IEEE P802.11
Wireless LANs

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| --- |
| Proposed resolutions to comments on clause 26.2.2 |
| Date: 2016-07-20 |
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Abstract

This submission contains proposed comment resolutions to comments 4/28/2016 on D0.1.

The comments assigned to the author in Clause 26.2.2 are:

1925, 1780, 835, 870, 880, 1105, 1609, 370, 1923, 2676, 2136, 2148, 2153, 2243, 2342, 2517, 2675, 1610.

The CID marked as green has been resoluted in 11-16-0663-04-00ax-cr-on-secition-26-2-2.

For comment resolution on CID 370, please refer to 11-16-0815-02-00ax-comment-resolution-mu-rts-scrambler-seed.

This document provides resolutions for the following CIDs:

2517, 1780, 1923, 1610

The changes marked in this document are based on **TGax Draft 0.2**

# Revision Notes

|  |  |
| --- | --- |
| R0 | Initial revision |
| R1 | Add the information about CID 370 in Abstract |
| R2 | Remove TBDs：DOPPLER: remove TBD, modify the descrition per discussion.TXPWR\_BOOST\_FACTOR： replace the range of [TBD1 TBD2] by refering to the parameter in equation （26-4）（26-5）CH\_BANDWIDTH: when format is HE\_MU, replace the TBD by refering to the field of Bandwidth in Table 26-16—Fields in the HE-SIG-A for an HE MU PPDUSPATIAL\_REUSE: replace TBD by adding description and reference. |
| R3 | Add the parameters:HE-LTF\_TYPEHE-LTF\_MODESTARTING\_STS\_NUM |
| R4 | Correct typo on SPATIAL\_REUSE;TXOP\_Duration is addressed in the latest revision of 11-16/877 with sam proposed text. |
|  |  |

## CID 2517

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CID | Page.Line | Clause Number | Comment | Proposed Change | Resolution |
| 2517 | 72.58 | 26.2.2 | Is there a notion of "first PPDU in a TXOP" in a PHY clause? | How does PHY know if this is the first PPDU in a TXOP? For example, do we need to add a TXVECTOR parameter indicating whether a PPDU is the first PPDU in a TXOP? | REVISED.Reason:The MAC layer knows if this PPDU is the first or not and decides the value for the BEAM\_CHANGE parameter. PHY needn't to know that info. Suggest removing this sentence from table 26-1 and add the content to clause 25.TGax Editor to make the changes shown in IEEE 802.11-16/0813r3under all headings that include CID 2517 |

*Changes to D0.2 related to CID 2517:*

**Instruction to Editor:**

***Please*** ***remove the following text*** ***from Table 26-1 in*** ***TGax D0.2 P72L******56:***

~~BEAM\_CHANGE shall be set to 1 if NSS > 2 or the PPDU is the first PPDU in a TXOP.~~

**Instruction to Editor:**

***Please*** ***change the title of subclause 25.11 to***

TXVECTOR parameters STA\_ID\_LIST, UPLINK\_FLAG, BEAM\_CHANGE, and BSS\_COLOR for an HE PPDU

**Instruction to Editor:**

***Please*** ***add the*** ***following paragraph to subclause 25.11:***

The TXVECTOR parameter BEAM\_CHANGE of an HE SU PPDU, HE extended range SU PPDU shall be set to 1 if Nss is bigger than 2 or the PPDU is the first PPDU in a TXOP.

## CID 1780, 1923, 1610

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CID | Page.Line | Clause Number | Comment | Proposed Change | Resolution |
| 1780 | 72.14 | 26.2.2 | Table 26-1 is incomplete | Add all the VHT parameters. Add missing HE parameters (for example, the ones referenced in 25.11) | REVISED. The table needs to be completed.TGax Editor to make the changes shown in IEEE 802.11-16/0813r3under all headings that include CID 1780 |
| 1923 | 72.14 | 26.2.2 | Definition of TXVECTOR and RXVECTOR parameters is very incomplete | Many required parameters are missing from this table. | REVISED.Similar comment to CID 1780. See resolution to CID 1780. |
| 1610 | 72.14 | 26.2.2 | Comparing with earlier PHYs, HE seems to be missing VECTOR parameters | Review HT and VHT to make sure no parameters are missing from HE (for example, the exact NON\_HT\_MODULATION) | REVISED.Similar comment to CID 1780. See resolution to CID 1780. |

*Changes to D0.2 related to CID 1780, 1923, 1610:*

**Instruction to Editor:**

***Please insert all the following entries to table 26-1 in TGax D0.2 P72L 38 one by one under subclause 26.2.2***

### NON\_HT\_MODULATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| NON\_HT\_MODULATION | See corresponding entry in Table 21-1 |

### L\_LENGTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| L\_LENGTH | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU | Not presentNOTE—The Length field of the L-SIG for HE PPDU is defined in Equation(26-17) using the TXTIME value defined in 26.4.3, which in turn depend on other parameters including the TXVECTOR parameter APEP\_LENGTH. | N | N |
| FORMAT is HE\_TRIG | Indicates the value in the Length field of the L-SIG in the range of 1 to 4095. The value comes from the trigger frame which triggers the HE\_TIRG PPDU. | Y | N |
| Otherwise | See corresponding entry in Table 21-1 |

### L\_DATARATE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| L\_DATARATE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not presentNOTE—The RATE field in the L-SIG field in HE PPDU is set to the value representing 6 Mb/s in the 20 MHz channel spacing column of Table17-6 (Contents of the SIGNAL field). | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### LSIGVALID

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LSIGVALID | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### SERVICE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SERVICE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### SMOOTHING

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SMOOTHING | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### AGGREGATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| AGGREGATION | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### NUM\_EXTEN\_SS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NUM\_EXTEN\_SS | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### ANTENNA\_SET

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ANTENNA\_SET | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### N\_TX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| N\_TX | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the number of transmit chains. | Y | N |
| Otherwise | See corresponding entry in Table 21-1 |

### EXPANSION\_MAT\_TYPE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EXPANSION\_MAT\_TYPE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Set to COMPRESSED\_SV. | Y | N |
| Otherwise | See corresponding entry in Table 21-1. |

### EXPANSION\_MAT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EXPANSION\_MAT | FORMAT is HE\_SU or HE\_EXT\_SU or HE\_TRIG | Contains a vector in the number of selected subcarriers containing feedback matrices as defined in 26.3.12.3.2 (Beamforming Feedback) based on the channel measured during the training symbols of previous HE NDP PPDUs or VHT NDP PPDUs. | Y | N |
| FORMAT is HE\_MU | For each user, contains a vector in the number of all the subcarriers within the RU which is assigned to this user. The vector for each subcarrier contains feedback matrics as defined in in 26.3.12.3.2 (Beamforming Feedback) based on the channel measured during the training symbols of previous HE NDP PPDUs or VHT NDP PPDUs. | MU | N |
| Otherwise | See corresponding entry in Table 21-1 |

### CHAN\_MAT\_TYPE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CHAN\_MAT\_TYPE | FORMAT is HE\_SU and PSDU\_LENGTH equals 0 | Set to COMPRESSED\_SV | N | Y |
| FORMAT is HE\_MU or HE\_EXT\_SU or HE\_TRIG or (FORMAT is HE\_SU and PSDU\_LENGTH is greater than 0) | Not present | N | N |
|  | Otherwise | See corresponding entry in Table 21-1 |

### CHAN\_MAT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CHAN\_MAT | FORMAT is HE\_SU and PSDU\_LENGTH equals 0 | Contains a vector in the number of selected subcarriers containing feedback matrices as defined in 26.3.12.3.2 (Beamforming Feedback) based on the channel measured during the training symbols of previous HE NDP PPDU. | N | Y |
| FORMAT is HE\_MU or HE\_EXT\_SU or HE\_TRIG or (FORMAT is HE\_SU and PSDU\_LENGTH is greater than 0) | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### DELTA\_SNR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DELTA\_SNR | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Contains an array of delta SNR values as defined in 9.4.1.63 (HE MU Exclusive Beamforming Report field) based on the channel measured during the training symbols of the received VHT NDP PPDU or HE NDP PPDU.NOTE—In the RXVECTOR this parameter is present only for HE NDP PPDUs for MU sounding. | MU | Y |
| Otherwise | See corresponding entry in Table 21-1 |

### RCPI

|  |  |  |
| --- | --- | --- |
| RCPI |  | See corresponding entry in Table19-1 (TXVECTOR and RXVECTOR parameters) |

### SNR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SNR | FORMAT is HE\_SU or or HE\_EXT\_SU  | Contains an array of received SNR measurements for each spatial stream. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones represented in each stream as described in 9.4.1.62 (HE Compressed Beamforming Report field) | N | Y |
| FORMAT is HE\_MU | Contains an array of received SNR measurements for each spatial stream of the receiver. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones which are assigned to the receiver in each stream as described in 9.4.1.62 (HE Compressed Beamforming Report field) | N | Y |
| FORMAT is HE\_TRIG | Contains an array of received SNR measurements for each spatial stream per user. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones which are assigned to the user in each stream as described in 9.4.1.62 (HE Compressed Beamforming Report field) | N | MU |
| Otherwise | See corresponding entry in Table 21-1 |

### CQI

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CQI | FORMAT is HE\_SU and PSDU\_LENGTH equals 0 | Contains an array of received SNR measurements for each spatial stream per 26-tone. Each SNR is an absolute number represented by 6 bits, with 1 dB granularity and a range of -10 dB to 53 dB | N | Y |
| FORMAT is HE\_MU or HE\_EXT\_SU or HE\_TRIG or (FORMAT is HE\_SU and PSDU\_LENGTH is greater than 0) | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### NO\_SIG\_EXTN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NO\_SIG\_EXTN | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### FEC\_CODING

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FEC\_CODING | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates which FEC encoding is used.Enumerated type:BCC\_CODING indicates binary convolutional code.LDPC\_CODING indicates low-density parity check code. | MU | MU |
| Otherwise | See corresponding entry in Table 21-1 |

### STBC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| STBC | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates if STBC is used.In an HE\_MU PPDU where each RU includes no more than 1 user, set to 1 to indicate all RUs are STBC encoded in the payload, set to 0 to indicate all RUs are not STBC encoded in the payload.In HE\_SU or HE\_EXT\_SU or HE\_TRIG PPDU, 1 indicates STBC is used in the payload, 0 indicates STBC is not used in the payload.STBC is not applied in MU-MIMO RUs, in case of HE\_MU PPDU if any RU is assigned to more than 1 user, STBC is set to 0 to indicate all RUs are not STBC encoded in the payload. | Y | Y |
| Otherwise | See corresponding entry in Table 21-1 |

### GI\_TYPE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GI\_TYPE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the length of GI for HE-LTF and HE-Data.Enumerated type:0.8 µs1.6 µs3.2 µsNote: the length of GI for pre-HE modulated fields should be 0.8µs. | Y | Y |
| Otherwise | See corresponding entry in Table 21-1 |

### TXPWR\_LEVEL\_INDEX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TXPWR\_LEVEL\_INDEX | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | The allowed values for the TXPWR\_LEVEL\_INDEX parameter are in the range from 1 to numberOfOctets (dot11TxPowerLevelExtended)/2. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. | Y | N |
| Otherwise | See corresponding entry in Table 21-1 |

### TXPWR\_BOOST\_FACTOR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TXPWR\_BOOST\_FACTOR | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the power boost factor per RU, see the parameter  in equations (26-4) and (26-5) | MU | N |
| Otherwise | See corresponding entry in Table 21-1 |

### RSSI

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| RSSI | FORMAT is HE\_SU or or HE\_EXT\_SU | The allowed values for the RSSI parameter are in the range 0 to 255 inclusive. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of the HE-LTF field. RSSI is intended to be used in a relative manner, and it is a monotonically increasing function of the received power. | N | Y |
| FORMAT is HE\_MU | The allowed values for the RSSI parameter are in the range 0 to 255 inclusive. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of PHY legacy preamble. RSSI is intended to be used in a relative manner, and it is a monotonically increasing function of the received power. | N | Y |
| FORMAT is HE\_TRIG | Not present. | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### MCS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MCS | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the modulation and coding scheme used in the transmission of the PPDU.Integer: range 0 to 11 | MU | MU |
| Otherwise | See corresponding entry in Table 21-1 |

### MCS\_SIG\_B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MCS\_SIG\_B | FORMAT is HE\_ MU | Indicates the modulation and coding scheme used for HE-SIG-B field.Integer: range 0 to 5 | Y | Y |
| Otherwise | Not present | N | N |

### SIG\_B\_COMPRESSION\_MODE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SIG\_B\_COMPRESSION\_MODE | FORMAT is HE\_ MU | Used to differentiate full bandwidth MU-MIMO from OFDMA MU PPDU. In case of full bandwidth MU-MIMO set to 1, otherwise set to 0. | Y | N |
| Otherwise | Not present | N | N |

### DCM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DCM | FORMAT is HE\_SU or HE\_MU or or HE\_EXT\_SU or HE\_TRIG | 1 indicates dual carrier modulation is used for HE Data field and 0 indicates dual carrier modulation is not used for HE Data field.Note——DCM is only applied to MCS0, MCS1, MCS3 and MCS4.DCM is only applied to 1 and 2 spatial streams. DCM is only applied to HE SU PPDU, HE extend range SU PPDU, and SU RUs in HE MU PPDU.DCM is not applied to MU-MIMO.DCM is not applied to STBC. | MU | MU |
| Otherwise | Not present | N | N |

### DCM\_SIG\_B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DCM\_SIG\_B | FORMAT is HE\_ MU | 1 indicates dual carrier modulation is used for HE-SIG-B field and 0 indicates dual carrier modulation is not used for HE-SIG-B field. | Y | Y |
| Otherwise | Not present | N | N |

### REC\_MCS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| REC\_MCS | FORMAT is HE\_SU or HE\_MU or or HE\_EXT\_SU | Indicates the MCS that the receiver recommends | N | O |
| FORMAT is HE\_ TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### CH\_BANDWIDTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CH\_BANDWIDTH | FORMAT is HE\_SU or HE\_EXT\_SU or HE\_TRIG | Indicates the channel width of the transmitted PPDU:Enumerated type:CBW20 for 20 MHzCBW40 for 40 MHzCBW80 for 80 MHzCBW160 for 160 MHzCBW80+80 for 80+80 MHz | Y | Y |
| FORMAT is HE\_MU | Indicates the channel occupied by the transmitted PPDU, supporting channel bonding. See the field of Bandwidth in Table 26-16 (Fields in the HE-SIG-A for an HE MU PPDU) | Y | Y |
| Otherwise | See corresponding entry in Table 21-1 |

### DYN\_BANDWIDTH\_IN\_NON\_HT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DYN\_BANDWIDTH\_IN\_NON\_HT | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### CH\_BANDWIDTH\_IN\_NON\_HT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CH\_BANDWIDTH\_IN\_NON\_HT | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### LENGTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LENGTH | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### APEP\_LENGTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| APEP\_LENGTH | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | If equal to 0, indicates an HE NDP PPDU.If greater than 0, indicates the number of octets in the range 1 to 1048575 in the A-MPDU pre-EOF padding (see 10.13.2 (A-MPDU length limit rules)) carried in the PSDU. | MU | N |
| Otherwise | See corresponding entry in Table 21-1 |

### PSDU\_LENGTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PSDU\_LENGTH | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the number of octets in the HE PSDU in the range of 0 to aPSDUMaxLength octets (see Table 26-38—HE PHY characteristics). A value of 0 indicates a HE NDP PPDU. | N | Y |
| Otherwise | See corresponding entry in Table 21-1 |

### USER\_POSITION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| USER\_POSITION | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### NUM\_STS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NUM\_STS | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the number of space-time streams.Integer: range 1-8 for HE\_SU, 1~2 for HE\_EXT\_SU,1-4 per user in the TXVECTOR and 0-4 in the RXVECTOR per MU-MIMO RU and 1~8 per non MU-MIMO RU in the TXVECTOR and 0~8 per non MU-MIMO RU in the RXVECTOR for HE\_MU, 1-4 in the TXVECTOR for MU-MIMO RU and 0~4 per user in the RXVECTOR per MU-MIMO RU and 1~8 in the TXVECTOR for non MU-MIMO RU and 0-8 per non MU-MIMO RU in the RXVECTOR for HE\_TRIG.NUM\_STS summed over all users per RU is not greater than 8. | MU | MU |
| Otherwise | See corresponding entry in Table 21-1 |

### GROUP\_ID

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GROUP\_ID | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### PARTIAL\_AID

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PARTIAL\_AID | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### TXOP\_DURATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TXOP\_DURATION | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG |  If B0 is set to 0, the duration information indicated by TXOP\_DURATION is equal to 8 times the value of TXOP\_DURATION from B1 to B6 in units of microseconds. If B0 is set to 1, and B1 to B6 of TXOP\_DURATION is not set to all 1s, then duration information indicated by TXOP\_DURATION is equal to 128 times the value of TXOP\_DURATION from B1 to B6 plus 512 in units of mircoseconds.Note that TXOP\_DURATION set to all 1s indicates no duration information. (see 25.11a (TXVECTOR parameters TXOP\_DURATION for an HE PPDU))  | Y | Y |
| Otherwise | Not present | N | N |

### SPATIAL\_REUSE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SPATIAL\_REUSE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the spatial reuse parameter. There is only one value for HE\_SU, HE\_EX\_SU and HE\_MU PPDU. There might be one to four values for HE\_TRIG PPDU depending on the bandwidth of the PPDU. See the field of Spatial Reuse in 26.3.9.7.2 (Content) | Y | Y |
| Otherwise | Not present | N | N |

### DOPPLER

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DOPPLER | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU | Indicates whether Doppler effect should be considered for the PPDU. The value is 0 or 1  | Y | N |
| Otherwise | Not present | N | N |

### NUM\_USERS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NUM\_USERS | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not presentNote: number of users for HE\_SU, HE\_EXT\_SU and HE\_TRIG PPDU is always 1, the number of users for HE\_MU PPDU can be calculated by RU\_ALLOCATION. | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### RU\_ALLOCATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| RU\_ALLOCATION | FORMAT is HE\_SU or HE\_EXT\_SU | Not present | N | N |
| FORMAT is HE\_MU | Each 8 bit per 20 MHz PPDU BW for signaling:* The RU arrangement in frequency domain
* Number of MU-MIMO allocations

See 26.3.9.8.4 (HE-SIG-B common content) for details. | Y | Y |
| FORMAT is HE\_TRIG | 8 bit for RU allocation in the whole bandwidth.See 9.3.1.23 (Trigger frame format) for details. | Y | N |
| Otherwise | Not present |

### BEAMFORMED

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BEAMFORMED | FORMAT is HE\_SU or HE\_EXT\_SU | Set to 1 if a beamforming steering matrix is applied to the waveform in an SU transmission. Set to 0 otherwise. | Y | O |
| FORMAT is HE\_MU or HE\_TRIG | For single-user allocation in an RU, set to 1 if a beamforming steering matrix is applied, and set to 0 otherwise.For each user in a multi-user allocation in an RU, always set to 0. | MU | O |
| Otherwise | See corresponding entry in Table 21-1 |

### HE-LTF\_TYPE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HE-LTF\_TYPE | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Indicates the type of HE-LTF.Enumerated type: 1x HE-LTF2x HE-LTF4x HE-LTFSee 26.3.9.10 HE-LTF for details. | Y | Y |
| Otherwise | Not present | N | N |

### HE-LTF\_MODE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HE-LTF\_MODE | FORMAT is HE\_TRIG | Indicates whether the UL MU MIMO transmission uses single stream pilots or a mask on each spatial stream of the LTF sequence by a distinct orthogonal code. It is only present for full bandwidth MU-MIMO. | Y | N |
| Otherwise | Not present | N | N |

### STARTING\_STS\_NUM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **STARTING\_STS\_NUM** | FORMAT is HE\_TRIG | Indicates the starting STS number in the global space-time streams for the UL MU MIMO.  | Y | N |
| Otherwise | Not present | N | N |

### TXOP\_PS\_NOT\_ALLOWED

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TXOP\_PS\_NOT\_ALLOWED | FORMAT is HE\_SU or HE\_MU or HE\_EXT\_SU or HE\_TRIG | Not present | N | N |
| Otherwise | See corresponding entry in Table 21-1 |

### TIME\_OF\_DEPARTURE\_REQUESTED

|  |  |  |
| --- | --- | --- |
| TIME\_OF\_DEPARTURE\_REQUESTED |  | See corresponding entry in Table19-1 (TXVECTOR and RXVECTOR parameters) |

### RX\_START\_OF\_FRAME\_OFFSET

|  |  |  |
| --- | --- | --- |
| RX\_START\_OF\_FRAME\_OFFSET |  | See corresponding entry in Table19-1 (TXVECTOR and RXVECTOR parameters) |

### PREAMBLE\_TYPE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PREAMBLE\_TYPE | FORMAT is NON\_HT and NON\_HT\_MODULATION is one of—ERP-DSSS—ERP-CCK | Enumerated type: SHORTPREAMBLELONGPREAMBLE | Y | Y |
| Otherwise  | Not present | N | N |