IEEE P802.11  
Wireless LANs

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| Comment resolution | | | | |
| Date: 2018-03-09 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Solomon Trainin | Qualcomm |  |  | strainin@qti.qualcomm.com |
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Resolution of CIDs 1464, 2204, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2231, 2235, 2244, 2245, 2260, 2265 is presented

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 1464 | 30.12 | 9.2.4.4.1 | Are there ever going to be cases when a transmitting and receiving STA will support segmentation and reassembly, but they will not employ it? If, so then the text here needs to change and we need a way to signal when it is employed. Also, do we need text to say segmentation and reassembly is not used for broadcast frames? | Clarify how the sequence control field is used if necessary. |

**Proposal: Revised**

Discussion:

Segmentation and reassembly is established for a particular TID using an ADDBA Request and ADDBA Response frame exchange that includes the SAR Configuration element and the support of SAR may be rejected as defined in 10.25.2 Setup and modification of the block ack parameters, with addition of CID 2245 (IEEE 802.11-18/0336r2). No need to clarify the sequience control field. Additional clarification of SAR establishment is provided.

SAR exploits the HT Immediate Block Ack that does not provide support for broadcast frames.

***TGay Editor: modify as follows (Draft 1.1)***

P30L16

If segmentation and reassembly is established by block ack agreement , the Sequence Control field has the format illustrated in Figure 4.

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| 2204 | 107.07 | 10.3.2.11.2 | Add a reference to the normative section where this is defined - 9.2.4.4.1 or is it 9.4.2.250.7 table 5 | Add a reference to the normative text. |

**Proposal: Revised**

Discussion:

*The commented text is a NOTE, the reference is added as suggested*

***TGay Editor: modify as follows (Draft 1.1)***

P134L14

NOTE—Under a block ack agreement using segmentation and reassembly (10.62), the MPDU sequence number is represented by a 2MPDU Modulo counter and the MSDU sequence number is represented by

2MSDU Modulo counter (9.2.4.4.1), where MPDU Modulo and MSDU Modulo are as defined in the SAR Configuration element (9.4.2.266).

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| 2212 | 195.31 | 10.62.1 | Intro need to be clearer. The flow of MSDU to MSDU segments, the transmission of each MSDU segment in a MPDU, the reception of each of the MPDU, from which each MSDU segment is received, and then the reassembly of the MSDU segments into the original MSDU which is then delivered to the MAC must be clear. The use of the term MSDU to refer to an MSDU segment is very confusing and should be avoided. | Rework the paragraph so that the manner of moving the MSDU into MSDU segments and then back again to the original MSDU is clear. |
| 2215 | 196.17 | 10.62.2 | There is no statement the MSDUs are segmented such that the segmented MSDU will be transmitted in a maximum sized MPDU, except for the final MDDU segment which can be any size equal to or less than the max MPDU. | Clearly state how an MSDU is segmented in the MSDU segments. Clearly state that the size of an MSDU segment is chosen so that when it is carried by the MPDU the MPDU size is at the maximum MPDU size, except for the MPDU which contains the final MSDU segment which can be smaller. |

**Proposal: Revised**

Discussion:

*The required text to clarify the behavior of segmentation and reassemble already exists in 10.62.2 Segmentation operation and in 10.62.3 Reassembly operation respectively. Add references to the commented text. There is no requirement that all MPDU’s but the last that belong to same MSDU shall of max size to allow efficient use of A-MPDU space – MPDUs that belong to different MSDUs may share the same A-MPDU.*

***TGay Editor: modify as follows (Draft 1.1)***

P235L34

EDMG STA that supports segmentation and reassembly may segment large MSDUs received at the MAC SAP into MSDU segments that are transmitted into MPDUs (10.62.2). These MSDU segments are reassemble at the receiving STA to recreate the original MSDU (10.62.3).

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| 2213 | 196.03 | 10.62.1 | How a particular TID chosen? This seems unclear. Who does the choosing and how is it checked that the chosen TID is not already in use on one of the STAs. I think more definition of this process is necessary. | Please define how a TID is assigned to a particularly MSDU fragment stream. How are they reused? Who keeps track so different MSDU fragment streams don't use the same TID and hence mix the data. |

**Proposal: Reject**

Discussion:

SAR does not change the TID assignment and the TID assignment is not part of the SAR. The TID assignment is covered in the basic spec 5.1.1.2 Determination of UP (IEEE Std 802.11-2016)

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| 2214 | 196.12 | 10.62.1 | Figure 110 is very confusing, it appears the x-axis is time but reassembly is shown before reception of all segments, also acks are not shown. The concept of transmission/retransmission is not clear and there is nothing about out of order reception/reordering | Rework the figure so that the procedure is clearly defined. |

**Proposal: Revised**

*Discussion:*

*The figure is repaced and explanation is provided*

*Reference to the HT Immediate BA should be provided in the subclause 10.62.2 Segmentation operation to address commenter concern about transmission rules.*

***TGay Editor: replace the Figure 127 as follows (Draft 1.1)***

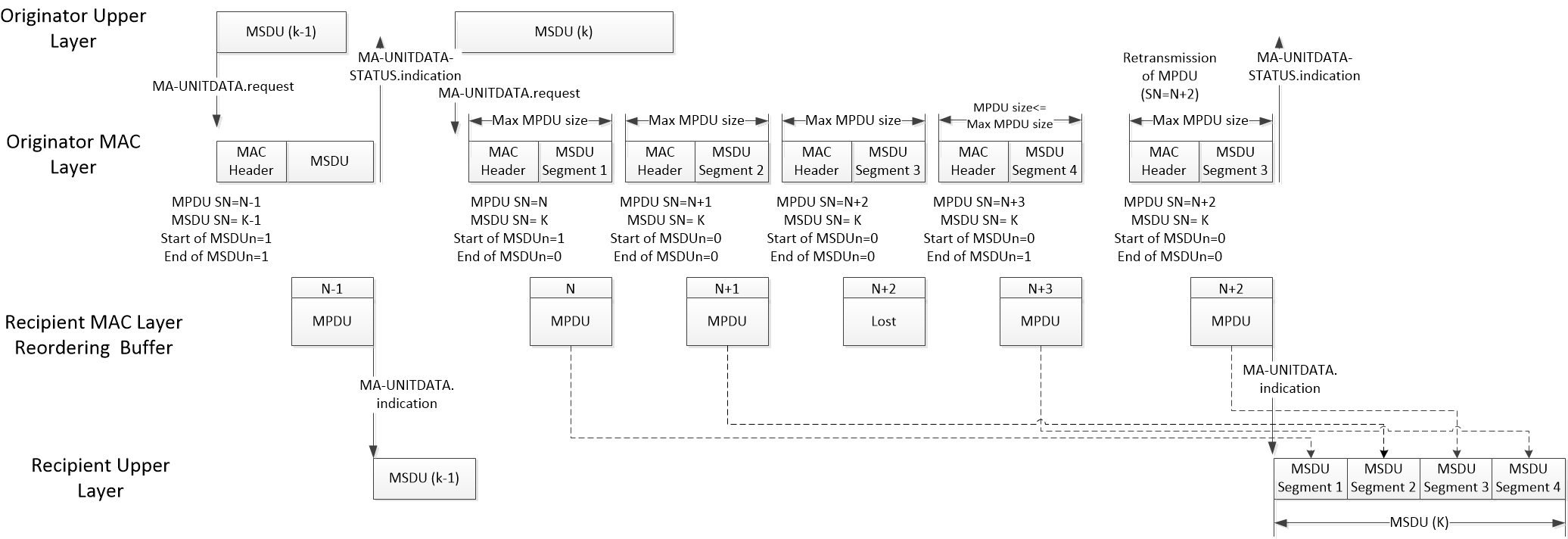


Figure 127 depicts an example of the transmission of MSDUs using the segmentation and reassembly procedure.

Upper layer of the Originator uses MA-UNITDTA.request primitive to indicate MSDU’s to the MAC Layer for delivery to the Recipient. Successful delivery of the MSDU to the Recipient is indicated by the MA-UNITDTA-STATUS.indication primitive issued by the MAC at the successful delivery of all MSDU segments that belong to the specific MSDU. The MAC level acknowledgements are not depicted in the figure. Delivered MPDUs resides in the Recipient Reordering buffer. The MA-UNITDTA.indication primitive is used to deliver the complete MSDU to the Recipient Upper Layer. In this example, the MSDU (K-1) contains one segment delivered in the MPDU (SN=N-1). It is successfully delivered to the Recipient Reordering buffer and then released to the Recipient Upper Layer.

The MSDU(K) comprises of four MSDU segments that are transmitted to the Recipient by MPDU’s (SN=N, N+1, N+2, N+3). First transmission attempt of the MPDU (SN=N+2) failed and it is retransmitted. The entire MSDU (K) is released to the Recipient upper layer at arrival of all MSDU segments to the Recipient Reordering buffer.

***TGay Editor: modify as follows (Draft 1.1)***

P235L39

… carried within MPDUs transmitted over the wireless link (10.24.7 HT-immediate block ack extensions)

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| 2216 | 196.17 | 10.62.2 | It does not make sense that an MSDU segment can be a complete MSDU, as if it can be one there is no reason to segment the MSDU. Hence an MSDU segment may not comprise all or a portion of an MSDU. | Change the sentence:  An MSDU segment may comprise all or a portion of an MSDU.  To be:  An MSDU segment comprises a portion of an MSDU. |

**Proposal: Reject**

Discussion:

*MAC establishes SAR enabled BA agreement per TID. MAC is not responsible for MSDU sizes arrived at MAC SAP. Any size of MSDU can arrive at the established BA even of single MPDU size.*

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 2217 | 197.05 | 10.62.3 | All the discussion of reception of the MSDU fragments which refer to them as MSDUs is very confusing. There has got to be a better way to describe the removal of the fragment MSDU's header and then the concatenation of the fragments MSDU's date with the previously received fragments to form the original MSDU, without calling each fragment an MSDU. | Rework the text so that it is clear that each MDPU contains a fragment MSDU and that the fragment MSDUs are reassembled to create the original MSDU and once the MSDU has been reassembled it is passed to the MAC. The current description is lacking. |
| 2218 | 197.08 | 10.62.3 | The discussion about de-encapsulated and decryption is not very clear. I assume that this is done to the MSDU fragment before it is inserted into the MPDU, and hence these operations need to be reversed prior to obtaining the MSDU fragment which is used to be concatenated with the other MSDU fragments to form the original MDSU. | Clarify the process, so that it is clear that an MSDU fragment is treated by the PHY in the same manner that the PHY treats an MSDU, hence the MDSU fragment may be encapsulated or encrypted prior to insertion into the MPDU and then once the MPDU is received the PHY must de-encapsulated and decrypt the MSDU fragment received in the MPDU to obtain the original MSDU fragment and then that these original MSDU fragments must then be assembled to form the original MSDU. |
| 2219 | 196.19 | 10.62.2 | There is no discussion in the Segmentation operation section about encapsulation or encryption. This needs to be added or a statement made that the PHY can conduct additional operation on the MSDU fragment, just as it would with a regular MSDU. | Clarify the process, so that it is clear that an MSDU fragment is treated by the PHY as if it is an MSDU and may be encapsulated or encrypted. |

**Proposal: Revised**

Discussion:

*There is some misconception presented in the comments in relation to the MAC and PHY layering. The PHY has nothing to do with the MSDU that appears only on the MAC SAP. The existent text clearly states that “An MSDU segment is carried within an MPDU”.*

*As defined, the SAR is applicable for EDMG STA only (10.62.1). The EDMG STA uses the GCMP encryption that is defined per MPDU, so no need for any additional explanation in this relation.*

*There are few places in the commented text that I suggest editing:*

***TGay Editor: modify as follows (Draft 1.1)***

P237L2

A recipient STA reassembles an MSDU comprised of one or more MSDU segments according to the Start of MSDUn, End of MSDUn, MSDU Sequence Number, MPDU Sequence Number indications of the MPDU the segment is contained as described in 10.25.7.6.2. The recipient MAC shall reassemble the MSDU by concatenating MSDU segments contained in decrypted frame body of the MPDUs with equal MSDU sequence numbers starting from MPDU with Start of MSDUn subfield equal to one and ending with MPDU End of MSDUn subfield equal to one in increasing order of MPDU SN. The MA-UNITDATA.indication is used by the recipient MAC to release the reassembled MSDU at MAC SAP.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 2231 | 31.05 | 9.2.4.4.1 | SAR could be supported but BA agreement with SAR is not enabled (e.g. rejected by recipient) | change supported to enabled |

**Proposal: Accept**

***TGay Editor: modify in P49L5 (Draft 1.1) Figure 4***

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| **CID** | **Page** | **Line** | **Clause** | **Comment** | **Proposed Change** |
| 2235 | 61.08 | 8 | 9.4.2.250.6 | If a STA can rx n TIDs in an AMPDU it should be able to generate multi-TID BA for this number of TIDs. Not clear why 2 separated capabilities.    Is the intention of EDMG Multi-TID BA agreement subfield to support the case that a STA does not support rx of Multi-TID AMPDU but can receive/ack A-PPDU with multi-TIDs?    The EDMG Multi-TID Aggrement Support subfield should be a receiver capability | remove 'aggregate' on L11. Clarify the intention of the EDMG Multi-TID BlockAck Support subfield |

**Proposal: Revised**

*Discussion: It is solved in resolution of CIDs 1956, 2272 in doc 18/0137r2 that only EDMG Multi-TID Aggregation Support is used to indicate the capability of supporting multi-TID aggregation and the relevant BA and BAR formats*

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 2244 | 85.12 | 9.4.2.266 | The MPDU buffer size field was also included in the mandatory Block Ack Parameter Set    The requirement in 10.24.2 indicates that with SAR enabled the MPDU buffer size cannot be greater than 1024 so the Buffer Size in Block Ack Parameter set should be sufficient | Remove this field |

**Proposal: Revised**

Discussion:

There is a reason to keep the field that the buffer size subfield in the Block Ack Parameter Set  
may contain different value. Resolution of the CID requires more changes to resolution of CID2245 already resolved as part of 18/0336r2 See below the complete resolution.

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| 2245 | 116.03 | 10.24.2 | It is not clear whether a recipient can accept a BA agreement by setting SAR enabled to 0 (or SAR config element not present) and accepts/modifies the Block Ack Parameter set in ADDBA response | should not allow such behavior  change to "A recipient may reject the BA agreement ..." |

Proposal: **Revised**

Discussion:

A recipient may reject the ADDBA request by setting the Status code in the ADDBA response frame to anything but SUCCESS. From the other side the originator may reject the Block Ack agreement by issuing DELBA frame to the recipient. There are multiple parameters that may be negotiated over Block Ack agreement so, no need is seeing to require rejection of Block Ack agreement establishment in case of recipient rejection support of SAR. Some clarification is needed to the case the agreement is established w/o SAR support however the SAR configuration element is present in the ADDBA request frame.

***TGay editor (Draft 1.1)***

***In P143L43 append***

A recipient may reject the SAR configuration by setting the SAR Enabled field within the SAR Configuration element in the ADDBA Response to zero or by not including the SAR Configuration element in the ADDBA Response frame.

Size of the originator transmission window shall be not greater than value in the Buffer Size subfield of the Block Ack Parameter Set field of the ADDBA Response frame in case that the Recipient rejects the SAR configuration and responds with Status code set to SUCCESS in the ADDBA response frame.

The originator shall set to zero Sequence Number field in the MPDU it transmits first under the established Block Ack agreement in case that the Recipient rejects the SAR configuration and responds with Status code set to SUCCESS in the ADDBA response frame,

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 2260 | 196.12 | 10.62.1 | The Start/End of MSDUn flag is set differently from the definition in 9.2.4.4 | change the flag in the figure |

Proposal: **Accept**

Discussion: the commenter is right, polarities of the field shall be opposite.

***TGay editor (Draft 1.1)***

It is already covered in the new figure

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 2265 | 116.13 | 10.24.2 | Not clear why it is 2^(MPDU\_Modulo-2) instead of 2^(MPDU\_Modulo-1) | change to 2^(MPDU\_Modulo-1) |

Proposal: **Reject**

Discussion The buffer size shall be less than half of the SN range to allow shifting of the window start for a window size. It is important to keep the opportunity to shift the window as part of the recovery mechanism defined in 10.24.7.3

Comment: Use of the abbreviature SAR overlaps with FCC that may introduce confusion, replace it.

Proposal: **Reject**

**Discussion:** The acronym SAR is already used for the purpose of Segmetation and Reassembly and it is not specific to the TGay.

References:

<https://en.wikipedia.org/wiki/Segmentation_and_Reassembly>

<https://searchnetworking.techtarget.com/definition/segmentation-and-reassembly>

# “Segmentation and reassembly (SAR)

In a packet-switched telecommunication network, segmentation and reassembly (SAR, sometimes just referred to as *segmentation*) is the process of breaking a [packet](https://searchnetworking.techtarget.com/definition/packet) into smaller units before transmission and reassembling”

**References:**

1. IEEE P802.11ay/D1.1
2. IEEE Std 802.11-2016