IEEE P802.11
Wireless LANs

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| Comment Resolution on Trigger Frame MAC Padding |
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Abstract: This document addresses the following CIDs:

 *CIDs* *15662, 16983, 16984*

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| 15662 | 27.5.3.2.2 | 282.22 | "An AP transmitting a PPDU that contains a Trigger frame or frame containing a TRS Control subfield shall ensure that the duration of the PPDU that follows BSYM is greater than or equal MinTrigProcTime indicated by the soliciting non-AP STA (see Table 9-262z (Subfields of the HE MAC Capabilities Information field)).BSYM is the OFDM symbol of the PPDU that contains either the last bit of SCH when BCC is used to encode the PSDU or the last coded bit of the LDPC codeword that encodes the last bit of SCH when LDPC is used to encode the PSDU," This sentence may have issues mathematically from PHY perspecitve. The description implies that the amount of MAC padding for trigger frame should be equivalent to the duration as defined in MinTRigProcTime AFTER the BSYM symbol boundary--meaning that MAC needs to find BSYM first. However this is contradictory to the math description of the number of octets in the MAC padding field as indicated by equations (9-0b) and (9-0c). We need to either (1) Adjust the text here to match the equations (9-0b) and (9-0c); or (2) Change the equations to reflect the text here. However, option(2) seems extremely difficult mathematically and too late for implementation, especially for the case of LDPC. This is because: First, it is awkward for MAC to compute the OFDM symbol boundary before even fully figuring out all the MAC fields; secondly and more importantly, the LDPC codeword length, extra symbol insertion, and other parameters are a function of the total number of data bits (see 19.3.11.7.5), while MAC padding field is part of the data bits to be encoded, so this ends up to a chicken and egg situation, and might be too late to address. | Revise the text to reflect the equations in (9-0b) and (9-0c), i.e. Option(1) in the comment. | **Revised.**Change to as in doc IEEE802.11-17/1906r0. |
| 16983 | 9.3.1.23 | 104.15 | eq 9-0b and eq 9-0c don't consider LDPC coding in which one CW could include both user info field and padding field. such that the padding bits cannot gain processing time to process the trigger frame. | Since the number of padding bits depends on MCS, and it's case by case regarding ifuser info field and padding field belong to the same LDPC CW or not, it's better toremove the equations and leave the padding bits to implementation. | **Revised.**Refer to resolutions on CID 15662 |
| 16984 | 27.5.3.2.2 | 282.25 | Shall ensure that the duration of the PPDU that follows BSYM is greater than or equal MinTrigProcTime indicated by the soliciting non-AP STA.The decoding could end before the end of the BSYM because pre-FEC padding have 4 possible segments.The post-FEC padding with in the symbol can be used to parse trigger frame. so if inTrigProcTime is counted after BSYM, AP are adding more padding than the non-AP STA needed. | replace "BSYM is the OFDM symbol of the PPDU that contains either" with"BSYM is the PPDU that contains either" | **Revised.**Refer to resolutions on CID 15662 |

***Discussions:***

It is true that the “BSYM boundary” statement is almost not possible to be realized by the AP when LDPC is used, and also the equations in (9-0b) and (9-0c) are not consistent with the statement in clause 27.5.3.2.2.

Propose to remove the statement about BSYM in clause 27.5.3.2.2 and move the equations (9-0b) and (9-0c) to clause 27.5.3.2.2, which may be contributed not only by the MAC padding field but any other bits after the last bit of user info field.

The complexity of LDPC encoding especially for HT and VHT PPDUs carrying the Trigger Frame is still difficult to address, suggest to disallow transmitting trigger frame by HT or VHT PPDU with LDPC encoding.

TGax editor: please make the following change in P293L38~P294L26 of D3.2:

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An AP shall not use the short guard interval for an HT or VHT PPDU that carries a Trigger frame or a frame that includes a TRS Control subfield. An AP shall not use LDPC encoding for an HT or VHT PPDU that carries a Trigger frame or a frame that includes a TRS Control subfield. A Trigger frame shall not be carried in a DSSS or HR/DSSS PPDU. An AP shall not use STBC encoding for a PPDU that carries a Trigger frame or a frame that includes a TRS Control subfield.

**27.5.3.2.2 Padding for Trigger frame or frame containing TRS Control subfield**

An AP transmitting a PPDU that contains a Trigger frame or frame containing a TRS Control subfield soliciting a response from a non-AP STA shall ensure that the number of bits in the PSDU following the last bit of *SCH* is at least *LPAD,MAC* as defined in equation (27-xx), which is based on ~~the duration of the PPDU that follows~~ *~~BSYM~~* ~~is greater than or equal to~~ the *MinTrigProcTime* indicated by the non-AP STA(#15083) (see Table 9-322a (Subfields of the HE MAC Capabilities Information field)), where

*~~BSYM~~* ~~is the OFDM symbol of the PPDU that contains either:~~

~~• the last bit of~~ *~~SCH~~* ~~if the PSDU is BCC encoded, or~~

~~• the last coded bit of the LDPC codeword that encodes the last bit of~~ *~~SCH~~* ~~if the PSDU is LDPC encoded.~~

*SCH* is either:

• the User Info field addressed to the STA of the last or only Trigger frame, or

• the TRS Control subfield of the last or only frame.(#15328)

 , (27-xx)

where *NDBPS* is defined in Table 17-4 (Modulation-dependent parameters) if a Non-HT PPDU is used, or in Table 19-7 (Frequently used parameters) if an HT PPDU is used, or in Table 21-6 (Frequently used parameters) if a VHT PPDU is used, or in Table 28-15 (Frequently used parameters) if an HE PPDU is used. For a non-HT PPDU, HT PPDU and VHT PPDU:

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and for an HE PPDU:

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An AP transmitting a Trigger frame that contains at least one User Info field with AID12 subfield set to 0 (i.e., an RA-RU for associated STAs) shall ensure that the number of bits following the last bit of *SCH* is at least *LPAD,MAC* as defined in equation (27-xx), which is based on ~~the duration of the PPDU that follows~~ *~~AssocUoraB-SYM~~* ~~is greater than or equal to~~ the largest *MinTrigProcTime* of all associated non-AP STAs(#16592), where *~~AssocUoraBSYM~~* ~~is the OFDM symbol of the PPDU that contains either:~~

~~• the last bit of~~ *~~SCH~~* ~~if(#15329) the PSDU is BCC encoded, or~~

~~• the last coded bit of the LDPC codeword that encodes the last bit of~~ *~~SCH~~* ~~if(#15330) the PSDU is LDPC encoded.~~

*SCH* is the last User Info field with AID12 subfield equal to 0.(#15328)

An AP transmitting a Trigger frame that contains at least one User Info field with AID12 subfield set to 2045 (i.e., an RA-RU for unassociated non-AP STAs(#16592)) should ensure that the number of bits following the last bit of *SCH* is at least $4N\_{DBPS}$ for a non-HT PPDU, HT PPDU or VHT PPDU, or $N\_{DBPS}$ for an HE PPDU, where  ~~the duration of the PPDU that follows~~ *~~UnassocUoraBSYM~~* ~~is at least 16 μs, where~~ *~~UnassocUoraBSYM~~* ~~is the OFDM symbol of the PPDU that contains either:~~

~~• the last bit of~~ *~~SCH~~* ~~if(#15331) the PSDU is BCC encoded, or~~

~~• the last coded bit of the LDPC codeword that encodes the last bit of~~ *~~SCH~~* ~~if(#15332) the PSDU is LDPC encoded.~~

*SCH* is the last User Info field with AID12 subfield equal to 2045.(#15328)

An AP transmitting an NFRP Trigger frame shall ensure that the number of bits following the last User Info field with the AID12 not equal to 4095 is at least $4N\_{DBPS}$ for a non-HT PPDU, HT PPDU or VHT PPDU, or $N\_{DBPS}$ for an HE PPDU. ~~a~~ *~~MinTrigProcTime~~* ~~of at least 16 μs passes from the last User Info field with the AID12 field not equal to 4095.~~

An AP may use any type of padding to satisfy the *MinTrigProcTime* requirement of a non-AP STA(#16592)(#16122), such as using the Padding field in a Trigger frame, post-EOF A-MPDU padding, or aggregating other MPDUs in the A-MPDU~~, or the PE field at the end of HE PPDU~~. ~~An AP that includes a Padding field in a Trigger frame shall set the Padding field as defined in 9.3.1.22 (Trigger frame format).~~