IEEE P802.11
Wireless LANs

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| Comment Resolutions for MISC Topics |
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Abstract

This submission proposes resolutions to the comments received on miscellaneous topics in TGbd D0.3, including CIDs: 35, 259, 264.

Revisions:

* r0: initial version
* r1: editorial changes
* r2: modify resolution reasoning for CID 35. Add more text changes for CID 264.

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 35 | 32 |  | Clause 17 specifies 5, 10 and 20 MHz channel spacing. The NGV STA text does not mention 5 MHz channel spacing. While 5 MHz support might not be a high priority for TGbd, if 5 MHz support is easy to include in the specification via a half-clocking of 10 MHz support, perhaps it should be included for NGV as well. | I suggest TGbd consider including 5 MHz support as an optional feature of an NGV STA. | Rejected.As defined in TGbd PAR, 11bd amendment shall provide interoperability, coexistence and backward compabibility with deployed OCB devices. As we are close to D1.0, prefer not to make big changes at current stage of standards development. |
| 259 | 32.3 | 33.37 | fill TBD | as in comment | Revised.Following other PHY amendement, replace <TBD> with a “Introduction” subclause.See changes in 11-20/1175r2. |
| 264 | 32.3.3 | 36.30 | fill TBD | as in comment | Revised.Following other PHY amendement, replace <TBD> with a “General” subclause.See changes in 11-20/1175r2. |

*TGbd Editor: Please make the following changes in Section 32.3 of D0.3.*

32.3 NGV PHY

32.3.1 Introduction

This subclause provides the procedure by which PSDUs are converted to and from transmissions on the wireless medium.

During transmission, a single PSDU is processed and appended to the NGV PHY preamble including L-STF, L-LTF, L-SIG, RL-SIG, NGV-SIG and RNGV-SIG fields to create the NGV PPDU. At the receivers, the PHY preamble is processed to aid in the detection, demodulation, and delivery of the PSDU.

*TGbd Editor: Please make the following changes in Section 32.3.3 of D0.3.*

32.3.3 Overview of the PPDU encoding process

32.3.3.1 General

This subclause provides an overview of the NGV PPDU encoding process.

32.3.3.2 Construction of L-STF

Construct the L-STF field as defined in 32.3.7.2.2 (L-STF definition) with the following highlights:

1. Determine the CH\_BANDWIDTH from the TXVECTOR.
2. Sequence generation: Generate the L-STF sequence over the CH\_BANDWIDTH as described in 32.3.7.2.2 (L-STF definition).
3. Phase rotation: Apply appropriate phase rotation for each 10 MHz subchannel as as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
4. IDFT: Compute the inverse discrete Fourier transform.
5. CSD: Apply CSD for each transmit chain and frequency segment as described in 32.3.7.2.1 (Cyclic shift for pre-NGV modulated fields).
6. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

32.3.3.3 Construction of the L-LTF

Construct the L-LTF field as defined in 32.3.7.2.3 (L-LTF definition) with the following highlights:

1. Determine the CH\_BANDWIDTH from the TXVECTOR.
2. Sequence generation: Generate the L-LTF sequence over the CH\_BANDWIDTH as described in 32.3.7.2.3 (L-LTF definition).
3. Phase rotation: Apply appropriate phase rotation for each 10 MHz subchannel as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
4. IDFT: Compute the inverse discrete Fourier transform.
5. CSD: Apply CSD for each transmit chain and frequency segment as described in 32.3.7.2.1 (Cyclic shift for pre-NGV modulated fields).
6. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

32.3.3.4 Construction of L-SIG and RL-SIG

Construct the L-SIG field as the SIGNAL field with the following highlights:

1. In a NGV PPDU set the RATE subfield in the SIGNAL field to 6 Mb/s. Set the Length, Parity, and Tail bits in the SIGNAL field as described in 32.3.7.2.4 (L-SIG definition).
2. BCC encoder: Encode the SIGNAL field by a convolutional encoder at the rate of R=1/2 as described in 17.3.5.6 (Convolutional encoder).
3. BCC interleaver: Interleave as described in 17.3.5.7 (Data interleaving).
4. Constellation Mapper: BPSK modulate as described in 17.3.5.8 (Subcarrier modulation mapping).
5. Pilot insertion: Insert pilots as described in 17.3.5.10 (OFDM modulation).
6. Duplication and phase rotation: Duplicate the L-SIG field over each 10 MHz of the CH\_BANDWIDTH. Apply appropriate phase rotation for each 10 MHz subchannel as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
7. IDFT: Compute the inverse discrete Fourier transform.
8. CSD: Apply CSD for each transmit chain and frequency segment as described in 32.3.7.2.1 (Cyclic shift for pre-NGV modulated fields).
9. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

Construct the RL-SIG field as the repeat SIGNAL field defined in 32.3.7.2.5 (RL-SIG definition) with the same process as L-SIG.

32.3.3.5 Construction of NGV-SIG and RNGV-SIG

The NGV-SIG field consists of one symbol as defined in 32.3.7.3.3 (NGV-SIG definition) and is constructed as follows:

1. Obtain the NGV-SIG field values from the TXVECTOR. Add the reserved bits, append the calculated CRC, then append the tail bits as shown in 32.3.7.3.3 (NGV-SIG definition). This results in 24 uncoded bits.
2. BCC encoder: Encode the data by a convolutional encoder at the rate of R=1/2 as described in 17.3.5.6 (Convolutional encoder)
3. BCC interleaver: Interleave as described in 17.3.5.7 (Data interleaving).
4. Constellation mapper: BPSK modulate the 24 interleaved bits as described in 17.3.5.8 (Subcarrier modulation mapping) to form the NGV-SIG symbol.
5. Pilot insertion: Insert pilots as described in 17.3.5.9 (Pilot subcarriers).
6. Duplication and phase rotation: Duplicate NGV-SIG over each 10 MHz of the CH\_BANDWIDTH. Apply the appropriate phase rotation for each 10 MHz subchannel as described in as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
7. IDFT: Compute the inverse discrete Fourier transform.
8. CSD: Apply CSD for each transmit chain and frequency segment as described in 32.3.7.2.1 (Cyclic shift for pre-NGV modulated fields).
9. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

Construct the RNGV-SIG field as the repeat NGV-SIG field defined in 32.3.7.3.4 (RNGV-SIG definition) with the same process as NGV-SIG.

32.3.3.6 Construction of NGV-STF

The NGV-STF field is defined in 32.3.7.3.5 (NGV-STF definition) and is constructed as follows:

1. Sequence generation: Generate the NGV-STF in the frequency domain over the bandwidth indicated by CH\_BANDWIDTH as described in 32.3.7.3.5 (NGV-STF definition).
2. Phase rotation: Apply appropriate phase rotation for each 10 MHz subchannel as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
3. CSD: Apply CSD for each spatial stream as described in 32.3.7.3.2 (Cyclic shift for NGV modulated fields).
4. Spatial mapping: Apply the Q matrix as described in 32.3.8.9.1 (Transmission in NGV format).
5. IDFT: Compute the inverse discrete Fourier transform.
6. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

32.3.3.7 Construction of NGV-LTF

The NGV-LTF field is defined in 32.3.7.3.6 (NGV-LTF definition) and constructed as follows:

1. Sequence generation: Generate the NGV-LTF sequence in the frequency domain over the bandwidth indicated by CH\_BANDWIDTH as described in 32.3.7.3.6 (NGV-LTF definition).
2. Phase rotation: Apply appropriate phase rotation for each 10 MHz subchannel as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
3. ANGV-LTF matrix mapping: Apply the PNGV-LTF matrix to the data tones of the NGV-LTF sequence and apply the RNGV-LTF matrix to the pilot tones as described in 32.3.7.3.6 (NGV-LTF definition).
4. CSD: Apply CSD for each spatial stream as described in 32.3.7.3.2 (Cyclic shift for NGV modulated fields).
5. Spatial mapping: Apply the Q matrix as described in 32.3.8.9.1 (Transmission in NGV format).
6. IDFT: Compute the inverse discrete Fourier transform.
7. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
8. 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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.

32.3.3.8 Construction of the Data field in a NGV PPDU

The construction of the Data field in a NGV PPDU proceeds as follows:

1. Construct the SERVICE field as described in 32.3.8.2 (SERVICE field) and append the PSDU to the SERVICE field..
2. PHY padding: Append the PHY pad bits to the PSDU. There are no tail bits.
3. Scrambler: Scramble the PHY padded data.
4. LDPC encoder: The scrambled bits are encoded using the LDPC code with the APEP\_LENGTH in the TXVECTOR as described in 32.3.8.4.2 (LDPC coding).
5. Stream parser: The output of the LDPC encoder is rearranged into blocks as described in 32.3.8.5 (Stream parser).
6. Constellation mapper: Map to BPSK, QPSK, 16-QAM, 64-QAM or 256-QAM constellation points as described in 32.3.8.6 (Constellation mapping).
7. Pilot insertion: Insert pilots following the steps described in 32.3.8.8 (Pilot subcarriers).
8. CSD: Apply CSD for each spatial stream as described in 32.3.7.3.2 (Cyclic shift for NGV modulated fields).
9. Spatial mapping: Apply the Q matrix as described in 21.3.10.11.1 (Transmission in VHT format).
10. Phase rotation: Apply the appropriate phase rotations for each 10 MHz subchannel as described in 32.3.6.3 (Transmitted signal) and 32.3.6.4 (Definition of tone rotation).
11. IDFT: Compute the inverse discrete Fourier transform.
12. Insert GI and apply windowing: Prepend a GI and apply windowing as described in 32.3.6.3 (Transmitted signal).
13. 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 32.3.6.3 (Transmitted signal) and 32.3.7 (NGV preamble) for details.