IEEE P802.11
Wireless LANs

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| Comment resolution on CID5054 and 5055 |
| Date: 2019-7-31 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Takenori Sakamoto | Panasonic |  |  | sakamoto.takenori@jp.panasonic.com |
| Hiroyuki Motozuka | Panasonic |  |  |  |
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Abstract

This submission proposes resolutions of CID5054 and 5055.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5054 | 744 | 29.12.33 | TXTIME calculation for EDMG SC mode A-PPDU is missing | Add TXTIME calculation for EDMG SC mode A-PPDU | RevisedIn case of EDMG A-PPDU, the duration of the EDMG-Header-A and the length of the guard interval prepended to the first data block are different between the first PPDU and the following PPDUs.The duration of the EDMG-Header-A and the length of the guard interval for EDMG A-PPDU shall be added. |
| 5055 | 746 | 29.12.3.4 | TXTIME calculation for EDMF OFDM mode A-PPDU is missing | Add TXTIME calculation for EDMG OFDM mode A-PPDU | RevisedIn case of EDMG A-PPDU, the duration of the EDMG-Header-A is different between the first PPDU and the following PPDUs, because the EDMG-Header-A in the first PPDU is modulated by SC, on the other hand the EDMG-Header-A in the following PPDUs are modulated by OFDM.The EDMG-Header-A starting from the second PPDU aggregated in an EDMG A-PPDU consist of two OFDM symbols.The duration of the EDMG-HeaderA shall be defined separately based on ippdu. |

**29.12.3.3 TXTIME calculation for EDMG SC mode**

If the EDMG\_MODULATION parameter is set to EDMG\_SC\_MODE, the TXTIME parameter shall be defined in microseconds (μs) as follows:

$$TXTIME\left(μs\right)=T\_{L-STF}+T\_{L-CEF}+T\_{L-Header}+T\_{EDMG-Header-A}+T\_{EDMG-STF}+T\_{EDMG-CEF}+T\_{EDMG-Header-B}+T\_{Data}+T\_{TRN}$$

where:

$$T\_{L-STF}=2176×aDMGChipTimeDuration≈1.24 μs$$

$$T\_{L-CEF}=1152×aDMGChipTimeDuration≈0.65 μs$$

$$T\_{L-Header}=1024×aDMGChipTimeDuration≈0.58 μs$$

If EDMG\_ADD\_PPDU = NO-ADD-PPDU, NUM\_USERS = 1, CH\_BANDWIDTH has a single bit set to 1, and NUM\_STS = 1, then

$$T\_{EDMG-Header-A}=1024×aDMGChipTimeDuration≈0.58 μ$$

If EDMG\_ADD\_PPDU = NO-ADD-PPDU, NUM\_USERS ≥ 1, CH\_BANDWIDTH has more than 1 bit set to 1 and/or NUM\_STS ≠ 1, then

$$T\_{EDMG-Header-A}=1088×aDMGChipTimeDuration≈0.62 μ$$

If EDMG\_ADD\_PPDU = ADD-PPDU, *iPPDU* = 1, CH\_BANDWIDTH has a single bit set to 1, and NUM\_STS = 1, then

$$T\_{EDMG-Header-A}=1024×aDMGChipTimeDuration≈0.58 μs$$

If EDMG\_ADD\_PPDU = ADD-PPDU, *iPPDU* = 1, CH\_BANDWIDTH has more than 1 bit set to 1 and/or NUM\_STS ≠ 1, then

$$T\_{EDMG-Header-A}=1088×aDMGChipTimeDuration≈0.62 μs$$

If EDMG\_ADD\_PPDU = ADD-PPDU, iPPDU > 1,

$$T\_{EDMG-Header-A}=1024×aDMGChipTimeDuration≈0.58 μs$$

If NUM\_USERS = 1, CH\_BANDWIDTH has a single bit set to 1, and NUM\_STS = 1, then

$T\_{EDMG-STF}=0$ and $T\_{EDMG-CEF}=0$

If NUM\_USERS ≥ 1, CH\_BANDWIDTH has more than 1 bit set to 1 and/or NUM\_STS ≠ 1, then

$T\_{EDMG-STF}=2432×aDMGChipTimeDuration≈1.38 μs$ and

$$T\_{EDMG-CEF}={\left(1152+1280×\left(N\_{EDMG-CEF}^{N\_{STS}}-1\right)\right)}/{\left(1.76×10^{3}\right)}$$

If NUM\_USERS = 1, then $T\_{EDMG-Header-B}=0$

If NUM\_USERS > 1, then $T\_{EDMG-Header-B}=512×aDMGChipTimeDuration≈0.29 μs$

$$T\_{Data}=\left(N\_{BLKS}×512+N\_{GI}\right)×aDMGChipTimeDuration μs$$

If the NUM\_USERS parameter is equal to 1, the CH\_BANDWIDTH parameter has a single bit set to 1, and the NUM\_STS parameter is equal to 1, then the EDMG-STF and EDMG-CEF fields are not transmitted and *TEDMG-STF* = 0 and *TEDMG-CEF* = 0.

If the NUM\_USERS parameter is greater than or equal to 1 and the CH\_BANDWIDTH parameter has more than 1 bit set to 1 and/or the NUM\_STS parameter is not equal to 1, then the EDMG-STF and EDMG-CEF fields are transmitted with a time duration specified above.

If the NUM\_USERS parameter is equal to 1, then the EDMG-Header-B is not transmitted and *TEDMG-Header-B* = 0. If the NUM\_USERS is equal to a value greater than 1, then the EDMG-Header-B is transmitted with a time duration specified above.

If the NUM\_STS parameter is equal to 1 or 2, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 1. If the NUM\_STS parameter is equal to 3 or 4, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 2. If the NUM\_STS parameter is equal to 5, 6, 7, or 8, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 4.

The number of SC symbol blocks, *NBLKS*, depends on the EDMG\_LENGTH, MCS and other parameters in the TXVECTOR and shall be as defined in 29.5.9.4.

If the EDMG\_ADD\_PPDU parameter is equal to NO-ADD-PPDU, the NUM\_USERS parameter is equal to 1, the CH\_BANDWIDTH parameter has a single bit set to 1, and the NUM\_STS is equal to 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 64
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

If the EDMG\_ADD\_PPDU parameter is equal to NO-ADD-PPDU, the NUM\_USERS parameter is equal to 1, the CH\_BANDWIDTH parameter has more than 1 bit set to 1 and/or the NUM\_STS parameter is not equal to 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 32
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

If the EDMG\_ADD\_PPDU parameter is equal to NO-ADD-PPDU, the NUM\_USERS parameter is greater than 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 64
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

If the EDMG\_ADD\_PPDU parameter is equal to ADD-PPDU, *iPPDU* is equal to 1, the CH\_BANDWIDTH parameter has a single bit set to 1, and the NUM\_STS is equal to 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 64
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

If the EDMG\_ADD\_PPDU parameter is equal to ADD-PPDU, *iPPDU* is equal to 1, the CH\_BANDWIDTH parameter has more than 1 bit set to 1 and/or the NUM\_STS parameter is not equal to 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 32
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

If the EDMG\_ADD\_PPDU parameter is equal to ADD-PPDU and *iPPDU* is more than 1, then:

* If the GI\_TYPE parameter is equal to SHORT, *NGI* = 64
* If the GI\_TYPE is equal to NORMAL, *NGI* = 64
* If the GI\_TYPE is equal to LONG, *NGI* = 128

The TRN field duration shall be as defined in 29.12.3.2.

If the L\_BEAM\_TRACKING\_REQUEST parameter is equal to Beam\_Tracking\_Not\_Requested, the L\_PACKET\_TYPE parameter is equal to TRN-R-PACKET, the EDMG\_BEAM\_TRACKING\_REQUEST parameter is equal to Beam\_Tracking\_Requested, the EDMG\_PACKET\_TYPE parameter is equal to EDMG-TRN-R-PACKET, and the EDMG\_TRN\_LEN parameter is greater than 0, then *LT* = 0, *LTRN-Unit-P* = 0, and *LTRN-Unit-M* = 0.

If the EDMG\_ADD\_PPDU parameter is equal to ADD-PPDU, then the TXTIME parameter shall be updated every time a PLME-TXTIME.request(TXVECTOR) primitive is received for each consecutive PPDU. The TXTIME shall be increased by the duration of (*TEDMG-Header-A* + *TData*) every time the PHY entity receives a new PPDU transmitted as a part of the A-PPDU.

If present in an A-PPDU, the TRN field shall be appended only once at the last PPDU of the A-PPDU.

**29.12.3.4 TXTIME calculation for EDMG OFDM mode**

If the EDMG\_MODULATION parameter is equal to EDMG\_OFDM\_MODE, the TXTIME parameter shall be defined in microseconds (μs) as follows:

$$TXTIME\left(μs\right)=T\_{L-STF}+T\_{L-CEF}+T\_{L-Header}+T\_{EDMG-Header-A}+T\_{EDMG-STF}+T\_{EDMG-CEF}+T\_{EDMG-Header-B}+T\_{Data}+T\_{TRN}$$

where:

$$T\_{L-STF}=2176×aDMGChipTimeDuration≈1.24 μs$$

$$T\_{L-CEF}=1152×aDMGChipTimeDuration≈0.65 μs$$

$$T\_{L-Header}=1024×aDMGChipTimeDuration≈0.58 μs$$

If EDMG\_ADD\_PPDU is equal to NO-ADD-PPDU then

$$T\_{EDMG-Header-A}=1088×aDMGChipTimeDuration≈0.62 μs$$

If EDMG\_ADD\_PPDU is equal to ADD-PPDU and *iPPDU* = 1, then

$$T\_{EDMG-Header-A}=1088×aDMGChipTimeDuration≈0.62 μs$$

$T\_{EDMG-STF}=3840×aDMGSampleTimeDuration≈1.45 μs$

$$T\_{EDMG-CEF}=\left(704×N\_{EDMG-CEF}^{N\_{STS}}\right)×aDMGSampleTimeDuration μs$$

If NUM\_USERS = 1, then $T\_{EDMG-Header-B}=0$

If NUM\_USERS > 1, then $T\_{EDMG-Header-B}=\left(512+N\_{GI}\right)×aDMGSampleTimeDuration μs$

$$T\_{Data}=\left(N\_{SYMS}×\left(512+N\_{GI}\right)\right)×aDMGSampleTimeDuration μs$$

$$T\_{TRN}=\left(L\_{T}+\left(L\_{TRN-Unit-P}+L\_{TRN-Unit-M}\right)×TRN\\_BASIC\\_LENGTH×EDMG\\_TRN\\_LEN+L\_{TRN-Unit-P}×TRN\\_BASIC\\_LENGTH\right)×aDMGSampleTimeDuration μs$$

$$TRN\\_BASIC\\_LENGTH=TRN\\_BL×N\_{TRN}^{N\_{TX}}$$

If EDMG\_TRN\_LEN > 0, EDMG-TRN-T-PACKET or EDMG-TRN-R/T-PACKET, then

$L\_{T}=4×704×N\_{TRN}^{N\_{TX}}, L\_{TRN-Unit-P}=0,1,2, or 4$ and $L\_{TRN-Unit-M}=1,2, …, or 16$

If EDMG\_TRN\_LEN > 0 and EDMG-TRN-R-PACKET, then *LTRN-Unit-P* = 0 and *LTRN-Unit-M* = 10

If EDMG\_TRN\_LEN = 0, then *LT* = 0, *LTRN-Unit-P* = 0 and *LTRN-Unit-M* = 0

If the NUM\_STS parameter is equal to 1 or 2, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 2. If the NUM\_STS parameter is equal to 3, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 3. If the NUM\_STS parameter is equal to 4, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 4. If the NUM\_STS parameter is equal to 5 or 6, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 6. If the NUM\_STS parameter is equal to 7 or 8, then the $N\_{EDMG-CEF}^{N\_{STS}}$ parameter is set to 8.

If the NUM\_USERS parameter is equal to 1, then the EDMG-Header-B is not transmitted and *TEDMG-Header-B* = 0. If the NUM\_USERS parameter is equal to a value greater than 1, then the EDMG-Header-B is transmitted with time a duration specified above.

If the GI\_TYPE parameter is equal to SHORT, *NGI* = 48. If the GI\_TYPE parameter is equal to NORMAL, *NGI* = 96. If the GI\_TYPE parameter is equal to LONG, *NGI* = 192.

The number of OFDM symbols, *NSYMS*, depends on the EDMG\_LENGTH, MCS and other parameters in the TXVECTOR and shall be as defined in 29.6.9.2.

If the TRN\_SEQ\_LENGTH parameter is equal to NORMAL, then TRN\_BL is set to 2×704. If the TRN\_SEQ\_LENGTH parameter is equal to LONG, then TRN\_BL is set to 4×704. If the TRN\_SEQ\_LENGTH parameter is equal to SHORT, then TRN\_BL is set to 704.

If the NUM\_TX\_CHAINS parameter is equal to 1 or 2, then $N\_{TRN}^{N\_{TX}}$ is set to 2. If the NUM\_TX\_CHAINS parameter is equal to 3, then $N\_{TRN}^{N\_{TX}}$ is set to 3. If the NUM\_TX\_CHAINS parameter is equal to 4, then $N\_{TRN}^{N\_{TX}}$ is set to 4. If the NUM\_TX\_CHAINS parameter is equal to 5 or 6, then $N\_{TRN}^{N\_{TX}}$ is set to 6. If the NUM\_TX\_CHAINS parameter is equal to 7 or 8, then $N\_{TRN}^{N\_{TX}}$ is set to 8.

If the EDMG\_TRN\_LEN parameter is greater than 0 and the EDMG\_PACKET\_TYPE parameter is equal to EDMG-TRN-T-PACKET or EDMG-TRN-R/T-PACKET, then $L\_{T}=4×704×N\_{TRN}^{N\_{TX}}$, *LTRN-Unit-P* = 0,1,2, or 4 and *LTRN-Unit-M* = 1,2, …, or 16.

If the EDMG\_TRN\_LEN parameter is greater than 0 and the EDMG\_PACKET\_TYPE parameter is equal to EDMG-TRN-R-PACKET, then *LT* = 0, *LTRN-Unit-P*, and *LTRN-Unit-M* = 10.

If the EDMG\_TRN\_LEN parameter is equal to 0, then *LT* = 0, *LTRN-Unit-P* = 0, and *LTRN-Unit-M* = 0.

If the L\_BEAM\_TRACKING\_REQUEST parameter is equal to Beam\_Tracking\_Not\_Requested, the L\_PACKET\_TYPE parameter is equal to TRN-R-PACKET, the EDMG\_BEAM\_TRACKING\_REQUEST parameter is equal to Beam\_Tracking\_Requested, the EDMG\_PACKET\_TYPE parameter is equal to EDMG-TRN-R-PACKET, and the EDMG\_TRN\_LEN parameter is greater than 0, then *LT* = 0, *LTRN-Unit-P* = 0 and *LTRN-Unit-M* = 0.

If the EDMG\_ADD\_PPDU parameter is equal to ADD-PPDU, then the TXTIME parameter shall be updated every time a PLME-TXTIME.request(TXVECTOR) is received for each consecutive PPDU. The TXTIME shall be increased by the duration of (*TEDMG-Header-A* + *TData*) every time the PHY entity receives a new PPDU to be transmitted as a part of the A-PPDU.

The duration of the EDMG-Header-A starting from the second PPDU aggregated in an A-PPDU is defined as follows:

$$T\_{EDMG-Header-A}=\left(512+N\_{GI}\right)×aDMGSampleTimeDuration μs$$

$$T\_{EDMG-Header-A}=\left(1024+2×N\_{GI}\right)×aDMGSampleTimeDuration μs$$

where:

*NGI* depends on the GI\_TYPE parameter as defined above

If present in an A-PPDU, the TRN field shall be appended only once at the last PPDU of the A-PPDU.

**References:**

1. Draft P802.11ay\_D4.0