IEEE P802.11
Wireless LANs

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| TGah D0.1 PHY Comment Resolutions on Clause 24.3.4 |
| Date: 2013-09-09 |
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This document provides PHY resolutions for CIDs on Clause 24.3.4.

| **CID** | **Commenter** | **Clause Number** | **Page** | **Line** | **Comment** | **Proposed change** | **Resolution** |
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| 207 | Hongyuan Zhang | 24.3.4.1.1 | 213 | 31 | BCC and LDPC padding is slightly different from 11ac, need to provide clause reference for padding. | provide clause reference for BCC padding, i.e. 24.3.9.4.3.1, same applies for MCS10 BCC construction in page 215. Provide clause reference for LDPC padding, i.e. 24.3.9.4.4.1, for LDPC encoding construction for both regular MCS (page 214), and MCS10 (page 216). | ACCEPT.Refer to 13/1050r0. |
| <Discussion> **TGah editor: modify the D0.2 text from P234L55, as follows*** Using BCC

The construction of the Data field in an S1G SU PPDU with BCC encoding proceeds as follows:* SERVICE field: Generate the SERVICE field as described in 24.3.9.2 (SERVICE field) and append the PSDU to the SERVICE field.
* PHY padding: Append the PHY pad bits to the PSDU as described in 24.3.9.4.3.1 (Padding for BCC).

**TGah editor: modify the D0.2 text from P235L47, as follows*** *Using LDPC*

*The construction of the Data* field in an S1G SU PPDU with LDPC encoding proceeds as follows:* SERVICE field: Generate the SERVICE field as described in 24.3.9.2 (SERVICE field) and append the PSDU to the SERVICE field.
* PHY padding: Append the PHY pad bits to the PSDU as described in 24.3.9.4.4.1 (Padding for LDPC).
 |
| **TGah editor: modify the D0.2 text from P236L44, as follows*** Using BCC

The construction of the Data field in an S1G SU PPDU (1MHz MCS0 rep2 mode) with BCC encoding proceeds as follows:* SERVICE field: Generate the SERVICE field as described in 24.3.9.2 (SERVICE field) and append the PSDU to the SERVICE field.
* PHY padding: Append the PHY pad bits to the PSDU as described in 24.3.9.4.3.1 (Padding for BCC).

**TGah editor: modify the D0.2 text from P237L29, as follows*** Using LDPC

The construction of the Data field in an S1G SU PPDU (1MHz MCS0 rep2 mode) with LDPC encoding proceeds as follows:* SERVICE field: Generate the SERVICE field as described in 24.3.9.2 (SERVICE field) and append the PSDU to the SERVICE field.
* PHY padding: Append the PHY pad bits to the PSDU as described in 24.3.9.4.4.1 (Padding for LDPC).
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| 725 | Ronald Murias | 24.3.4.2 | 206 | 1 | PPDU construction descriptions do not provide a clear or consistent picture of the procedures. It is not clear to me whether the CSD is applied in the frequency domain or the time domain. For the STF in 24.3.4.2.1, CSD is applied after the IDFT. For 24.3.4.2.4, the CSD is applied before spatial mapping and the IDFT. in 24.3.4.3.1 (STF), CSD is applied before the IDFT. | Re-format the section as flow diagrams, check for consistency. | REJECT.Refer to 13/1050r0. |
| <Discussion>While CSD operation can be done either at the frequency domain or at the time domain, currently it is described that CSD block is located after IDFT for per-chain portion (omni-portion) of the PPDU and it is located before IDFT for per-STS portion (data portion) of the PPDU to comply with the description method in the 802.11n and 802.11ac and their illustrative figures. Refer to 802.11ac block diagram figures described in clause 22.3.3 (Transmitter Block Diagram) in the followings:So, it may not be a bad idea to keep the current expression as in the 802.11n and 802.11ac.  **TGah editor: No change** |
| 191 | Hongyuan Zhang | 24.3.4.2.3 | 206 | 61 | Beam Chage is now Beam change/Smoothing according to the motions passed with the presentation "11-13-0497-00-00ah-TGah-Miscellaneous-PHY-Updates". | revise SIG-A construction procedure according to the presentation. | ACCEPT.Refer to 13/1050r0. |
| <Discussion>By updated definition of beam change from "11-13-0497-00-00ah-TGah-Miscellaneous-PHY-Updates", even in SU transmission SMOOTHING may be available if NUM\_STS is larger than 1.

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| “Beam-change/smoothing indication bit: if Nsts=1, a value of 1 indicates that Q matrix is changed; a value of 0 indicates that Q matrix is un-changed. If Nsts>1, a value of 1 indicates that channel smoothing is recommended, otherwise channel smoothing is not recommended.* Note: When Nsts=1, if the beam-change indication bit in long preamble is set to 0, the receiver may do channel smoothing. Otherwise, smoothing is not recommended. ”
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 **TGah editor: modify the D0.2 text from P228L26, as follows*** Construction of SIG-A

The SIG-A field consists of two symbols, SIG-A1 and SIG-A2, as defined in 24.3.8.2.2.1.4 (SIG-A definition) and is constructed as follows:* Obtain the CH\_BANDWIDTH, STBC, MU\_SU, GROUP\_ID (MU only), PARTIAL\_AID (SU only), NUM\_STS, GI\_TYPE, FEC\_CODING, MCS (SU only), NUM\_USERS, LENGTH, AGGREGATION (SU only), ACK\_INDICATION, BEAM\_CHANGE (SU only for single space-time stream), SMOOTHING and DOPPLER from the TXVECTOR. Add the reserved bits, append the calculated 4 bit CRC, then append the Ntail tail bits as shown in 24.3.8.2.2.1.4 (SIG-A definition). This results in 48 uncoded bits.
* BCC encoder: Encode the data by a convolutional encoder at the rate of R=1/2 as described in 18.3.5.6 (Convolutional encoder).
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| 206 | Hongyuan Zhang | 24.3.4.2.5 | 208 | 1 | 11ah LTF Pilot modulation is different from 11ac, we cannot directly copy paste 11ac preamble construction text here. There is no "A\_D-LTF" and "P\_D-LTF" defined, instead we always use the term "A\_LTF" and "P\_LTF", no matter short or long preambles. Also, there is no "R matrix" defined for 11ah at all, because in pilots we use first column of P matrix for the ease of 1M/2M classifications in multi-stream cases. Same issue for SIG-B construction text, as well as the STF , LTFs and SIG construction text for short preamble and 1MHz preamble. | Correct all the mentioned construction text according to the waveform descriptions clause for the 3 types of the preambles. | REVISE.Refer to 13/1050r0. |
| <Discussion>Matched to the current equations in clause 24.3.8. **TGah editor: modify the D0.2 text from P229L38, as follows*** *ALTF* matrix mapping: Apply the  *PHTLTF* matrix to the D-LTF sequence (the pilot tones are processed differently) as described in 24.3.8.2.2.2.3 (D-LTF definition).

**TGah editor: modify the D0.2 text from P230L12, as follows*** *PHTLTF* matrix mapping: Apply the mapping of the 1st column of the  *PHTLTF* matrix to the data subcarriers as described in 24.3.8.2.2.2.4 (SIG-B definition). The total number of data and pilot subcarriers is the same as in the Data field.

**TGah editor: modify the D0.2 text from P230L52, as follows*** *PHTLTF* matrix mapping: Apply the mapping of the first column of the  *PHTLTF* matrix to the STF sequence as described in 24.3.8.2.1.3 (LTF definition).

**TGah editor: modify the D0.2 text from P231L17, as follows*** ALTF matrix mapping: Apply the mapping of the first column of the  *PHTLTF* matrix to the LTF1 sequence (the pilot tones are processed differently) as described in 24.3.8.2.1.3 (LTF definition).

**TGah editor: modify the D0.2 text from P231L55, as follows*** *PHTLTF* matrix mapping: Apply the mapping of the 1st column of the  *PHTLTF* matrix to the data subcarriers as described in 24.3.8.2.1.4 (SIG definition).

**TGah editor: modify the D0.2 text from P232L25, as follows*** ALTF matrix mapping: Apply the mapping of the  *PHTLTF* matrix (from the 2nd column to the last column) to the LTF2-LTFNLTF sequence (the pilot tones are processed differently) as described in 24.3.8.2.1.3 (LTF definition).

**TGah editor: modify the D0.2 text from P232L60, as follows*** *PHTLTF* matrix mapping: Apply the mapping of the first column of the  *PHTLTF* matrix to the 1MHz STF sequence as described in 24.3.8.3.3 (LTF definition).

**TGah editor: modify the D0.2 text from P233L24, as follows*** *ALTF* matrix mapping: Apply the mapping of the first column of the  *PHTLTF* matrix to the 1MHz LTF1 sequence (the pilot tones are processed differently) as described in 24.3.8.3.3 (LTF definition).

**TGah editor: modify the D0.2 text from P233L64, as follows*** *PHTLTF* matrix mapping: Apply the mapping of the 1st column of the  *PHTLTF* matrix to the data subcarriers as described in 24.3.8.3.4 (SIG definition).

**TGah editor: modify the D0.2 text from P234L33, as follows*** *ALTF* matrix mapping: Apply the mapping of the  *PHTLTF* matrix (from the 2nd column to the last column) to the 1MHz LTF2-LTFNLTF sequence (the pilot tones are processed differently) as described in 24.3.8.3.3 (LTF definition).
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| 285 | Li Chia Choo | 24.3.4.3.3 | 210 | 37 | The itemized list for 24.3.4.3.3 Construction of SIG should only be from a) to l) | Remove item l) on line 37, change item m) on line 39 to l). | ACCEPT.Refer to 13/1050r0. |
| <Discussion>Editorial change.  **TGah editor: modify the D0.2 text from P232L05, as follows*** Insert GI and apply windowing: Prepend a GI (LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions).
* Analog and RF: Up-convert 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 24.3.7 (Mathematical description of signals) and 24.3.8 (S1G preamble) for details.
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| 286 | Li Chia Choo | 24.3.4.4.1 | 211 | 19 | There is no reference for the 3dB power boost under item b) of 24.3.4.4.1 Construction of 1MHz STF | Line 19 should be changed to "Apply the 3dB power boosting if the MCS from the TXVECTOR equals MCS10 (See 24.3.8.3.2 STF definition)." | REVISE. Refer to 13/1050r0. |
| <Discussion>Added its reference clause.  **TGah editor: modify the D0.2 text from P232L46, as follows*** Construction of 1MHz STF

The 1MHz STF field is defined in 24.3.8.3.2 (STF definition) and constructed as follows:* Determine the CH\_BANDWIDTH from the TXVECTOR if 1MHz Duplicate PPDU.
* Sequence generation: Generate the 1MHz STF in the frequency-domain over the bandwidth indicated by CH\_BANDWIDTH as described in 24.3.8.3.2 (STF definition). Apply the 3dB power boosting if the MCS from the TXVECTOR equals MCS10 as described in 24.3.8.3.2 (STF definition).
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| 287 | Li Chia Choo | 24.3.4.4.3 | 212 | 46 | The itemized list for 24.3.4.4.3 Construction of 1MHz SIG should only be from a) to l) | Remove item l) on line 46, change item m) on line 48 to l). | ACCEPT.Refer to 13/1050r0. |
| <Discussion>Editorial change.  **TGah editor: modify the D0.2 text from P234L13, as follows*** Insert GI and apply windowing: Prepend a GI (LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions).
* Analog and RF: Up-convert 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 24.3.7 (Mathematical description of signals) and 24.3.8 (S1G preamble) for details.
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| 288 | Li Chia Choo | 24.3.4.5.1 | 214 | 10 | Grammatical error for item p) under 24.3.4.5.1 Using BCC. | Line 10 should be changed to "can be applied from the 2nd symbol of data field." | ACCEPT.Refer to 13/1050r0. |
| 289 | Li Chia Choo | 24.3.4.5.2 | 215 | 4 | Grammatical error for item p) under 24.3.4.5.2 Using LDPC. | Line 4 should be changed to "can be applied from the 2nd symbol of data field." | ACCEPT.Refer to 13/1050r0. |
| 293 | Li Chia Choo | 24.3.4.6.1 | 215 | 56 | Grammatical error for item o) under 24.3.4.6.1 Using BCC | Line 56 should be changed to "can be applied from the 2nd symbol of data field." | ACCEPT.Refer to 13/1050r0. |
| 294 | Li Chia Choo | 24.3.4.6.2 | 216 | 44 | Grammatical error for item n) under 24.3.4.6.2 Using LDPC | Line 44 should be changed to "can be applied from the 2nd symbol of data field." | ACCEPT.Refer to 13/1050r0. |
| 295 | Li Chia Choo | 24.3.4.7.4 | 217 | 32 | Grammatical error for item d) under 24.3.4.7.4 Combining to form an S1G MU PPDU | Line 32 should be changed to "can be applied from the 2nd symbol of data field." | ACCEPT.Refer to 13/1050r0. |
| <Discussion>Editorial change.  **TGah editor: modify the D0.2 text from P235L38, as follows*** Insert GI and apply windowing: Prepend a GI (SHORT\_GI or LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions). Note that SHORT\_GI can be applied from the 2nd symbol of data field.

**TGah editor: modify the D0.2 text from P236L33, as follows*** Insert GI and apply windowing: Prepend a GI (SHORT\_GI or LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions). Note that SHORT\_GI can be applied from the 2nd symbol of data field.

**TGah editor: modify the D0.2 text from P237L20, as follows*** Insert GI and apply windowing: Prepend a GI (SHORT\_GI or LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions). Note that SHORT\_GI can be applied from the 2nd symbol of data field.

**TGah editor: modify the D0.2 text from P238L07, as follows*** Insert GI and apply windowing: Prepend a GI (SHORT\_GI or LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions). Note that SHORT\_GI can be applied from the 2nd symbol of data field.

**TGah editor: modify the D0.2 text from P238L58, as follows*** Insert GI and apply windowing: Prepend a GI (SHORT\_GI or LONG\_GI) and apply windowing as described in 18.3.2.5 (Mathematical conventions in the signal descriptions). Note that SHORT\_GI can be applied from the 2nd symbol of data field.
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| 290 | Li Chia Choo | 24.3.4.6 | 215 | 10 | Inconsistent terminology in title of 24.3.4.6 | Line 10 should be changed to "Construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode)" | ACCEPT. Refer to 13/1050r0. |
| 208 | Hongyuan Zhang | 24.3.4.6 | 215 | 10 | MCS10 instead of MCS0 rep2 | revise the title to use MCS10 instead of MCS0 rep2. | ACCEPT.Refer to 13/1050r0. |
| 291 | Li Chia Choo | 24.3.4.6.1 | 215 | 15 | Inconsistent terminology in description of 24.3.4.6.1 Using BCC | Line 15 should be changed to "The construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode) with BCC encoding". | ACCEPT.Refer to 13/1050r0. |
| 292 | Li Chia Choo | 24.3.4.6.2 | 216 | 5 | Inconsistent terminology in description of 24.3.4.6.2 Using LDPC | Line 5 should be changed to "The construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode) with LDPC encoding". | ACCEPT.Refer to 13/1050r0. |
| <Discussion>Changed into MCS10 accordingly.  **TGah editor: modify the D0.2 text from P236L42, as follows*** Construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode)
* Using BCC

The construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode) with BCC encoding proceeds as follows:**TGah editor: modify the D0.2 text from P237L29, as follows*** Using LDPC

The construction of the Data field in an S1G SU PPDU (1MHz MCS10 mode) with LDPC encoding proceeds as follows: |
| 209 | Hongyuan Zhang | 24.3.4.6 | 215 | 29 | No segment parser and deparser for 1MHz MCS10 | Remove segment parser/deparser for MCS10 BCC and LDPC in pages 215~216. | ACCEPT. Refer to 13/1050r0. |
| 210 | Hongyuan Zhang | 24.3.4.6 | 215 | 43 | MCS10 is for single STS only | Remove per STS CSD for both BCC and LDPC in pages 215~216. | ACCEPT. Refer to 13/1050r0. |
| <Discussion>

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| **24.3.9.7 Segment parser**The segment parser for S1G 16MHz PPDUs is the same as those specified for 160MHz PPDUs in 22.3.10.7(Segment parser) . |

Regarding CID 209, the segment parser for S1G 16MHz PPDUs is the same as those specified for 160MHz PPDUs in 22.3.10.7(Segment parser), in which minimum transmit BW unit is defined as 20MHz (equivalent to 2MHz for S1G). So, 16MHz “data” transmission with the use of 1MHz duplicate is not available in 802.11ah until now because segment parser and segment deparser are not defined accordingly, while NDP exchange with the use of 1MHz duplicate may be possible for 16MHz bandwidth.

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| **24.3.9.6 Stream parser**The stream parser for S1G PPDUs is the same as those specified in 22.3.10.6 (Stream parser) with up to 4spatial streams.For 1MHz PPDU modulated using MCS10, more than one spatial stream shall not be applied. |

Regarding CID 210, becase more than one spatial stream is not allowed for 1MHz PPDU modulatd using MCS10, per-stream CSD needs to be deleted.   **TGah editor: modify the D0.2 text from P236L60, as follows (BCC case)*** BCC interleaver: Interleave as described in 24.3.9.8 (BCC interleaver).
* Constellation mapper: Map to BPSK constellation points as described in 24.3.9.9 (Constellation mapping).
* Pilot insertion: Insert pilots following the steps described in 24.3.9.10 (Pilot subcarriers).
* Spatial mapping: Apply the *Q* matrix as described in 24.3.10 (SU-MIMO and DL-MU-MIMO Beamforming).

**TGah editor: modify the D0.2 text from P237L46, as follows (LDPC case)*** Constellation mapper: Map to BPSK constellation points as described in 24.3.9.9 (Constellation mapping).
* Pilot insertion: Insert pilots following the steps described in 24.3.9.10 (Pilot subcarriers).
* Spatial mapping: Apply the *Q* matrix as described in 24.3.10 (SU-MIMO and DL-MU-MIMO Beamforming).
 |