### IEEE P802.11Wireless LANs

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| 11ax D3.2 MAC Comment Resolution for MU-RTS/CTS Part II |
| Date: 2018-11-12 |
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Abstract

This submission proposes resolutions for comments of TGax Draft D3.2 with the following CIDs:

15993, 15994, 15998, 16087, 16088, 16089, 17145

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 D3.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D3.2 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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 15593 | 249.17 | 17.3.9.10 | How the measurement is to be done in the following statement "After compensation, the absolute value of residual CFO error with respect to the PPDU carryingthe soliciting MU-RTS Trigger frame shall not exceed 2 kHz when measured at the 10% point of the complementarycumulative distribution function (CCDF) of CFO errors in AWGN at a received power of -60dBm in the primary 20 MHz." is not clear. Please clarify whether this measurement is done over a single antenna or over all antennas. | Please clarify how many antennas are used to make this measurement. | Rejected – This is a general requirement for the Rx, not trying to define a specific number depends on different number of antennas. As long as Rx meet this requirement, it’s not critical how many antennas are deployed.Note that there is no additional description about multiple antennas in 28.3.14.3 for other variants of Trigger frame response as well. |
| 15594 | 249.17 | 17.3.9.10 | 2 kHz requirement corresponds to either 0.83 ppm (in 2.4 GHz) or 0.28 ppm (in 7.125 GHz). It is better to quantify residual CFO error in terms of ppm rather than an absolute number such as 2 kHz. | Please state the 2 kHz number in terms of ppm | Rejected – Similar comment has been discussed in CID 15596. We reject this CID with similar reason as shown below. 2 kHz can be easily translated into ppm value based on carrier frequency. The current text is reasonable. Also, as commenter pointed out, if using ppm to represent tracking error, different requirements have to be used for different carrier frequence.  |
| 15598 | 249.34 | 17.3.9.10 | For STAs that do not compensate for the RTD, a distance greater than 60m between AP and STA causes the +-0.4us requirement in 17.3.9.10 to fail. We should add clarifying language to the spec that indicates this. | Replace the following sentence: "The STA is not expected to measure or compensate for the RTD when transmitting the non-HT or non-HT duplicate PPDU." with "For STAs that are less than or equal to 60 m apart from the AP, the STA is not expected to measure or compensate for the RTD when transmitting the non-HT or non-HT duplicate PPDU. For STAs that are more than 60 m apart from the AP, the STA is expected to measure and compensate for the RTD when transmitting the non-HT or non-HT duplicate PPDU." | Rejected—Similar comment has been discussed in CID 15599. We reject this CID with similar reason as shown below. The requirement is written for verification of TB PPDU synchronization requirements against test equipment. Such tests are cabled tests with equal cable length for each STA. |
| 16087 | 249.14 | 17.3.9.10 | This is confusing as it first talks of "a non-HT or non-HT duplicate PPDU where the TXVECTOR parameter TRIGGER\_RESPONDING is present and true" and then talks of "the PPDU carrying the soliciting MU-RTS Trigger frame" | In the referenced subclause at the referenced location change "a non-HT or non-HT duplicate PPDU where the TXVECTOR parameter TRIGGER\_RESPONDING is present and true" to "a CTS frame in response to an MU-RTS Trigger frame" | Revised—Agree in principle with the commenter. We note that the description follows the similar requirement description in 28.3.14.3 Pre-correction accuracy requirements. We simply revise it to follow the style in 28.3.14.3.*A STA that transmits an HE TB PPDU in response to a triggering PPDU (PPDU containing a Trigger frameor a frame containing a TRS Control subfield) from an AP shall ensure that the arrival time of the HE TBPPDU at the AP is within ±0.4 µs of TXTIME + aSIFSTime + RTD from the transmission start time of thetriggering PPDU, where TXTIME is that of the triggering PPDU and RTD is the round-trip delay betweenthe AP and the STA.*TGax editor, please make changes as shown in doc 11-18/1803r0 under all headings that include CID 16087. |
| 16088 | 249.17 | 17.3.9.10 | The resolution to CID 12587 mostly aligned 17.3.9.10 and 28.3.14.3 but there's a "for data subcarriers" in the latter that is not in the former | After "2 kHz" in the referenced subclause add " for data subcarriers" | Rejected – The measurement in 28.3.14.3 is made after HE-SIG-A, but the measurement in 17.3.9.10 is made after L-STF. Due to the difference, there is no need to add “for data subcarriers”. |
| 16089 | 249.24 | 17.3.9.10 | What is "A STA that transmits a non-HT or non-HT duplicate PPDU where the TXVECTOR parameter TRIG-GER\_RESPONDING is true and that is a response to a PPDU containing a MU-RTS Trigger frame receivedfrom an AP shall ensure that the arrival time of the non-HT or non-HT duplicate PPDU at the AP is" doing in a PHY clause? | Move to Clause 27 | Rejected – The citied text is about the timing requirement, which should be described in the PHY clause.  |
| 17145 | 259.00 | 27.2.5.2 | "If the MAC does not receive a PHYRXSTART.indication primitive during the CTSTimeout interval, the STA shall conclude that the transmissionof the MU-RTS Trigger frame has failed, and, if the MU-RTS Trigger frame initiated a TXOP," This spec text was added to allow all other type of trigger frame exchange before the MU-RTS/CTS to enhance the protection of DL transmission to far end STA. However, to support this mechanims, the TXOP holder has to record what type of frame initialized the TXOP which is not a good design. In addition, this mechanism requires long frame exchange for DL frame protection and is very easy to break. So the whole mechanism of DL protection for the far end STA need a major enhancement. | as in the comment | Rejected –Sending two variants of Trigger frame is already part of many design. For example, AP can send BQRP Trigger frame, BSRP Trigger frame, or NFRP Trigger frame in front of any UL or DL MU sequence. If these sequence succeeds, then the following MU sequence can all follow the PIFS rule. There is no difference between these existing designs and the MU-RTS design.  |

**Discussion:** *None.*

**Propose:** Revised for CID 16087 per discussion and editing instructions in 11-18/1803r0.

*TGax editor: Change 17.3.9.10 Pre-correction accuracy requirements as follows: (Track change on)*

* Orthogonal frequency division multiplexing (OFDM) PHY specification
* OFDM PHY
* PHY transmit specifications

Insert a new subclause at the end of 17.3.9 as follows:

* Pre-correction accuracy requirements

A STA that transmits a non-HT or non-HT duplicate PPDU where the TXVECTOR parameter TRIGGER\_RESPONDING is present and true compensates for carrier frequency offset (CFO) error and symbol clock error. After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting MU-RTS Trigger frame shall not exceed 2 kHz when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN at a received power of 60 dBm in the primary 20 MHz. The residual CFO error measurement shall be made on the non-HT PPDU or non-HT duplicate PPDU following the L-STF field. The symbol clock error shall be compensated by the same ppm amount as CFO error.

A non-AP HE STA(#16578) that transmits a non-HT or non-HT duplicate PPDU where the TXVECTOR parameter TRIGGER\_RESPONDING is true in response to a triggering PPDU (PPDU containing a MU-RTS Trigger frame) from an AP shall ensure that the arrival time of the non-HT or non-HT duplicate PPDU at the AP is within ±0.4 µs of TXTIME+aSIFSTime+RTD from the transmission start time of the triggering PPDU, where TXTIME is that of the triggering PPDU and RTD is the round trip delay between the AP and the STA.(#16087)

NOTE 1—TXTIME contains the SignalExtension, thus TXTIME + aSIFSTime is equivalent to 16 µs after the end of transmission of the PPDU containing the MU-RTS Trigger frame at the AP. The STA is not expected to measure or compensate for the RTD if(#15300) transmitting the non-HT or non-HT duplicate PPDU.

NOTE 2—The timing requirement for transmitting an non-HT or non-HT duplicate PPDU if(#15301) the TXVECTOR parameter TRIGGER\_RESPONDING is true is the same as the timing requirement for transmitting an HE TB PPDU (see 28.3.14.3 (Pre-correction accuracy requirements)).