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Wireless LANs

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Abstract

This document contains a proposed resolution for CID 5914.

**CID 5914**

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| --- | --- | --- | --- | --- | --- |
| 5914 | 22.2.2 | 2458 | 40 | In Table 22-1, sometimes reference is made to Table 20-1 for HT-related values, while sometimes content of Table 20-1 is copied explicitly. | Propose to consistently refer to Table 20-1 when appropriate rather than duplicating text in both Table 22-1 and Table 20-1. |

This CID was discussed earlier in 802.11-15/1090r2 and it was agreed in principle to modify Table 22-1 to avoid duplicating parts of Table 20-1.

The Table below shows Table 22-1 and the proposed modifications. Some issues that require further discussion are highlighted.

 **Table 22-1—TXVECTOR and RXVECTOR parameters**

| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| --- | --- | --- | --- | --- |
| FORMAT |  | Determines the format of the PPDU.Enumerated type:NON\_HT indicates Clause 18 (Orthogonal frequency divisionmultiplexing (OFDM) PHY specification) (Orthogonalfrequency division multiplexing (OFDM) PHY specification)or non-HT duplicate PPDU format. In this case, themodulation is determined by the NON\_HT\_MODULATIONparameter.HT\_MF indicates HT-mixed format.HT\_GF indicates HT-greenfield format.VHT indicates VHT format. | Y | Y |
| NON\_HT\_MODULATION | FORMAT is NON\_HT | In TXVECTOR, indicates the format type of the transmitted non-HT PPDU.In RXVECTOR, indicates the estimated format type of thereceived non-HT PPDU.Enumerated type:OFDM indicates Clause 18 (Orthogonal frequency divisionmultiplexing (OFDM) PHY specification) (Orthogonalfrequency division multiplexing (OFDM) PHY specification)formatNON\_HT\_DUP\_OFDM indicates non-HT duplicate format | Y | Y |
| Otherwise | Not Present | N | N |
| L\_LENGTH |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| FORMAT is VHT | Not presentNOTE—The Length field of the L-SIG in VHT PPDUs isdefined in Equation (22-24) using the TXTIME value defined byEquation (22-110) and Equation (22-111), which in turn dependon other parameters including the TXVECTOR parameterAPEP\_LENGTH. | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| L\_DATARATE |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| FORMAT is VHT | Not presentNOTE—The RATE field in the L-SIG field in a VHT PPDU isset to the value representing 6 Mb/s in the 20 MHz channelspacing column of Table 18-6 (Contents of the SIGNAL field). | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LSIGVALID | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| SERVICE | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| SMOOTHING | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| AGGRGATION | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| NUM\_EXTEN\_SS | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| ANTENNA\_SET | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| N\_TX | FORMAT is VHT | Indicates the number of transmit chains. | Y | N |
|  |  |  |  |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| EXPANSION\_MAT\_TYPE | FORMAT is VHT andEXPANSION\_MATis present. | Set to COMPRESSED\_SV | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| EXPANSION\_MAT | FORMAT is VHT andEXPANSION\_MATis present. | Contains a vector in the number of selected subcarrierscontaining feedback matrices as defined in 22.3.11.2(Beamforming Feedback Matrix V) based on the channelmeasured during the training symbols of a previous VHT NDPPPDU. | MU | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| CHAN\_MAT\_TYPE | FORMAT is VHT andPSDU\_LENGTH equals 0 | Set to COMPRESSED\_SV | N | Y |
| FORMAT is VHT andPSDU\_LENGTH isgreater than 0 | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| CHAN\_MAT | FORMAT is VHT andPSDU\_LENGTH equals 0 | Contains a set of compressed beamforming feedback matrices asdefined in 22.3.11.2 (Beamforming Feedback Matrix V) basedon the channel measured during the training symbols of thereceived VHT NDP PPDU. | N | Y |
| FORMAT is VHT andPSDU\_LENGTH isgreater than 0 | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| DELTA\_SNR | FORMAT is VHT | (MU Exclusive Beamforming Report field) based on the channelmeasured during the training symbols of the received VHT NDPPPDU.NOTE—In the RXVECTOR this parameter is present only forVHT NDP PPDUs for MU sounding. | MU | Y |
| Otherwise | Not Present | N | N |
| RCPI |  | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) | N | Y |
| SNR | FORMAT is VHT | Contains an array of received SNR measurements for eachspatial stream. SNR indications of 8 bits are supported. SNRshall be the sum of the decibel values of SNR per tone divided bythe number of tones represented in each stream as described in8.4.1.48 (VHT Compressed Beamforming Report field) | N | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| NO\_SIG\_EXTN | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| FEC\_CODING | FORMAT is VHT | Indicates which FEC encoding is used.Enumerated type:BCC\_CODING indicates binary convolutional code.LDPC\_CODING indicates low-density parity check code. | MU | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| STBC | FORMAT is VHT | Indicates whether STBC is used.0 indicates no STBC (*NSTS=NSS* in the Data field).1 indicates STBC is used (*NSTS=2NSS* in the Data field)*.*This parameter is 0 for a VHT MU PPDU. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| GI\_TYPE | FORMAT is VHT | Indicates whether a short guard interval is used in thetransmission of the Data field of the PPDU.Enumerated type:LONG\_GI indicates short GI is not used in the Data field ofthe PPDU.SHORT\_GI indicates short GI is used in the Data field of thePPDU. | Y | Y |
| Otherwise | Not present |
| TXPWR\_LEVEL | FORMAT is VHT | The allowed values for the TXPWR\_LEVEL parameter are inthe range from 1 tonumberOfOctets(dot11TxPowerLevelExtended)/2. Thisparameter is used to indicate which of the available transmitoutput power levels defined in dot11TxPowerLevelExtendedshall be used for the current transmission. | Y | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| RSSI | FORMAT is VHT | The allowed values for the RSSI parameter are in the range 0 to255 inclusive. This parameter is a measure by the PHY of thepower observed at the antennas used to receive the current PPDUmeasured during the reception of the VHT-LTF field. RSSI isintended to be used in a relative manner, and it is amonotonically increasing function of the received power. | N | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| MCS | FORMAT is VHT | Indicates the modulation and coding scheme used in thetransmission of the PPDU.Integer: range 0 to 9 | MU | Y |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| REC\_MCS | FORMAT is VHT | Indicates the modulation and coding scheme used in thetransmission of the PPDU.Integer: range 0 to 9 | N | O |
| Otherwise | Not present | N | N |
| CH\_BANDWIDTH | FORMAT is HT\_MF orHT\_GF | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| FORMAT is VHT | 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 NON\_HT | In TXVECTOR, indicates the channel width of the transmittedPPDU.In RXVECTOR, indicates the estimated channel width of thereceived PPDU.Enumerated type:CBW40, CBW80, CBW160, or CBW80+80 ifNON\_HT\_MODULATION equalsNON\_HT\_DUP\_OFDMCBW20 if NON\_HT\_MODULATION equals OFDM | Y | Y |
| DYN\_BANDWIDTH\_IN\_NON\_HT | FORMAT is NON\_HT | In TXVECTOR, if present, indicates whether the transmitter iscapable of Static or Dynamic bandwidth operation.In RXVECTOR, if valid, indicates whether the transmitter iscapable of Static or Dynamic bandwidth operation.Enumerated type:Static if the transmitter is capable of Static bandwidthoperationDynamic if the transmitter is capable of Dynamic bandwidthoperationNOTE—In the RXVECTOR, the validity of this parameter isdetermined by the MAC based on the contents of the receivedMPDU. | O | Y |
| Otherwise | Not present | N | N |
| CH\_BANDWIDTH\_IN\_NON\_HT | FORMAT is NON\_HT | In TXVECTOR, if present, indicates the channel width of thetransmitted PPDU, which is signaled via the scramblingsequence.In RXVECTOR, if valid, indicates the channel width of thereceived PPDU, which is signaled via the scrambling sequence.Enumerated type:CBW20, CBW40, CBW80, CBW160, CBW80+80NOTE—In the RXVECTOR, the validity of this parameter isdetermined by the MAC based on the contents of the currentlyreceived MPDU (e.g., RTS) or the previous MPDU in anexchange (e.g., the RTS preceding a CTS). | O | Y |
| Otherwise | Not present | N | N |
| LENGTH | FORMAT is VHT | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTOR parameters) |
| APEP\_LENGTH | FORMAT is VHT | If equal to 0, indicates a VHT NDP PPDU for both RXVECTORand TXVECTOR.If greater than 0 in the TXVECTOR, indicates the number ofoctets in the range 1 to 1 048 575 in the A-MPDU pre-EOFpadding (see 9.13.2 (A-MPDU length limit rules)) carried in thePSDU.If greater than 0 in the RXVECTOR, this parameter is the valueobtained from the VHT-SIG-B Length field multiplied by 4. | MU | O |
| Otherwise | Not present | N | N |
| PSDU\_LENGTH | FORMAT is VHT | Indicates the number of octets in the VHT PSDU in the range of0 to 1 048 575 octets. A value of 0 indicates a VHT NDP PPDU. | N | Y |
| Otherwise | Not present | N | N |
| USER\_POSITITION | FORMAT is VHT and1 ≤ GROUP\_ID ≤ 62 | Index for user in MU transmission. Integer: range 0-3.NOTE—The entries in the USER\_POSITION array are inascending order. | MU | O |
| Otherwise | Not present | N | N |
| NUM\_STS | FORMAT is VHT | Indicates the number of space-time streams.Integer: range 1-8 for SU, 1-4 per user in the TXVECTOR and 0-4 in the RXVECTOR for MU.NUM\_STS summed over all users is in the range 1 to 8. | MU | Y |
| Otherwise | Not present | N | N |
| GROUP\_ID | FORMAT is VHT | Indicates the group ID.Integer: range 0-63 (see Table 22-12 (Fields in the VHT-SIG-Afield))A value of 0 or 63 indicates a VHT SU PPDU. A value in therange 1 to 62 indicates a VHT MU PPDU. | Y | Y |
| Otherwise | Not present | N | N |
| PARTIAL\_AID | FORMAT is VHT andGROUP\_ID is 0 or 63 | Provides an abbreviated indication of the intended recipient(s) ofthe PSDU (see 9.20 (Group ID and partial AID in VHTPPDUs)).Integer: range 0-511. | Y | Y |
| Otherwise | Not present | N | N |
| NUM\_USERS | FORMAT is VHT | Indicates the number of users with nonzero space-time streams.Integer: range 1 to 4. | Y | N |
| Otherwise | Not present | N | N |
| BEAMFORMED | FORMAT is VHT andGROUP\_ID is 0 or 63 | Set to 1 if a beamforming steering matrix is applied to thewaveform in an SU transmission as described in 20.3.11.11.2(Spatial mapping). Set to 0 otherwise.NOTE—When BEAMFORMED is set to 1, frequency domainsmoothing as part of channel estimation is not recommended. | Y | O |
| Otherwise | Not present | N | N |
| TXOP\_PS\_NOT\_ALLOWED | FORMAT is VHT | Indicates whether a VHT AP allows non-AP VHT STAs in VHTTXOP power save mode to enter doze state during the TXOP.0 indicates that the VHT AP allows non-AP VHT STAs to enterdoze state during a TXOP.1 indicates that the VHT AP does not allow non-AP VHT STAsto enter doze state during a TXOP. | Y | Y |
| Otherwise | Not present | N | N |
| TIME\_OF\_DEPARTURE\_REQUESTED |  |  |  |  |
|  | See corresponding entry in Table 20-1 (TXVECTOR and RXVECTORparameters) |
| RX\_START\_OF\_FRAME\_OFFSET | dot11TimingMsmtActivated is true | 0 to 232– 1. An estimate of the offset (in 10 ns units) from thepoint in time at which the start of the preamble corresponding tothe incoming frame arrived at the receive antenna connector tothe point in time at which this primitive is issued to the MAC. | N | Y |
| Otherwise | Not present | N | N |
| NOTE 1—In the “TXVECTOR” and “RXVECTOR” columns, the following apply:Y = Present;N = Not present;O = Optional;MU indicates that the parameter is present once for a VHT SU PPDU and present per user for a VHT MU PPDU.Parameters specified to be present per user are conceptually supplied as an array of values indexed by *u*, where *u*takes values 0 to NUM\_USERS-1.NOTE 2—On reception, where valid, the CH\_BANDWIDTH\_IN\_NON\_HT parameter is likely to be a more reliableindication of subformat and channel width than the NON\_HT\_MODULATION and CH\_BANDWIDTH parameters,since for non-HT or non-HT duplicate frames, CH\_BANDWIDTH is a receiver estimate of the bandwidth, whereasCH\_BANDWIDTH\_IN\_NON\_HT is the signaled bandwidth. |