IEEE P802.11 Wireless LANs

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| Proposal of Spec Text Changes for TRIGVECTOR | | | | |
| Date: 2017-09-11 | | | | |
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Abstract

This submission provisions with resolutions to CID 0084 on clause 8.3.4.4 (Vector descriptions) of TGax D1.0, including suggested spec text modification to IEEE P802.11ax D1.4 to TGax editor.

Revisions:

* R0: initial draft.

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 TGax Draft. This introduction is not part of the adopted material.

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

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

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| **CID** | **Clause Number** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 0084 | 8.3.4.4 | 549.00 | 11ax has a new PHY that introduces a bunch of parameters. As such Table 8-4 (Vector descriptions) needs to be updated. | As in comment. | **Revised**  Agree in principle.  TGax Editor: please make changes to IEEE P802.11ax D1.4 according to the proposed text changes in 11-17/1454r0 |

Discussion:

In current 11ax spec, the receiving parameters of a HE\_TB PPDU is not included in the preamble of the HE\_TB PPDU. How the receiver’s PHY knows these parameters to receive an HE\_TB PPDU is not defined. Typically these parameters are included in a Trigger frame for STA to prepare for HE\_TB PPDU transmission. But the AP’s PHY should also know these parameters to prepare for the receiving of the HE\_TB PPDU since these parameters will not be included in the preamble of an HE\_TB PPDU.

Therefore 11ax spec should include one more parameter vector for MAC to indicate PHY of the receiving parameters for coming HE \_TB PPDU.

***TGax Editor: please add new rows to end of Table 8-4 (Vector descriptions) in clause 8.3.4.4 (Vector description) as below.:***

**Table 8-4 – Vector descriptions**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Associated vector** | **Values** |
| … | … | … |
| **CH\_BANDWIDTH** | TRIGVECTOR | Indicates the bandwidth in the HE-SIG-A of the HE TB PPDU.  Enumerated type:  CBW20 for 20 MHz  CBW40 for 40 MHz  CBW80 for 80 MHz  CBW160 for 160 MHz CBW80+80 for 80+80 MHz |
| **GI\_HELTF TYPE** | TRIGVECTOR | Indicates the GI and HE-LTF type of the coming HE TB PPDU.    Enumerated type:  1x LTF + 1.6 *u*s GI  2x LTF + 1.6 *u*s GI  4x LTF + 3.2 *u*s GI |
| **MU-MIMO LTF MODE** | TRIGVECTOR | Indicates the LTF mode of the UL MUMIMO HE TB PPDU.  Set to 0 to indicate that HE single stream pilot HE LTF mode is used.  Set to 1 to indicate that HE masked HE LTF sequence mode is used. |
| **NUMBER\_OF\_HELTF\_SYMBOLS** | TRIGVECTOR | Indicates the number of HE-LTF symbols present in the HE TB PPDU.  Set to 0 for 1 HE-LTF symbol  Set to 1 for 2 HE-LTF symbols  Set to 2 for 4 HE-LTF symbols  Set to 3 for 6 HE-LTF symbols  Set to 4 for 8 HE-LTF symbols  Other values are reserved. |
| **STBC** | TRIGVECTOR | Indicates the status of STBC encoding of the HE TB PPDU.  Set to 1 if STBC encoding is used.  Set to 0 otherwise. |
| **LDPC\_EXTRA\_SYMBOL** | TRIGVECTOR | Indicates the status of the LDPC extra symbol segment.  Set to 1 if LDPC extra symbol segment is present  Set to 0 otherwise. |
| **PRE-FEC FACTOR** | TRIGVECTOR | Indicates the pre-FEC padding factor.  Set to 0 to indicate a pre-FEC padding factor of 4.  Set to 1 to indicate a pre-FEC padding factor of 1.  Set to 2 to indicate a pre-FEC padding factor of 2.  Set to 3 to indicate a pre-FEC padding factor of 3. |
| **PE DISAMBIGUITY** | TRIGVECTOR | Indicates PE disambiguity.  Set to 0 to indicate no PE disambiguity.  Set to 1 to indicate PE disambiguity. |
| **SPATIAL\_REUSE** | TRIGVECTOR | Indicates the value for the Spatial Reuse field in the HE-SIG-A field of the coming HE TB PPDU    NOTE—For 20 MHz one SR field corresponding to entire 20 MHz (other 3 fields indicate identical values); For 40 MHz two SR fields for each 20 MHz (other 2 fields indicate identical values); For 80 MHz four SR fields for each 20 MHz;For 160 MHz four SR fields for each 40 MHz. |
| **DOPPLER** | TRIGVECTOR | Indicates a high Doppler mode of transmission.  Set to 0 to indicate a high Doppler mode of transmission  Set to 1 otherwise. |
| **AID12 LIST** | TRIGVECTOR | Carries the 12 LSBs of the AID of each triggered STA.  NOTE—Each element of AIDLIST is (12-bit) AID of the corresponding HE TB PPDU. Please see subfield AID12 in 9.3.1.23 for more information of each element . |
| **RU\_ALLOCATION\_LIST** | TRIGVECTOR | 8 bits are used per STA to indicate the RU allocated in the whole bandwidth with the same encoding scheme as in Table 9-25g (The encoding of B19-B13 of the RU Allocation subfield).  See 9.3.1.23 (Trigger frame format) for details. |
| **CODINGTYPE\_LIST** | TRIGVECTOR | Carries the code type of each triggered STA in coming HE\_TB PPDU.  NOTE—Each element of CODINGTYPE\_LIST indicates coding type of the corresponding HE TB PPDU. Please see Coding Type subfield in 9.3.1.23 for more information of each element. |
| **MCS\_LIST** | TRIGVECTOR | Carries the MCS of each triggered STA in coming HE\_TB PPDU.  NOTE—Each element of MCS\_LIST indicates MCS of the corresponding HE TB PPDU. Please see Coding Type subfield in 9.3.1.23 for more information of each element. |
| **SS\_ALLOCATION\_LIST** | TRIGVECTOR | Indicates spatial streams of each triggered STA in coming HE\_TB PPDU  NOTE—Each element of SS\_ALLOCATION\_LIST indicates spatial streams of the corresponding HE TB PPDU.Please see SS Allocation subfield in 9.3.1.23 for more information of each element. |

***TGax Editor: please the following paragraph to the end of clause 8.3.4.4 Vector descriptions***

The Clause 28 PHY TXVECTOR and RXVECTOR contain additional parameters related to the operation of the Clause 28 PHY modes of operation as described in 28.2. In certain modes of operation, the DATARATE parameter is replaced by MCS, CH\_BANDWIDTH, RU\_ALLOCATION, NUM\_STS, STBC, GI\_TYPE and DCM values. The mapping from these values to data rate is defined 28.5, where HE-MCS is MCS and NSS is NUM\_STS / (STBC + 1).

***TGax Editor: please add new clause 8.3.5.18 PHY-TRIGGER.reqeust and 8.3.5.19 PHY-TRIGGER.confirm as below:***

**8.3.5.18 PHY-TRIGGER.request**

**8.3.5.18.1 Function**

This primitive is a request by the MAC sublayer to the local PHY entity to provide parameters for the receipt of HE TB PPDU.

**8.3.5.18.2 Semantics of the service primitive**

The primitive provides the following parameter:

PHY-TRIGGER..request (

TRIGVECTOR

)

The TRIGVECTOR represents a list of parameters (contains common info and all user info of trigger frame) that the MAC sublayer provides to the local PHY entity in order to receive the HE TB PPDUs.

**8.3.5.18.3 When generated**

This primitive is issued by the MAC sublayer to the PHY entity after issuing PHY-TXSTART.request and before receiving HE TB PPDU.

**8.3.5.18.4 Effect of receipt**

The effect of receipt of this primitive by the PHY entity is to configure receiver module with parameters in TRIGVECTOR before HE TB PPDUs arrival.

**8.3.5.19 PHY-TRIGGER.confirm**

**8.3.5.19.1 Function**

This primitive is issued by the PHY to the local MAC entity to confirm that the PHY has applied the parameters provided in the PHY-TRIGGER.request primitive.

**8.3.5.19.2 Semantics of the service primitive**

The semantics of the primitive are as follows:

PHY-TRIGGER.confirm

This primitive has no parameters

**8.3.5.19.3 When generated**

This primitive is issued by the PHY to the MAC entity when the PHY has received and successfully applied the parameters in the PHY-TRIGGER.request primitive.

**8.3.5.19.4 Effect of receipt**

The effect of the receipt of this primitive by the MAC is unspecified.

***TGax Editor: please add the following paragraph to the end of clause 27.5.2.1 General:***

**27.5.2.1 General**

……

An HE AP shall finish configuration to its receiver module with the parameters of TRIGVECTOR carried by PHY-TRIGGER.request primitive to receive HE TB PPDUs from triggered STAs before HE TB PPDU arrivals.

***TGax Editor: please add the new sub-clause 28.2.x TRIGVECTOR into clause 28.2 (HE PHY service interface) as below:***

**28.2.x TRIGVECTOR**

The TRIGVECTOR carried in a PHY-TRIGGER.request primitive for PHY of AP to receive HE TB PPDU over each assigned RU. The parameters in Table 28-4 (TRIGVECTOR parameters) are defined as part of the TRIGVECTOR parameter list in the PHY-TRIGGER.request primitive

**Table 28-y TRIGVECTOR parameters**

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| **CH\_BANDWIDTH** | Indicates the bandwidth in the HE-SIG-A of the HE TB PPDU.  Enumerated type:  CBW20 for 20 MHz  CBW40 for 40 MHz  CBW80 for 80 MHz  CBW160 for 160 MHz CBW80+80 for 80+80 MHz |
| **GI HELTF\_TYPE** | Indicates the GI and HE-LTF type of the coming HE TB PPDU.    Enumerated type:  1x LTF + 1.6 *u*s GI  2x LTF + 1.6 *u*s GI  4x LTF + 3.2 *u*s GI |
| **MU-MIMO LTF MODE** | Indicates the LTF mode of the UL MUMIMO HE TB PPDU.  Set to 0 to indicate that HE single stream pilot HE LTF mode is used.  Set to 1 to indicate that HE masked HE LTF sequence mode is used. |
| **NUMBER\_OF\_HELTF\_SYMBOLS** | Indicates the number of HE-LTF symbols present in the HE TB PPDU.  Set to 0 for 1 HE-LTF symbol  Set to 1 for 2 HE-LTF symbols  Set to 2 for 4 HE-LTF symbols  Set to 3 for 6 HE-LTF symbols  Set to 4 for 8 HE-LTF symbols  Other values are reserved. |
| **STBC** | Indicates the status of STBC encoding of the HE TB PPDU.  Set to 1 if STBC encoding is used.  Set to 0 otherwise. |
| **LDPC\_EXTRA\_SYMBOL** | Indicates the status of the LDPC extra symbol segment.  Set to 1 if LDPC extra symbol segment is present  Set to 0 otherwise. |
| **PRE-FEC FACTOR** | Indicates the pre-FEC padding factor.  Set to 0 to indicate a pre-FEC padding factor of 4.  Set to 1 to indicate a pre-FEC padding factor of 1.  Set to 2 to indicate a pre-FEC padding factor of 2.  Set to 3 to indicate a pre-FEC padding factor of 3. |
| **PE DISAMBIGUITY** | Indicates PE disambiguity.  Set to 0 to indicate no PE disambiguity.  Set to 1 to indicate PE disambiguity. |
| **SPATIAL\_REUSE** | Indicates the value for the Spatial Reuse field in the HE-SIG-A field of the coming HE TB PPDU    NOTE—For 20 MHz one SR field corresponding to entire 20 MHz (other 3 fields indicate identical values); For 40 MHz two SR fields for each 20 MHz (other 2 fields indicate identical values); For 80 MHz four SR fields for each 20 MHz;For 160 MHz four SR fields for each 40 MHz. |
| **DOPPLER** | Indicates a high Doppler mode of transmission.  Set to 0 to indicate a high Doppler mode of transmission  Set to 1 otherwise. |
| **AID12 LIST** | Carries the 12 LSBs of the AID of each triggered STA.  NOTE—Each element of AIDLIST is (12-bit) AID of the corresponding HE TB PPDU. Please see subfield AID12 in 9.3.1.23 for more information of each element . |
| **RU\_ALLOCATION\_LIST** | 8 bits are used per STA to indicate the RU allocated in the whole bandwidth with the same encoding scheme as in Table 9-25g (The encoding of B19-B13 of the RU Allocation subfield).  See 9.3.1.23 (Trigger frame format) for details. |
| **CODINGTYPE\_LIST** | Carries the code type of each triggered STA in coming HE\_TB PPDU.  NOTE—Each element of CODINGTYPE\_LIST indicates coding type of the corresponding HE TB PPDU. Please see Coding Type subfield in 9.3.1.23 for more information of each element. |
| **MCS\_LIST** | Carries the MCS of each triggered STA in coming HE\_TB PPDU.  NOTE—Each element of MCS\_LIST indicates MCS of the corresponding HE TB PPDU. Please see Coding Type subfield in 9.3.1.23 for more information of each element. |
| **SS\_ALLOCATION\_LIST** | Indicates spatial streams of each triggered STA in coming HE\_TB PPDU  NOTE—Each element of SS\_ALLOCATION\_LIST indicates spatial streams of the corresponding HE TB PPDU.Please see SS Allocation subfield in 9.3.1.23 for more information of each element. |

**References:**

1. **IEEE P802.11axTM/D1.0, Nov 2016.**
2. **IEEE P802.11axTM/D1.4, Aug 2016**