IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB 203 Comment Resolution for Section 24.3.8 | | | | |
| Date: 2014-09-15 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Eugene Baik | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 |  | eugeneb@qca.qualcomm.com |

Abstract

This submission proposes resolutions for comments in subclause 24.3.8 of TGah Draft 2.1 with the following CIDs:

* 3070
* 3071
* 3072
* 3527, 3528, 3529, 3530, 3532
* 3563, 3564, 3565, 3566

Revisions:

* Rev 0: Initial version of the document

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGah Draft. This introduction is not part of the adopted material.

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3070 | 415.42 | 24.3.8.2.2.1.4 | The left most constellation is presumably for SIG-A1, but it does not say so. | Label left constellation | Revise  Accept in principle. Please see detailed comment resolution in 11-14/1125r0 |
| 3071 | 425.8 | 24.3.8.3.4 | "Set to 1 when aggregation is ON (A-MPDU), and 0 otherwise."  That's funny. The PHY knows nothing about A-MPDU, only about the service it provides to the MAC. | Relate to VECTOR parameters. | Revise.  Will clarify that bit is set to 1 when aggregation is ON (as indicated by AGGREGATION parameter of TXVECTOR)  Please see detailed comment resolution in 11-14/1125r0 |
| 3072 | 425.10 | 24.3.8.3.4 | "NOTE-- S1G PPDUs shall be transmitted with aggregation ON wheneverPHY payload size is greater than 511 octets"  No, you can't say this. This is a require on MAC behaviour, and it must go in the MAC. Also, NOTEs don't have shalls in them. | Remove "NOTE--" and move to clause 9. | Revise  Accept in principle.  Will state in Clause 9.13.5 the following: “The S1G STA shall set the TXVECTOR parameter Aggregation to 1 when the length of the PSDU to be carried in the S1G PPDU is greater than 511 octets”  Will remove “shall” from NOTE, pointing out instead that it is clarified in 9.13.5  Please see detailed comment resolution in 11-14/1125r0 |
| 3527 | 404.10 | 24.3.8.2.1.4 | Current text states that LENGTH field of 2MHz Short preamble SIG is populated with PPDU length in number of symbols when aggregation = 1, number of octets when aggregation = 0. "PPDU" refers to the entire PHY frame, including preamble. It's actually "PSDU Length", either in number of symbols, or number of octets. Additionally unclear whether it is number of octets as indicated by APEP\_LENGTH or PSDU\_LENGTH | Clarify whether Length means APEP\_LENGTH or PSDU\_LENGTH. Replace text in description box with "Denotes the length of the Data field in number of symbols when aggregation bit is set to 1, and APEP\_LENGTH/PSDU\_LENGTH (in octets) of the PSDU when aggregation bit is set to 0" | Revise  Accept in principle.  Replace text in description box with "When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation).”  Modify equations for TXTIME, Nsym in 24.4.3 to clarify and remove references to APEP\_LENGTH.  Please see detailed comment resolution in 11-14/1125r0 |
| 3528 | 412.9 | 24.3.8.2.2.1.4 | Current text states that LENGTH field of 2MHz Long SU preamble SIG-A is populated with PPDU length in number of symbols when aggregation = 1, number of octets when aggregation = 0. "PPDU" refers to the entire PHY frame, including preamble. It's actually "PSDU Length", either in number of symbols, or number of octets. Additionally unclear whether it is number of octets as indicated by APEP\_LENGTH or PSDU\_LENGTH | Clarify whether Length means APEP\_LENGTH or PSDU\_LENGTH. Replace text in description box with "Denotes the length of the Data field in number of symbols when aggregation bit is set to 1, and APEP\_LENGTH/PSDU\_LENGTH (in octets) of the PSDU when aggregation bit is set to 0" | Revise  Accept in principle.  Replace text in description box with "When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation).”  Modify equations for TXTIME, Nsym in 24.4.3 to clarify and remove references to APEP\_LENGTH.  Please see detailed comment resolution in 11-14/1125r0 |
| 3529 | 414.11 | 24.3.8.2.2.1.4 | Current text states that LENGTH field of 2MHz Long MU preamble SIG-A is populated with PPDU length in number of symbols when aggregation = 1" It's actually PSDU length in number of symbols | Replace text in description box with "Denotes the length of PSDU in number of symbols. NOTE-- A-MPDU is always used for MU PPDUs | Revise  Accept in principle.  Replace text in description box with "Set to the value of the PSDU\_LENGTH parameter in TXVECTOR  NOTE— A-MPDU is always used for MU PPDUs.”  Replace text with “Set to LENGTH parameter of TXVECTOR, which denotes the duration of the Data field in number of symbols.  NOTE— A-MPDU is always used for MU PPDUs.”  Please see detailed comment resolution in 11-14/1125r0 |
| 3530 | 425.15 | 24.3.8.3.4 | Current text states that LENGTH field of 1MHz preamble SIG is populated with PPDU length in number of symbols when aggregation = 1, number of octets when aggregation = 0. "PPDU" refers to the entire PHY frame, including preamble. It's actually "PSDU Length", either in number of symbols, or number of octets. Additionally unclear whether it is number of octets as indicated by APEP\_LENGTH or PSDU\_LENGTH | Clarify whether Length means APEP\_LENGTH or PSDU\_LENGTH. Replace text in description box with "Denotes the length of the Data field in number of symbols when aggregation bit is set to 1, and APEP\_LENGTH/PSDU\_LENGTH (in octets) of the PSDU when aggregation bit is set to 0" | Revise  Accept in principle.  Replace text in description box with "When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation).”  Modify equations for TXTIME, Nsym in 24.4.3 to clarify and remove references to APEP\_LENGTH.  Please see detailed comment resolution in 11-14/1125r0 |
| 3532 | 422.41 | 24.3.8.3.3 | Windowing function w\_TLTF(t) used in Eq. 24-36 and 24-37 should be different for 1st/2nd and 3rd/4th OFDM symbols of LTF1, because of DGI and regular GI being used, respectively | Fix equations by defining separate windowing functions for Equation 24-36 and 24-37 | Revise  Accept in principle.  Please see detailed comment resolution in 11-14/1125r0 |
| 3563 | 411.10 | 24.3.8.2.2.1.4 | STBC in table 24-14 is for SU, may remove "Set to 0 for MU PPDU". The STBC field in table 24-15 is for MU, according to 11ac, STBC shall not be allowed for MU PPDU (because STBC always performs worse than non-STBC if beamforming is applied). Therefore, STBC field in table 24-15 should be changed to "Always set to 0", or make STBC field in MU PPDU as reserved bit. | as in comment. | Revise  Accept in principle.  Please see detailed comment resolution in 11-14/1125r0 |
| 3564 | 423.27 | 24.3.8.3.3 | "1MHz preamble" and "2MHz preamble" are not defined terms. | Similar to Note-2, change the text to "to facilitate the differentiation of S1G\_1M preamble from S1G\_SHORT preamble and S1G\_LONG preamble". | Revise  Accept in principle.  Please see detailed comment resolution in 11-14/1125r0 |
| 3565 | 423.27 | 24.3.8.3.3 | "The orthogonality metric...." this math description is confusing, the spec already gives the detailed sequence therefore it does not need to explain the math. | Remove the text from "The orthogonality metric..." to the end of Note-1. | Revise  Accept in principle.  NOTE is only intended to provide helpful information to reader. Will reword text to make it clear that the orthogonality metric USED to select sequences satisfied the criteria.  Please see detailed comment resolution in 11-14/1125r0 |
| 3566 | 423.32 | 24.3.8.3.3 | Text is not clear | Change to "to facilitate the differentiation of S1G\_1M preamble from S1G\_SHORT preamble and S1G\_LONG preamble". | Revise  Accept in principle.  Please see detailed comment resolution in 11-14/1125r0 |

**TGah Editor: Please replace existing Figure 24-9 and Figure 24-15 (striked out) with the new figures in the section below to resolve CID 3070**

* SIG definition

|  |
| --- |
|  |
| * Data constellation in SIG field of S1G\_SHORT |

* SIG-A definition

|  |
| --- |
|  |
| * Data constellation in SIG-A field of S1G\_LONG |

**TGah Editor: Please add the following text to the section below to resolve CID 3072**

* Transport of A-MPDU by the PHY data service

***Insert the following sentence to the end of this subclause as follows:***

The S1G STA shall set the TXVECTOR parameter Aggregation to 1 when the length of the MPDU to be carried in the S1G PPDU is greater than 511 octets.

**TGah Editor: Please modify the tables in the following sections below to resolve CID 3071, 3072, 3527, 3528, 3529, 3540**

* SIG definition

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Fields in the SIG field of short preamble | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-1 | B0 | Reserved | 1 | Reserved. Set to 1. |
| B1 | STBC | 1 | Set to 1 if all spatial streams have space time block coding and set to 0 if no spatial streams has space time block coding. |
| B2 | Uplink Indication | 1 | Set to the value of the TXVECTOR parameter UPLINK\_INDICATION. |
| B3-B4 | BW | 2 | Set to 0 for 2 MHz, 1 for 4 MHz, 2 for 8 MHz, 3 for 16 MHz |
| B5-B6 | Nsts | 2 | Set to 0 for 1 space time stream  Set to 1 for 2 space time streams  Set to 2 for 3 space time streams  Set to 3 for 4 space time streams |
| B7-B15 | ID | 9 | If Uplink Indication is not present or set to 1, set to the value of the TXVECTOR parameter PARTIAL\_AID. PARTIAL\_AID provides an abbreviated indication of the intended recipient(s) of the PSDU (see Table 9.20a (Group ID, partial AID, Uplink Indication and COLOR in S1G PPDUs))). If Uplink Indication is set to 0, B7-B9 are set to the value of the TXVECTOR parameter COLOR and B10-B15 are set to the value of the TXVECTOR parameter PARTIAL\_AID. |
| B16 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B17-B18 | Coding | 2 | B17 set to 0 for BCC and 1 for LDPC  If B17 is 1, B18 is set to 1 if the LDPC PPDU encoding process (of an SU PPDU), results in an extra  OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding), otherwise set to 0.  If B17 is 0, B18 is reserved and set to 1. |
| B19-B22 | MCS | 4 | MCS Index |
| B23 | Smoothing | 1 | A value of 1 indicates that channel smoothing is recommended.  A value of 0 indicates that channel smoothing is not recommended. |
| SIG-2 | B0 | Aggregation | 1 | Set to 1 when aggregation is ON (as indicated by AGGREGATION parameter of TXVECTOR), and 0 otherwise.  NOTE— S1G PPDUs are transmitted with aggregation ON when PSDU to be carried is greater than 511 octets, as defined in 9.13.5 Transport of A-MPDU by the PHY data service |
| B1-B9 | Length | 9 | When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation). |
| B10-B11 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B12 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B13 | NDP Indication | 1 | Used to indicate that frame is a Control NDP frame. If set to 1, then the SIG field format is as in Figure 24-21 (SIG field format for >= 2 MHz NDP MAC frame) and the SIG field contents follow the description in 8.9 (NDP MAC frames) |
| B14-B17 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| B18-B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |

* SIG-A definition

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Fields in the SIG-A field of S1G\_LONG preamble SU PPDU | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-A-1 | B0 | MU/SU | 1 | Set to 0 for SU PPDUs. |
| B1 | STBC | 1 | Set to 1 if all spatial streams have space time block coding and set to 0 if no spatial streams has space time block coding. |
| B2 | Uplink Indication | 1 | Set to the value of the TXVECTOR parameter UPLINK\_INDICATION. |
| B3-B4 | BW | 2 | Set to 0 for 2 MHz, 1 for 4 MHz, 2 for 8 MHz, 3 for 16 MHz |
| B5-B6 | Nsts | 2 | Set to 0 for 1 space time stream  Set to 1 for 2 space time streams  Set to 2 for 3 space time streams  Set to 3 for 4 space time streams |
| B7-B15 | ID | 9 | If Uplink Indication is not present or set to 1, set to the value of the TXVECTOR parameter PARTIAL\_AID. PARTIAL\_AID provides an abbreviated indication of the intended recipient(s) of the PSDU (see Table 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs))). If Uplink Indication is set to 0, B7-B9 are set to the value of the TXVECTOR parameter COLOR and B10-B15 are set to the value of the TXVECTOR parameter PARTIAL\_AID. |
| B16 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B17-B18 | Coding | 2 | B17 set to 0 for BCC and 1 for LDPC  If B17 is 1, B18 is set to 1 if the LDPC PPDU encoding process (of an SU PPDU), results in an extra  OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding), otherwise set to 0.  If B17 is 0, B18 is reserved and set to 1. |
| B19-B22 | MCS | 4 | MCS Index |
| B23 | Beam Change/Smoothing Indication | 1 | If Nsts subfield indicates 1 space time stream. A value of 1 indicates that the Q matrix is changed from the Omni portion to the Data portion of the long preamble, in at least one of the non-zero sub-carriers of the Omni portion.  A value of 0 indicates that the Q matrix is un-changed in all the non-zero sub-carriers of the Omni portion.  If Nsts subfield indicates more than 1 space time stream. A value of 1 indicates that channel smoothing is recommended, a value of 0 indicates that channel smoothing is not recommended.  See Note-1.  See Note-2. |
| SIG-A-2 | B0 | Aggregation | 1 | Set to 1 when aggregation is ON (as indicated by AGGREGATION parameter of TXVECTOR), and 0 otherwise.  NOTE— S1G PPDUs are transmitted with aggregation ON when PSDU to be carried is greater than 511 octets, as defined in 9.13.5 Transport of A-MPDU by the PHY data service |
| B1-B9 | Length | 9 | When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation). |
| B10-B11 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B12 | Reserved | 1 | Reserved. Bit set to 1. |
| B13 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B14-B17 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| B18-B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |
| Note-1: When the Nsts subfield indicates 1 space time stream, if beam-change indication bit is set to 0, the receiver may do channel smoothing. Otherwise, smoothing is not recommended.  Note-2: The Q matrix for Omni portion is  as defined in 24.3.7 (Mathematical description of signals). | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Fields in the SIG-A field of S1G\_LONG preamble MU PPDU | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-A-1 | B0 | MU/SU | 1 | Set to 1 for MU PPDUs |
| B1 | STBC | 1 | Set to 0 in MU PPDUs. |
| B2 | Reserved | 1 | Reserved. Set to 1. |
| B3-B10 | NSTS | 8 | NSTS is divided into 4 user positions  of 2 bits each, , denoted by 4 subfields MU[0] Nsts …MU[3] Nsts. User position *p*, where , uses bits . The space-time streams of user u are indicated at user position  where  and the notation A[*b*] denotes the value of array A at index *b*. Zero space-time streams are indicated at positions not listed in the  USER\_POSITION array.  Set to 0 for 0 space time streams  Set to 1 for 1 space time stream  Set to 2 for 2 space time streams  Set to 3 for 3 space time streams |
| B11-B12 | BW | 2 | Set to 0 for 2 MHz, 1 for 4 MHz, 2 for 8 MHz, 3 for 16 MHz |
| B13-B18 | GID | 6 | In an MU PPDU the Group ID is set as defined in 24.3.10.4 (Group ID)(#3946) |
| B19 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B20-B23 | Coding-I | 4 | If the MU[0] NSTS field is non-zero, then B20 indicates coding for user 0: set to 0 for BCC, 1 for LDPC.  If the MU[0] NSTS field is 0, then B20 is reserved and set to 1.  If the MU[1] NSTS field is non-zero, then B21 indicates coding for user 1: set to 0 for BCC, 1 for LDPC.  If the MU[1] NSTS field is 0, then B21 is (#Ed)reserved and set to 1.  If the MU[2] NSTS field is non-zero, then B22 indicates coding for user 2: set to 0 for BCC, 1 for LDPC.  If the MU[2] NSTS field is 0, then B22 is reserved and set to 1.  If the MU[3] NSTS field is non-zero, then B23 indicates coding for user 3: set to 0 for BCC, 1 for LDPC.  If the MU[3] NSTS field is 0, then B23 is reserved and set to 1. |
| SIG-A-2 | B0 | Coding-II | 1 | Set to 1 if at least one LDPC user’s PPDU encoding process results in an extra OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding) and 22.3.10.5.5 (Encoding process for VHT(#3609) MU PPDUs). Set to 0 otherwise. |
| B1 | Reserved | 1 | Reserved. Set to 1. |
| B2-B10 | Length | 9 | Set to the value of the PSDU\_LENGTH parameter in TXVECTOR.  NOTE— A-MPDU is always used for MU PPDUs. |
| B11-B12 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B13 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B14-B17 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| B18-B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |

* SIG definition

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Fields in the SIG field of S1G\_1M PPDU | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-1 | B0-B1 | NSTS | 2 | Set to 0 for 1 space time stream  Set to 1 for 2 space time streams  Set to 2 for 3 space time streams  Set to 3 for 4 space time streams |
| B2 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B3-B4 | Coding | 2 | B3 set to 0 for BCC and 1 for LDPC  If B3 is 1, B4 is set to 1 if the LDPC PPDU encoding process (of an SU PPDU), results in an extra  OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding), otherwise set to 0.  If B3 is 0, B4 is reserved and set to 1. |
| B5 | STBC | 1 | Set to 1 if all spatial streams have  space time block coding and set to 0 if no spatial streams has space time block coding. |
| SIG-2 | B6 | Reserved | 1 | Reserved. Set to 1. |
| B7-B10 | MCS | 4 | MCS Index |
| B11 | Aggregation | 1 | Set to 1 when aggregation is ON (as indicated by AGGREGATION parameter of TXVECTOR), and 0 otherwise.  NOTE— S1G PPDUs are transmitted with aggregation ON when PSDU to be carried is greater than 511 octets, as defined in 9.13.5 Transport of A-MPDU by the PHY data service. |
| SIG-3 and SIG-4 | B12-B20 | Length | 9 | When the Aggregation bit is set to 1, set to the value of the PSDU\_LENGTH parameter in TXVECTOR. When the Aggregation bit is set to 0, set to N\_sym, given in Section 24.4.3 (TXTIME and PSDU\_LENGTH calculation). |
| B21-22 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B23 | Smoothing | 1 | A value of 1 indicates that channel smoothing is recommended.  A value of 0 indicates that channel smoothing is not recommended. |
| SIG-5 | B24 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B25 | NDP Indication | 1 | Used to indicate that frame is a Control NDP frame. If set to 1, then the SIG field format is as in Figure 24-20 (SIG field format for 1 MHz NDP MAC frame) and the SIG field contents follow the description in 8.9 (NDP MAC frames) |
| B26-B29 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| SIG-6 | B30-B35 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |

**TGah Editor: Please modify the text in the following section below to resolve CIDs 3532, 3564, 3565, 3566**

* LTF definition

The time domain representation of the first two repetitions of the LTF1 field, and the last two repetitions of the LTFs field shall be as specified in Equation (24-37) and Equation (24-38), respectively



where

 and  are defined in Table 24-4 (Timing-related constants)

 represents the cyclic shift for space-time stream *m* with a value given in Table 24-17 (Cyclic shift values of S1G\_1M PPDU)

 is defined by Equation (24-6) ~ Equation (24-9)

 is defined in Table 24-4 (Timing-related constants)

 is defined in Table 24-6 (Frequently used parameters)

 has the value given in Tone scaling factor and guard interval duration values for PHY fieldsTable 24-7 (Tone scaling factor and guard interval duration values for PHY fields).

 is defined in Equation (24-39).

 is defined in Table 24.3.7 (Mathematical description of signals)

* 

where

 is the subcarrier indices for the fixed pilot tones. For a 1 MHz transmission, .

is the first column of the *PHTLTF* matrix.

={0, 0, 0, 1, -1, 1, -1, -1, 1, -1, 1, 1, -1, 1, 1, 1, 0, -1, -1, -1, 1, -1, -1, -1, 1, -1, 1, 1, 1, -1, 0, 0}

NOTE1 – This LTF sequence is chosen to be orthogonal to both halves of the 2 MHz LTF sequence in order to facilitate the differentiation of S1G\_1M preambles from S1G\_SHORT and S1G\_LONG preambles. The orthogonality metric used to select the sequences satisfied the criteriawhere {A} and {B} are the 1MHz sequence and either of the halves of the 2MHz sequence, and where k=1,2,3,...,16,18,19,...,31(#Ed) skipping the 1 MHz DC location on k=17.

NOTE2—This definition results in a BPSK modulation on the last two symbols of LTF1 field, to facilitate the differentiation of S1G\_SHORT preambles from S1G\_SHORT and S1G\_LONG preambles.

**TGah Editor: Please modify the text in the following section below to resolve CIDs 3527, 3528, 3529, 3530**

* Padding for BCC

For a BCC encoder, the number of PHY padding bits, , is calculated as

Where

is the value of the PSDU\_LENGTH parameter in TXVECTOR for user

is the number of symbols in the Data field and is given in 24.4.3 (TXTIME and PSDU\_LENGTH calculation) by Equation 24-75 for S1G SU PPDUs and Equation 24-77 for S1G MU PPDUs.

For SU, .

* Padding for LDPC

For LDPC encoding, the number of PHY padding bits, , is as

Where

is the value of the PSDU\_LENGTH parameter in TXVECTOR for user

is the number of symbols in the Data field and is given in 24.4.3 (TXTIME and PSDU\_LENGTH calculation) by Equation 24-76 for S1G SU PPDUs and Equation 24-77 for S1G MU PPDUs.

For SU, .

**TGah Editor: Please modify the text in the following section below to resolve CIDs 3527, 3528, 3529, 3530**

* PHY receive procedure

When Aggregation = 0 in the SIG/SIG-A field, the value of the PSDU\_LENGTH parameter returned in the RXVECTOR using is set to the LENGTH field of the SIG/SIG-A.

When Aggregation = 1 in the SIG/SIG-A field, the value of the PSDU\_LENGTH parameter returned in the RXVECTOR using BCC encoding is calculated using Equation (24-67).





Where

 denotes the largest integer smaller than or equal to *x*

 is defined in Table 24-6 (Frequently used parameters)

 is defined in Table 24-6 (Frequently used parameters)

 are defined in Table 24-4 (Timing-related constants)

When Aggregation = 1 in the SIG/SIG-A field, the value of the PSDU\_LENGTH parameter returned in the RXVECTOR using LDPC encoding is calculated using Equation (24-69)

* 

Where

 denotes the largest integer smaller than or equal to *x*

 is defined in Table 24-6 (Frequently used parameters)

 is defined in Table 24-4 (Timing-related constants)

The value of the PSDU\_LENGTH parameter returned in the RXVECTOR for an NDP sounding or an NDP MAC frame is 0.

**TGah Editor: Please modify the text in the following section below to resolve CIDs 3527, 3528, 3529, 3530**

* TXTIME and PSDU\_LENGTH calculation

For S1G\_SHORT preamble, the value of the TXTIME parameter returned by the PLME-TXTIME.confirm primitive shall be calculated for an S1G PPDU using Equation (24-69) for short GI and Equation (24-70) for long GI.

* 

where

 denotes the smallest integer greater than or equal to *x*



, , ,  and  are defined in Table 24-4 (Timing-related constants)

 is defined in Table 24-5 (Timing-related constants for SIG/SIG-A field in 2 MHz PPDUs).

 is defined in Table 24-10 (Number of LTFs required for different numbers of space time streams)

For S1G\_LONG preamble, the value of the TXTIME parameter returned by the PLME-TXTIME.confirm primitive shall be calculated for an S1G PPDU using Equation (24-71) for short GI and Equation (24-72) for long GI.

* 

where

 denotes the smallest integer greater than or equal to *x*





, , , , ,  and  are defined in Table 24-4 (Timing-related constants)

 is defined in Table 24-5 (Timing-related constants for SIG/SIG-A field in 2 MHz PPDUs).

 is defined in Table 24-10 (Number of LTFs required for different numbers of space time streams).

For S1G\_1M preamble, the value of the TXTIME parameter returned by the PLME-TXTIME.confirm primitive shall be calculated for an S1G PPDU using Equation (24-73) for short GI and Equation (24-74) for long GI.

* 



Instruction to editor: For equations 24-73 and 24-74, change 2\*T\_PREAMBLE 🡪 T\_PREAMBLE

Instruction to editor: For equations 24-73 and 24-74, change 3\*T\_SIG 🡪 T\_SIG

Where

 denotes the smallest integer greater than or equal to *x*



, , , ,  and  are defined in Table 24-4 (Timing-related constants)

 is defined in Table 24-10 (Number of LTFs required for different numbers of space time streams).

For an NDP, there is no Data field and  = 0.

For an S1G SU PPDU using BCC encoding, the total number of data symbols in the Data field is given by Equation (24-75).





Where

 is equal to 2 when STBC is used, and 1 otherwise;

 and  are defined in Table 24-6 (Frequently used parameters)

 and  are defined in Table 24-4 (Timing-related constants)

For an S1G SU PPDU using LDPC encoding, the total number of data symbols in the Data field, , is given in 24.3.9.4.4 (LDPC coding).

For an S1G MU PPDU, the total number of data symbols in the Data field, , is given by

Where is defined in Equation (24-75) for BCC and in Section 24.3.9.4.4 (LDPC coding) for LDPC.

Instruction to editor: Please add equation above with the additional text, and update equation number, hyperlinks.

The value of the PSDU\_LENGTH parameter returned in the PLME-TXTIME.confirm primitive for an S1G SU PPDU using BCC encoding is calculated using Equation (24-76)



Where

 is given by Equation (24-75)

 denotes the largest integer smaller than or equal to *x*

 and  are defined in Table 24-6 (Frequently used parameters)

 and  are defined in Table 24-4 (Timing-related constants).

The value of the PSDU\_LENGTH parameter returned in the PLME-TXTIME.confirm primitive for an S1G SU PPDU using LDPC encoding is calculated using Equation (24-77)



Where

 is given by Equation (22-62)

 denotes the largest integer smaller than or equal to *x*

 is defined in Table 24-6 (Frequently used parameters)

 is defined in Table 24-4 (Timing-related constants).The value of the PSDU\_LENGTH parameter for user u returned in the PLME-TXTIME.confirm primitive and in the RXVECTOR for an S1G MU PPDU is calculated using Equation (24-78)



Where

 denotes the largest integer smaller than or equal to *x*

 is given by Equation (22-65)

 is  for user *u*, where  is defined in Table 24-6 (Frequently used parameters)

 is  for user *u*, where  is defined in Table 24-6 (Frequently used parameters)

 and  are defined in Table 24-4 (Timing-related constants).

The value of the PSDU\_LENGTH parameter returned in the PLME-TXTIME.confirm primitive for an NDP is 0.

**TGah Editor: Please add the following highlighted row in Table 24-1 below to resolve CIDs 3527, 3528, 3529, 3530**

* TXVECTOR and RXVECTOR parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LENGTH | FORMAT is S1G and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G PSDU. | Y | | Y |
| FORMAT is S1G\_DUP\_2M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 2 MHz Duplicate PSDU. | Y | | Y |
| FORMAT is S1G\_DUP\_1M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 1 MHz Duplicate PSDU. | Y | | Y |
| FORMAT is S1G and AGGREGATION is NOT\_AGGREGATED | Indicates the packet duration in number of octets in the S1G PSDU. | Y | | Y |
| FORMAT is S1G\_DUP\_2M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 2 MHz Duplicate PSDU. | Y | | Y |
| FORMAT is S1G\_DUP\_1M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 1 MHz Duplicate PSDU. | Y | | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | | |
| APEP\_LENGTH | FORMAT is S1G | If equal to 0, indicates a S1G NDP PPDU for both RXVECTOR and TXVECTOR.  If greater than 0 in the TXVECTOR, indicates the number of octets in the range 1 to 1 048 575 in the A-MPDU pre-EOF padding (see 9.12.2) carried in the PSDU. This parameter is used to determine the number of OFDM symbols in the Data field that do not appear after a subframe with 1 in the EOF subfield. | MU | O | |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | | |
| PSDU\_LENGTH | FORMAT is S1G | Indicates the number of octets in the S1G PSDU. A value of 0 indicates an S1G NDP PPDU | Y | | Y |
| FORMAT is S1G\_DUP\_2M | Indicates the number of octets in the S1G 2 MHz Duplicate PSDU. A value of 0 indicates an S1G NDP PPDU. | Y | | Y |
| FORMAT is S1G\_DUP\_1M | Indicates the number of octets in the S1G 1 MHz Duplicate PSDU. A value of 0 indicates an S1G NDP PPDU. | Y | | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | | |