IEEE P802.11
Wireless LANs

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| **Resolutions to comments to subclauses 10.3.7, 3.1, 3.2, and 27.5.1.1** |
| **Date:** 2018-11-12 |

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| Tomoko Adachi | Toshiba | 1, Komukai Toshiba-cho, Saiwai-ku, Kawasaki, Japan |  +81 44 549 2283 | tomo.adachi@toshiba.co.jp |
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Abstract

This submission proposes resolutions for the following CIDs submitted to subclause 10.3.7, 3.1, 3.2, and 27.5.1.1 (**7 CIDs**):

* 16907,
* 16909, 16910, 16915,
* 16916, 16918
* 16921

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.***

# 10.3.7

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| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 16907 | Tomoko Adachi | 208.00 | Table 10-5 (Determination of the EstimatedAckTxTime based on properties of the PPDU causing the EIFS) in the baseline should be revisited to be compatible with 11ax. | As the response frame will be in variable length by multiple TIDs and multiple AIDs, it seems it's impossible to estimate the duration of the response frame. Thus, considering that dot11DynamicEIFSActivated is read-only, it's better to add a sentence in 10.3.7 that an HE STA with dot11DynamicEIFSActivated set to true and joining an HE BSS shall not use Equation (10-8).Or delete the whole mechanism related to dot11DynamicEIFSActivated. | Revised. See the instructions to the TGax editor in doc. 11-18/1853r0. |
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**Discussion**

Table 10-8 (Determination of the EstimatedAckTxTime based on properties of the PPDU causing the EIFS) is as follows:

**Table 10-8—Determination of the EstimatedAckTxTime based on properties of the PPDU causing the EIFS**

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| **Modulation of PPDU causing EIFS** | **Rate/MCS of PPDU causing EIFS** | **Other properties of PPDU causing EIFS** | **Presumed response** | **Presumed response rate** | **EstimatedAck TxTime (μs)** |
| (HR-)DSSS | 1 Mb/s |  | Ack | 1 Mb/s | 304 |
| (HR-)DSSS | ≥ 2 Mb/s (long preamble) |  | Ack | 2 Mb/s | 248 |
| (HR-)DSSS | ≥ 2 Mb/s (short preamble) |  | Ack | 2 Mb/s | 152 |
| (ERP-)OFDM | BPSK |  | Ack | 6 Mb/s | 44 |
| (ERP-)OFDM | QPSK |  | Ack | 12 Mb/s | 32 |
| (ERP-)OFDM | ≥16-QAM |  | Ack | 24 Mb/s | 28 |
| HT | BPSK | Aggregation = 0 | Ack | 6 Mb/s | 44 |
| HT | QPSK | Aggregation = 0 | Ack | 12 Mb/s | 32 |
| HT | ≥16-QAM | Aggregation = 0 | Ack | 24 Mb/s | 28 |
| HT | BPSK | Aggregation = 1 | BlockAck | 6 Mb/s | 68 |
| HT | QPSK | Aggregation = 1 | BlockAck | 12 Mb/s | 44 |
| HT | ≥16-QAM | Aggregation = 1 | BlockAck | 24 Mb/s | 32 |
| VHT | BPSK |  | BlockAck |  | 68 |
| VHT | QPSK |  | BlockAck |  | 44 |
| VHT | ≥16-QAM |  | BlockAck |  | 32 |

It does not include the case when HE PPDU is causing the EIFS.

We can leave this table intentionally as is, since HE operation allows various responses and furthermore, we have TXOP\_DURATION that avoids invoking EIFS when it is not set to UNSPECIFIED.

The third last paragraph in 10.3.7 in the baseline covers this case.

The problem is that, a non-HE PPDU can also carry MPDUs using HE MAC extensions.

For example, a Trigger frame can be transmitted in a non-HE PPDU and the frame solicited by the Trigger frame is no longer just a simple Ack or a BlockAck frame.

**HE STAs in an HE BSS** can expect that such unpredictable frame exchanges tend to frequently occur. So it is better to use the basic simple equation to calculate the EIFS, i.e., to **use Equation (10-7)**, rather than trying to find out the EstimatedAckTxTime, which can’t be accurate anyway.

Equation (10-7) is the following:

EIFS = aSIFSTime + AckTxTime + DIFS

* **Add a condition that when an HE STA is in an HE BSS, Equation (10-7) is always used.**

There is also a case such as non-AP HE STA transmits multi-TID A-MPDUs to a TDLS HE STA within a non-HE BSS using a non-HE PPDU. The BlockAck frame can be much longer than the EstimatedAckTxTime shown in Table 10-8. But if the non-HE PPDU causes EIFS, it is impossible to predict that HE MAC extensions are used under TDLS, and the probability of using HE MAC extensions should be relatively low when in a non-HE BSS compared to being in an HE BSS. So, it is better to cast a veil over this situation and just **follow the ordinary behaviour based on Table 10-8 when a HE STA whose dot11DynamicEIFSActivated is true is in a non-HE BSS**.

* **The behaviour will be just the same with a legacy STA, so no need to add this condition.**

**Proposed Change**

TGax Editor: Insert subclause 10.3.7 title from the baseline and change the third last paragraph as follows:

##### 10.3.7 DCF timing relations

Change the third last paragraph as follows:

When dot11DynamicEIFSActivated is true and the modulation of the PPDU that causes the EIFS does not occur in Table 10-8 (Determination of the EstimatedAckTxTime based on properties of the PPDU causing the EIFS), then EIFS is determined as shown in Equation (10-7). When an HE STA whose dot11DynamicEIFSActivated is set to true is in an HE BSS and a non-HE PPDU causes the EIFS, the EIFS is always determined as shown in Equation (10-7).(#16907)

NOTE—When the RXVECTOR parameter TXOP\_DURATION of a received HE PPDU is set to UNSPECIFIED and EIFS is invoked, EIFS is determined as shown in Equation (10-7), as the HE PPDU is not listed in Table10-8. When the RXVECTOR parameter TXOP\_DURATION of a received HE PPDU is not set to UNSPECIFIED, EIFS is not invoked. See 10.3.2.3.7 (EIFS).(#16907)

# 3.1

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| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 16909 | Tomoko Adachi | 33.09 | The part "(unfragemented)" is deleted from the definition of the A-MSDU. However, even with this change, it still says the A-MSDU is carried in a single MPDU, which means its not fragmented. After fragmentation, there will be multiple MPDUs generated. There is no need to describe the relation with MPDUs now. | Change the definition to simply "A structure that contains one or more MSDUs."Or if there is an intention to clarify that the fragmentation can be done only when the recipient HE STA has such capability, add such explanation after the above. | Revised. See the instructions to the TGax editor in doc. 11-18/1853r0. |
| 16910 | Tomoko Adachi | 33.05 | The baseline, IEEE Std 802.11-2016, has the PPDU definition as follows: "The unit of data exchanged between two peer PHY entities to provide the PHY data service." This can't include MU PPDU. (Note that this comment was submitted in the previous LB, and rejected saying that 802.11-2016 is defining it as "The uniit of data exchanged between PHY entities." but this is not true. Checked all the baselines to P802.11ax D3.0, also P802.11REVmd D1.0 and D1.1 and found no such change.) | Copy and paste the definition of PPDU from the baseline to clause 3.1 of the draft and strike out the part "two peer" to show its deleted. | Revised. Agree in principle. See the instructions to the TGax editor in doc. 11-18/1853r0. |
| 16915 | Tomoko Adachi | 33.05 | The definition of OFDMA should be in 3.1 as the same with MU-MIMO. | Add the following definition to 3.1.orthogonal frequency division multiple access (OFDMA): A technique by which multiple stations (STAs) either simultaneously transmit to a single STA or simultaneously receive from a single STA over different radio frequencies. | Revised. Agree in principle. See the instructions to the TGax editor in doc. 11-18/1853r0. |
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TGax Editor: Change texts under 3.2 in P802.11ax D3.2 as follows:

##### 3.1 Definitions

Change the following definitions:

**aggregate medium access control (MAC) service data unit (A-MSDU):** A structure that contains one or more MSDUs and is treated as a single ~~(unfragmented)~~ MSDU when constructing one or more data medium access control (MAC) protocol data units (MPDUs).(#16909)

**multi-user multiple input, multiple output (MU-MIMO):** A technique by which multiple stations (STAs), each with one or more antennas, either simultaneously transmit to a single STA or simultaneously receive from a single STA independent data streams over the same radio frequencies.

~~NOTE—IEEE Std 802.11 supports only downlink (DL) MU-MIMO. See downlink multi-user multiple input, multiple output (DL-MU-MIMO) (in 3.2).~~

**physical layer (PHY) protocol data unit (PPDU):** The unit of data exchanged between ~~two peer~~ PHY entities to provide the PHY data service.(#16910)

Insert the following definition maintaining alphabetical order:

**orthogonal frequency division multiple access (OFDMA):** A technique by which multiple stations (STAs) either simultaneously transmit to a single STA or simultaneously receive from a single STA independent data streams over different radio frequencies.(#16915)

# 3.2

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| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 16916 | Tomoko Adachi | 38.26 | Now that the definition of MU PPDU says its uses the DL-MU-MIMO technique, DL OFDMA technique, or a combination of the two techniques, the similar description should be added to the definition of HE TP PPDU. | Change the definition of HE TB PPDU to read "An HE PPDU transmitted with HE TB PPDU format that is capable of carrying one or more PHY service data units (PSDU) for one or more users using the uplink multi-user multiple input, multiple output (UL MU-MIMO) technique, uplink orthogonal frequency division multiple access (UL OFDMA) technique, or a combination of the two techniques." | Revised. Agree in principle. See the instructions to the TGax editor in doc. 11-18/1853r0. |
| 16918 | Tomoko Adachi | 37.00 | There are two similar definitions, one is for "high efficiency (HE) extended range (ER) single user (SU) physical layer (PHY) protocol data unit (PPDU)" starting from line 54 and the other is for "high efficiency (HE) extended range (ER) single-user (SU) physical layer (PHY) protocol data unit (PPDU)" starting from line 59. The second term is correct, as a hypen should be needed between singla and user. But for the sentence for the definition, the first one aligns with other definitions in the baseline. | Delete the second definition starting from pp.ll 37.59 and add "-" between "single" and "user" in pp.ll 37.54. | Accepted.  |
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TGax Editor: Change texts under 3.2 in P802.11ax D3.2 as follows:

##### 3.2 Definitions specific to IEEE 802.11

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**high efficiency (HE) extended range (ER) single-user (SU)**(#16918) **physical layer (PHY) protocol data unit (PPDU):** A Clause 28 (High Efficiency (HE) PHY specification PPDU) PPDU with the TXVECTOR parameter FORMAT equal to HE\_ER\_SU.

(#16918)…

**high efficiency (HE) trigger-based (TB) physical layer protocol data unit (PPDU):** An HE PPDU transmitted with HE TB PPDU format that is capable of carrying one or more PHY service data units (PSDUs) for one or more users using the uplink multi-user multiple input, multiple output (UL MU-MIMO) technique, uplink orthogonal frequency division multiple access (UL OFDMA) technique, or a combination of the two techniques.(#16916)

# 27.5.1.1

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| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 16921 | Tomoko Adachi | 277.55 | "An AP shall not transmit an HE MU PPDU of DL MU-MIMO within OFDMA allocated in an RU that is addressed to a STA unless the AP has received from the STA ..." Here, "a STA" should be "STAs", as multiple STAs are always transmitted in DL MU-MIMO within OFDMA. If it is to a single STA, then it don't have to be in DL MU-MIMO... | Change it to read "An AP shall not transmit an HE MU PPDU of DL MU-MIMO within OFDMA allocated in an RU that is addressed to STAs unless the AP has received from each of the STAs ...". | Revised. It is resolved by CID 15643.  |
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