IEEE P802.11
Wireless LANs

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| Resolution to 11ad related CIDs |
| Date: 2015-04-27 |
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Abstract

This document includes proposed resolutions to the following CIDs: 5112, 5113, 5114, 5115, 5116, 5118, 5119, 5120, 5122.

The discussion is in reference to Draft P802.11REVmc\_D4.

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| 5112 | 8.3.1.16 | 609 | 60 | T | Y | 1) When a DMG STA initiates an ISS in a CBAP with an SSW frame transmission (i.e., Grant frame not used), the Duration field is set to the end of the ISS according to (8.3.1.16) and (9.38.2.2.1). This means that the responder has to obtain a new TXOP before it can respond with an RSS. The same issue happens with the RSS.The problem with the above is that it requires a STA to obtain a new TXOP before it can begin the RSS. This was not the original intent and introduces "considerable" implementation complexity/changes.2) Timing between SSW-Feedback and SSW-ACK frames is MBIFS, but the SIFS definition (9.3.2.3.3) lists the timing as SIFS. Inconsistency is removed. | Propose to add MBIFS to the calculation of the Duration field in SSW frames of both ISS and RSS. Also, need to resolve inconsistencyAlso need to disallow the following, (1) ISS fragmentation across multiple (SP or CBAP) allocations in one or multiple BIs, (2) RSS fragmentation across multiple allocations in one or multiple BIs, (3) ISS and RSS happening in two separate allocations. A partial/incomplete RSS following an ISS inside a single allocation is still allowed and optional.Complete set of proposed changes can be found in https://mentor.ieee.org/802.11/dcn/14/11-14-1570-02-000m-duration-field-during-sls.docx |

**Proposed resolution**: Revised

**Discussion**: document 11-14/1570r2 had been reviewed and agreed to by the 11mc members back in Jan/15. However, it was not included in a motion back then. The content below is simply a copy of the proposed changes in 11-14/1570r2.

**Proposed changes**:

**8.3.1.16 Sector sweep (SSW) frame format**

*Change the second paragraph as follows*

The Duration field is set to the time until the end of the current SSW slot when the SSW frame is transmitted within an association beamforming training (A-BFT). Otherwise, it is set to the time until the end of the SSW frame transmission that has the CDOWN subfield within the SSW field equal to 0, plus MBIFS, or until the end of the current allocation (see 9.38 (DMG beamforming)), whichever comes first.

**8.3.1.17 Sector sweep feedback (SSW-Feedback) frame format**

*Editor - Change the second paragraph as follows*

The Duration field is set to 0 when the SSW-Feedback frame is transmitted within an association beamforming training (A-BFT). Otherwise, it is set to the time, in microseconds, required to transmit an SSW-Ack frame, plus MBIFS, or until the end of the current allocation, whichever comes first.

**9.3.2.3.3 SIFS**

*Change the 1st paragraph as follows*

The SIFS shall be used prior to transmission of an Ack frame, a CTS frame, a PPDU containing a BlockAck frame that is an immediate response to either a BlockAckReq frame or an A-MPDU, a DMG CTS frame, a DMG DTS frame, , a Grant Ack frame, a response frame transmitted in the ATI, the second or subsequent MPDU of a fragment burst, and by a STA responding to any polling by the PCF.

**9.22.2.8 TXOP Limits**

*Change item (d) under the 3rd paragraph as follows*

d) Any frames required for beamforming as specified in 9.30 (Sounding PPDUs), in 9.34.5 (VHT sounding protocol), and in 9.38 (DMG beamforming).

**9.38.1 General**

*Change the second paragraph as follows*

In this subclause, the STA that initiates BF training through the transmission of a BF frame is referred to as the initiator, and the recipient STA of the BF frame that participates in BF training with the initiator is referred to as the responder. For BF training that occurs within the A-BFT allocation, the AP or PCP is the initiator and a non-AP and non-PCP STA becomes the responder. For BF training that occurs during an SP allocation, the source DMG STA of the SP is the initiator and the destination DMG STA of the SP becomes the responder. For BF training during a CBAP allocation, the TXOP holder is the initiator and the TXOP responder is the responder.

**9.38.2.2 Initiator Sector Sweep (ISS)**

**9.38.2.2.1 General**

*Delete the 4th paragraph (duplicate text)*

**9.38.2.3 Responder Sector Sweep (RSS)**

**9.38.2.3.1 General**

*Delete the 5th paragraph (duplicate text)*

**9.38.6 Beamforming in DTI**

**9.38.6.1 General**

*Change the first and second paragraphs as follows*

An initiator and responder may perform BF training within an SP or CBAP.

An initiator shall determine the capabilities of the responder prior to initiating BF training with the responder if the responder is associated. A STA may obtain the capabilities of other STAs through the Information Request and Information Response frames (10.30.1 (Information Request and Response(11ad))) or following a STA’s association with the PBSS/infrastructure BSS. The initiator should use its own capabilities and the capabilities of the responder to compute the required allocation size and TXOP duration to perform BF training and BF training related timeouts.

**9.38.6.2 SLS phase execution**

*Change the indicated paragraphs as follows*

The initiator shall begin an ISS (9.38.2.2 (Initiator Sector Sweep (ISS)(Ed)(11ad))) at the start of an SP allocation or TXOP with an initiator TXSS, except in the case of an SP allocation that has the IsInitiatorTXSS field for this SP is equal to 0 in which case the initiator shall begin an ISS with an initiator RXSS.

If the responder has more than one DMG antenna, the initiator shall repeat its ISS *k*+1 times, where *k* is the value indicated by the responder in the last negotiated Number of RX DMG Antennas field transmitted by the responder. Repetitions of the ISS are separated by an interval equal to LBIFS. The value of the CDOWN field within SSW frames transmitted in the ISS indicates the number of sectors until the end of transmissions from all of the initiator’s DMG antennas to all of the responder’s DMG antennas. The ISS phase shall not be fragmented across multiple allocations.

The RSS comprises a responder TXSS unless the allocation is an SP and the IsResponderTXSS field for this SP is equal to 0 or the allocation is a CBAP and the RXSS Length field within the SSW frame received by the responder during the ISS is equal to a nonzero value. The responder shall begin an RSS (9.38.2.3 (Responder sector sweep (RSS))) MBIFS time following the completion of an ISS, provided the responder received an SSW frame from the initiator during the ISS and there is sufficient time in the allocation for the responder to transmit all SSW frames necessary to complete the RSS phase. The responder shall not begin or continue the RSS phase in a different allocation from the allocation that contained the ISS phase.

NOTE—The responder can begin an RSS if there is not sufficient time in the allocation to complete the RSS phase. The RSS phase does not continue in a subsequent allocation in this case.

The initiator shall begin an SSW Feedback (9.38.2.4 (Sector Sweep Feedback)) MBIFS time following the completion of an RSS, provided the initiator received an SSW frame from the responder during the RSS and there is sufficient time left in the allocation to complete the SSW Feedback followed by an SSW-Ack (9.38.2.5 (Sector Sweep Ack)) from the responder in MBIFS time. If there is not sufficient time left in the allocation for the completion of the SSW Feedback and SSW-Ack, the initiator may begin the SSW Feedback in the following allocation between the initiator and the responder.

The responder shall begin an SSW-Ack (9.38.2.5 (Sector Sweep Ack)) to the initiator in MBIFS time following the reception of a SSW-Feedback frame from the initiator.

The initiator may restart the SSW Feedback up to dot11BFRetryLimit times if it does not receive an SSW-Ack frame from the responder in MBIFS time following the completion of the SSW Feedback. The initiator shall restart the SSW Feedback PIFS time following the expected end of the SSW-Ack by the responder, provided there is sufficient time left in the allocation for the initiator to begin the SSW Feedback followed by an SSW-Ack from the responder in MBIFS time. If there is not sufficient time left in the allocation for the completion of the SSW Feedback and SSW-Ack, the initiator may restart the SSW Feedback in the following allocation between the initiator and the responder.

Once started, the initiator and responder shall complete the SLS phase before any additional frame exchange takes place between these STAs.

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| 5113 | 8.4.2.128 | 1006 | 53 | T | Y | The MLME-ASSOCIATE.request and MLME-REASSOCIATE.request have each a parameter named "(Re)AssociateFailureTimeout", which is used to specify a time limit after which the (re)associate procedure is to be terminated. This parameter is specified for a non-PCP and non-AP STA.At the same time, section (8.4.2.128 DMG Operation element) specifies a field named "AssocRespConfirmTime", which is conveyed by the PCP/AP and indicates how much time the PCP/AP expects to take in responding to an Associate Request frame with an Associate Response frame. This field can be used by a non-PCP and non-AP STA to configure the value of the "(Re)AssociateFailureTimeout" parameter, but this is not described in the text. Finally, the MIB variable dot11AssocRespConfirmTime is not needed. | 1) Replace the indicated para with "The AssocRespConfirmTime subfield indicates the amount of time that the AP or PCP expects to take to respond to association requests and is specified in units of 50 milliseconds. A non-PCP and non-AP STA that receives a DMG Operation element can use the value of this field to configure the AssociateFailureTimeout parameter in the MLME-ASSOCIATE.request primitive and the ReassociateFailureTimeout parameter in the MLME-REASSOCIATE.request primitive."2) Remove the "dot11AssocRespConfirmTime" MIB variable from the specification |

**Proposed resolution**: Accept

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| 5114 | 11.5.1.1.8 | 1929 | 11 | T | Y | "PBSS" is missing from the GTKSA section | Add "or in a PBSS" after "IBSS". The pseudo code in 11.8.2.2 and 11.8.2.6 also need to be modified to add PBSS - submission will be made |

**Proposed resolution**: Revised

**Discussion**: detailed changes are shown below

**Proposed change:**

**11.5.1.1.8 GTKSA**

*Change the first paragraph as follows*

The GTKSA results from a successful 4-Way Handshake, FT 4-Way Handshake, FT Protocol, FT Resource Request Protocol or the Group Key Handshake and is unidirectional. In an infrastructure BSS, there is one GTKSA, used exclusively for encrypting group addressed MPDUs that are transmitted by the AP and for decrypting group addressed transmissions that are received by the STAs. In an IBSS or in a PBSS, each STA defines its own GTKSA, which is used to encrypt its group addressed transmissions, and stores a separate GTKSA for each peer STA so that encrypted group addressed traffic received from other STAs may be decrypted. A GTKSA is created by the Supplicant’s SME when Message 3 of the 4-Way Handshake is received or when Message 1 of the Group Key Handshake is received. The GTKSA is created by the Authenticator’s SME when the SME changes the GTK and has sent the GTK to all STAs with which it has a PTKSA. A GTKSA consists of the following elements:

**11.8.2.2 Per-MSDU/Per-A-MSDU Tx pseudo-code**

*Change the text as follows*

**if** dot11RSNAActivated = true **then**

**if** MSDU or A-MSDU has an individual RA **and** Protection for RA is off for Tx **then**

transmit the MSDU or A-MSDU without protections

**else if** (MPDU has individual RA **and** Pairwise key exists for the MPDU’s RA) **or** (MPDU has

a group addressed RA **and** network type is IBSS/PBSS **and** IBSS/PBSS GTK exists for MPDU’s TA) **then**

**11.8.2.6 Per-MPDU Rx pseudo-code**

*Change the text as follows*

**if** *dot11RSNAActivated* = true **then**

**if** the Protected Frame subfield of the Frame Control field is 0 **then**

**if** *Protection for TA is off for Rx* **then**

Receive the unencrypted MPDU without protections

**else**

discard the frame body without indication to LLC **and** increment dot11WEPExcludedCount

**endif**

**else if** Protection is true for TA **then**

**if** ((MPDU has individual RA **and** Pairwise key exists for the MPDU’s TA) **or** (MPDU

has a group addressed RA **and** network type is IBSS/PBSS **and** IBSS/PBSS GTK exists for MPDU’s RA)) **then**

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| 5115 | 9.36.6.4 | 1457 | 1 | T | Y | It is not possible to always require that the Allocation Block Period field in the Extended Schedule element be set to a multiple or submultiple of the BI duration. First, assuming that the BI duration is 100TUs, the range of the Allocation Block Period field (2 octets) does not provide enough flexibility. More importantly, the beacon interval is expressed in units of TU while the Allocation Block Period field is expressed in units of microseconds, which makes the requirement of multiple or submultiple nearly impractical. | Delete the indicated paragraph |

**Proposed resolution:** Accept

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| 5116 | 10.1.4.3.3 | 1541 | 16 | T | Y | The changes approved as part of https://mentor.ieee.org/802.11/dcn/14/11-14-1594-05-000m-resolution-to-other-11ad-cids.docx were not properly implemented into the draft. Basically, the text is now requiring all probe requests to be transmitted to the broadcast address - this is not the intent, since they could also be transmitted as unicast. | At the end of the sentence "1) Send a probe request to the broadcast destination address", insert " or" |

**Proposed resolution:** Accept

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| 5118 | 9.38.6.3.3 | 1511 | 26 | T | Y | In Figure 9-78, there is a SIFS between the SSW-ACK and the first BRP frame. This is the only place in the spec that has this; the normative text does not enforce that the spacing has to be SIFS. | Delete "SIFS" from the figure. |

**Proposed resolution:** Accept

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| 5119 | 8.3.1.2 | 595 | 61 | T | Y | The sentence "The TA field is the address of the STA transmitting the RTS frame or a bandwidth signaling TA" gives the impression that bandwidth signaling TA is also applicable for other types of STAs, such as DMG STA. The following sentence in the same paragraph does not help, because it makes no mention to other types of STAs. The same situation happens in 8.3.1.5, 8.3.1.8.1, 8.3.1.9.1 | The sentence should be rewritten for clarity. Propose "The TA field is the address of the STA transmitting the RTS frame, except that for a VHT STA this field can be used as a bandwidth signaling TA". The other subclauses should also be clarified accordingly. |

**Proposed resolution:** Accept

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| 5120 | 8.7.1 | 1231 | 1 | T | Y | The definition of this MPDU Length (14 bits) in this para and next is only applicable to non-DMG STAs. | Insert "When transmitted by a non-DMG STA," at the start of the paragraph. Clarify the same in the next paragraph |

**Proposed resolution:** Accept

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| 5122 | 9.2.7 | 1243 | 62 | T | Y | The use of fragmentation in DMG is unnecessary given the larger MSDU sizes. | Insert the following paragraph after the first paragraph: "An MSDU transmitted by a DMG STA shall not be fragmented." |

**Proposed resolution:** Accept