IEEE P802.11  
Wireless LANs

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| Resolution to 11ad CIDs | | | | |
| Date: 2014-11-21 | | | | |
| Author(s): | | | | |
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Abstract

Proposes resolution to several 11ad related CIDs.

The proposed changes are in reference to Draft P802.11REVmc\_D3.2.

R3: includes results from 2014-11-21 teleconference, starting on page 11:

CIDs 3084, 3264, 3241 resolutions agreed

CIDs 3232, 3499, 3392, 3692 – direction agreed, text to be reviewed on 2014-12-12 teleconference

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| 3240 | 1067.39 | 8.5.1 | Given the value of LBIFS as a "virtual sector" transmission time, multi-antenna does not introduce additional complexity with respect to number of antenna arrays or elements in each array. | Remove the NOTE at the end of the section. |

**Proposed resolution**: Accept

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| 3094 | 1476.03 | 9.38.2.4 | The term "SSW Feedback" is overloaded to mean both a frame and a procedure. Recommend always qualifying the term to avoid ambiguity, so "SSW Feedback procedure" and "SSW-Feedback frame" are the terms used throughout. Is there a 1:1 correspondance? If so, then should talk only in terms of transmitting an SSW-Feedback frame, rather than "performing SSW Feedback". | Adjust language so that SSW Feedback is always qualified as either a procedure "SSW feedback procedure" or a frame "SSW Feedback frame". |

**Proposed resolution**: Revised

**Discussion**: Every occurrence of “SSW-Feedback” is already followed by “frame”. In the case of “SSW Feedback” (without “-“), there is “SSW Feedback field” and “SSW Feedback” referring to the procedure. When referring to field, the term “field” is already being used. Therefore, the one that needs to be clarified is the “procedure”.

The same situation happens with SSW Ack. Propose to fix both.

**Proposed changes**

**9.38.2.1 General**

*Change the first 5 paragraphs as follows*

The SLS phase can include as many as four components: an initiator sector sweep (ISS) to train the initiator link as described in 9.38.2.2 (Initiator Sector Sweep (ISS)(Ed)(11ad)), a responder sector sweep (RSS) to train the responder link as described in 9.38.2.3 (Responder sector sweep(#3671) (RSS)(Ed)(11ad)), an SSW Feedback(Ed) procedure as described in 9.38.2.4 (Sector Sweep Feedback(11ad)), and an SSW (#1198)Ack procedure as described in 9.38.2.5 (Sector Sweep (#1198)Ack(11ad)).

An initiator shall begin the SLS phase by transmitting the frames of the ISS.

A responder shall not begin transmitting the frames of an RSS before the ISS is successfully completed (as defined in 9.38.1 (General(11ad))),(#2100) except when the ISS occurs in the BTI (9.38.5 (Beamforming in A-BFT(11ad))).

An initiator shall not begin an SSW Feedback(Ed) procedure before the RSS phase is successfully completed (as defined in 9.38.1 (General(11ad))),(#2101) except when the RSS occurs in the A-BFT.

A responder shall not begin an SSW Ack(#1198)(Ed) procedure with an initiator in the A-BFT. A responder shall begin an SSW Ack(#1198)(Ed) procedure with an initiator immediately following the successful completion (as defined in 9.38.1 (General(11ad)))(#2102) of the SSW Feedback(Ed) procedure with the initiator.

**9.38.2.4 Sector Sweep Feedback**

*Change the first 3 paragraphs as follows*

A Sector Sweep Feedback (SSW Feedback) procedure occurs following each RSS.

During an SSW Feedback procedure, the initiator shall transmit an SSW-Feedback frame to the responder.

During an SSW Feedback procedure, the responder should have its receive antenna array configured to a quasi-omni antenna pattern in the DMG antenna through which it received with the highest quality during the ISS, or to the best antenna configuration it has found during RXSS if RXSS has been performed during the ISS, and should not change its receive antenna configuration when it communicates with the initiator until the expected end of the SSW Feedback procedure.

*Change the 6th paragraph as follows*

(#2051)The initiator may include transmit training as part of the beam refinement phase by setting the TX-TRN-REQ field to 1 in the SSW Feedback frame and setting the L-RX field to indicate the length of the training sequence it requests the responder to use in the beam refinement phase. The initiator may carry out the MIDC subphase as part of the beam refinement by setting the BC-REQ field to 1 (to request a BC subphase) and setting the MID-REQ field to 1 (to request an MID subphase); in this case, the L-RX field shall be set to indicate the number of receive AWVs the initiator uses during the MID subphase.

**9.38.2.5 Sector Sweep (#1198)Ack**

*Change the first 5 paragraphs as follows*

When present, the Sector Sweep (#1198)Ack (SSW-Ack(#1198)(Ed)) procedure occurs following an SSW Feedback procedure.

When a responder TXSS is performed during an RSS, the responder shall transmit an SSW-(#1198)Ack frame to the initiator to perform an SSW-Ack(#1198)(Ed) procedure. The SSW-(#1198)Ack frame shall be transmitted through the sector identified by the value of the Sector Select field and the DMG Antenna Select field received from the initiator in the last SSW-Feedback frame.

When an RXSS was performed during an RSS, an SSW-(#1198)Ack frame shall be sent by the responder to the initiator. The SSW-(#1198)Ack frame should be sent using(Ed) the DMG antenna indicated in the DMG Antenna Select field in the last SSW-Feedback frame.

The responder may include transmit training as part of the beam refinement phase by setting the TX-TRN-REQ field to 1 in the SSW-Ack(#3339) frame and setting the L-RX field to indicate the length of the training sequence it requests the initiator to use in the beam refinement phase, as described in 8.5.4 (BRP Request field(11ad)). The responder may carry out a MID subphase by setting the MID-REQ bit to 1 in the BRP Request field of the SSW frame. In this case, it shall also set the L-RX field to indicate the number of receive AWVs it uses during the MID subphase. The responder may carry out a BC subphase by setting the BC-REQ bit to 1. If the initiator has set either the MID-REQ or the BC-REQ fields to 1 in the SSW-Feedback frame, the responder may set the MID-Grant or the BC-Grant fields to 1, or both, to grant the requests.

At the start of an SSW-Ack(#1198)(Ed) procedure, the initiator should have its receive antenna array configured to a quasi-omni antenna pattern using the DMG antenna through which it received with the highest quality during the RSS, or the best receive sector if an RXSS has been performed during the RSS, and should not change its receive antenna configuration while it attempts to receive from the responder until the expected end of the SSW-Ack(#1198)(Ed) procedure.

**9.38.5.2 Operation during the A-BFT**

*Change the first paragraph as follows*

Beamforming training in the A-BFT consists of the RSS and SSW Feedback procedures of the SLS between the AP or PCP and a STA.

*Change the fifth paragraph as follows*

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| aSSFBDuration | provides time for the initiator to perform an SSW Feedback procedure (see 10.39 (DMG MAC sublayer parameters(11ad)))(Ed) |

*Change the tenth paragraph as follows*

The initiator shall initiate an SSW Feedback procedure to a responder (9.38.2.4 (Sector Sweep Feedback(11ad))) at a time such that the beginning of the first symbol of the SSW-Feedback frame on the air occurs at aSSFBDuration + MBIFS before the end of the SSW slot. A responder that transmitted at least one SSW frame within a SSW slot shall be in quasi-omni receive mode for a period of aSSFBDuration ending MBIFS time before the end of the SSW slot. The initiator may initiate an SSW Feedback procedure to the responder at an SSW slot even if the responder did not complete RSS within that SSW slot. If the initiator transmits an SSW-Feedback under this circumstance, it can transmit an Announce frame to the responder in an ATI. Following the reception of the Announce frame, the responder can respond with an SPR frame requesting time for the responder to continue with the RSS. Alternatively, the responder can transmit an SPR frame to the AP or PCP in accordance with the channel access rules.

*Change the sixteenth paragraph as follows*

In an A-BFT, the responder shall not initiate an SSW-Ack(#1198)(Ed) procedure (9.38.2.5 (Sector Sweep (#1198)Ack(11ad))) in response to the reception of a SSW-Feedback frame from the initiator. The SSW-Ack(#1198)(Ed) procedure occurs within the DTI of a beacon interval (9.38.6.2 (SLS phase execution(11ad))); it does not occur otherwise.(MDR)

*Change the nineteenth paragraph as follows*

In an ATI after the completion of the SSW Feedback procedure, a responder should have its receive antenna configured to a quasi-omni antenna pattern in the DMG antenna in which it received the best sector from the initiator during the preceding ISS in order to receive an Announce, Grant, or BRP frame (with the Capability Request subfield within the BRP Request field set to 1) from the initiator, while the initiator should configure its transmit DMG antenna to the value of the Sector Select and the DMG Antenna Select fields received from the responder during the preceding RSS. If the responder does not receive an Announce or Grant frame from the initiator with the RA address equal to the responder’s MAC address until aMinBTIPeriod beacon intervals after the beacon interval in which the SLS phase with the initiator was last attempted, it may retry BF with the initiator in the A-BFT.

**9.38.6.2 SLS phase execution**

*Change the 6th, 7th and 8th paragraphs as follows*

The initiator shall begin an SSW Feedback procedure (9.38.2.4 (Sector Sweep Feedback(11ad))) 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 procedure followed by an SSW Ack procedure (#1198)(Ed) (9.38.2.5 (Sector Sweep (#1198)Ack(11ad))) from the responder in MBIFS(M44) time. If there is not sufficient time left in the allocation for the completion of the SSW Feedback and SSW-Ack(#1198)(Ed) procedures, the initiator shall begin the SSW Feedback procedure at the start of the following allocation between the initiator and the responder.

The responder shall begin an SSW Ack(#1198)(Ed) procedure (9.38.2.5 (Sector Sweep (#1198)Ack(11ad))) to the initiator in MBIFS time following the reception of a SSW-Feedback frame from the initiator.

The initiator may restart the SSW Feedback procedure up to dot11BFRetryLimit times if it does not receive an SSW-(#1198)Ack frame from the responder in MBIFS time following the completion of the SSW Feedback procedure. The initiator shall restart the SSW Feedback procedure PIFS time following the expected end of the SSW-Ack(#1198)(Ed) frame by the responder, provided there is sufficient time left in the allocation for the initiator to begin the SSW Feedback procedure followed by an SSW Ack(#1198)(Ed) procedure from the responder in MBIFS(M44) time. If there is not sufficient time left in the allocation for the completion of the SSW Feedback and SSW Ack(#1198)(Ed) procedures, the initiator shall restart the SSW Feedback procedure at the start of the following allocation between the initiator and the responder.

**9.38.6.3.3 MIDC subphase with MID subphase only**

*Change the first paragraph as follows*

In the example of Figure 9-78 (Example of the use of the BRP setup subphase to set up the subsequent I-MID subphase(11ad)(#3338)), the initiator transmits an SSW-Feedback frame with the MID-REQ subfield set to 1 and the BC-REQ subfield set to 0 in the BRP Request field, thus requesting an MIDC with only the R-MID subphase. The responder grants the MID-REQ by setting the MID-Grant subfield to 1 in the SSW-(#1198)Ack frame. The initiator then sends a frame with the SNR Present and Sector ID Order Present subfields both set to 1, the Number of Measurement(#2162) subfield in the FBCK-TYPE field indicating the number of SNR measurements from the last SLS phase, and the SNR and Sector ID subfields with the SNRs measured during the SLS phase and the list of received sectors, respectively. The L-RX subfield is set according to the number of training fields the initiator needs in each packet as part of the R-MID. The responder then starts the R-MID process by transmitting BRP-RX packets.

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| 3099 | 1735.31 | 10.24.16.2 | "If the PCP of the PBSS has the PCP forwarding field within the PCP's DMG Capabilities element set to 0, a non-PCP STA in the PBSS cannot employ the PCP to forward frames using DMS to another STA in the PBSS. "    So what? How is this relevant to the DMS procedures? | In sequence:  1. Turn it into a note  2. Obsolete, deprecate and excoriate said note.  3. Print note on a piece of paper. Spindle, fold and mutilate said note.  4. Delete said note.    Or skip to the main event and delete cited text. |

**Proposed resolution**: Revised

**Discussion**: the first paragraph of the noted subclause already has a definition of DMS provider. Propose to use this term to make the rule clear.

**Proposed resolution**:

*Change the 3rd paragraph as follows*

In a PBSS, DMS is a service that may be provided by any STA to other STAs associated in the same PBSS that support DMS, where the STA transmits group addressed MSDUs as individually addressed A-MSDUs. If the PCP of the PBSS has the PCP Forwarding field within the PCP’s DMG Capabilities element set to 0, a non-PCP STA in the PBSS shall not use the PCP as a DMS provider in the PBSS.

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| 3100 | 1820.08 | 10.39 | "DMG MAC sublayer parameter values" - parameters are generally variable. So this is a poor name. | Change to "DMG MAC sublayer attribute values" |

**Proposed resolution**: Revised

**Proposed changes**:

Replace “parameters” by “attributes” in the heading of (**10.39 DMG MAC sublayer parameters**) and in the caption of table “**Table 10-24—DMG MAC sublayer parameter values**”

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| 3102 | 1735.41 | 10.24.16.2 | "dot11DMGOptionImplemented shall be true for a DMG STA"    This is probably true by definition, so is unncessary. But if necessary, it certainly doesn't deserve be to buried in the bowels of the DMS procedures. | Either delete cited text, or move to somewhere general to DMG STAs. |

**Proposed resolution**: Revised

**Discussion**: Deletion of the noted text does not make it clear the possible configuration for the MIB variables for the DMG case “When dot11(#1676)DMSImplemented is true, at least one of(11aa) …” (see beginning of the sentence). Propose to simply remove redundancy.

**Proposed changes**:

*Change the noted paragraph as follows*

Implementation of DMS is optional for a WNM STA and mandatory for a robust AV streaming STA (as defined in 10.27.1 (Robust AV streaming dependencies(11aa))).(11aa) A STA that implements DMS has dot11(#1676)DMSImplemented set to true. When dot11(#1676)DMSImplemented is true, at least one of(11aa) dot11WirelessManagementImplemented and dot11RobustAVStreamingImplemented shall be true.(11aa) When dot11DMSImplemented is true, either dot11HighThroughputOptionImplemented or dot11DMGOptionImplemented shall be true (11ad). A STA that has a value of true for dot11(#1676)DMSActivated is defined as a STA that supports the directed multicast service(Ed). A STA for which dot11(#1676)DMSActivated is true shall set the DMS field of the Extended Capabilities element to 1.

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| 3233 | 1587.04 | 10.3.7 | (1) Missing word "transmit"  (2) It is not specified by what time the Information Response frame is supposed to be transmitted to each STA. This can be left implementation-dependent or assigned a timing budget such as 5 seconds. Commenter's preference is to leave this implementation-dependent but highlight that unsolicited Information Response transmission may not be "instantaneous" (suggested text does not adress this, a NOTE will be useful).  (3) Commenter believes we normally use "association with a PCP" or "Association with an AP" than "association with PBSS". | Suggest the following text for the first paragraph: "Following the association or security association of a STA with a PCP, the PCP shall transmit an unsolicited Information Response frame (8.6.20.5 (Information Response frame format(11ad)) to the broadcast address or individually to each to all the STAs associated with the PBSSPCP. The PCP shall set the Subject Address field of the Information Response frame to the broadcast address and shall include in the Information Response frame the DMG Capabilities element for the PCP and each STA associated with the PCPPBSS. This process is referred to as PBSS information distribution." |

**Proposed Resolution**: Revised

**Discussion**:

Issue (1): already been resolved in in D3.2, where “send” has been used.

Issue (2): agree to make it implementation dependent. However, prefer not to mention it than to include a note, which would not add much additional clarify.

Issue (3): there are many instances in the 802.11 spec for “associate with … BSS”. Examples: first para of 10.24.3.4, Table 8-173, etc. However, agree with the commenter that using PCP or AP is more appropriate.

**Proposed changes**:

*Change the first paragraph of 10.3.7 Communicating PBSS information as follows*

Following the association or security association of a STA with a PCP, the PCP shall send(#2144)(#3513)an unsolicited Information Response frame (8.6.20.5 (Information Response frame format(11ad)) to all (#3530) STAs(#3731) associated with the PCP.(#2144) The PCP shall send a broadcast Information Response frame and/or shall send individually addressed Information Response frames to each STA associated with the PCP. The PCP shall set the Subject Address field of the Information Response frame to the broadcast address and shall include in the Information Response frame the DMG Capabilities element(#2144) for the PCP and each STA associated with the PCP. This process is referred to as PBSS information distribution.(#2144)

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| 3237 | 1250.32 | 9.3.2.13 | The paragraph is also true for DMG CTS-to-self. | Add DMG variations to the paragraph. |

**Proposed Resolution**: Revised

**Proposed changes**:

**9.3.2.13 NAV distribution**

*Change the last paragraph as follows*

The CTS-to-self and DMG CTS-to-self NAV distribution mechanisms are lower in network overhead cost than are the RTS/CTS and RTS/DMG CTS NAV distribution mechanisms, respectively, but CTS-to-self and DMG CTS-to-self are less robust against hidden nodes and collisions than RTS/CTS and RTS/DMG CTS-to-self, respectively. STAs employing a NAV distribution mechanism should choose a mechanism that is appropriate for the given network conditions. If errors occur when employing the CTS-to-self or DMG CTS-to-self mechanism, STAs should switch to a more robust mechanism.

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| 3263 | 1567.58 | 10.2.6.3 | "To enter PS mode, the PCP shall announce the start of the first PCP Doze BI and the length of the PCP sleep interval through the Wakeup Schedule element and include this element within DMG Beacon frame. The Wakeup Schedule element shall be transmitted at least dot11MaxLostBeacons times before the PCP goes into PS mode."    PCP should also be able to announce the Doze BI schedule through Announce frames with acknowledgement, and hence a more agressive (shorter) advertise cycle than braodcasting through beacons. | Text contribution will be provided. |

**Proposed Resolution**: Reject. This text in P1567L58 allows the use of Announce frames.

**Discussion**: this change already shows in D3.2: “To enter PS mode, the PCP shall announce the start of the first PCP Doze BI and the length of the PCP sleep interval through the DMG(#2022) Wakeup Schedule element (8.4.2.130 (DMG(#2022) Wakeup Schedule element(11ad))) and include this element within DMG Beacon or Announce frames”

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| 3648 | 1069.44 | 8.5.4 | Where is "I/R-MID subphase" specified? | If "I/R-MID subphase" is not specified, then replace this term with something that is defined. Does this mean "I-MID subphase or R-MID subphase"? |

**Proposed Resolution**: Revised

**Proposed changes**:

*Throughout the draft (there are 2 occurrences), change* “I/R-MID subphase” *by* “I-MID subphase or R-MID subphase”

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| 3675 | 1480.44 | 9.38.3.2 | The acronyms I-TXSS and R-TXSS are specified in the definitions, but no text specifies what they are. They simply seem to be very infrequently used shorthand terms for "TXSS done by an initiator" and 'TXSS done by a repsonder". If that is all they are, then replace these acronyms in the figures and text with the descriptive names. | On page.line 54.60 delete the I-TXSS line; On 58.53 delete the R-TXSS line. In figures 9-66 and 9-72 replace "I-TXSS" with "Initiator TXSS" and "R-TXSS" with "Responder TXSS". On 1491.15 replace "I-TXSS" with "Initiator TXSS". In figure 10-51 replace "I-TXSS" with "initiator TXSS" |

**Proposed resolution**: Accept

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| 3239 | 634.49 | 8.3.4 | Are all Extension frames expected to have a common header? | If yes, there should be a Section 8.3.4.1 ("Format of Extension frames") describing the common format. If no, it is still a good idea to have that section (to be consistent with other frame types) and state in there that Extension frames are not expected to have a common header format |

**Proposed Resolution**: Revised

**Discussion**: the original purpose for this frame type was to enable different frame structures following the Duration field. Therefore, the MAC header could potentially be different for different Extension frames.

**Proposed changes**:

*Insert the following subclause at the cited location*

**8.3.4.0 Format of Extension frames**

The format of Extension frames is defined in Figure 8-YY. The MAC Header of an Extension frame starts with the Frame Control field followed by the Duration field. The MAC Header of different Extension frames can have different number and types of fields following the Duration field.

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| Octets: | 2 | 2 | variable | variable | … | variable | variable | 4 |
|  | Frame Control | Duration | <Field 0> | <Field 1> | … | <Field N> | Frame Body | FCS |

MAC Header

**Figure 8-YY—Extension frame format**

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| 3668 | 1452.44 | 9.36.10 | The only mentions of NAV\_RTSCANCELABLE and NAV\_DTSCANCELABLE in the standard are in 9.36.10. The only mentions of NAVSRC and NAVDST are on page 1446 and in 9.36.10. In 9.36.10 it is hinted that these identifiers and variables are somehow associated with some STAs, but there is no specification of them anywhere in the standard, much less how information about their values is exchanged between STAs. | Either provide technical specifications of these identifiers and variables, including which STAs they apply to and how the information about them is exchanged between those STAs, or delete all mentions of them. The latter appears to be the better approach, as these 'variables' do not appear to be related to the interoperability of STAs (which, after all, is the defining characteristic of functions and features that are included in an IEEE standard). |

**Proposed Resolution**: Reject

**Discussion**:

1. All these are variables necessary to explain the behaviour for STAs that have more than one NAV timer. This is important in DMG, since having more than one NAV timer allows exploitation of spatial reuse.
2. Section 9.36.10 is applicable to DMG STAs, since 9.36 is entitled “DMG channel access” and the first paragraph of 9.36.10 states “If a DMG STA supports multiple NAV timers, the number of available NAV timers within the STA shall be not less than aMinNAVTimersNumber.”
3. Section 9.36.10 defines all such variables in the first paragraph itself. Moreover, the pseudocode in the same subclause define their use in the NAV update procedure.

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| 3669 | 1452.60 | 9.36.10 | The NAV\_TIMER\_UPDATE routine provided here is much too specific and limiting for an interoperability standard. This routine needs to be replaced with a set of criteria that specify the interoperability requirements related to DMG NAV timers. | Replace this pseudocode routine with a set of criteria that specify the features that are required for interoperability of these NAV timers (requirements listing the interoperability features needed in the NAV timers, not the internal design of the update timer functions). |

**Proposed Resolution**: Reject

**Discussion**:

Having the pseudocode helps with interoperability, since implementations behave the same. Note that there are several examples of pseudocode in the 802.11 standard, particularly in clause 11 (e.g., 11.6.9.5, 11.8.1, 11.8.2.2).

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| 3234 | 1482.41 | 9.38.5.2 | The behavior of a DMG STA that receives a DMG Beacon frame with the Discovery Mode field equal to 1 and the CC Prsent field equal to 0 is not specified; in particulr, it needs to be clarified that a DMG STA does not have to respond in A-BFT. | "A DMG STA that receives a DMG Beacon frame with the Discovery Mode field equal to 1 ~~and the CC Present field equal to 1~~ may transmit in the A-BFT following the BTI where the DMG Beacon frame is received if at least one of the following conditions is met:    -- The CC Present field within the received DMG Beacon frame is set to 0.  -- The CC Present field within the received DMG Beacon frame is set to 1 and tThe STA's MAC address is equal to the value of the A-BFT Responder Address subfield within the received DMG Beacon frame.  -- The CC Present field within the received DMG Beacon frame is set to 1 and tThe value of the A-BFT Responder Address subfield within the DMG Beacon frame is a group address of a group to which the STA belongs.    If none of these conditions is met following the reception of thea DMG Beacon frame with the Discovery Mode field equal to 1 and the CC Present field equal to 1, the DMG STA shall not transmit in the A-BFT." |

**Proposed Resolution:** Revised

**Proposed changes:**

**9.38.5.2 Operation during the A-BFT**

*Change the third paragraph as follows*

A DMG STA that receives a DMG Beacon frame with the Discovery Mode field equal to 1 may transmit in the A-BFT following the BTI where the DMG Beacon frame is received if at least one of the following conditions is met:

* The CC Present field within the received DMG Beacon frame is equal to 1 and the STA’s MAC address is equal to the value of the A-BFT Responder Address subfield within the received DMG Beacon frame.
* The CC Present field within the received DMG Beacon frame is equal to 1 and the value of the A-BFT Responder Address subfield within the received DMG Beacon frame is a group address of a group to which the STA belongs.
* The CC Present field within the received DMG Beacon frame is equal to 0.

If none of these conditions is met following the reception of a DMG Beacon frame with the Discovery Mode field equal to 1, the STA shall not transmit in the A-BFT.

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| 3232 | 1009.01 | 8.4.2.136 | It is not stated anywhere which frame(s) are used to carry the Awake Window element. | Add AwakeWindow to DMG Beacon and Announce frame body (Table 8-49 and Table 8-401), or state in 8.4.2.136 that the element can be carried in DMG Beacon and Announce frames, or other solution. |

November 21 telecon discussion: Simple addition as proposed not agreed; need to add to tables. Order debated.

Need to bring back. Discuss on Dec 12th telecom with CID 3499.

**Proposed resolution:** Revised

**Discussion**: specify the change in 8.4.2.136.

**Proposed changes:**

**8.4.2.136 Awake Window element**

*Change the first paragraph as follows*

The Awake Window element is defined as shown in Figure 8-520 (Awake Window element format(11ad)). This element can be transmitted in DMG Beacon, Announce, FST Setup Request, FST Setup Response, Information Request, and Information Response frames.

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| 3392 | 1272.11 | 9.6 | "A STA shall support the concurrent reception of fragments of at least three MSDUs or MMPDUs. [...]  The destination STA shall maintain a Receive Timer for each MSDU or MMPDU being received, for a minimum of three MSDUs or MMPDUs." -- does this always apply (e.g. DMG STAs -- see end of 9.5 and 9.22.2.1; also what about the risk of MSDU/MMPDU reordering caused by concurrent reception causing replay detection to discard MSDUs/MMPDUs)? | If it doesn't apply to all STAs, add suitable caveats |

November 21 telecon discussion: Note: might be separate issue outside the scope of this comment relating to last paragraph in 9.5. Broader text exists. Need to find and cite. Discuss on Dec 12th telecom – Mark R.

**Proposed resolution:** Reject

**Discussion**: The text pointed to by the commenter (e.g., last paragraph of 9.5) describes the behaviour of the transmitter DMG STA. From a receiver point of view, because support to Block Ack is mandatory to DMG STAs, the receiving STA would have to be able to comply with the noted paragraph and “… shall support the concurrent reception of fragments of at least three MSDUs or MMPDUs”

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| 3084 | 1006.58 | 8.4.2.135 | BRP stands for both a frame and a packet. Multiple references from within the MAC to "fields of a BRP packet", which is both confusion as to which structure is being referenced, and breaks the layer model. Such references should either be fields of a BRP frame, or parameters of the TXVECTOR. | Terminology needs to be improved, e.g. to "BRP PPDU containing one or more BRP MPDUs with the xyz field equal to abc." where the field is in the MPDU. |

**Proposed resolution:** Reject

**Discussion**: The comment fails to identify changes in sufficient detail so that the specific wording of the changes that will satisfy the commenter can be determined.

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| 3264 | 1299.14 | 9.7.7.2 | "A STA transmitting an Ack frame or a BlockAck frame in response to a frame sent using the DMG SC modulation class or DMG OFDM modulation class shall use an MCS from the mandatory MCS set of the DMG SC modulation class and shall use the highest MCS index for which the Data Rate is the same as or lower than that of the frame that elicited the response." This statement requires the ACK or Block ACK frame to an MCS 10 data frame to be transmitted using MCS 4, but any MCS 1-4 is Ok for ACK and any MCS 2-4 is Ok for Block Ack (frame duration won't change), and lower MCS's bring more robustness. | Text contribution will be provided. |

**Proposed resolution:** Reject

**Discussion**: The comment fails to identify changes in sufficient detail so that the specific wording of the changes that will satisfy the commenter can be determined.

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| 3241 | 1294.25 | 9.12 | The word "may" in the sentence has been used in a confusing way, creating an interpretation that "use of A-MSDUs for PCP forwarding" is optional, whereas what is optional is the "PCP forwarding" itself, and the only way to perform PCP forwarding is through A-MSDUs. | A non-PCP DMG STA in a PBSS may use the PCP of the PBSSan A-MSDU to forward frames to another non-PCP STA in the PBSS via the PCP of the PBSS if the value of the PCP Forwarding field within the PCP's DMG Capabilities element is equal to 1. A non-PCP DMG STA in a PBSS shall not use the PCP to forward framesdo the forwarding if the value of the PCP Forwarding field within the PCP's DMG Capabilities element is equal to 0. In order to forward frames through the PCP, a non-PCP STA shall send individually addressed or group addressed MSDUs as A-MSDU subframes within an individually addressed A-MSDU frame sent to the PCP. The A-MSDU shall be formatted as specified in 8.3.2.2 (Aggregate MSDU(11ad) (A-MSDU) format), with the A-MSDU subframe headers' DA address set to the target individual or group address. |

November 21 telecon discussion: minor edit to proposed text changes

**Proposed resolution:** Revised

**Discussion**: agree with comment, but proposed text needs correction.

1. A non-PCP STA uses the PCP to forward MSDUs.
2. Need to make the use of A-MSDU normative
3. There is no need for a “shall” to refer to the A-MSDU structure – there is only one that can be used.

**Proposed change**:

**9.12 A-MSDU operation**

*Change the second paragraph as follows*

A non-PCP DMG STA in a PBSS may use the PCP of the PBSS to forward MSDUs to another non-PCP STA in the PBSS if the value of the PCP Forwarding field within the PCP’s DMG Capabilities element is 1. A non-PCP DMG STA in a PBSS shall not use the PCP to forward MSDUs if the value of the PCP Forwarding field within the PCP’s DMG Capabilities element is 0. To forward an MSDU via the PCP, a non-PCP STA shall encapsulate the MSDU within an individually addressed A-MSDU sent to the PCP. The DA field of the A-MSDU shall be set to the destination’s individual or group address.

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| 3499 | 1211.28 | 8.6.22.2 | "Multiple elements can appear in this frame." Like what? Anything? This is underconstrained. List what can, and makes sense, to put here; or something | Clarify what elements are sensible or expected in this frame. |

November 21 telecon discussion: Either delete the row indicated or completely specify. Related to CID 3232. Discuss on Dec 12th telecon

**Proposed resolution:** Reject

**Discussion**: a more comprehensive contribution is needed to resolve this comment. A more in-depth analysis of the spec would be needed to collect a list of all elements.

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| 3692 | 1525.13 | 10.1.4.3.3 | "perform the basic access procedure defined ... prior to the transmission": as if we didn't know the definition was prior to the transmission. It also is unclear whether this procedure is to be followed just once or each time a Probe Request frame is to be transmitted, and exactly why there may be more than one transmission of a Probe Request frame. | Since "prior to the transmission" is not part of the procedure defined in 9.3.4.2, this really is a run-on sentence. Replace "9.3.4.2 (Basic access) prior to the transmission of each of one or more Probe Request frames, each with an SSID indicated in the SSID List and the BSSID from the MLME-SCAN.request primitive." with "9.3.4.2 (Basic access). Perform this procedure prior to each transmission of a Probe Request frame. Each of these transmitted Probe Request frames shall contain an SSID that was included in the SSID List parameter and the BSSID from the BSSID parameter of the received MLME-SCAN.request primitive. One Probe Request frame shall be transmitted for each SSID included in the received SSID List parameter.". |

November 21 telecon discussion: Itentified 2 locations with similar text. Mark R and Carlos to propose changes to those sections if needed. Discuss on Dec 12th teleconference.

**Proposed resolution:** Revised

**Discussion**: Language can be improved in certain places. However, for those changes which differ from the language that is already used in (**10.1.4.3.2**), propose to reject them. In particular, the last sentence “One Probe Request frame shall be transmitted for each SSID included in the received SSID List parameter” is not an explicit requirement in (**10.1.4.3.2**).

**10.1.4.3.3 Active scanning procedure for a DMG STA**

*Change item c at 1524.3 as shown below:*

Send a probe request to the broadcast destination address. The probe request is sent with the SSID

and BSSID from the MLME-SCAN.request primitive. When the SSID List is present in the MLMESCAN.

request primitive, send one or more Probe Request frames, each with an SSID indicated in

the SSID List and the BSSID from the MLME-SCAN.request primitive.

*Change the noted paragraph under item (f and g at 1525.11) as follows*

In all these cases, the probe request is sent with the SSID and BSSID from the received(#3680) MLME-SCAN.request primitive. The probe request includes the DMG Capabilities element. When the SSID List is present in the MLME-SCAN.request primitive, perform the basic access procedure defined in 9.3.4.2 (Basic access) prior to each transmission of a Probe Request frame. Each of the transmitted Probe Request frames contain an SSID indicated in the SSID List and the BSSID from the received(#3680) MLME-SCAN.request primitive.

g) If an SSW-Feedback frame is neither transmitted nor received in step (d), optionally send a probe

request to the broadcast destination address. The probe request is sent with the SSID and BSSID

from the MLME-SCAN.request primitive. The probe request includes the DMG Capabilities

element. When the SSID List is present in the MLME-SCAN.request primitive, perform the basic

access procedure defined in 9.3.4.2 (Basic access) prior to the transmission of each of the one or

more Probe Request frames, each with an SSID indicated in the SSID List and the BSSID from the

MLME-SCAN.request primitive.