IEEE P802.11
Wireless LANs

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| Comment Resolutions on Clause 9. 3.1.23 (Trigger Frame) Part 1 |
| Date: 2017-01-16 |
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Abstract

This submission proposes resolutions for the following comments on 9.3.1.23 (Trigger frame) of TGax D1.0:

9773

Revisions:

* Rev 0: Initial version of the document.

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** |
| 9773 | 9.3.1.23 | 48.17 | HE trigger based PPDU needs to be sent exactly SIFS (or Signal Extension + SIFS) after the end of reception of the Trigger Frame. If HT/VHT PPDU w/ SGI was used to transmit the Trigger Frame, then the receiver is supposed to align to 4 usec boundary before counting down SIFS, which could introduce ambiguity in the HE trigger based PPDU transmission timing. Also, since DSSS/CCK PPDU formats do not have Signal Extension, HE trigger based PPDUs may need to be sent only 10 usec after the reception of Trigger Frame if the Trigger Frame was sent using DSSS/CCK format. | Add the following to P48L17. "SGI is disallwed for Trigger Frame transmission if the Trigger Frame is sent using the HT or VHT PPDU format. DSSS and CCK PPDU formats are disallwed for Trigger Frame transmission." | Revised— Proposed resolution accounts for the suggested change. TGax Editor to make the changes shown in IEEE 802.11-17/0114r1 under all headings that include CID 9773. |

Discussion

**SIFS was originally defined based on DSSS/CCK in the 2.4 GHz band, while based on 11a in the 5 GHz band. Hence, the value of SIFS is different between the 2.4 and 5 GHz bands (10 usec in the 2.4 GHz band, and 16 usec in the 5 GHz band.) When 11g was added to the 2.4 GHz band, aSignalExtension was defined to make the inter-frame spacing (e.g. between data reception to transmission of ACK) consistent between 11a and 11g without changing the value of SIFS. I.e., aSignalExtension is 6 and 0 usec for 2.4 and 5 GHz bands, respectively, resulting in a constant 16 usec for aSignalExtension + SIFS for both 2.4 and 5 GHz bands.**

**The HE trigger based PPDU needs to be sent at the end of SIFS after receiving the Trigger frame. The intent here is to keep a constant 16 usec gap between the HE trigger based PPDU and the immediately preceding Trigger frame to provide consistent HW latency budget for both 2.4 and 5 GHz bands, as well as provide very clear timing reference for the transmission and reception of the HE trigger based PPDU. If some of the STAs transmit/receive the HE trigger based PPDU using an incorrect timing reference, then the entire HE trigger based PPDU may see performance degradation. Hence, it is essential that the transmission timing reference for the HE trigger reference be simple, precise and clear.**

**🡪 If Trigger frame transmitted using 11ax PPDU**

**Upon receiving the 11ax PPDU, the Rx waits until the end of the PPDU, DOES NOT wait for the 4 us boundary, waits for signal extension, aSignalExtension, and then starts counting down SIFS.**

***In this case time gap between HE trigger based PPDU and the immediately preceding Trigger frame = 16 us***

**Note that in all cases, the gap is a constant 16 usec as intended.**

**🡪If Trigger frame transmitted using 11a/g PPDUs:**

**Note that all 11a/g PPDU has PPDU duration which is a multiple of 4 usec, hence the end of PPDU is always ‘aligned’ to a 4 usec boundary. Upon receiving the 11a/g PPDUs, the Rx waits until the end of the PPDU, waits for signal extension, aSignalExtension, and then starts counting down SIFS.**

***In this case time gap between HE trigger based PPDU and the immediately preceding Trigger frame = 16 us***

**Again, the gap is a constant 16 usec as intended.**

**🡪If Trigger frame transmitted using 11n/ac PPDUs:**

**Upon receiving the 11n/ac PPDUs, the Rx waits until the end of the PPDU, waits for the earliest 4 us boundary (0 ~3.6 us is the duration required to align to 4 us boundary when SGI is used), waits for signal extension, aSignalExtension, and then starts counting down SIFS.**

***In this case time gap between HE trigger based PPDU and the immediately preceding Trigger frame = 16 us ~ 19.6 us***

**Hence, the gap is varying depending on the GI duration and the PPDU duration.**

**🡪 If Trigger frame transmitted using DSSS/CCK format**

**Upon receiving the DSSS/CCK modulated PPDU, the Rx waits until the end of the PPDU, DOES NOT wait for 4 us boundary, DOES NOT wait for signal extension, aSignalExtension (aSignalExtension not defined for DSSS/CCK), and then starts counting down SIFS.**

***In this case time gap between HE TRIG PPDU and the immediately preceding Trigger frame = 10 us***

**Here, the HW is given less than 10 usec to turn around from Trigger Frame to the HE trigger based PPDU.**

**Proposal:**

1. Trigger frame is not transmitted using DSSS/CCK modulated PPDU
2. Trigger frame transmitted using 11a/g/n/ac PPDUs does not use Short Guard Interval (SGI).

According to REVmc D8.0, A STA shall not transmit a Control frame that initiates a TXOP with the TXVECTOR parameter GI\_TYPE set to a value of SHORT\_GI.

*Changes to D1.0 related to CIDS: 9773*

***TGax Editor: Please add the following text at the end of section 27.5.2.2.2.***

Short guard interval shall not be used for Trigger frame transmission if the Trigger Frame is transmitted using HT or VHT PPDU format. DSSS or HR/DSSS PPDU format shall not be used for Trigger frame transmission.

**References:**

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