IEEE P802.11
Wireless LANs

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| CR for 10.5 MPDU Fragmentation |
| Date: 2017-08-24 |
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Abstract

This submission proposes resolutions for comments related to TGax D1.0 with the following CIDs:

* 6561, 6961, 6962, 6963, 6964, 7782, 8433

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Changes in Annex B

***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** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6964 | 122.46 | Do not change this paragraph as changing it breaks the specification for all non-HE STAs. Instead add an additional paragraph providing the fragmentation limitation for HE STAs. | Remove all changes to this paragraph. If necessary insert a new paragraph that provides the length limitations and behavior of fragmentation for HE STAs. | **Reivised**Agree in principle.If a STA is not capable of dynamic fragmentation, it shall follow the baseline fragmentation rule. No additional instruction is necessary for such STA. We propose to restore the referred paragraph to its baseline state. Instead, an instruction is added for HE STA capable of dynamic fragmentation.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 6964. |
| 6963 | 122.39 | Delete the last sentence "Unless the conditions described in 27.3.2 (Support and requirements for dynamic fragmentation) are met, static fragmentation is used." and add a paragraph defining the new feature of dynamic fragmentation. | "Delete: ""Unless the conditions described in 27.3.2 (Support and requirements for dynamic fragmentation) are met, static fragmentation is used."" | **Reivised**Agree in principle.Similar comment with CID 6964If a STA is not capable of dynamic fragmentation, it shall follow the baseline fragmentation rule. No additional instruction is necessary for such STA. We propose to restore the referred paragraph to its baseline state. Instead, an instruction is added for HE STA capable of dynamic fragmentation.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 6963. |
| 6516 | 122.40 | "... static fragmentation is used". It seems that what is intended is that dynamic fragmentation is not used, not that static fragmentation is necessarily used. | Change "static fragmentation is used" to "only static fragmentation may be used". | **Reivised**Agree in principle.Similar comment with CID 6964If a STA is not capable of dynamic fragmentation, it shall follow the baseline fragmentation rule. No additional instruction is necessary for such STA. We propose to restore the referred paragraph to its baselne state. Instead, an instruction is added for HE STA capable of dynamic fragmentation.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 6516. |
| 7782 | 122.40 | Use proper normative verbs | Change "is" to "shall be" | **Reivised**Agree in principle.Similar comment with CID 6964If a STA is not capable of dynamic fragmentation, it shall follow the baseline fragmentation rule. No additional instruction is necessary for such STA.We propose to restore the referred paragraph to its baseline state. Instead, an instruction is added for HE STA capable of dynamic fragmentation.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 7782. |
| 6961 | 122.32 | Static fragmentation is a new term introduced in this amendment. Hence the use of to define the "two" types on fragmentation now in the specification effectively breaks the existing specification, unless all mentions in the baseline specification of "fragmentation" are corrected to be "static fragmentation" | Delete the insertion "With static fragmentation" | **Reivised**Agree in principle.Dynamic fragmentation provides additional functionalities based on the existing fragmentation procedure when it’s supported by HE STA. Since there is no change to the legacy fragmentation behavior, we don’t need to introduce a new term, ‘static fragmentation’.We propose to remove the term ‘static’ fragmentation throughout the draft.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 6961. |
| 6962 | 122.35 | Static fragmentation is a new term introduced in this amendment. Hence the use of to define the "two" types on fragmentation now in the specification effectively breaks the existing specification, unless all mentions in the baseline specification of "fragmentation" are corrected to be "static fragmentation" | Delete the insertion "static" | **Reivised**Agree in principle.Similar comment with CID 6961Dynamic fragmentation provides additional functionalities based on the existing fragmentation procedure when it’s supported by HE STA. Since there is no change to the legacy fragmentation behavior, we don’t need to introduce a new term, ‘static fragmentation’.We propose to remove the term ‘static’ fragmentation throughout the draft.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 6962. |
| 8433 | 122.31 | The term "static fragmention" is not descriptive of the characteristic being descibed. It is not the whole procedure that is different, it is just the requirement for each fragment having the same number of octets that changes. | Name the charactreristic not the procedure: uniformly fragmented MSDU or MMPDU and non-uniformly fragmented MSDU or MMPDU. Since we are now defining a term, remove all the "shalls". The shalls apply to the implementation so we make an additional shall statement against the STA once the term has been defined. Change to read: "With a uniformly fragmented MSDU or MMPDU, the length of each fragment consists of an equal number of octets for all fragments except the last, which may be smaller. The length of each fragment is an even number of octets, except the last fragment, which may be either an even or an odd numver of octets. The length of each fragment is never larger than dot11FragmentationThreshold unless security encapsulation is invoked for the MPDU. If security encapsulation is invoked for the MPDU, then the MPDU shall be expanded by the encapsulation overhead and this may result in a fragment larger than dot11FragmentationThreshold. A STA shall uniformly fragment an MSDU or MMPDU unless the conditions in 27.3.2 are met, in which case, the STA may non-uniformly fragment the MSDU or MMPDU." | **Reivised**Agree in principle.Similar comment with CID 6961Dynamic fragmentation provides additional functionalities based on the existing fragmentation procedure when it’s supported by HE STA. Since there is no change to the legacy fragmentation behavior, we don’t need to introduce a new term, ‘static fragmentation’.We propose to remove the term ‘static’ fragmentation throughout the draft.TGax editor to make the changes shown in 11-17/1283r1 under all headings that include CID 8433. |

**Discussion: *None***

## 10.5 MPDU Fragmentation

**TGax Editor: *Change the 2nd paragraph as follows (#CID 6963, 6964, 6516, 7782, 6961, 6962, 8433):***

The length of each fragment shall be an equal number of octets for all fragments except the last, which may be smaller. The length of each fragment shall be an even number of octets, except for the last fragment of an MSDU or MMPDU, which may be either an even or an odd number of octets. The length of a fragment shall never be larger than dot11FragmentationThreshold unless security encapsulation is invoked for the MPDU. If security encapsulation is active for the MPDU, then the MPDU shall be expanded by the encapsulation overhead and this may result in a fragment larger than dot11FragmentationThreshold.

**TGax Editor: *Insert the following sentence at the end of this subcluase (#CID 6963, 6964, 6516, 7782, 6961, 6962, 8433):***

An HE STA may also use the dynamic fragmentation as defined in 27.3 (Fragmentation and defragmentation) if the conditions described in 27.3.1 (General) are met.

**10.22.2.8 TXOP limits**

**TGax Editor: *Change the following paragraphs as below (#CID 6961, 6962, 8433)***

The TXOP holder may exceed the TXOP limit only if it does not transmit more than one Data or Management frame in the TXOP, and only for:

* Retransmission of an MPDU, not in an A-MPDU consisting of more than one MPDU
* Initial transmission of an MSDU under a block ack agreement, where the MSDU is not in an A-MPDU consisting of more than one MPDU and the MSDU is not in an A-MSDU
* Transmission of a Control MPDU or a QoS Null MPDU, not in an A-MPDU consisting of more than one MPDU
* Initial transmission of a fragment of an MSDU or MMPDU, if the fragment is not a dynamic fragment and a previous fragment of that MSDU or MMPDU was retransmitted
* Transmission of a fragment of an MSDU or MMPDU fragmented into 16 fragments if the fragment is not a dynamic fragment
* Transmission of the 16th fragment of an MSDU or MMPDU or A-MSDU under dynamic fragmentation
* Initial transmission of the first fragment of an MSDU or MMPDU or A-MSDU under dynamic fragmentation, where the size of the first fragment is equal to the minimum fragment size specified by the receiver STA and the MSDU or MMPDU or A-MSDU is not in an A-MPDU consisting of more than one MPDU
* Transmission of an A-MPDU consisting of the initial transmission of a single MPDU not containing an MSDU and that is not an individually addressed Management frame
* Transmission of a group addressed MPDU, not in an A-MPDU consisting of more than one MPDU
* Transmission of a null data packet (NDP)
* Transmission of a VHT NDP Announcement frame and NDP or transmission of a Beamforming Report Poll frame, where these fit within the TXOP limit and it is only the response and the immediately preceding SIFS that cause the TXOP limit to be exceeded.
* Transmission of an HE NDP Announcement frame and NDP or transmission of an HE NDP Announcement frame and NDP and BRP Trigger frame or transmission of a BRP Trigger frame, where these fit within the TXOP limit and it is only the response and the immediately preceding SIFS that cause the TXOP limit to be exceeded.

Except as described above, a STA shall fragment an individually addressed MSDU or MMPDU so that the

initial transmission of the first fragment does not cause the TXOP limit to be exceeded.

NOTE 3—The TXOP limit is not exceeded for:

* Initial transmission of an MPDU containing an unfragmented though fragmentable (see 10.2.7 (Fragmentation/ defragmentation overview) and 27.3 (Fragmentation and defragmentation)) MSDU/MMPDU
* Initial transmission of the first fragment of a fragmented MSDU/MMPDU, except when the MSDU/MMPDU is fragmented into 16 fragments and the fragment is not a dynamic fragment
* Initial transmission of an A-MSDU
* Initial transmission of a fragment of a fragmented MSDU/MMPDU, if no previous fragment of that MSDU/ MMPDU was retransmitted, except when the MSDU/MMPDU is fragmented into 16 fragments and the fragment is not a dynamic fragment
* Initial transmission of a fragment of a fragmented MSDU/MMPDU/A-MSDU under dynamic fragmentation, except for, either the first fragment of a fragmented MSDU/MMPDU/A-MSDU using the minimum fragment size specified by the receiver STA, or the 16th fragment of a fragmented MSDU/MMPDU/A-MSDU
* Transmission of an A-MPDU consisting of a single MPDU containing an A-MSDU or individually addressed Management frame, unless this is a retransmission of that MPDU
* Transmission of an A-MPDU consisting of more than one MPDU, even if some or all of the MPDUs are retransmissions

## 27.3 Fragmentation and defragmentation

**TGax Editor: *Change the 1st paragraph as follows (#CID 6961, 6962, 8433):***

An HE STA supports the fragmentation procedure defined in 10.2.7 (Fragmentation/defragmentation overview), 10.5 (Fragmentation), and 10.6 (Defragmentation). In addition, an HE STA can support the dynamic fragmentation procedure defined in this subclause.

## B.4.4.1 MAC protocol capabilities

**TGax Editor: *Change the following (#CID 6961, 6962, 8433):***

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| --- | --- | --- | --- | --- |
| Item | Protocol capability | References | Status | Support |
|  | Are the following MAC protocol capabilities supported? |  |  |  |
| PC6 | Fragmentation | 10.3 (DCF), 10.5 (Fragmentation) | M | Yes  No  |
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| PC7 | Defragmentation | 10.3 (DCF), 10.6 (Defragmentation) | M | Yes  No  |

## B.4.27.1 HE MAC features

**TGax Editor: *Insert the following rows (#CID 6961, 6962, 8433):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Protocol capability | References | Status | Support |
| HEMa | Dynamic fragmentation | 27.3 (Fragmentation and defragmentation) |  |  |
| HEMa.1 | Dynamic fragmentation level 1 | 27.3.2.2 (Level 1 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.2 | Dynamic fragmentation level 2 | 27.3.2.3 (Level 2 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.3 | Dynamic fragmentation level 3 | 27.3.2.4 (Level 3 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.4 | Dynamic defragmentation level 1 | 27.3.3.2 (Level 1 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.5 | Dynamic defragmentation level 2 | 27.3.3.3 (Level 2 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.6 | Dynamic defragmentation level 3 | 27.3.3.4 (Level 3 dynamic defragmentation) | CFHE:O | Yes  No  N/A  |
| HEMa.7 | Maximum number of fragmented MSDUs | 27.3.3.1 (General) | CFHE:O | Yes  No  N/A  |
| HEMa.8 | Minimum fragment size | 27.3.1 (General) | CFHE:O | Yes  No  N/A  |
| HEMa.9 | A-MSDU fragmentation support | 27.3.1 (General) | CFHE:O | Yes  No  N/A  |