 21.3.7.4.
10. 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. Refer to 21.3.7.4 and 21.3.8 for details.

**TGba Editor: *Instruction*: *Modify*** ***32.3.8.2*** ***as follows:***

**32.2.8.2 Non-WUR portion of WUR PHY preamble**

The Non-WUR portion of the WUR PHY preamble consists of four fields: L-STF, L-LTF, L-SIG and BPSK-Mark. All of these fields are 20 MHz channel width.

The L-STF field is constructed according to 21.3.4.2 (Construction of L-STF).

The L-LTF field is constructed according to 21.3.4.3 (Construction of L-LTF).

The L-SIG field is constructed according to 21.3.4.4 (Construction of L-SIG) and 21.3.8.2.4 (L-SIG definition). The value of TXTIME used in 21.3.8.2.4 (L-SIG definition) is described in 32.3.2 (TXTIME and PSDU length calculation).

The BPSK-Mark field is a single OFDM symbol with BPSK modulation. It is constructed according to 32.2.4.5 (Construction of BPSK-Mark) and 32.2.8.2.1 (BPSK-Mark Definition).

**TGba Editor: *Instruction*: *Add*** ***32.3.8.2.1*** ***as follows:***

**32.2.8.2.1 BPSK-Mark Definition**

The BPSK-Markis used to communicate signature information.The field of BPSK-Markfor WUR-PPDUis shown in Figure 31-X. The subfields for the BPSK-Mark field are TBD

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| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

Figure 31-X. Format of BPSK-Mark

The BPSK-Mark shall be encoded, interleaved and mapped by following the steps described in 17.3.5.6, 17.3.5.7, and 17.3.5.8 and the modulation shall be BPSK. The stream of 48 complex numbers generated by these steps is denoted by . Pilots shall be inserted as described in 17.3.5.9. The time domain waveform of the BPSK-Markin 20 MHz transmission shall be as given by Equation (31-W).

 (31-W)

where

 is defined in 21.3.7.3

 is defined in 17.3.5.10

 is the first pilot value in the sequence defined in 17.3.5.10

 is equal to given in Table 21-8

 is defined by Equation (21-14), Equation (21-15), and Equation (21-16) for 20 MHz, 40 MHz, and 80 MHz, respectively

 is the number of transmit chains as described in Table 21-6

 is a windowing function, where the suggested function is described in 17.3.2.5

 represents the cyclic shift for transmitter chain with a value given in Table 21-10

, , and are given in Table 21-5

NOTE— is a “reverse” function of the function defined in 17.3.5.10.