IEEE P802.11
Wireless LANs

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| LB188 (TGac D3.0) Comment Resolution –Clause 22.3.4 |
| Date: September 13th 2012 |
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Abstract

This document provides resolutions for CID 6320, 6340, 6581, 6582, 6583, 6584, 6585, 6586, 6587 and 6588.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed change** | **Resolution** |
| 6320 | 200.43 | 22.3.4.2 | The function of IDFT is described unclearly. It should be pointed out the objective of IDFT operation. The similar problems also exist through 22.3.4.3 to 22.3.4.10. | Explain the objective of IDFT operation. | REJECT |
| <Discussion>It seems that we don’t have to state that the objective of IDFT operation here is for the OFDM transmission, because it is one of widely known basics and the previous clause (clause 22.3.3 transmitter block diagram) already defines the block of IDFT. FYI, clause 18 (Legacy) and clause 20 (HT) describes an IDFT in the overview of the PPDU encoding process in the same way.  **TGac editor: No change** |
| 6340 | 206.30 | 22.3.4.9.1 | This sentence suggests that the number of IDFTs for 160 MHz and 80+80 MHz transmission as one and two, respectively; however, it is implementation-specific topic. For example, it is possible to use two IDFT per spatial stream to create 160MHz PPDU. Ditto P217L14. | Delete the two sentences, or add "typically" at the top of the sentence at P206L30. | REVISE |
| <Discussion>FFT size for 80+80MHz and 160MHz transmission can be clearly understood from Table 22-5 and clause 22.3.7, that is, 256 (with the number of segment = 1) and 512 (with the number of segment = 2), respectively. See clause 22.3.7 as follows:For a 160 MHz VHT PPDU transmission, the 160 MHz is divided into 512 subcarriers. The signal is transmittedon subcarriers -250 to -130, -126 to -6, 6 to 126, and 130 to 250.For a non-contiguous 80+80 MHz VHT PPDU transmission, each 80 MHz frequency segment is divided into256 subcarriers. In each frequency segment, the signal is transmitted on subcarriers -122 to -2 and 2 to 122.On more thin to consider here is about wording on “frequency segment”. Strictly speaking, wording change may be needed from “two frequency segments” into some other word to avoid not complying with original definition of the number of frequency segments for 80+80MHz (=2) and 160MHz (=1) transmission. FYI, in the clause describing segment parer, “sub-block”, “block” and “subset” are already used as quite different meanings from that of “frequency segment”.* Sub-block : in unit of *Ncbpss*/2 bits
* Sub-set : in unit of *s* bits (more minute one)

In addition, wording of “sub-block” in segment deparser in this clause has also some error in the same viewpoint.  **TGac editor: modify the 3.0 text from P206L28, as follows**Segment Parser (if needed): For a contiguous 160 MHz or non-contiguous 80+80 MHz transmission,divide the output bits of each stream parser into two frequency parts as described in22.3.10.7 (Segment parser). For a contiguous 160 MHz transmission, map each frequency part to theupper and the lower part of one IDFT. For a non-contiguous 80+80 MHz transmission, map eachfrequency part to the separate IDFT. This block is bypassed for 20 MHz, 40 MHz and 80 MHz VHTPPDU transmissions.**TGac editor: modify the 3.0 text from P206L40, as follows**Segment Deparser (if needed): For a contiguous 160 MHz transmission, merge the two frequencyparts into one frequency segment as described in 22.3.10.9.3 (Segment deparser).**TGac editor: modify the 3.0 text from P207L12, as follows**Segment Parser (if needed): For a contiguous 160 MHz or non-contiguous 80+80 MHz transmission,divide the output bits of each stream parser into two frequency parts as described in22.3.10.7 (Segment parser). For a contiguous 160 MHz transmission, map each frequency part to the upperand the lower part of one IDFT, respectively. For a non-contiguous 80+80 MHz transmission, mapeach frequency part to the separate IDFT. This block is bypassed for 20 MHz, 40 MHz and 80 MHz VHTPPDU transmissions.**TGac editor: modify the 3.0 text from P207L25, as follows**Segment Deparser (if needed): For a contiguous 160 MHz transmission, merge the two frequencyparts into one frequency segment as described in 22.3.10.9.3 (Segment deparser) |
| 6581 | 199.62 | 22.3.4.2 | There is no duplication needed after step b) in the generation of L\_STF, only phase rotation. Step b) already generates the sequence for the full bandwidth. | Remove duplication from step c) | ACCEPT |
| 6582 | 200.62 | 22.3.4.3 | There is no duplication needed after step b) in the generation of L\_LTF, only phase rotation. Step b) already generates the sequence for the full bandwidth. | Remove duplication from step c) | ACCEPT |
| <Discussion>As commenter mentioned, sequence generation of L\_STF is done over the CH\_BANDWIDTH from the TXVECTOR as described in (22-14) (for 80MHz transmission) or (22-15) (for 160MHz transmission) or etc. After that, we need to additionally apply to phase rotation pattern as defined in equations from (22-10) to (22-13). **TGac editor: modify the 3.0 text from P199L61, as follows**(b) Sequence generation: Generate the L-STF sequence over the CH\_BANDWIDTH as described in 22.3.8.1.2 (L-STF definition).c) Phase rotation: Apply appropriate phase rotation for each 20 MHz subchannel as described in 22.3.7 (Mathematicaldescription of signals).**TGac editor: modify the 3.0 text from P200L61, as follows**Sequence generation: Generate the L-LTF sequence over the CH\_BANDWIDTH as described in 22.3.8.1.3 (L-LTF definition).c) Phase rotation: Apply appropriate phase rotation for each 20 MHz subchannel as described in 22.3.7 (Mathematicaldescription of signals). |
| 6583 | 204.16 | 22.3.4.5 | It's not correct to state that 24 uncoded bits are assigned to the VHT-SIG-A1 symbol and the second 24 uncoded bits are assigned to the VHT-SIG-A2 symbol. Instead 48 coded bits get modulated on the first symbol and 48 coded bits on the second. This is not the same since the coding runs over two symbols. | Remove the sentence "Partition the VHT-SIG-A bits such that ... symbol". Replace with "This results in 48 uncoded bits". | REVISE |
| <Discussion>As commenter pointed out, mapping to the first and second symbol of VHT-SIG-A will be done after BCC coding and interleaving process.  **TGac editor: modify the 3.0 text from P204L11, as follows*** Obtain the CH\_BANDWIDTH, STBC, GROUP\_ID, PARTIAL\_AID (SU only), NUM\_STS, GI\_TYPE, FEC\_CODING, MCS (SU only), BEAMFORMED (SU only), NUM\_USERS and TXOP\_PS\_NOT\_ALLOWED(#4220) from the TXVECTOR. Add the reserved bits, append the calculated CRC, then append the  tail bits as shown in 22.3.8.2.3 (VHT-SIG-A definition). This results in 48 uncoded bits. BCC Encoder(#4569): Encode the data by a convolution coder at the rate of R=1/2 as described in 18.3.5.6 (Convolutional encoder).
* BCC Interleaver: Interleave as described in 18.3.5.7 (Data interleaving).
* Constellation Mapper: BPSK modulate the first 48 bits as described in 18.3.5.8 (Subcarrier modulation mapping) to form the first symbol of VHT-SIG-A. BPSK modulate the second 48 bits and rotate by 90° counter-clockwise relative to the first symbol to form the second symbol of VHT-SIG-A.
* Pilot insertion: Insert pilots as described in 18.3.5.10 (OFDM modulation).
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| 6584 | 205.08 | 22.3.4.7 | Steps b) and c) both mention phase rotation | Swap steps b) and c) and remove plase rotation from the step that describes pilot insertion | ACCEPT |
| <Discussion>As comment point out, phase rotation is applied for the VHT-LTF after pilot insertion, which can be verified by equation (22-38) **TGac editor: modify the 3.0 text from P206L05, as follows*** Sequence generation: Generate the VHT-LTF sequence in the frequency-domain over the bandwidth indicated by CH\_BANDWIDTH as described in 22.3.8.2.5 (VHT-LTF definition).
* Pilot insertion: Insert pilots as described in 22.3.8.2.5 (VHT-LTF definition). Phase rotation: Apply appropriate phase rotation for each 20 MHz subchannel as described in 22.3.7 (Mathematical description of signals).
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| 6585 | 205.34 | 22.3.4.8 | Remove "For a VHT PPDU" in step b). VHT-SIG-B only exists for VHT PPDUs | See comment | ACCEPT |
| <Discussion>As commented pointed out, a conditional clauses needs not. **TGac editor: modify the 3.0 text from P205L34, as follows*** Obtain the MCS (for MU only) and APEP\_LENGTH from the TXVECTOR.
* VHT-SIG-B bits: Set the MCS (for MU only) and VHT-SIG-B Length field as described in 22.3.8.2.6 (VHT-SIG-B definition). Add the reserved bits (for SU only) and  bits of tail. For an NDP set VHT-SIG-B to the fixed bit pattern for the bandwidth used as described in 22.3.8.2.6 (VHT-SIG-B definition)
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| 6586 | 205.40 | 22.3.4.8 | Replace "Repeat the VHT-SIG-B bits over the bandwidth indicated by CH\_BANDWIDTH" by "Repeat the VHT-SIG-B bits as a function of CH\_BANDWIDTH". This captures the fact that the "repetition" also involves pad bits. | See comment | ACCEPT |
| <Discussion>The number of VHT-SIG-B bits per each 20MHz is 26, 27 and 29 for 20MHz, 40MHz and 80/80+80/160MHz transmission. The number of data sub-carrier (which will be also applied to VHT-SIG-B transmission is 52, 108, 234 and 468 for 20MHz, 40MHz, 80MHz and 80+80/160MHz transmission. There comes need to add an additional padding in case of 80/80+80/160MHz transmission because 234 or 468 can be divisible by 29. **TGac editor: modify the 3.0 text from P205L39, as follows*** VHT-SIG-B Bit Repetition: Repeat the VHT-SIG-B bits as a functional of CH\_BANDWIDTH.
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| 6587 | 206.23 | 22.3.4.9.1 | Bullet e) refers to encoder parsing, which is already listed explicitly as bullet d) | Remove reference to encoder parsing from bullet e) and move to bullet d) | ACCEPT |
| <Discussion> **TGac editor: modify the 3.0 text from P206L18, as follows*** BCC Encoder(#4569): Divide the scrambled bits between the encoders by sending bits to different encoders in a round robin manner. The number of encoders is determined by rate-dependent parameters described in 22.5 (Parameters for VHT MCSs). BCC encode as described in 22.3.10.5.2 (BCC encoder parsing operation) and 22.3.10.5.3 (Binary convolutional coding and puncturing)

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| 6588 | 207.52 | 22.3.4.10.2 | Clarify sentence on MU transmission | Change sentence to:"For an MU transmission, the PPDU encoding process is performed on a per-user basis up to the input of the Spatial Mapper block. All user data is combined and mapped to the transmit chains in the Spatial Mapper." | ACCEPT |
| <Discussion>Modified to make it more clearly understandable. **TGac editor: modify the 3.0 text from P207L51, as follows**For an MU transmission, the PPDU encoding process is performed on a per-user basis up to the input of the Spatial Mapping block. All user data is combined and mapped to the transmit chanins in the Spatial Mapping block.  |