IEEE P802.11
Wireless LANs

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| Resolution for CIDs in 9.3.1.23 |
| Date: January 7, 2018 |
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Abstract

This submission proposes resolutions for following CIDs received for TGax LB230 (18):

11118, 14206, 11003, 11371, 13694, 13861, 12374, 12719, 11004, 13330, 13695, 11978, 12375, 13331, 12164, 12227, 13862, 11917

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updated based on offline feedback
	+ Revised resolution for CIDs 11003, 11371, 13694, 13861
* Rev 2: Revised resolution based on feedback received when the contribution was presented on 1/12 (ad-hoc)
	+ Updated resolution for CIDs 11003, 11371 (changed to ‘More TF’)

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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg / Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 11118 | Adrian Stephens | 85.13 | 9.3.1.23 | "The HE TB PPDU transmission starts SIFS after the PPDU that carries the Trigger frame." - this is not frame format | If cited text does not occur anywhere else, move cited text to clause 10. Otherwise delete it. | **Revised**Agree with the comment. Deleted cited text. Corresponding text exists in 27.5.3.3.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11118** |
| 14206 | Yunbo Li | 85.23 | 9.3.1.23 | In the exsiting standard draft, the MAC header of each frame is indicated in the figure of the frames. But in 11ax draft 2.0, the MAC header of Trigger is not indicated. Please check whether there are similar issues for other frames. | Add the MAC header indication in Figure 9-52c- Trigger frame | **Accept****TGax editor, please indicate MAC header in the figure showing Trigger frame format and VHT/HE NDP Announcement frame format as suggested by the comment. Please refer to baseline spec for examples.** |
| 11003 | Abhishek Patil | 86.47 | 9.3.1.23 | To avoid any ambiguity with the MU Cascade operation (27.5.4), change the name of Cascade Indication field to something more directed towards operation within TWT | As in comment | **Revised**Agree with the comment.The field name is changed to “More TF” to correctly capture the intended meaning of this field.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11003. Also, please update all references to this field throughout the draft text.** |
| 11371 | Bibhu Mohanty | 86.47 | 9.3.1.23 | Since Cascade Indication applies only for the case when the Trigger frame is sent within a TWT SP, rename to some thing more representative of it's intended purpose (for example, 'TWT SP Cascade Indicator') | As in comment | **Revised**Agree with the comment. Please see resolution to CID 11003.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11371** |
| 13694 | Tomoko Adachi | 87.45 | 9.3.1.23 | Normative expression should not be used in clause 9. | Change "The AP shall set the MU-MIMO LTF Mode subfield to single stream pilots if the triggered UL PPDU contains partial or full UL OFDMA allocation." to "The AP sets the MU-MIMO LTF Mode subfield to single stream pilots if the triggered UL PPDU contains partial or full UL OFDMA allocation." | **Revised**Agree with the comment.Revised text so that it is no longer normative in clause 9. Added normative text to section 27 to cover this case.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 13694** |
| 13861 | Yongho Seok | 87.45 | 9.3.1.23 | "The AP shall set the MU-MIMO LTF Mode subfield to single stream pilots if the triggered UL PPDU contains partial or full UL OFDMA allocation."Move this "shall" sentence to clause 27.5.3.2.3. | As in comment. | **Revised**Agree with the comment.Revised text so that it is no longer normative in clause 9. Added normative text to section 27 to cover this case.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 13861** |
| 12374 | Liwen Chu | 88.15 | 9.3.1.23 | Cahnge Table 21-13 to 28-19 | As in comment | **Revised**Agree with the comment.The incorrect reference is fixed and points to Table 28-19.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 12374** |
| 12719 | Mark RISON | 88.15 | 9.3.1.23 | "is defined in Table 21-13" -- broken link | Put in a real cross-reference | **Revised**Agree with the comment.The incorrect reference is fixed and points to Table 28-19.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 12719** |
| 11004 | Abhishek Patil | 89.03 | 9.3.1.23 | Reference to Table 28-20 seems incorrect. The cited table doesn't have any information related to padding | As in comment | **Revised**Agree with the comment. Changed reference to Table 28-19.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11004** |
| 13330 | ron porat | 89.03 | 9.3.1.23 | Table 28-20 doesn't have a packet extension subfield. | Refer to table 28-18 (the table for HE SU PPDU) instead of 28-20. | **Revised**Agree with the comment. Changed reference to Table 28-19.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 13330** |
| 13695 | Tomoko Adachi | 89.22 | 9.3.1.23 | Normative expression should not be used in clause 9. | Change "The PE Disambiguity subfield shall be set to 1 if the condition in Equation (28-113) is met, otherwise it shall be set to 0." to "The PE Disambiguity subfield is set to 1 if the condition in Equation (28-113) is met, otherwise it is set to 0." | **Revised**Agree with the comment. The text is revised to be declarative.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 13695** |
| 11978 | James Yee | 89.30 | 9.3.1.23 | Reference to Table 28-19 should be to Table 28-20 instead. | As suggested. | **Revised**Agree with the comment. Changed reference to Table 28-20.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11978** |
| 12375 | Liwen Chu | 89.30 | 9.3.1.23 | Change to "Table 28-20 (HE-SIG-A field of an HE TB PPDU)." | As in comment | **Revised**Agree with the comment. Changed reference to Table 28-20.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 12375** |
| 13331 | ron porat | 89.30 | 9.3.1.23 | Referring to HE-SIG-A field of MU PPDU rather than TB PPDU. | Refer to table 28-20 instead of 28-19. | **Revised**Agree with the comment. Changed reference to Table 28-20.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 13331** |
| 12164 | kaiying Lv | 94.08 | 9.3.1.23.1 | The HE Capabilities element should be transmitted by the STA. Change "the AP" to "the STA" | as comment | **Revised**Agree with the commentRevised text to fix the error. The value carried in the TID Aggregation Limit in the TF would be bound by the Multi-TID Aggregation Support field advertised by the non-AP STA to whom the TF is directed.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 12164** |
| 12227 | kaiying Lv | 94.08 | 9.3.1.23.1 | The HE Capabilities element should be transmitted by the STA. Change "the AP" to "the STA" | as comment | **Revised**Agree with the comment. Please see resolution for CID 12164 |
| 13862 | Yongho Seok | 94.08 | 9.3.1.23.1 | "... is the value indicated in the Multi-TID Aggregation Support subfield in the HE MAC Capabilities Information field in the HE Capabilities element transmitted by the AP that is the intended receiver of the User Info field."The intended receiver of the User Info field couldn't be an AP. | As in comment. | **Revised**Agree with the comment. Please see resolution for CID 12164 |
| 11917 | Huizhao Wang | 94.28 | 9.3.1.23.1 | Preferred AC field values should follow the ACI-to-AC coding defined in Table 9-136. | Instead of redefine the Preferred AC subfield coding in Table 9-25j, please just change it to: "The Preferred AC subfield coding is use the same ACI-to-AC coding table defined in Table 9-136" | **Revised**Agree with the comment.Deleted Table 9-25j and changed reference to 9-136 which is defined in the baseline spec so that 11ax is consistent with baseline spec.**TGax editor, please make changes as shown in doc 11-18/0065r2 that are marked with CID 11917** |

* Trigger frame format

***TGax Editor: Please make the following changes to section 9.3.1.23:***

The Trigger frame solicits and allocates resources for HE TB PPDU transmissions. [CID 11118]The Trigger frame also carries other information required by the responding STA to send an HE TB PPDU.

The frame format for the Trigger frame is defined in Figure 9-52c (Trigger frame).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | Frame Control | Duration | RA | TA | Common Info | User Info | ... | User Info | Padding | FCS |
| Octets: | 2 | 2 | 6 | 6 | 8 or more | 5 or more |  | 5 or more | variable | 4 |
| * **Trigger frame**
 |

The Duration field is set as defined in 9.2.5 (Duration/ID field (QoS STA)).

The RA field of the Trigger frame is the address of the recipient STA(s). The RA field is set to the individual address of the STA if the Trigger frame has only one User Info field containing the 12 LSBs of the AID of the STA in the AID12 field, is set to the broadcast address if the Trigger frame is not a GCR MU-BAR and has either more than one User Info field or has at least one User Info field that allocates random access RUs, and is set to the MAC address of the group for which reception status is being requested if the Trigger frame is GCR MU-BAR.

The TA field is the address of the STA transmitting the Trigger frame when the Trigger frame is addressed to STAs that belong to a single BSS. The TA field is the address of the transmitted BSSID when the Trigger frame is addressed to STAs from at least two different BSSs of the multiple BSSID set. The rules for setting of the TA field are defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control field).

The Common Info field is defined in Figure 9-52d (Common Info field).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0    B3 | B4   B15 | B16 | B17 | B18 B19 | B20   B21 | B22 | B23                B25 |
|  | Trigger Type | Length | More TF [CID 11003, 11371] | CS Required | BW | GI And LTF Type | MU-MIMO LTF Mode | Number Of HE-LTF Symbols And Midamble Periodicity(#3320) |
| Bits: | 4 | 12 | 1 | 1 | 2 | 2 | 1 | 3 |
|  | B26 | B27 | B28   B33 | B34   B36 | B37    B52 | B53 | B54    B62 | B63 |  |
|  | STBC | LDPC Extra Symbol Segment | AP TX Power | Packet Extension | Spatial Reuse | Doppler | HE-SIG-A Reserved | Reserved | Trigger Dependent Common Info |
| Bits: | 1 | 1 | 6 | 3 | 16 | 1 | 9 | 1 | variable |
| * **Common Info field**
 |

The Trigger Type subfield indicates the type of the Trigger frame and the encoding is defined in Table 9-25b (Trigger Type subfield encoding).

|  |
| --- |
| * **Trigger Type subfield encoding**
 |
| **Trigger Type field value** | **Description** |
| 0 | Basic Trigger |
| 1 | Beamforming Report Poll (BRP)(#10340) |
| 2 | MU-BAR |
| 3 | MU-RTS |
| 4 | Buffer Status Report Poll (BSRP) |
| 5 | GCR MU-BAR |
| 6 | Bandwidth Query Report Poll (BQRP) |
| 7 | NDP Feedback Report Poll(#6144) |
| 8-15 | Reserved |

The Length subfield of the Common Info field indicates the value of the L-SIG Length field of the HE TB PPDU that is the response to the Trigger frame.

[CID 11003, 11371]The More TF subfield of the Common Info field is set to 1 to indicate that a subsequent Trigger frame is scheduled for transmission as defined in 27.7 (TWT operation) and in 27.14.2 (Power save with UORA). Otherwise the More TF subfield is set to 0.

***TGax Editor: Please update all references of “Cascade Indication” subfield of Trigger frame to “More TF” throughout the draft text.*** [CID 11003, 11371]

The CS Required subfield of the Common Info field is set to 1 to indicate that the STAs identified in the User Info fields are required to use ED to sense the medium and to consider the medium state and the NAV in determining whether or not to respond. The CS Required subfield is set to 0 to indicate that the STAs identified in the User Info fields are not required to consider the medium state or the NAV in determining whether or not to respond. See 27.5.3.3 (STA behavior for UL MU operation) and 27.5.3.5 (UL MU CS mechanism) for details.

The BW subfield of the Common Info field indicates the bandwidth in the HE-SIG-A of the HE TB PPDU and is defined in Table 9-25c (BW subfield encoding).

|  |
| --- |
| * **BW subfield encoding**
 |
| **BW subfield value** | **Description** |
| 0 | 20 MHz |
| 1 | 40 MHz |
| 2 | 80 MHz |
| 3 | 80+80 MHz or 160 MHz |

The GI And LTF Type subfield of the Common Info field indicates the GI and HE-LTF type of the HE TB PPDU response. The GI And LTF Type subfield encoding is defined in Table 9-25d (GI And LTF Type subfield encoding).

|  |
| --- |
| * **GI And LTF Type subfield encoding**
 |
| **GI And LTF field value** | **Description** |
| 0 | 1x LTF + 1.6 µs GI |
| 1 | 2x LTF + 1.6 µs GI |
| 2 | 4x LTF + 3.2 µs GI |
| 3 | Reserved |

The MU-MIMO LTF Mode subfield of the Common Info field indicates the LTF mode of the UL MU-MIMO HE TB PPDU response. [CID 13694, 13861]If a Trigger frame only allocates one RU that spans the entire HE TB PPDU bandwidth, and the RU is assigned to more than one STA, then the MU-MIMO LTF Mode subfield is set to indicate either HE single stream pilot HE LTF mode or HE masked HE LTF sequence mode. Otherwise, the MU-MIMO LTF Mode subfield is set to indicate HE single stream pilot HE LTF mode. The MU-MIMO LTF Mode subfield encoding is defined in Table 9-25e (MU-MIMO LTF Mode subfield encoding).

|  |
| --- |
| * **MU-MIMO LTF Mode subfield encoding**
 |
| **MU-MIMO LTF subfield value** | **Description** |
| 0 | HE single stream pilot HE LTF mode |
| 1 | HE masked HE LTF sequence mode(#4979, #10388) |

If the Doppler subfield of the Common Info field is 0, then the Number Of HE-LTF Symbols And Midamble Periodicity subfield of the Common Info field indicates the number of HE-LTF symbols present in the HE TB PPDU that is the response to the Trigger frame minus 1.

If the Doppler subfield of the Common Info field is 1, then B23-B24 of the Number OF HE-LTF Symbols And Midamble Periodicity subfield indicates the number of HE-LTF symbols present in the HE TB PPDU that is the response to the Trigger frame, and B25 of the Number OF HE-LTF Symbols And Midamble Periodicity subfield indicates midamble periodicity in the same HE TB PPDU.

For a non-OFDMA PPDU, the number of HE-LTF symbols is a function of the total number of space-time streams, *NSTS,total* and the encoding of the Number Of HE-LTF Symbols And Midamble Periodicity subfield is defined in Table [CID 12374, 12719]28-19 (HE-SIG-A field of an HE MU PPDU).

For an OFDMA PPDU, the number of HE-LTF symbols is greater than or equal to the maximum *NSTS,total* across all allocated RUs and the encoding of the Number Of HE-LTF Symbols And Midamble Periodicity subfield is the same as the Number of HE-LTF Symbols field defined in Table 28-19 (HE-SIG-A field of an HE MU PPDU).

The STBC subfield of the Common Info field indicates the status of STBC encoding of the HE TB PPDU that is the response to the Trigger frame. It is set to 1 if STBC encoding is used and set to 0 otherwise.

The LDPC Extra Symbol Segment subfield of the Common Info field indicates the status of the LDPC extra symbol segment. It is set to 1 when LDPC extra symbol segment is present and set to 0 otherwise.

The AP Tx Power subfield of the Common Info field indicates the combined average power per 20 MHz bandwidth referenced to the antenna connector, of all transmit antennas used to transmit the Trigger frame(#5129) at the HE AP. The resolution for the transmit power reported in the Common Info field is 1 dB. The AP Tx Power subfield encoding is defined in Table 9-25f (AP Tx Power subfield encoding).

|  |
| --- |
| * **AP Tx Power subfield encoding**
 |
| **AP Tx Power subfield value** | **Description** |
| 0-60 | Values 0 to 60(#7677) map to 20 dBm to 40 dBm |
| 61-63 | Reserved |

The Packet Extension subfield of the Common Info field indicates the PPDU extension (PE) duration of the HE TB PPDU that is the response to the Trigger frame. The structure of the Packet Extension subfield is defined in Figure 9-52e (Packet Extension subfield).

|  |  |  |
| --- | --- | --- |
|  | B0                     B1 | B2 |
|  | Pre-FEC Padding Factor | PE Disambiguity |
| Bits: | 2 | 1 |
| * **Packet Extension subfield**
 |

The subfields of the Packet Extension subfield are defined in Table 9-25g (Subfields of the Packet Extension subfield) and have the same encoding as their respective subfields in HE SIG-A [CID 12374, 12719](seeTable 28-19 (HE-SIG-A field of an HE MU PPDU)).

|  |
| --- |
| * **Subfields of the Packet Extension subfield**
 |
| **Subfield** | **Description** | **Encoding** |
| Pre-FEC Padding 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 1Set to 2 to indicate a pre-FEC padding factor of 2Set to 3 to indicate a pre-FEC padding factor of 3 |
| PE Disambiguity | Indicates PE disambiguity | Set to 0 to indicate no PE disambiguitySet to 1 to indicate PE disambiguity |

[CID 13695]The PE Disambiguity subfield is set to 1 if the condition in Equation (28-113) is met, otherwise it is set to 0.

The Spatial Reuse subfield of the Common Info field carries the value for the Spatial Reuse field in the HE-SIG-A field of the HE TB PPDU that is the response to the Trigger frame. The format of the Spatial Reuse subfield is shown in Figure 9-52f (Spatial Reuse field), where each Spatial Reuse *n* subfield, 1  *n*  4, is set to the same value as its corresponding subfield in the HE-SIG-A of the TB PPDU, which are defined in [CID 11978, 12375, 13331]Table 28-20 (HE-SIG-A field of an HE TB PPDU).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0                 B3 | B4                 B7 | B8               B11 | B12             B15 |
|  | Spatial Reuse 1 | Spatial Reuse 2 | Spatial Reuse 3 | Spatial Reuse 4 |
| Bits: | 4 | 4 | 4 | 4 |
| * **Spatial Reuse field**
 |

The Doppler subfield of the Common Info field is set to 1 to indicate that a midamble is present in the HE TB PPDU and set to 0 otherwise.

The HE-SIG-A Reserved subfield of the Common Info field indicates the values of the reserved bits in the HE-SIG-A2 subfield of the HE TB PPDU that is the response to the Trigger frame. Bits B54 to B62 in the Trigger frame are set to 1 and correspond to the bits B7 to B15 in the HE-SIG-A2 subfield of the HE TB PPDU with B54 in the Trigger frame corresponding to B7 in the HE-SIG-A2 subfield of the HE TB PPDU and so on.

The Trigger Dependent Common Info subfield in the Common Info field is optionally present based on the value of the Trigger Type field.

The User Info field is defined in Figure 9-52g (User Info field).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0   B11 | B12    B19 | B20 | B21  B24 | B25 | B26            B31 | B32     B38 | B39 |  |
|  | AID12 | RUAllocation | Coding Type | MCS | DCM | SS Allocation / Random Access RU Information | Target RSSI | Reserved | Trigger Dependent User Info |
| Bits: | 12 | 8 | 1 | 4 | 1 | 6 | 7 | 1 | variable |
| * **User Info field**
 |

The AID12 subfield of the User Info field carries the 12 LSBs of the AID of the STA for which the User Info field is intended. An AID12 subfield that is 0 or 2045 indicates that the User Info field allocates one or more contiguous RUs for random access (see 27.5.5 (UL OFDMA-based random access (UORA))). An AID12 subfield that is 2046 indicates an unassigned RU (see 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control field)). An AID12 subfield set to 4095 is reserved to indicate start of Padding field (see 27.5.3.2.2 (Padding for Trigger frame or frame containing UMRS Control field)).

When the value of the AID12 subfield is not 0 or 2045, then the RU Allocation subfield of the User Info field indicates the RU used by the HE TB PPDU of the STA identified by the AID12 subfield. The first bit, B12, is set to 0 to indicate that the allocated RU is located within the primary 80 MHz and is set to 1 to indicate that the allocated RU is located within the secondary 80 MHz. The mapping of the subsequent 7 bits, B19-B13, indices to the RU allocation is defined in Table 9-25h (The encoding of B19–B13 of the RU Allocation subfield).

|  |
| --- |
| * **The encoding of B19–B13 of the RU Allocation subfield**
 |
| **B19 – B13** | **Description** | **Number of entries** |
| 0–36 | Possible 26-tone RU cases in 80 MHz | 37 |
| 37–52 | Possible 52-tone RU cases in 80 MHz | 16 |
| 53–60 | Possible 106-tone RU cases in 80 MHz | 8 |
| 61–64 | Possible 242-tone RU cases in 80 MHz | 4 |
| 65–66 | Possible 484-tone RU cases in 80 MHz | 2 |
| 67 | 996-tone RU cases in 80 MHz | 1 |
| 68 | 2996-tone RU case | 1 |
| 69–127 | Reserved | 59 |
| Total |  | 128 |
| NOTE—These values are in binary form in PHY (for example, see Table 28-24 (RU Allocation subfield)) |

B12 is set to 0 for 20 MHz, 40 MHz and 80 MHz PPDUs, and is set to either 0 or 1 for 80+80 MHz and 160 MHz PPDUs. The mapping of subsequent 7 bits indices B19-B13 to RU index in each row depends on the BW subfield in Common Info field:

* For a 20 MHz PPDU, the mapping of B19-B13 to RU allocation follows the RU index in Table 28-6 (Data and pilot subcarrier indices for RUs in a 20 MHz HE PPDU) in increasing order.
* The value 0 indicates 26-tone RU1 [121: 96], the value 8 indicates 26-tone RU9 [96: 121], and the values 9–36 are not used(#5322).
* The value 37 indicates 52-tone RU1 [121: 70], the value 40 indicates 52-tone RU4 [70: 121], and the values 41–52 are not used.
* The value 53 indicates 106-tone RU1 [122: 17], the value 54 indicates 106-tone RU2 [17: 122], and the values 55–60 are not used.
* The value 61 indicates 242-tone RU1 [122: 2, 2:122], and the values 62–64 are not used.
* For a 40 MHz PPDU, the mapping of B19-B13 to RU allocation follows the RU index in Table 28-7 (Data and pilot subcarrier indices for RUs in a 40 MHz HE PPDU) in increasing order.
* The value 0 indicates 26-tone RU1 [243: 218], the value 17 indicates 26-tone RU18 [218: 243], and the values 18–36 are not used.
* The value 37 indicates 52-tone RU1 [243: 192], the value 44 indicates 52-tone RU8 [192: 243], and the values 45–52 are not used.
* A similar ordering is followed for 106-tone RU, 242-tone RU and 484-tone RU.
* For an 80 MHz, 160 MHz and 80+80 MHz PPDU, the mapping of B19-B13 to RU allocation follows the RU index in Table 28-8 (Data and pilot subcarrier indices for RUs in an 80 MHz HE PPDU) in increasing order.
* The value 0 indicates 26-tone RU1 [499: 474], and the value 36 indicates 26-tone RU37 [474: 499].
* The value 37 indicates 52-tone RU1 [499: 448], and the value 52 indicates 52-tone RU16 [448: 499].
* A similar ordering is followed for 106-tone RU, 242-tone RU, 484-tone RU and 996-tone RU. For a 160 MHz and 80+80 MHz PPDU, B19-B13 are 1000100 indicates 2996-tone RU.

When the value of the AID12 field is 0 or 2045, then the RU Allocation subfield indicates the first RU of one or more contiguous random access RUs. If there are more than one random access RUs, the sizes of all random access RUs are the same and equal to the size of the first RU. Further all the subfields of the User Info field apply to all the random access RUs.

The Coding Type subfield of the User Info field indicates the code type of the HE TB PPDU that is the response to the Trigger frame. The Coding Type subfield is set to 0 to indicate BCC and set to 1 to indicate LDPC.

The MCS subfield of the User Info field indicates the MCS of the HE TB PPDU that is the response to the Trigger frame. The encoding of the MCS field is defined in 28.3.7 (HE modulation and coding schemes (HE-MCSs)).

The DCM subfield of the User Info field indicates dual carrier modulation of the HE TB PPDU that is the response to the Trigger frame. The DCM subfield is set to 1 to indicate that DCM is used the HE TB PPDU that is the response to the Trigger frame as defined in 28.3.11.15 (Dual carrier modulation). The DCM subfield is set to 0 to indicate that DCM is not used.

If the AID12 field is neither 0 nor 2045, then the SS Allocation/Random Access RU Information subfield of the User Info field indicates the spatial streams of the HE TB PPDU that is the response to the Trigger frame and the format is defined in Figure 9-52h (SS Allocation/Random Access RU Information subfield format (AID12 subfield is neither 0 nor 2045)).

|  |  |  |
| --- | --- | --- |
|  | B26 B28 | B29 B31 |
|  | Starting Spatial Stream | Number Of Spatial Streams |
| Bits: | 3 | 3 |
| * **SS Allocation/Random Access RU Information subfield format (AID12 subfield is neither 0 nor 2045)**
 |

The Starting Spatial Stream subfield indicates the starting spatial stream, STARTING\_SS\_NUM, and is set to STARTING\_SS\_NUM  1.

The Number Of Spatial Streams subfield indicates the number of spatial streams, NUM\_SS and is set to NUM\_SS  1.

If the AID12 field is 0 or 2045, then the SS Allocation/Random Access RU Information subfield of the User Info field indicates the random access RU information and the format is defined in Figure 9-52h (SS Allocation/Random Access RU Information subfield format (AID12 subfield is neither 0 nor 2045)).

|  |  |  |
| --- | --- | --- |
|  | B26 B30 | B31 |
|  | [#ed]Number of RA-RU | [#ed]No Further RA-RU |
| Bits: | 5 | 1 |
| * **SS Allocation/Random Access RU Information subfield format (AID12 subfield is 0 or 2045)**
 |

[#ed]The Number of RA-RU subfield indicates the number of contiguous RUs allocated for UORA. The value of the Number of RA-RU subfield is equal to the number of contiguous random access RUs minus one. The starting spatial stream and the number of spatial streams of the HE TB PPDU transmitted on each random access RU are 1.

[#ed]The No Further RA-RU subfield is set to 1 to indicate that random access RUs are not allocated in subsequent Trigger frames that are sent before either the end of the current TWT SP or the end of the current TXOP in the case of no TWT SP.

The Target RSSI subfield of the User Info field indicates the target receive signal power averaged over the AP's antenna connectors for the HE TB PPDU that is the response to the Trigger frame. The resolution for the Target RSSI subfield in the User Info field is 1 dB. The Target RSSI subfield encoding is defined in Table 9-25i (Target RSSI subfield encoding).

|  |
| --- |
| * **Target RSSI subfield encoding**
 |
| **Target RSSI subfield** | **Description** |
| 0–90 | Values 0 to 90 map to 110 dBm to 20 dBm |
| 91–126 | Reserved |
| 127 | Indicates to the STA to transmit an HE TB PPDU response at its maximum transmit power for the assigned MCS |

The Trigger Dependent User Info subfield in the User Info field is optionally present based on the value of the Trigger Type field.

The Padding field is optionally present in a Trigger frame to extend the frame length to give the recipient STAs enough time to prepare a response SIFS after the frame is received. The Padding field of the Trigger frame, if present, is at least two octets in length and is set to all 1s. The start of the Padding field is identified by the value 4095 in the AID12 subfield of a User Info field that would otherwise be present. An AP can use any type of padding to satisfy the duration requirement (see 27.5.3.2.2 (Padding for Trigger frame or frame containing UMRS Control field)). An example of how to compute the length, *LPAD,MAC*, of the Padding field (if present) to meet the duration requirements is given below.

For a non-HT PPDU, HT PPDU and VHT PPDU, the length of the Padding field (in octets)), which depends on the *MinTrigProcTime* (see 27.5.3.2.2 (Padding for Trigger frame or frame containing UMRS Control field), is given by Equation (9-0a).

* 

where



*NDBPS* is defined in Table 28-13 (Tone allocation related constants for the Data field in a non-OFDMA HE PPDU)

For an HE PPDU, the length of the Padding field (in octets), which depends on the *MinTrigProcTime* (see 27.5.3.2.2 (Padding for Trigger frame or frame containing UMRS Control field), is given by Equation (9-0b).

* 

where

*NDBPS,SHORT* is defined in 28.3.11.2 (Pre-FEC padding process)

* **Basic Trigger variant**

The Trigger Dependent Common Info subfield is not present in the Basic Trigger frame. The Trigger Dependent User Info subfield of the Basic Trigger frame is defined in Figure 9-52j (Trigger Dependent User Info subfield for the Basic Trigger variant).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0                       B1 | B2                    B4 | B5 | B6               B7 |
|  | MPDU MU Spacing Factor | TID Aggregation Limit | Reserved(#3018) | Preferred AC |
| Bits: | 2 | 3 | 1 | 2 |
| * **Trigger Dependent User Info subfield(#7324) for the Basic Trigger variant**
 |

The MPDU MU Spacing Factor subfield is used for calculating *MSF*, the value by which the minimum MPDU start spacing is multiplied (see 10.13.3 [#ed](Minimum MPDU start spacing field rules)). *MSF* is equal to 2MPDU MU Spacing Factor.

The TID Aggregation Limit subfield indicates the MPDUs allowed in an A-MPDU carried in the HE TB PPDU and the maximum number of TIDs that can be aggregated by the STA in the A-MPDU and is set as defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control field).

The value in the TID Aggregation Limit subfield in Trigger frame is less than or equal to *MT* + 1, where *MT* is the value indicated in the Multi-TID Aggregation Support subfield in the HE MAC Capabilities Information field in the HE Capabilities element transmitted by the non-AP STA that is the intended receiver of the User Info field.[CID 12164, 12227, 13862]

The Preferred AC subfield indicates the lowest AC that is recommended for aggregation of MPDUs in the A-MPDU contained in the HE TB PPDU sent as a response to the Trigger frame[#ed]. The encoding of the Preferred AC subfield is [CID 11917]the same as the AC index (ACI) field as shown in Table 9-136 (ACI-to-AC coding).

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**27.5.3.2.3 Allowed settings of the Trigger frame fields and UMRS Control field**

***TGax Editor: Please add the following sentence to the 3rd paragraph in section 27.5.3.2.3 (11ax D2.0 P246L50):***

An AP shall not set any subfields of the Common Info field of a Trigger frame to a value that is not supported by all the recipient STAs of the Trigger frame. An AP that transmits a Trigger frame that only allocates one RU that spans the entire HE TB PPDU bandwidth, and assigns the RU to more than one STA (i.e., using UL MU-MIMO) may set the MU-MIMO LTF Mode subfield in the Common Info field of the Trigger frame to indicate either HE single stream pilot HE LTF mode or HE masked HE LTF sequence mode. Otherwise, the AP shall set the MU-MIMO LTF Mode subfield in the Common Info field to HE single stream pilot HE LTF mode.[CID 13694, 13861]