IEEE P802.11  
Wireless LANs

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| D1 Comment Resolution, brianh, part 1 | | | | |
| Date: 2011-07-06 | | | | |
| Author(s): | | | | |
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##### Baseline is 11ac D1.0. Changes indicated by a mixture of Word track-changes and instructions. For equation changes, Latex notation is sometimes used. E.g. a\_{xyz}^b denotes axyzb

Coex CIDs addressed [16]:

2045, 2339, 2688, 2046, 2689, 2047, 2048

2600

2341

2340

2173, 2344

2198, 3193

2436, 2437

##### Coex

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2045 | Asai, Yusuke | 102.19 | 17.2.2 | CBW80+80 shall also be defined as one of values for TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT because non-HT duplicate mode using 80+80MHz channel is defined in Table 22-2. | As in comment. | **Accept: see 11/926r0** | COEX |
| 2339 | Hart, Brian | 102.19 | 17.2.2 | Add CBW80+80. Ditto 17.2.2.7, Table 17-2, 17.2.3.7 | As in comment | **Accept: see 11/926r0** | COEX |
| 2688 | Kim, Youhan | 102.19 | 17.2.2 | CBW80+80 is missing. Same comment for P103L14 | Change CBW160 to CBW160/CBW80+80 | **Accept: see 11/926r0** | COEX |
| 2046 | Asai, Yusuke | 102.31 | 17.2.2.7 | CBW80+80 shall also be defined as one of values for TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT because non-HT duplicate mode using 80+80MHz channel is defined in Table 22-2. | As in comment. | **Accept: see 11/926r0** | COEX |
| 2689 | Kim, Youhan | 102.32 | 17.2.7 | CBW80+80 is missing. Same comment for P103L27 | Change CBW160 to CBW160/CBW80+80 | **Accept: see 11/926r0** | COEX |
| 2047 | Asai, Yusuke | 103.13 | 17.2.3 | CBW80+80 shall also be defined as one of values for RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT because non-HT duplicate mode using 80+80MHz channel is defined in Table 22-2. | As in comment. | **Accept: see 11/926r0** | COEX |
| 2048 | Asai, Yusuke | 103.26 | 17.2.3.7 | CBW80+80 shall also be defined as one of values for RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT because non-HT duplicate mode using 80+80MHz channel is defined in Table 22-2. | As in comment. | **Accept: see 11/926r0** | COEX |

**Discussion**: Simple oversight that needs to be fixed as per comments.

**Change:**

**17.2.2 TXVECTOR parameters**

***Insert new rows for CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT at the***

***end of the Table 17-1:***

**Table 17-1—TXVECTOR parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Associate primitive** | **Value** |
| CH\_BANDWIDTH\_IN\_NON\_HT | PHY-TXSTART.request(TXVECTOR) | If present, CBW20, CBW40, CBW80, CBW160 and CBW80+80 |
| DYN\_BANDWIDTH\_IN\_NON\_HT | PHY-TXSTART.request(TXVECTOR) | If present, Static and Dynamic |

***Insert sections 17.2.2.7 and 17.2.2.8 following 17.2.2.6 as follows:***

**17.2.2.7 TXVECTOR CH\_BANDWIDTH\_IN\_NON\_HT**

If present, the allowed values for CH\_BANDWIDTH\_IN\_NON\_HT are CBW20, CBW40, CBW80,

CBW160 and CBW80+80. If present, this parameter is used to modify the first 7 bits of the scrambling sequence to indicate the duplicated bandwidth of the PPDU.

**17.2.3 RXVECTOR parameters**

***Insert new rows for CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT at the***

***end of the Table 17-2:***

**Table 17-2—RXVECTOR parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Associate primitive** | **Value** |
| CH\_BANDWIDTH\_IN\_NON\_HT | PHY-RXSTART.request(RXVECTOR) | If present, CBW20, CBW40, CBW80, CBW160 and CW80+80 |
| DYN\_BANDWIDTH\_IN\_NON\_HT | PHY-RXSTART.request(RXVECTOR) | If present, Static and Dynamic |

***Insert new sections 17.2.3.7 and 17.2.3.8 following 17.2.3.6 as follows:***

**17.2.3.7 RXVECTOR CH\_BANDWIDTH\_IN\_NON\_HT**

If present, the allowed values for CH\_BANDWIDTH\_IN\_NON\_HT are CBW20, CBW40, CBW80,

CBW160 and CBW80+80. If present and valid, this parameter indicates the duplicated bandwidth of the PPDU. The validity of this parameter is determined by the MAC.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2600 | Hunter, David | 102.45 | 17.2.2.8 | This appears to be a requirement, not a statement of fact. | Replace "is also" with "shall also be" both here and on line 40 of page 103. | **Agree in principle. Since this defines an interface, the language should be descriptive. Instead, add normative language for the requirement to 9.7.9. See 11/926r0** | COEX |

***Insert a new section 9.7.9 following 9.7.8 as follows:***

**9.7.9 Channel Width in Non-HT and Non-HT Duplicate PPDUs**

A non-VHT STA shall include neither the CH\_BANDWIDTH\_IN\_NON\_HT parameter nor the DYN\_BANDWIDTH\_IN\_NON\_HT parameter in either of the Clause 17 TXVECTOR or RXVECTOR. A non-VHT STA shall not set the Individual/Group bit in the TA field to 1. A VHT STA that includes the DYN\_BANDWIDTH\_IN\_NON\_HT parameter in the TXVECTOR shall also include the CH\_BANDWIDTH\_IN\_NON\_HT parameter in the TXVECTOR. A VHT STA shall include both the CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT parameters in the Clause 17 RXVECTOR.

**17.2.3.7 RXVECTOR CH\_BANDWIDTH\_IN\_NON\_HT**

NOTE—The CH\_BANDWIDTH\_IN\_NON\_HT parameter is not present when the frame is received by a non-VHT

STA (see section 9.7.9 (Channel Width in Non-HT and Non-HT Duplicate PPDUs)).

**17.2.3.8 RXVECTOR DYN\_BANDWIDTH\_IN\_NON\_HT**

NOTE—The DYN\_BANDWIDTH\_IN\_NON\_HT parameter is not present when the frame is received by a non-VHT

STA (see section 9.7.9 (Channel Width in Non-HT and Non-HT Duplicate PPDUs)).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2341 | Hart, Brian | 103.62 | 17.3.2.2 | "pseudo-random nonzero integer, CHBW and if present, DYNBW" but sometimes it can be zero. | Change to something like "CHHBW, and if present, DYNBW, and a pseudo-random integer constrained such that the first 7 bits of the scambling seq are nonzero" | **Agree in principle. The commenter is correct that the current descriptive language does not handle all cases. Implement the proposed changes while keeping it readable as per 11/926r0** | COEX |

**Change:**

**17.3.2.2 Overview of the PPDU encoding process**

***Change step e) as follows:***

e) If the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT is not present, i~~I~~nitiate the scrambler with a pseudo-random nonzero seed~~,~~ and generate a scrambling sequence. If the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT is present, construct the first 7 bits of the scrambling sequence from a) CH\_BANDWIDTH\_IN\_NON\_HT b) if present, DYN\_BANDWIDTH\_IN\_NON\_HT and c) a pseudo-random integer constrained such that the first 7 bits of the scrambling sequence are not all zeros; then set the scrambler state to these 7 bits and generate the remainder of the scrambling sequence. ~~, and~~ XOR ~~it~~ the scrambling sequence with the extended string of data bits. Refer to 17.3.5.4 (PLCP DATA scrambler and descrambler) for details.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2340 | Hart, Brian | 103.29 | 17.2.3.7 | "validity … is determined by the MAC" | Add a reference to the clause where this language is. Ditto 17.2.3.8 | **Agree in principle. The MAC language has been changed to remove the definition for “valid” so include references and adapt the PHY language accordingly. See 11/926r0** | COEX |

**17.2.3.7 RXVECTOR CH\_BANDWIDTH\_IN\_NON\_HT**

If present, the allowed values for CH\_BANDWIDTH\_IN\_NON\_HT are CBW20, CBW40, CBW80, and

CBW160. If present and valid, this parameter indicates the duplicated bandwidth of the PPDU. This parameter is only used by the MAC when valid (see 9.3.2.7 (CTS procedure) and 9.7.5.6 (Channel Width selection for control frames)).

**17.2.3.8 RXVECTOR DYN\_BANDWIDTH\_IN\_NON\_HT**

If present, the allowed values for DYN\_BANDWIDTH\_IN\_NON\_HT are Static and Dynamic. If present and

valid, this parameter indicates whether the transmitter is capable of Static or Dynamic bandwidth operation.

This parameter is only used by the MAC when valid (see 9.3.2.7 (CTS procedure) and 9.7.5.6 (Channel Width selection for control frames)). If DYN\_BANDWIDTH\_IN\_NON\_HT is present, then CH\_BANDWIDTH\_IN\_NON\_HT is also present.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2173 | Chu, Liwen | 104.51 | 17.3.5.5 | change to "4 bit pseudo-random nonzero integer if CH\_BANDWIDTH\_IN\_NON\_HT equals CBW20 and DYN\_BANDWIDTH\_IN\_NON\_HT is 0, otherwise a 4 bit pseudorandom integer " | As proposed. | **Agree in principle: See CID 2344** | COEX |
| 2344 | Hart, Brian | 104.53 | 17.3.5.5 | if CHBW equals CBW20 and a 4 bit pseudo-random integer otherwise | if DYN\_BANDWIDTH\_IN\_NON\_HT equals Static and CHBW equals CBW20, and a 4 bit pseudo-random integer otherwise | **Accept: see 11/926r0** | COEX |

**Discussion**: Use a named constant (Static) rather than the value (0). Also, clarify the parameters used to construct the first 7 bits of the scrambling sequence

**Discussion**: See rollup of changes after next CIDs

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2198 | Dehghan, Hossein | 104.40 | 17.3.5.5 | 8.3.1.2 states that setting the Individual/Group bit to 1 indicates that the scrambling sequence carries the parameters CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT. It's not clear how the presence of these parameters can be conveyed separately to the receiver. Ho can the receiver distinguish between DYN\_BANDWIDTH\_IN\_NON\_HT present or not present? | Clarify | **Agree in principle. Add a row for the RXVECTOR case and associated text. See 11/926r0** | COEX |
| 3193 | Perahia, Eldad | 104.51 | 17.3.5.5 | on reception, how does the receiver know whether the DYN\_BANDWIDTH\_IN\_NON\_HT is present or not? B4 is either 0 or 1 if present, but it will also randomly be 0 or 1 if not present. | please clarify | **Agree in principle. Add a row for the RXVECTOR case and associated text. See 11/926r0** | COEX |

**Discussion**: The existing table only deals with the TXVECTOR case, and certainly the RXVECTOR case is more different. Therefore add an extra row to the table to deal with the TXVECTOR case.

Additional background. In clause 17, in regards to the receiver, “presence” refers the existence of CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT parameters in the RXVECTOR. For non-VHT STAs, these parameters are never present, from 9.7.9. For VHT STAs, (according to clarifications made under CID 2600), these parameters are always present. Hence the PHY receiver, by virtue of knowing its PHY capability, knows when these should be present in the RXVECTOR or not.

Importantly, “presence” does not refer to the *validity* of these fields. Since the VHT PHY receiver does not consult the TA field, the VHT PHY receiver cannot know whether these these values are valid or not. What the VHT PHY receiver does is to always extract values for the CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT parameters from the relevant bits in the scrambling sequence, then to send these values to the VHT MAC receiver. The MAC processes them if valid, and not otherwise. Hence the field descriptions in the PHY are conditional: i.e. “if valid”.

**Changes:**

**17.3.5.5 PLCP DATA scrambler and descrambler**

***Change section 17.3.5.5 and insert new Tables 17-ac1, 17-acXX100 and 17-acXX101 as follows:***

The 127-bit sequence generated repeatedly by the scrambler shall be (leftmost used first), 00001110

11110010 11001001 00000010 00100110 00101110 10110110 00001100 11010100 11100111 10110100

00101010 11111010 01010001 10111000 1111111, when the all ones initial state is used. The same scrambler

is used to scramble transmit data and to descramble receive data. If the TXVECTOR parameter

CH\_BANDWIDTH\_IN\_NON\_HT is not present, w~~W~~hen transmitting, the initial state of the scrambler shall

be set to a pseudo-random nonzero state. If the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT

is present,

— the first 7 bits of the scrambling sequence shall be set as shown in Table 17-ac1 (with fields defined in Tables 17-acXX100 and 17-acXX101) and shall be also used to initialize the state of the scramblr, and

— the scrambler with this initialization shall generate the remainder (i.e. after the first 7 bits) of the

scrambling sequence as shown in Figure 17-7.

— CH\_BANDWIDTH\_IN\_NON\_HT is transmitted LSB first. For example, CBW80 has a value of 2,

which is ’10’ in binary representation, hence, B5=0 and B6=1.

**Table 17-ac1—CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT in First 7 Bits of Scrambling Sequence**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **First 7 bits of Scrambling Sequence** | | |
| TXVECTOR | CH\_BANDWIDTH\_IN\_NON\_HT is present and DYN\_BANDWIDTH\_IN\_NOT\_HT is not present in TXVECTOR | 5 bit pseudo-random nonzero integer if CH\_BANDWIDTH\_IN\_NON\_HT equals CBW20, and a 5 bit pseudo-random integer otherwise | | CH\_BANDWIDTH\_IN\_NON\_HT |
| TXVECTOR | CH\_BANDWIDTH\_IN\_NON\_HT is present and DYN\_BANDWIDTH\_IN\_NOT\_HT is present in TXVECTOR | 4 bit pseudo-random nonzero integer if CH\_BANDWIDTH\_IN\_NON\_HT equals CBW20 and DYN\_BANDWIDTH\_IN\_NON\_HT equals Static, and a 4 bit pseudorandom integer otherwise | DYN\_BANDWIDTH\_IN\_NON\_HT |
| RXVECTOR | CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NOT\_HT are present in RXVECTOR | - | DYN\_BANDWIDTH\_IN\_NON\_HT | CH\_BANDWIDTH\_IN\_NON\_HT |
|  |  | B0 B3 | B4 | B5 B6 |

During reception by a VHT STA, the CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT parameters in RXVECTOR shall be set to selected bits in the scrambling sequence as shown in Table 17-ac1. The fields shall be interpreted as being sent LSB-first, and then shall be mapped to the named values defined in Tables 17-acXX100 and 17-acXX101.

Note: It is the responsibility of the MAC to determine the validity of the CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT parameters in the RXVECTOR, since their validity cannot be determined by the PHY.

Table 17-acXX100 – **CH\_BANDWIDTH\_IN\_NON\_HT values**

|  |  |
| --- | --- |
| **Named value** | **Value** |
| CBW20 | 0 |
| CBW40 | 1 |
| CBW80 | 2 |
| CBW160 or CBW80+80 | 3 |

Table 17-acXX101 – **DYN\_BANDWIDTH\_IN\_NON\_HT values**

|  |  |
| --- | --- |
| **Named value** | **Value** |
| Static | 0 |
| Dynamic | 1 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2436 | Hart, Brian | 157.57 | 22.3.10.4 | "scrambled … and intialized with a … seed" is back to front: first you need the seed, then perform the scrambling | "The scrambler shall be initialixed with … seed, then the SERVICE … pad parts … shall be scrambled by the scrambler defined in 17.xxx" | **Agree in principle. Given CID 2437, an alternative wording without a reordering is called for. See 11/926r0** | COEX |
| 2437 | Hart, Brian | 157.57 | 22.3.10.4 | "defined in 17.3.5.4" but this has been generalized and the ref seems to be wrong | 17.3.5.4 => 17.3.5.5, and for clarity, write "The TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT is not present" | **Agree in principle. Use “defined not to be present” for clarity, and merge with existing scrambler seed language for clarity. LEverage the comment for other fixes too. See 11/926r0** | COEX |

**Discussion**: The clarifications requested for CID 2437 also apply to clause 18 and 19, so apply them there too. As well, for MU-MIMO, clarify that different users can use different scrambling seeds.

**18.3.3.4.1 General**

The scrambler of 16.2.4 (PLCP/High Rate PHY data scrambler and descrambler) is used to scramble the

DSSS-OFDM PLCP header, and the scrambler in 17.3.5.5 (PLCP DATA scrambler and descrambler) is

used to scramble the data symbols in the OFDM segment, where the Clause 17 TXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT are defined not to be present.

**19.3.11.3 Scrambler**

The data field shall be scrambled by the scrambler defined in 17.3.5.5 (PLCP DATA scrambler and

descrambler). The Clause 17 TXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT are defined not to be present, and so the initial state of the scrambler is set to a pseudo-random nonzero seed.

**22.3.10.4 Scrambler**

The SERVICE, PSDU and pad parts of the Data field shall be scrambled by the scrambler defined in 17.3.5.5 (PLCP DATA scrambler and descrambler). The Clause 17 TXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT are defined not to be present, and so the initial state of the scrambler is set to a pseudo-random nonzero seed. Different users in a multi-user PPDU may use different pseudo-random nonzero seeds.