IEEE P802.11
Wireless LANs

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| Resolutions for some comments on 11mc/D6.0 (SBmc2) |
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Abstract

This submission proposes resolutions for CIDs 8056, 8064, 8067, 8116, 8145, 8158, 8168, 8169, 8172, 8316, 8320 on 11mc/D6.0. Green indicates material agreed to in the group, yellow material to be discussed, red material rejected by the group and cyan material not to be overlooked. The “Final” view should be selected in Word.

r1: Added CID 8088, 8179. Alternatives added for CID 8158. SM Power Save added to CID 8168.

r2: Tweaked CID 8056, 8116, 8168, 8172.

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| Identifiers | Comment | Proposed change |
| CID 8158Mark RISON10.161341.21 | There are several instances of wording of the form "A STA shall not transmit a frame with the TXVECTOR parameter blah set to foo unless the RA of the frame is of type baz": 1341.23, 1341.29, 1341.35, 1341.41, 1342.7, 1342.18, 1342.29, 1342.40, 1342.51, 1343.23. These are broken because the first "frame" means PPDU and the second one means "MPDU". Also, what if the RA is a group address? | Reword these instances to the form "A STA shall not transmit a PPDU with the TXVECTOR parameter blah set to foo unless the RA of the frame(s) it contains are of type baz (where this condition applies to all addressed STAs if the RA is a group address)" |

Discussion:

As it says in the comment, an MPDU does not have a TXVECTOR. The TXVECTOR is associated with the PPDU. Additionally, for group-addressed frames the requirements need to apply w.r.t. all the targeted recipients.

It has been asserted, however, that the current spec does not define the behaviour for group-addressed frames, only for frames that have only one intended recipient.

Note, however, that it is considered acceptable to refer to PPDUs as “frames”:

**physical layer (PHY) frame**: The unit of data exchanged between PHY entities. Syn: **PPDU**.

NOTE 14—In contexts in which the PHY is clearly the subject, “frame” is an implicit reference to a PHY frame.

So the problem is restricted to cases where “frame” is being used for both MPDUs and PPDUs (typically because one part of the wording refers to the RA or to a frame type and another refers to the TXVECTOR).

Proposed changes:

Change 1282.43 in 10.3.2.8.1 as follows:

The STA indicates truncation of the TXOP by transmitting a CF-End frame in a PPDU with TXVECTOR parameter restrictions as specified in 10.7.6.3 (Rate selection for CF-End frames).

Change 1314.60 in 10.7.5.7 as follows:

— A STA shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not supported by the receiver STA(s), as reported in any HT Capabilities element or VHT Capabilities element received from the intended receiver(s).

— An HT STA that is a member of a BSS and that is not a VHT STA shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received HT Operation element, with the exception of transmissions on a TDLS off-channel link, which follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— A VHT STA that is a member of a BSS shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received VHT Operation element with the following exceptions:

— Transmissions on a TDLS off-channel link follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— Transmissions by a VHT STA on a TDLS link follow the rules described in 11.23.1 (General) and 11.23.6.5 (Setting up a wide bandwidth off-channel direct link).

— If at least one Operating Mode field with the Rx NSS Type subfield equal to 0 was received from the receiver STA(s):

— A STA shall not transmit a frame using a value for the TXVECTOR parameter CH\_BANDWIDTH that is not supported by the receiver STA(s) as reported in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 0, if any, from the receiver STA(s).

Change 1317.47 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by a non-AP STA through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1317.62 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by an AP through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1319.53 in 10.7.6.5.2 as follows:

 The modulation class of the control response frame shall be selected according to the following rules:

— If the PPDU containing the received frame is of a modulation class other than HT or VHT and the control response frame is carried in a non-HT PPDU, the control response frame shall be transmitted in a PPDU using the same modulation class as the PPDU containing the received frame. In addition, the control response frame shall be sent in a PPDU using the same value for the TXVECTOR parameter PREAMBLE\_TYPE as the PPDU containing the received frame.

Change 1322.56 in 10.7.6.5.5 as follows:

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter GI\_TYPE set to SHORT\_GI unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter GI\_TYPE equal to SHORT\_GI.

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter FEC\_CODING equal to LDPC\_CODING.

A STA shall not transmit a control response frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF.

Change 1341.23 in 10.16 as follows:

An HT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF or HT\_GF and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to (an) HT STA(s) for which the LDPC Coding Capability subfield of the HT Capabilities element received from that/those STA(s) contained a value of 1 and dot11LDPCCodingOptionActivated is true.

~~A VHT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to a VHT STA for which the Rx LDPC subfield of the VHT Capabilities element received from that STA contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true.~~

A VHT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to (a) VHT STA(s) for which the Rx LDPC subfield of the VHT Capabilities element received from that/those STA(s) contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true.

A STA should not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF, HT\_GF or VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING if the RA of the frame corresponds to (a) STA(s) from which it has received ~~a~~at least one frame containing an Operating Mode field and the most recent Operating Mode field it has received from that/each of those STA(s), if any, had the No LDPC subfield equal to 1.

Change 1342.7 in 10.18 as follows:

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW20 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to (a) STA(s) for which the Short GI for 20 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInTwentyActivated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW40 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to (a) STA(s) for which the Short GI for 40 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInFortyActivated is present and is true.

A STA shall not transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW80 and GI\_TYPE set to SHORT\_GI unless all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to (a) STA(s) for which the Short GI for 80 MHz/TVHT\_MODE\_4C subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn80Activated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW160 or CBW80+80 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to (a) STA(s) for which the Short GI for 160 and 80+80 MHz subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters FORMAT set to VHT, NUM\_USERS set to greater than 1, and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RAs of all MPDUs in the VHT MU PPDU correspond to STAs for which the Short GI subfield of the following conditions are satisfied:

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW20, the Short GI for 20 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInTwentyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW40, the Short GI for 40 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInFortyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW80, the Short GI for 80 MHz/ TVHT\_MODE\_4C subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn80Activated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW160 or CBW80+80, the Short GI for 160 MHz and 80+80 MHz subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

An HT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to HT\_GF and the GI\_TYPE parameter set to SHORT\_GI when the MCS parameter indicates a single spatial stream.

Change 1343.23 in 10.19 as follows:

An HT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF unless the RA of the frame corresponds to (a) STA(s) for which the HT-Greenfield subfield of the HT Capabilities element contained a value of 1 and dot11HTGreenfieldOptionActivated is true.

Alternative version that leaves the behaviour for group-addressed frames unspecified:

Change 1282.43 in 10.3.2.8.1 as follows:

The STA indicates truncation of the TXOP by transmitting a CF-End frame in a PPDU with TXVECTOR parameter restrictions as specified in 10.7.6.3 (Rate selection for CF-End frames).

Change 1314.60 in 10.7.5.7 as follows:

— A STA shall not transmit an individually addressed frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not supported by the receiver STA, as reported in any HT Capabilities element or VHT Capabilities element received from the intended receiver.

— An HT STA that is a member of a BSS and that is not a VHT STA shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received HT Operation element, with the exception of transmissions on a TDLS off-channel link, which follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— A VHT STA that is a member of a BSS shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received VHT Operation element with the following exceptions:

— Transmissions on a TDLS off-channel link follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— Transmissions by a VHT STA on a TDLS link follow the rules described in 11.23.1 (General) and 11.23.6.5 (Setting up a wide bandwidth off-channel direct link).

— If at least one Operating Mode field with the Rx NSS Type subfield equal to 0 was received from the receiver STA:

— A STA shall not transmit an individually addressed frame using a value for the TXVECTOR parameter CH\_BANDWIDTH that is not supported by the receiver STA as reported in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 0 from the receiver STA.

Change 1317.47 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by a non-AP STA through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1317.62 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by an AP through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1319.53 in 10.7.6.5.2 as follows:

 The modulation class of the control response frame shall be selected according to the following rules:

— If the PPDU containing the received frame is of a modulation class other than HT or VHT and the control response frame is carried in a non-HT PPDU, the control response frame shall be transmitted in a PPDU using the same modulation class as the PPDU containing the received frame. In addition, the control response frame shall be sent in a PPDU using the same value for the TXVECTOR parameter PREAMBLE\_TYPE as the PPDU containing the received frame.

Change 1322.56 in 10.7.6.5.5 as follows:

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter GI\_TYPE set to SHORT\_GI unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter GI\_TYPE equal to SHORT\_GI.

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter FEC\_CODING equal to LDPC\_CODING.

A STA shall not transmit a control response frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF.

Change 1341.23 in 10.16 as follows:

An HT STA shall not transmit an individually addressed frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF or HT\_GF and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to an HT STA for which the LDPC Coding Capability subfield of the HT Capabilities element received from that STA contained a value of 1 and dot11LDPCCodingOptionActivated is true.

~~A VHT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to a VHT STA for which the Rx LDPC subfield of the VHT Capabilities element received from that STA contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true.~~

A VHT STA shall not transmit an individually addressed frame in a PPDU with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to a VHT STA for which the Rx LDPC subfield of the VHT Capabilities element received from that STA contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true.

A STA should not transmit an individually addressed frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF, HT\_GF or VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING if the RA of the frame corresponds to a STA from which it has received a frame containing an Operating Mode field and the most recent Operating Mode field it has received from that STA had the No LDPC subfield equal to 1.

Change 1342.7 in 10.18 as follows:

A STA may transmit an individually addressed frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW20 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 20 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInTwentyActivated is present and is true.

A STA may transmit an individually addressed frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW40 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 40 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInFortyActivated is present and is true.

A STA shall not transmit an individually addressed frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW80 and GI\_TYPE set to SHORT\_GI unless all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 80 MHz/TVHT\_MODE\_4C subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn80Activated is present and is true.

A STA may transmit an individually addressed frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW160 or CBW80+80 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 160 and 80+80 MHz subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

A STA may transmit an individually addressed frame in a PPDU with TXVECTOR parameters FORMAT set to VHT, NUM\_USERS set to greater than 1, and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RAs of all MPDUs in the VHT MU PPDU correspond to STAs for which the Short GI subfield of the following conditions are satisfied:

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW20, the Short GI for 20 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInTwentyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW40, the Short GI for 40 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInFortyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW80, the Short GI for 80 MHz/ TVHT\_MODE\_4C subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn80Activated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW160 or CBW80+80, the Short GI for 160 MHz and 80+80 MHz subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

An HT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to HT\_GF and the GI\_TYPE parameter set to SHORT\_GI when the MCS parameter indicates a single spatial stream.

Change 1343.23 in 10.19 as follows:

An HT STA shall not transmit an individually addressed frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF unless the RA of the frame corresponds to a STA for which the HT-Greenfield subfield of the HT Capabilities element contained a value of 1 and dot11HTGreenfieldOptionActivated is true.

Yet another alternative, to account for group-addressed frames:

Change 1282.43 in 10.3.2.8.1 as follows:

The STA indicates truncation of the TXOP by transmitting a CF-End frame in a PPDU with TXVECTOR parameter restrictions as specified in 10.7.6.3 (Rate selection for CF-End frames).

Change 1314.60 in 10.7.5.7 as follows:

— A STA shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not supported by the receiver STA, as reported in any HT Capabilities element or VHT Capabilities element received from the intended receiver (if there is more than one intended receiver, then this requirement applies to each intended receiver).

— An HT STA that is a member of a BSS and that is not a VHT STA shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received HT Operation element, with the exception of transmissions on a TDLS off-channel link, which follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— A VHT STA that is a member of a BSS shall not transmit a frame using a value for the CH\_BANDWIDTH parameter of the TXVECTOR that is not permitted for use in the BSS, as reported in the most recently received VHT Operation element with the following exceptions:

— Transmissions on a TDLS off-channel link follow the rules described in 11.23.6.2 (General behavior on the off-channel) and 11.23.6.3 (Setting up a 40 MHz direct link).

— Transmissions by a VHT STA on a TDLS link follow the rules described in 11.23.1 (General) and 11.23.6.5 (Setting up a wide bandwidth off-channel direct link).

— If at least one Operating Mode field with the Rx NSS Type subfield equal to 0 was received from the receiver STA (if there is more than one intended receiver, then this requirement applies to each intended receiver):

— A STA shall not transmit a frame using a value for the TXVECTOR parameter CH\_BANDWIDTH that is not supported by the receiver STA as reported in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 0 from the receiver STA.

Change 1317.47 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by a non-AP STA through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1317.62 in 10.7.6.3 as follows:

A STA that transmits a CF-End frame at the end of a TXOP that was obtained by an AP through the use of the dual CTS mechanism shall transmit the CF-End frame in a PPDU with the same value for the TXVECTOR parameter STBC, TXVECTOR parameter MCS (if present), and TXVECTOR parameter RATE as was used for the transmission of the PPDU containing the matching Control frame at the beginning of the TXOP.

Change 1319.53 in 10.7.6.5.2 as follows:

 The modulation class of the control response frame shall be selected according to the following rules:

— If the PPDU containing the received frame is of a modulation class other than HT or VHT and the control response frame is carried in a non-HT PPDU, the control response frame shall be transmitted in a PPDU using the same modulation class as the PPDU containing the received frame. In addition, the control response frame shall be sent in a PPDU using the same value for the TXVECTOR parameter PREAMBLE\_TYPE as the PPDU containing the received frame.

Change 1322.56 in 10.7.6.5.5 as follows:

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter GI\_TYPE set to SHORT\_GI unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter GI\_TYPE equal to SHORT\_GI.

A STA shall not transmit a control response frame in a PPDU with TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless it is in response to a reception of a frame in a PPDU with the RXVECTOR parameter FEC\_CODING equal to LDPC\_CODING.

A STA shall not transmit a control response frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF.

Change 1341.23 in 10.16 as follows:

An HT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF or HT\_GF and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to an HT STA for which the LDPC Coding Capability subfield of the HT Capabilities element received from that STA contained a value of 1 and dot11LDPCCodingOptionActivated is true (if there is more than one intended receiver, then this requirement applies to each intended receiver).

~~A VHT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to a VHT STA for which the Rx LDPC subfield of the VHT Capabilities element received from that STA contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true.~~

A VHT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING unless the RA of the frame corresponds to a VHT STA for which the Rx LDPC subfield of the VHT Capabilities element received from that STA contained a value of 1 and dot11VHTLDPCCodingOptionActivated is true (if there is more than one intended receiver, then this requirement applies to each intended receiver).

A STA should not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_MF, HT\_GF or VHT and the TXVECTOR parameter FEC\_CODING set to LDPC\_CODING if the RA of the frame corresponds to a STA from which it has received a frame containing an Operating Mode field and the most recent Operating Mode field it has received from that STA had the No LDPC subfield equal to 1 (if there is more than one intended receiver, then this requirement applies to each intended receiver).

Change 1342.7 in 10.18 as follows:

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW20 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met (if there is more than one intended receiver, then this requirement applies to each intended receiver):

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 20 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInTwentyActivated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW40 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met (if there is more than one intended receiver, then this requirement applies to each intended receiver):

— The STA is an HT STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF, or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 40 MHz subfield of the HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInFortyActivated is present and is true.

A STA shall not transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW80 and GI\_TYPE set to SHORT\_GI unless all of the following conditions are met (if there is more than one intended receiver, then this requirement applies to each intended receiver):

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 80 MHz/TVHT\_MODE\_4C subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn80Activated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters CH\_BANDWIDTH set to CBW160 or CBW80+80 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met (if there is more than one intended receiver, then this requirement applies to each intended receiver):

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 160 and 80+80 MHz subfield of the VHT Capabilities element contained a value of 1.

— dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

A STA may transmit a frame in a PPDU with TXVECTOR parameters FORMAT set to VHT, NUM\_USERS set to greater than 1, and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RAs of all MPDUs in the VHT MU PPDU correspond to STAs for which the Short GI subfield of the following conditions are satisfied:

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW20, the Short GI for 20 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInTwentyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW40, the Short GI for 40 MHz subfields of the HT Capabilities element contained a value of 1, and dot11ShortGIOptionInFortyActivated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW80, the Short GI for 80 MHz/ TVHT\_MODE\_4C subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn80Activated is present and is true.

— If the TXVECTOR parameter CH\_BANDWIDTH is set to CBW160 or CBW80+80, the Short GI for 160 MHz and 80+80 MHz subfields of the VHT Capabilities element contained a value of 1, and dot11VHTShortGIOptionIn160and80p80Activated is present and is true.

An HT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to HT\_GF and the GI\_TYPE parameter set to SHORT\_GI when the MCS parameter indicates a single spatial stream.

Change 1343.23 in 10.19 as follows:

An HT STA shall not transmit a frame in a PPDU with the TXVECTOR parameter FORMAT set to HT\_GF unless the RA of the frame corresponds to a STA for which the HT-Greenfield subfield of the HT Capabilities element contained a value of 1 and dot11HTGreenfieldOptionActivated is true (if there is more than one intended receiver, then this requirement applies to each intended receiver).

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8158 in <this document>, which address the issue raised.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8064Mark RISON11.1.3.21557.57 | "should suspend the decrementing" is (a) useless (since it's a should) and (b) a can of worms (e.g. what happens on unsuspending? Does the AP have to maintain a new counter just for beacons and other group frames, so that the counters are not lost for other frames while they are suspended?) | Make the changes shown under CID 7349 in 16/0276r14 |

Discussion:

The most recent revision of 16/0276 is r15. However, this was not derived or uploaded by the author (the author has vague memories that it was all rushed through at the end of the last round).

r14 called for the following changes:

Change the first para of 11.1.3.2 Beacon generation in non-DMG infrastructure networks as follows:

The AP shall define the timing for the entire BSS by transmitting Beacon frames according to dot11BeaconPeriod. This defines a series of TBTTs exactly dot11BeaconPeriod TUs apart. Time 0 is defined to be a TBTT with the Beacon frame being a DTIM. At each TBTT, the AP shall schedule a Beacon frame as the next frame for transmission~~. At each TBTT the AP should suspend the decrementing of the backoff timer for any pending non-beacon transmission and transmit the Beacon frame~~ according to the medium access rules specified in Clause 10 (MAC sublayer functional description).

NOTE—To achieve this, the AP suspends any pending transmissions until the beacon has been transmitted, and in the case of a DTIM, suspends any pending individually addressed transmissions until any pending group addressed transmissions have been performed (see 11.2.2.4).

The beacon period is included in Beacon and Probe Response frames, and a STA shall adopt that beacon period when joining the BSS, i.e., the STA sets dot11BeaconPeriod to that beacon period.

Change the second para of 14.13.3.1 Beacon generation in MBSSs as follows:

The mesh STA shall define a series of TBTTs exactly dot11BeaconPeriod TUs apart. Time zero is defined to be a TBTT with the Beacon frame containing a DTIM. At each TBTT, the mesh STA shall schedule a Beacon frame as the next frame for transmission according to the medium access rules specified in Clause 10 (MAC sublayer functional description).

NOTE—To achieve this, the mesh STA suspends any pending transmissions until the beacon has been transmitted, and in the case of a DTIM, suspends any pending individually addressed transmissions until any pending group addressed transmissions have been performed (see 14.14.5).

The beacon period is included in Beacon and Probe Response frames.

r15 called for the following changes, and they have been so effected in D6.0:

Change the first para of 11.1.3.2 Beacon generation in non-DMG infrastructure networks as follows:

The AP shall define the timing for the entire BSS by transmitting Beacon frames according to dot11BeaconPeriod. This defines a series of TBTTs exactly dot11BeaconPeriod TUs apart. Time 0 is defined to be a TBTT with the Beacon frame being a DTIM. At each TBTT, the AP shall schedule a Beacon frame as the next frame for transmission. At each TBTT the AP should suspend the decrementing of the backoff timer for any pending non-beacon transmission and transmit the Beacon frame according to the medium access rules specified in Clause 10 (MAC sublayer functional description).

NOTE—To achieve this requirement, the AP suspends any pending transmissions until the beacon has been transmitted. In the case of a DTIM, the AP also suspends any pending individually addressed transmissions until any pending group addressed transmissions have been performed (see 11.2.2.4).

The beacon period is included in Beacon and Probe Response frames, and a STA shall adopt that beacon period when joining the BSS, i.e., the STA sets dot11BeaconPeriod to that beacon period.

Change the second para of 14.13.3.1 Beacon generation in MBSSs as follows:

The mesh STA shall define a series of TBTTs exactly dot11BeaconPeriod TUs apart. Time zero is defined to be a TBTT with the Beacon frame containing a DTIM. At each TBTT, the mesh STA shall schedule a Beacon frame as the next frame for transmission according to the medium access rules specified in Clause 10 (MAC sublayer functional description).

NOTE—To achieve this requirement, the mesh STA suspends any pending transmissions until the beacon has been transmitted. In the case of a DTIM, the mesh STA also suspends any pending individually addressed transmissions until any pending group addressed transmissions have been performed (see 14.14.5).

The beacon period is included in Beacon and Probe Response frames.

Note that the infrastructure and mesh wordings are essentially the same, except that the infrastructure one has the additional “should suspend the decrementing” thing.

The changes to the NOTE wording are editorial and fine.

So the issue is the non-deletion of “. At each TBTT the AP should suspend the decrementing of the backoff timer for any pending non-beacon transmission and transmit the Beacon frame” in the infrastructure case (the mesh case is fine). As the commenter says, this “should suspend the decrementing” is broken because:

(a) it is useless (since it's a should) – as a corollary, it loses the fact that the beacon must be transmitted using the Clause 10 rules

(b) it is a can of worms (e.g. what happens on unsuspending? Does the AP have to maintain a new counter just for beacons and other group frames, so that the counters are not lost for other frames while they are suspended?)

(c) it makes infrastructure and mesh inconsistent

The only important thing is that the beacon be the next thing out. The NOTE helps to explain the implications, but the only requirement is to “schedule a Beacon frame as the next frame for transmission according to the medium access rules” — as it already says for mesh.

Proposed resolution:

REVISED

At 1557.57 delete “. At each TBTT the AP should suspend the decrementing of the backoff timer for any pending non-beacon transmission and transmit the Beacon frame”.

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| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8056Mark RISON11.2.21576.1 | The definition of the Max SP Length field indicates that MMPDUs can be delivered in a SP. However, subclauses 11.2.2.6 and 11.2.2.10 do not allow for this | Extend subclauses 11.2.2.6 and 11.2.2.10 to allow for Management frames wherever QoS Data frames are currently referred to (e.g. 1584.55, 1588.35) |

Discussion:

The Max SP Length is the maximum number of buffered BUs that can be delivered in an SP. Bufferable MMPDUs are BUs.

1588.35 is fine, since a Management frame does not carry an EOSP subfield (since it does not have a QoS Control field). An AP can’t terminate a SP with a Management frame; it has to use a QoS Null frame if it has no QoS Data frame to send.

Proposed changes:

Change 1582.40 as follows:

The AP should set the EOSP ~~bit~~subfield to 1 in the frame that it expects to be the last frame transmitted to the non-AP STA during the U-APSD coexistence duration. If the last frame expected to be transmitted cannot be successfully transmitted to the non-AP STA before the termination of the U-APSD SP, or does not have QoS Control field, the AP should transmit a QoS Null frame with the EOSP ~~bit~~subfield set to 1.

Change 1584.53 as follows:

In all frames except for the final frame of the SP, the AP shall set the EOSP subfield ~~of the QoS Control field of the QoS Data frame~~, if present, to 0 to indicate the continuation of the SP.

Change 1585.2 as follows:

The AP considers an APSD STA to be in awake state after it has sent a QoS +CF-Ack frame, with the EOSP subfield in the QoS Control field equal to 0, to the APSD STA. If necessary, the AP may generate an extra QoS Null frame, with the EOSP set to 1. When the AP has transmitted an individually addressed frame to the STA with the EOSP subfield set to 1 during the SP except for retransmissions of that frame, the AP shall not transmit any more frames to that STA using this mechanism until the next SP.***<para break>***

The AP shall set the EOSP subfield to 1 to indicate the end of the SP in APSD.

NOTE—Management frames do not have an EOSP subfield and so the end of the SP cannot be indicated in a Management frame. If the SP is to end after a Management frame, a QoS Null frame is used to indicate this.

Change 1585.20 as follows:

j) If the AP does not receive an acknowledgment to an individually addressed Data frame that requires acknowledgment and that is a non-A-MPDU frame containing all or part of an MSDU or A-MSDU sent with the EOSP subfield equal to 1, it shall retransmit that frame at least once within the same SP, subject to applicable retry or lifetime limit. The maximum number of retransmissions within the same SP is the lesser of the maximum retry limit and dot11QAPMissingAckRetryLimit.

If the AP does not receive an acknowledgment to an individually addressed Data or Management frame that requires acknowledgment and that is not the initial attempt in this SP to send a frame with the EOSP subfield equal to 1, it may retransmit that frame in the next SP, subject to applicable retry or lifetime limits.

Change 1588.35 as follows:

c) The STA shall remain awake until it receives a QoS Data frame or QoS Null frame addressed to it, with the EOSP subfield ~~in the QoS Control field~~ equal to 1.

Change “MSDUs, A-MSDUs, and MMPDUs” to “BUs” at 671.42, 671.53, 671.55, 671.57, 671.60.

At 1585.5 and 3162.27 in “EOSP set to 1” add “subfield” after “EOSP”.

At 2913.24 and 3200.11 in “EOSP equal to 1” add “subfield” after “EOSP”.

At 1591.1 change “end of service period (EOSP) subfield” to “EOSP subfield”.

Change “EOSP field” to “EOSP subfield” throughout (17 instances including 2 hits for one caption).

Change 1582.18 and 1582.32 as follows:

or upon the successful transmission of a frame with the EOSP ~~bit~~subfield set to 1, whichever is earlier.

Change “with EOSP” to “with the EOSP” at 1602.58, 1604.40, 1604.47.

Delete “in the QoS Control field” at 1585.3.

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8056 in <this document>, which account for the fact that Management frames do not carry an EOSP subfield, as suggested by the commenter.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8067Mark RISONC.33199.63 | dot11QAPMissingAckRetryLimit's description suggests it's only used for PS-Poll contexts but the use is also in U-APSD contexts (see 1585.24). The description is confusing, too (how does the condition after "or after" relate to the one before (subset? Duplication?) | Change the last para of the description |

Discussion:

Context for PS-Poll (1585.11):

If the AP does not receive an acknowledgment to an individually addressed MPDU containing all or part of a BU sent to a STA in PS mode following receipt of a PS-Poll frame from that STA, it may retransmit the frame for at most the lesser of the maximum retry limit and dot11QAPMissingAckRetryLimit times before the next Beacon frame, but it shall retransmit that frame at least once before the next Beacon frame, time permitting and subject to its appropriate lifetime limit.

Context for U-APSD (1585.20):

If the AP does not receive an acknowledgment to an individually addressed Data frame that requires acknowledgment and that is a non-A-MPDU frame containing all or part of an MSDU or A-MSDU sent with the EOSP subfield equal to 1, it shall retransmit that frame at least once within the same SP, subject to applicable retry or lifetime limit. The maximum number of retransmissions within the same SP is the lesser of the maximum retry limit and dot11QAPMissingAckRetryLimit.

Actually the problem is the wording, which doesn’t make it clear the “or after” bit is about U-APSD (though the “EOSP” bit gives the game away).

Proposed changes:

Change 3200.7 as follows:

This attribute indicates the number of times the AP may retry a frame for which it does not receive an Ack frame for a STA in power save mode after receiving a PS-Poll frame and sending an individually addressed response or after receiving a U-APSD trigger frame and sending an individually addressed response with the EOSP subfield ~~the AP does not receive an Ack frame to an individually addressed MPDU sent with the EOSP~~ equal to 1.

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8067 in <this document>, which make the description of the MIB variable clearer.

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| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8116Mark RISON10.3.2.3.11273.33 | In Figure 10-4 what are the "[i]"s? | Replace one with "[AC]" and the other with "[AC$prime]", where $prime is the glyph for a prime |

Discussion:

Apparently the proposed change is not clear enough.

Proposed changes:

Change Figure 10-4 from:



to:



or to:



Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8116 in <this document>, which are the same changes as requested by the commenter.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8145Mark RISON6.3.19.1.2224.23 | One of the (I think) approved comment resolutions on D5.0 renamed the things in SAP primitives from "element"s to "parameter"s, but there's still a "element" here | Apply the D5.0 changes to get rid of "element" in such contexts (the referenced location is only one among several) |

Discussion:

Actually, the spurious "element"s are at 224.35, 224.38 and 225.40 and are in fact caused by one of the resolutions in 16/0276 not having been updated for our decision in another resolution to change "element" to "parameter" in the context of things in the SAP.

Proposed resolution:

REVISED

Change “element” to “parameter” at 224.35, 224.38 and 225.40.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8168Mark RISON6.3.7.2.2171.15 | Stuff passed in the MLME-JOIN.request (whether directly or through the BSSDescriptionSet) should not be passed again in the MLME-(RE)ASSOCIATION.request, since it cannot differ | Delete the CapabilityInformation,HT Capabilities,Extended Capabilities,20/40 BSS Coexistence,VHT Capabilities,from the arguments to the MLME-(RE)ASSOCIATION.request primitivesand the corresponding rows in the tables below them. |

Discussion:

Apparently the proposed change is not clear enough.

Additionally, it has been pointed out that there is one field in the HT Capabilities element sent to an AP that is not, in fact, a capability and is dynamic, namely the SM Power Save field.

Proposed changes:

Make the following changes in the two subclauses indicated.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-ASSOCIATE.request(

PeerSTAAddress,(#6071)

~~CapabilityInformation,~~

ListenInterval,

Supported Channels,

RSN,

QoSCapability,

Content of FT Authentication elements,

SupportedOperatingClasses,

~~HT Capabilities,~~

SM Power Save,

~~Extended Capabilities,~~

~~20/40 BSS Coexistence,~~

QoSTrafficCapability,

TIMBroadcastRequest,

EmergencyServices,

DMG Capabilities,(11ad)

Multi-band local,(11ad)

Multi-band peer,(11ad)

MMS,(11ad)

~~VHT Capabilities,(11ac)~~

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity with which to perform the association process. |
| ~~CapabilityInformation~~ | ~~Capability Information field~~ | ~~As defined in 9.4.1.4 (Capability Information field)~~ | ~~Specifies the requested operational capabilities to the AP.~~ |
| ListenInterval | Integer | 0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode. |
| Supported Channels | As defined in the Supported Channels -element | As defined in the Supported -Channels element | The list of channels in which the STA is capable of operating.Present if DFS functionality is required, as specified in 11.9 (DFS procedures); otherwise not present(#28). |
| RSN | RSNE  | As defined in 9.4.2.25 (RSNE) | A description of the cipher suites and AKM suites selected by the STA. |
| QoSCapability | QoS Capability element | As defined in 9.4.2.35 (QoS Capability element) | Specifies the parameters within the QoS Capability element that are supported by the MAC entity. The parameter is present if dot11QosOptionImplemented is true; otherwise not present(#28). |
| Content of FT Authentication elements  | Sequence of elements | As defined in 13.4 (FT initial mobility domain association) | The set of elements to be included in the initial mobility domain association request, as described in 13.4 (FT initial mobility domain association). Present if dot11FastBSSTransitionActivated is true; otherwise not present(#28). |
| SupportedOperatingClasses | As defined in the Supported Operating Classes element | As defined in 9.4.2.54 (Supported Operating Classes element) | Specifies the supported operating classes capabilities of the STA. This parameter is present if dot11ExtendedChannelSwitchActivated is true. |
| ~~HT Capabilities~~  | ~~As defined in frame format~~ | ~~As defined in 9.4.2.56 (HT Capabilities element); the HT-MCSs(Ed) in the element are present in dot11SupportedMCSRxTable and the highest supported data rate in the element does not exceed dot11HighestSupportedDataRate(#7278)~~ | ~~Specifies the parameters within the HT Capabilities element that are supported by the MAC entity.~~ ~~The parameter is present if dot11HighThroughputOption-Implemented is true and is absent otherwise.~~ |
| SM Power Save | Integer | As defined in Table 9-162 | Indicates the spatial multiplexing power save mode that is in operation immediately after association. |
| ~~Extended Capabilities~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.27 (Extended Capabilities element)~~ | ~~Specifies the parameters within the Extended Capabilities element that are supported by the MAC entity.~~  |
| ~~20/40 BSS Coexistence~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.60 (20/40 BSS Coexistence element)~~ | ~~Specifies the parameters within the 20/40 BSS Coexistence element that are indicated by the MAC entity.~~ ~~The parameter is present if dot112040BSSCoexistence-ManagementSupport is true.~~ |
| QoS Traffic Capability | As defined in the QoS Traffic Capability element | As defined in 9.4.2.78 (QoS Traffic Capability element) | Specifies the QoS Traffic Capability flags of the non-AP STA. This parameter is optionally present if dot11(#1676)ACStationCountActivated is true, and is not present otherwise. |
| TIMBroadcastRequest | As defined in theTIM Broadcast Request element | As defined in 9.4.2.83 (TIM Broadcast Request element) | Specifies the proposed service parameters for TIM Broadcast. This parameter is optionally present if dot11(#1676)TIMBroadcastActivated is true, and is not present otherwise. |
| EmergencyServices | Boolean | true(MDR), false(MDR) | Specifies that the non-AP STA intends to associate for the purpose of unauthenticated access to emergency services. The parameter is optionally be present if dot11InterworkingServiceActivated is true, and is not present otherwise.(MDR) |
| DMG Capabilities(11ad) | DMG Capabilities element | As defined in 9.4.2.128 (DMG Capabilities element) | Specifies the parameters within the DMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11DMGOptionImplemented is true and is absent otherwise. |
| Multi-band local(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that are supported by the local MAC entity. The parameter is present if dot11MultibandImplemented is true and is absent otherwise. |
| Multi-band peer(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that identify the remote (peer) MAC entity. The parameter is present if OCT is being used and is absent otherwise. |
| MMS(11ad) | Multiple MAC Sublayers element | As defined in 9.4.2.153 (Multiple MAC Sublayers (MMS) element) | Specifies the parameters within the Multiple MAC Sublayers element that are supported by the MAC entity. The parameter is present if dot11MultipleMACActivated is true and is absent otherwise. |
| ~~VHT Capabilities(11ac)~~ | ~~As defined in VHT Capabilities element~~ | ~~As defined in 9.4.2.158 (VHT Capabilities element); the VHT-MCSs(Ed) in the element are present in dot11VHTRxVHTMCSMap/dot11VHTTxVHTMCSMap and the highest supported rates in the element do not exceed dot11VHTRxHighestDataRateSupported/dot11VHTTxHighestDataRateSupported(#7278)~~ | ~~Specifies the parameters in the VHT Capabilities element that are supported by the STA. The parameter is present if dot11VHTOptionImplemented is true and not present otherwise.~~ |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.26 (Vendor Specific element) | Zero or more elements. |

Additional parameters needed to perform the association procedure are not included in the primitive parameter list since the MLME already has that data (maintained as internal state).

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.request(

NewPCPorAPAddress,(11ad)(#6071)
~~CapabilityInformation,~~
ListenInterval,
Supported Channels
RSN,
QoSCapability,
Content of FT Authentication elements,
SupportedOperatingClasses,
~~HT Capabilities,~~

SM Power Save, ~~Extended Capabilities,
20/40 BSS Coexistence,~~QoSTrafficCapability,
TIMBroadcastRequest,
FMSRequest,
DMSRequest,
EmergencyServices,
DMG Capabilities,(11ad)
Multi-band local,(11ad)
Multi-band peer,(11ad)
MMS,(11ad)
~~VHT Capabilities,(11ac)~~VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| NewPCPorAPAddress(11ad) | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity with which to perform the reassociation process. |
| ~~Capability-Information~~ | ~~Capability Information field~~ | ~~As defined in 9.4.1.4 (Capability Information field)~~ | ~~Specifies the requested operational capabilities to the AP or PCP.(11ad)~~ |
| ListenInterval | Integer | 0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode. |
| Supported Channels | As defined in the Supported Channels –element | As defined in the Supported -Channels -element | The list of channels in which the STA is capable of operating.Present if DFS functionality is required, as specified in 11.9 (DFS procedures); otherwise not present(#28). |
| RSN | RSNE  | As defined in 9.4.2.25 (RSNE) | A description of the cipher suites and AKM suites selected by the STA. |
| QoSCapability | QoS Capability element | As defined in 9.4.2.35 (QoS Capability element) | Specifies the parameters within the QoS Capability element that are supported by the MAC entity. The parameter is present if dot11QosOptionImplemented is true; otherwise not present(#28). |
| Content of FT Authentication elements  | Sequence of elements | As defined in 13.8 (FT authentication sequence) | The set of elements to be included in the third message of the FT authentication sequence, as described in 13.8.4 (FT authentication sequence: contents of third message). Present if dot11FastBSSTransitionActivated is true; otherwise not present(#28). |
| SupportedOperatingClasses | As defined in the Supported Operating Classes element | As defined in 9.4.2.54 (Supported Operating Classes element) | Specifies the supported operating classes of the STA. This parameter is present if dot11ExtendedChannelSwitchActivated is true. |
| ~~HT Capabilities~~  | ~~As defined in frame format~~ | ~~As defined in 9.4.2.56 (HT Capabilities element); the HT-MCSs(Ed) in the element are present in dot11SupportedMCSRxTable and the highest supported data rate in the element does not exceed dot11HighestSupportedDataRate(#7278)~~ | ~~Specifies the parameters within the HT Capabilities element that are supported by the MAC entity.~~ ~~The parameter is present if dot11HighThroughputOption-Implemented is true; otherwise it is not present.~~ |
| SM Power Save | Integer | As defined in Table 9-162 | Indicates the spatial multiplexing power save mode that is in operation immediately after reassociation. |
| ~~Extended Capabilities~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.27 (Extended Capabilities element)~~ | ~~Specifies the parameters within the Extended Capabilities element that are supported by the MAC entity.~~  |
| ~~20/40 BSS Coexistence~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.60 (20/40 BSS Coexistence element)~~ | ~~Specifies the parameters within the 20/40 BSS Coexistence element that are indicated by the MAC entity.~~ ~~The parameter is present if dot112040BSSCoexistenceManagementSupport is true.~~ |
| QoS Traffic Capability | As defined in the QoS Traffic Capability element | As defined in 9.4.2.78 (QoS Traffic Capability element) | Specifies the QoS Traffic Capability flags of the non-AP and non-PCP(11ad) STA. This parameter is optionally present if dot11(#1676)ACStationCountActivated is true, and is not present otherwise. |
| TIMBroadcastRequest | As defined in TIM Broadcast Request element | As defined in 9.4.2.83 (TIM Broadcast Request element) | Specifies the proposed service parameters for TIM Broadcast. This parameter is optionally present if dot11(#1676)TIMBroadcastActivated is true, and is not present otherwise. |
| FMSRequest | As defined in FMS Request element | As defined in 9.4.2.76 (FMS Request element) | Specifies the proposed multicast parameters for FMS Request. This parameter is optionally present if dot11(#1676)FMSActivated is true, and is not present otherwise. |
| DMSRequest | Sequence of DMS Request elements(#1170) | As defined in 9.4.2.88 (DMS Request element) | Specifies the proposed multicast parameters for DMS Request. This parameter is optionally present if dot11(#1676)DMSActivated is true, and is not present otherwise. |
| EmergencyServices  | Boolean | true(MDR), false(MDR) | Specifies that the non-AP and non-PCP(11ad) STA intends to (#1530)reassociate for the purpose of unauthenticated access to emergency services. The parameter shall only be present if dot11InterworkingServiceActivated is true. |
| DMG Capabilities(11ad) | DMG Capabilities element | As defined in 9.4.2.128 (DMG Capabilities element) | Specifies the parameters within the DMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11DMGOptionImplemented is true and is absent otherwise. |
| Multi-band local(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that are supported by the local MAC entity. The parameter is present if dot11MultibandImplemented is true and is absent otherwise. |
| Multi-band peer(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that identify the remote (peer) MAC entity. The parameter is present if OCT is being used and is absent otherwise. |
| MMS(11ad) | Multiple MAC Sublayers element | As defined in 9.4.2.153 (Multiple MAC Sublayers (MMS) element) | Specifies the parameters within the Multiple MAC Sublayers element that are supported by the MAC entity. The parameter is present if dot11MultipleMACActivated is true and is absent otherwise. |
| ~~VHT Capabilities(11ac)~~ | ~~As defined in VHT Capabilities element~~ | ~~As defined in 9.4.2.158 (VHT Capabilities element); the VHT-MCSs(Ed) in the element are present in dot11VHTRxVHTMCSMap/dot11VHTTxVHTMCSMap and the highest supported rates in the element do not exceed dot11VHTRxHighestDataRateSupported/dot11VHTTxHighestDataRateSupported(#7278)~~ | ~~Specifies the parameters in the VHT Capabilities element that are supported by the STA. The parameter is present if dot11VHTOptionImplemented is true and not present otherwise.~~ |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.26 (Vendor Specific element) | Zero or more elements. |

Additional parameters needed to perform the reassociation procedure are not included in the primitive parameter list since the MLME already has that data (maintained as internal state).

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8168 in <this document>, which are the same changes as requested by the commenter.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8169Mark RISON6.3.7.5.2180.35 | Stuff passed in the MLME-START.request should not be passed again in the MLME-(RE)ASSOCIATION.response, since it cannot differ | Delete the CapabilityInformation,EDCAParameterSet,DSERegisteredLocation,HT Capabilities,Extended Capabilities,20/40 BSS Coexistence,QMFPolicy,DMG Capabilities,Multi-band local,MMS,VHT Capabilities,from the arguments to the MLME-(RE)ASSOCIATION.response primitivesand the corresponding rows in the tables below them. |

Discussion:

Apparently the proposed change is not clear enough.

Proposed changes:

Make the following changes in the two subclauses indicated.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-ASSOCIATE.response(

PeerSTAAddress,
ResultCode,
~~CapabilityInformation,~~AssociationID,
~~EDCAParameterSet,~~RCPI,
RSNI,
RMEnabledCapabilities,
Content of FT Authentication elements,
SupportedOperatingClasses,
~~DSERegisteredLocation,
HT Capabilities,(#7278)
Extended Capabilities,
20/40 BSS Coexistence,~~
TimeoutInterval,
BSSMaxIdlePeriod,
TIMBroadcastResponse,
QoSMapSet,
~~QMFPolicy,(11ae)
DMG Capabilities,(11ad)
Multi-band local,(11ad)~~Multi-band peer,(11ad)
~~MMS,(11ad)
VHT Capabilities,(11ac)~~VendorSpecificInfo
)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the association request was received. |
| ResultCode | Enumeration | SUCCESS, REFUSED\_REASON\_UNSPECIFIED, REFUSED\_CAPABILITIES\_MISMATCH, REFUSED\_EXTERNAL\_REASON, REFUSED\_AP\_OUT\_OF\_MEMORY, REFUSED\_BASIC\_RATES\_MISMATCH, REJECTED\_EMERGENCY\_SERVICES\_-NOT\_SUPPORTED,REFUSED\_TEMPORARILY | Indicates the result response to the association request from the peer MAC entity. |
| ~~Capability-Information~~ | ~~Capability Information field~~ | ~~As defined in 9.4.1.4 (Capability Information field)~~ | ~~Specifies the operational capabilities advertised by the AP or PCP(11ad).~~ |
| AssociationID | Integer | Non-DMG: 1–2007DMG: 1–254(#6290) | If the association request result was SUCCESS, then AssociationID specifies the association ID value assigned to the peer MAC entity by the AP or PCP(11ad). |
| ~~EDCAParameterSet~~ | ~~EDCA Parameter Set element~~ | ~~As defined in 9.4.2.29 (EDCA Parameter Set element)~~ | ~~Specifies the EDCA parameter set that the STA should use. The parameter is present if dot11QosOptionImplemented(#160) is true; otherwise not present(#28).~~ |
| RCPI  | Integer | As defined in 9.4.2.38 (RCPI element)(#6756) | The RCPI value represents the measured RCPI of the corresponding Association Request frame. The element is optionally present if dot11RMRCPIMeasurementActivated is true; otherwise not present(#28). |
| RSNI  | Integer | As defined in 9.4.2.41 (RSNI element) | The RSNI value represents the measured RSNI at the time the corresponding Association Request frame was received. The element is optionally present if dot11RMRSNIMeasurementActivated is true; otherwise not present(#28). |
| RMEnabled-Capabilities  | RM Enabled Capabilities element | As defined in 9.4.2.45 (RM Enabled Capabilities element) | Specifies the RM enabled capabilities advertised by the AP or PCP(11ad). The element is present if dot11RadioMeasurementActivated is true; otherwise not present(#28). |
| Content of FT Authentication elements  | Sequence of elements | As defined in 13.4 (FT initial mobility domain association) | The set of elements to be included in the initial mobility domain association response, as described in 13.4 (FT initial mobility domain association). Present if dot11FastBSSTransitionActivated is true; otherwise not present(#28). |
| SupportedOperatingClasses | As defined in the Supported Operating Classes element | As defined in 9.4.2.54 (Supported Operating Classes element) | Indicates the supported operating classes capabilities of the AP or PCP(11ad). This parameter is present if dot11ExtendedChannelSwitchActivated is true. |
| ~~DSERegisteredLocation~~ | ~~As defined in the DSE Registered Location element~~ | ~~As defined in 9.4.2.52 (DSE Registered Location element)~~ | ~~Indicates the DSE registered location including the dependent enablement identifier assigned by the enabling STA. This parameter is optionally present if dot11LCIDSERequired is true.~~ |
| ~~HT Capabilities~~  | ~~As defined in frame format~~ | ~~As defined in 9.4.2.56 (HT Capabilities element); the HT-MCSs(Ed) in the element are present in dot11SupportedMCSRxTable and the highest supported data rate in the element does not exceed dot11HighestSupportedDataRate(#7278)~~ | ~~Specifies the parameters within the HT Capabilities element that are supported by the MAC entity.~~ ~~The parameter is present if dot11HighThroughputOption-Implemented is true; otherwise it is not present.~~ |
| ~~Extended Capabilities~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.27 (Extended Capabilities element)~~ | ~~Specifies the parameters within the Extended Capabilities element that are supported by the MAC entity.~~  |
| ~~20/40 BSS Coexistence~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.60 (20/40 BSS Coexistence element)~~ | ~~Specifies the parameters within the 20/40 BSS Coexistence element that are indicated by the MAC entity.~~ ~~The parameter is present if dot112040BSSCoexistenceManagementSupport is true.~~ |
| TimeoutInterval  | Timeout Interval element, as defined in frame format | As defined in 9.4.2.49 (Timeout Interval element (TIE)) | This parameter is present when ResultCode is REFUSED\_TEMPORARILY(#6377). |
| BSSMaxIdlePeriod | As defined in BSS Max Idle Period element | As defined in 9.4.2.79 (BSS Max Idle Period element) | Indicates the BSS (#1177)max idle period parameters of the AP or PCP(11ad). This parameter is present if dot11WirelessManagementImplemented is true, and is not present otherwise. |
| TIMBroadcastResponse | As defined in TIM Broadcast Response element | As defined in 9.4.2.84 (TIM Broadcast Response element) | Specifies the service parameters for TIM Broadcast. This parameter is optionally present if dot11(#1676)TIMBroadcastActivated is true and the TIM Broadcast Request element is present in (#1567)the corresponding Association Request frame, and is not present otherwise. |
| QoSMapSet | As defined in frame format | As defined in 9.4.2.95 (QoS Map element) | Specifies the QoS Map(#3349) the non-AP and non-PCP STA(11ad) should use. |
| ~~QMFPolicy~~ | ~~QMF Policy element~~ | ~~As defined in 9.4.2.120 (Quality-of-Service Management Frame Policy element)~~  | ~~Describes the QMF policy of the AP or PCP(11ad). This parameter is present when dot11QMFActivated is true, and is not present otherwise.~~ |
| ~~DMG Capabilities(11ad)~~ | ~~DMG Capabilities element~~ | ~~As defined in 9.4.2.128 (DMG Capabilities element)~~ | ~~Specifies the parameters within the DMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11DMGOptionImplemented is true and is absent otherwise.~~ |
| ~~Multi-band local(11ad)~~ | ~~Multi-band element~~ | ~~As defined in 9.4.2.138 (Multi-band element)~~ | ~~Specifies the parameters within the Multi-band element that are supported by the local MAC entity. The parameter is present if dot11MultibandImplemented is true and is absent otherwise.~~ |
| Multi-band peer(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that identify the remote (peer) MAC entity. The parameter is present if OCT is being used and is absent otherwise. |
| ~~MMS(11ad)~~ | ~~Multiple MAC Sublayers element~~ | ~~As defined in 9.4.2.153 (Multiple MAC Sublayers (MMS) element)~~ | ~~Specifies the parameters within the Multiple MAC Sublayers element that are supported by the MAC entity. The parameter is present if dot11MultipleMACActivated is true and is absent otherwise.~~ |
| ~~VHT Capabilities(11ac)~~ | ~~As defined in VHT Capabilities element~~ | ~~As defined in 9.4.2.158 (VHT Capabilities element); the VHT-MCSs(Ed) in the element are present in dot11VHTRxVHTMCSMap/dot11VHTTxVHTMCSMap and the highest supported rates in the element do not exceed dot11VHTRxHighestDataRateSupported/dot11VHTTxHighestDataRateSupported(#7278)~~ | ~~Specifies the parameters in the VHT Capabilities element that are supported by the AP. The parameter is present if dot11VHTOptionImplemented is true and not present otherwise.~~ |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.26 (Vendor Specific element) | Zero or more elements. |

Additional parameters needed to perform the association response procedure are not included in the primitive parameter list since the MLME already has that data (maintained as internal state).

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.response(

PeerSTAAddress,
ResultCode,
~~CapabilityInformation,~~AssociationID,
~~EDCAParameterSet,~~RCPI,
RSNI,
RMEnabledCapabilities,
Content of FT Authentication elements,
SupportedOperatingClasses,
~~DSERegisteredLocation,
HT Capabilities,
Extended Capabilities,
20/40 BSS Coexistence,~~TimeoutInterval,
BSSMaxIdlePeriod,
TIMBroadcastResponse,
FMSResponse,
DMSResponse,
QoSMapSet,
~~DMG Capabilities,(11ad)
Multi-band local,~~(11ad)
Multi-band peer,(11ad)
~~MMS,(11ad)
VHT Capabilities,(11ac)~~VendorSpecificInfo
)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the reassociation request was received. |
| ResultCode | Enumeration | SUCCESS, REFUSED\_REASON\_UNSPECIFIED, REFUSED\_CAPABILITIES\_MISMATCH, REFUSED\_EXTERNAL\_REASON, REFUSED\_AP\_OUT\_OF\_MEMORY, REFUSED\_BASIC\_RATES\_MISMATCHREJECTED\_EMERGENCY\_SERVICES\_-NOT\_SUPPORTED,REFUSED\_TEMPORARILY(#6377) | Indicates the result response to the reassociation request from the peer MAC entity. |
| ~~Capability-Information~~ | ~~Capability Information field~~ | ~~As defined in 9.4.1.4 (Capability Information field)~~ | ~~Specifies the operational capabilities advertised by the AP or PCP(11ad).~~ |
| AssociationID | Integer | Non-DMG: 1–2007DMG: 1–254(#6290) | If the reassociation request result was SUCCESS, then AssociationID specifies the association ID value assigned to the peer MAC entity by the AP or PCP(11ad). |
| ~~EDCAParameterSet~~ | ~~EDCA Parameter Set element~~ | ~~As defined in 9.4.2.29 (EDCA Parameter Set element)~~ | ~~Specifies the EDCA parameter set that the STA should use. The parameter is present if dot11QosOptionImplemented(#160) is true; otherwise not present(#28).~~ |
| RCPI  | Integer | As defined in 9.4.2.38 (RCPI element)(#6756) | The RCPI value represents the measured RCPI of the corresponding Reassociation (#99)Request frame. The element is optionally present if dot11RMRCPIMeasurementActivated is true; otherwise not present(#28). |
| RSNI  | Integer | As defined in 9.4.2.41 (RSNI element) | The RSNI value represents the measured RSNI at the time the corresponding Reassociation (#99)Request frame was received. The element is optionally present if dot11RMRSNIMeasurementActivated is true; otherwise not present(#28). |
| RMEnabled-Capabilities  | RM Enabled Capabilities element  | As defined in 9.4.2.45 (RM Enabled Capabilities element) | Specifies the RM enabled capabilities advertised by the AP or PCP(11ad). The element is present if dot11RadioMeasurementActivated is true; otherwise not present(#28). |
| Content of FT Authentication elements  | Sequence of elements | As defined in 13.8 (FT authentication sequence) | The set of elements to be included in the fourth message of the FT authentication sequence, as described in 13.8.5 (FT authentication sequence: contents of fourth message). This includes an optional response to a resource request (RIC). Present if dot11FastBSSTransitionActivated is true; otherwise not present(#28). |
| SupportedOperatingClasses | As defined in the Supported Operating Classes element | As defined in 9.4.2.54 (Supported Operating Classes element) | Specifies the supported operating classes of the STA. This parameter is present if dot11ExtendedChannelSwitchActivated is true. |
| ~~DSERegisteredLocation~~ | ~~As defined in the DSE Registered Location element~~ | ~~As defined in 9.4.2.52 (DSE Registered Location element)~~ | ~~Indicates the DSE registered location including the dependent enablement identifier assigned by the enabling STA. This parameter is optionally present if dot11LCIDSERequired is true.~~ |
| ~~HT Capabilities~~  | ~~As defined in frame format~~ | ~~As defined in 9.4.2.56 (HT Capabilities element); the HT-MCSs(Ed) in the element are present in dot11SupportedMCSRxTable and the highest supported data rate in the element does not exceed dot11HighestSupportedDataRate(#7278)~~ | ~~Specifies the parameters within the HT Capabilities element that are supported by the MAC entity.~~ ~~The parameter is present if dot11HighThroughputOption-Implemented is true; otherwise it is not present.~~ |
| ~~Extended Capabilities~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.27 (Extended Capabilities element)~~ | ~~Specifies the parameters within the Extended Capabilities element that are supported by the MAC entity.~~  |
| ~~20/40 BSS Coexistence~~ | ~~As defined in frame format~~ | ~~As defined in 9.4.2.60 (20/40 BSS Coexistence element)~~ | ~~Specifies the parameters within the 20/40 BSS Coexistence element that are indicated by the MAC entity.~~ ~~The parameter is present if dot112040BSSCoexistenceManagementSupport is true.~~ |
| TimeoutInterval | Timeout Interval element, as defined in frame format | As defined in 9.4.2.49 (Timeout Interval element (TIE)) | This parameter is present when ResultCode is REFUSED\_TEMPORARILY(#6377). |
| BSSMaxIdlePeriod | As defined in BSS Max Idle Period element | As defined in 9.4.2.79 (BSS Max Idle Period element) | Indicates the BSS (#1177)max idle period parameters of the AP or PCP(11ad). This parameter is present if dot11WirelessManagementImplemented is true, and is not present otherwise. |
| TIMBroadcastResponse | As defined in TIM Broadcast Response element | As defined in 9.4.2.84 (TIM Broadcast Response element) | Specifies the service parameters for TIM Broadcast. This parameter is optionally present if dot11(#1676)TIMBroadcastActivated is true and the TIM Broadcast Request element is present in (#1567)the corresponding Association Request frame, and is not present otherwise. |
| FMSResponse | As defined in FMS Response element | As defined in 9.4.2.77 (FMS Response element) | Specifies the multicast parameters for FMS Response. This parameter is optionally present if dot11(#1676)FMSActivated is true and the FMS Request element is present in (#1567)the corresponding Association Request frame, and is not present otherwise. |
| DMSResponse | Sequence of DMS Response elements (#1170) | As defined in 9.4.2.89 (DMS Response element) | Specifies the multicast parameters for DMS Response. This parameter is optionally present if dot11(#1676)DMSActivated is true and the DMS Request element is present in (#1567)the corresponding Association Request frame, and is not present otherwise. |
| QoSMapSet | As defined in frame format | As defined in 9.4.2.95 (QoS Map element) | Specifies the QoS Map(#3349) the non-AP and non-PCP(11ad) STA should use. |
| ~~DMG Capabilities(11ad)~~ | ~~DMG Capabilities element~~ | ~~As defined in 9.4.2.128 (DMG Capabilities element)~~ | ~~Specifies the parameters within the DMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11DMGOptionImplemented is true and is absent otherwise.~~ |
| ~~Multi-band local(11ad)~~ | ~~Multi-band element~~ | ~~As defined in 9.4.2.138 (Multi-band element)~~ | ~~Specifies the parameters within the Multi-band element that are supported by the local MAC entity. The parameter is present if dot11MultibandImplemented is true and is absent otherwise.~~ |
| Multi-band peer(11ad) | Multi-band element | As defined in 9.4.2.138 (Multi-band element) | Specifies the parameters within the Multi-band element that identify the remote (peer) MAC entity. The parameter is present if OCT is being used and is absent otherwise. |
| ~~MMS(11ad)~~ | ~~Multiple MAC Sublayers element~~ | ~~As defined in 9.4.2.153 (Multiple MAC Sublayers (MMS) element)~~ | ~~Specifies the parameters within the Multiple MAC Sublayers element that are supported by the MAC entity. The parameter is present if dot11MultipleMACActivated is true and is absent otherwise.~~ |
| ~~VHT Capabilities(11ac)~~ | ~~As defined in VHT Capabilities element~~ | ~~As defined in 9.4.2.158 (VHT Capabilities element); the VHT-MCSs(Ed) in the element are present in dot11VHTRxVHTMCSMap/dot11VHTTxVHTMCSMap and the highest supported rates in the element do not exceed dot11VHTRxHighestDataRateSupported/dot11VHTTxHighestDataRateSupported(#7278)~~ | ~~Specifies the parameters in the VHT Capabilities element that are supported by the AP. The parameter is present if dot11VHTOptionImplemented is true and not present otherwise.~~ |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.26 (Vendor Specific element) | Zero or more elements. |

Additional parameters needed to perform the reassociation response procedure are not included in the primitive parameter list since the MLME already has that data (maintained as internal state).

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8169 in <this document>, which are the same changes as requested by the commenter, except that (a) the MLME-REASSOCIATE.response does not have QMFPolicy, unlike the MLME-ASSOCIATE.response and (b) a typo after the table was fixed too.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8316Mark RISON6.5.4.2537.54 | aPreambleLength and aPHYHeaderLength are stated to be integers. However, for TVHT they aren't, because of the way TVHT is derived from VHT | Say they are reals in the case of TVHT |

Discussion:

The table in 6.5.4.2 claims that the type of aPreambleLength and aPHYHeaderLength is “integer”.

However 22.4.4 says:

The static TVHT PHY characteristics, provided through the PLME-CHARACTERISTICS service primitive, shall be as shown in Table 19-25 (HT PHY characteristics) except parameters listed in Table 22-25 (TVHT PHY characteristics) and aPreambleLength, aSTFOneLength, aSTFTwoLength, aLTFOneLength, aLTFTwoLength, aPHYHeaderLength, and aPHYSigTwoLength, which are multiplied by 7.5 for 6 MHz and 7 MHz unit channels and by 5.625 for 8 MHz unit channels. The definitions for these characteristics are given in 6.5 (PLME SAP interface).

The values for aPreambleLength and aPHYHeaderLength in Table 19-25 are 16 µs and 4 µs respectively. The result of multiplying the latter by 5.625 is not an integer.

Actually, this might also be true of a[SL]TF{One,Two}Length and aPHYSigTwoLength. Time for a table:

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic | × 1 | × 7.5 | × 5.625 |
| aPreambleLength | 16 µs | 120 µs | 90 µs |
| aSTFOneLength | 8 µs | 60 µs | 45 µs |
| aSTFTwoLength | 4 µs | 30 µs | 22.5 µs |
| aLTFOneLength | 8 µs | 60 µs | 45 µs |
| aLTFTwoLength | 4 µs | 30 µs | 22.5 µs |
| aPHYHeaderLength | 4 µs | 30 µs | 22.5 µs |
| aPHYSigTwoLength | 8 µs | 60 µs | 45 µs |

So the non-integers appear only for a[SL]TFTwoLength and aPHYHeaderLength. But for the latter 538.8 already says “If the actual value of the length of the modulated header is not an integer number of microseconds, the value is rounded up to the next higher value.”

So the problem is only for a[SL]TFTwoLength.

Proposed resolution:

REVISED

At 538.5½ add “If the actual value of the length of the HT-STF is not an integer number of microseconds, the value is rounded up to the next higher value.” to the end of the rightmost cell.

At 538.7½ add “If the actual value of the length of the Additional HT-STFs is not an integer number of microseconds, the value is rounded up to the next higher value.” to the end of the rightmost cell.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8320Mark RISON11.4.21638.44 | It says "corresponds to a VHT-MCS and NSS for which support is indicated by the combination of theTx VHT-MCS Map subfield in the VHT Operation parameter of the MLME-(RE)ASSOCIATE.request primitive, if present, and the AP's operational VHT-MCS and NSSset, if defined, and the VHT Capabilities Information field, at a bandwidth and guard intervalsupported by the non-AP STA on transmission and permitted in the BSS." -- this is very hard to parse ("the combination of X, if present, and Y, if defined, and Z, at A and B and C") and the precedence is unclear | Express this clearly. Ditto for rx a few lines down |

Discussion:

We need more structure.

Proposed changes:

Change 1638.35 as follows:

The value of the Minimum PHY Rate in a TSPEC shall satisfy the following constraints:

a) for an uplink TS, it

— is included in dot11SupportedDataRatesTxTable and in the AP’s operational rate set, or

— corresponds to an HT MCS included in dot11HTSupportedMCSTxTable, if present, and in the AP’s operational HT MCS set, if defined, at a bandwidth and guard interval supported by the non-AP STA on transmission and permitted in the BSS, or

— corresponds to a VHT-MCS and NSS for which support is indicated by the combination of: ***<para break and indent>***

— the Tx VHT-MCS Map subfield in the VHT Operation parameter of the MLME-(RE)ASSOCIATE.request primitive, if present~~, and~~

— the AP’s operational VHT-MCS and NSS set, if defined~~, and~~

— the VHT Capabilities Information field~~,~~

at a bandwidth and guard interval supported by the non-AP STA on transmission and permitted in the BSS.

b) for a downlink TS, it

— is included in the OperationalRateSet parameter of the MLME-JOIN.request primitive and supported by the AP on transmission, or

— corresponds to an HT MCS included in dot11HTSupportedMCSRxTable, if present, and supported by the AP on transmission, at a bandwidth and guard interval supported by the non-AP STA on reception and permitted in the BSS, or

— corresponds to a VHT-MCS and NSS for which support is indicated by the combination of: ***<para break and indent>***

— the Rx VHT-MCS Map subfield in the VHT Operation parameter of the MLME-(RE)ASSOCIATE.request primitive, if present~~, and~~

— the Tx VHT-MCS Map subfield of the VHT Operation element advertised by the AP, if present~~, and~~

— the VHT Capabilities Information field~~,~~

at a bandwidth and guard interval supported by the non-AP STA on reception and permitted in the BSS.

c) for a bidirectional TS, it satisfies both a) and b) above.

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8320 in <this document>, which clarify the structure of the criteria.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8172Mark RISON9.4.2.13737.59 | The wording of 9.4.2.3 Supported Rates and BSS Membership Selectors element does not match that of 9.4.2.13 Extended Supported Rates and BSS Membership Selectors element. They should be essentially identical, since the latter is just there due to a lack of foresight ("how could anyone possibly want to support more than 8 rates?") | Align the wording |

Discussion:

As the commenter says, the SRaBMSe has the same contents as the ESRaBMSe, except that the latter is not limited to 8 SRaBMS.

Proposed changes:

Change Subclauses 9.4.2.3 and 9.4.2.13 as follows:

* Supported Rates and BSS Membership Selectors(#3508) element

The Supported Rates and BSS Membership Selectors(#3508) element specifies up to eight rates in the OperationalRateSet parameter, as described in the MLME-JOIN.request and MLME-START.request primitives, and zero or more BSS membership selectors. The Information field is encoded as 1 to 8 octets, where each octet describes a single ~~S~~supported ~~R~~rate or BSS membership selector (see Figure 9-124 (Supported Rates and BSS Membership Selectors element format)).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Element ID | Length | Supported Rates |
| Octets: | 1 | 1 | 1–8 |
| * Supported Rates and BSS Membership Selectors(#3508)(#3625) element format
 |

The Element ID and Length fields are defined in 9.4.2.1 (General).(#139)

Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each rate contained in the BSSBasicRateSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the data rate, if necessary rounded up to the next 500 (#258)kb/s, in units of 500 kb/s (e.g., a 2.25 Mb/s rate contained in the BSSBasicRateSet parameter is encoded as X'85'). Each rate in the OperationalRateSet parameter not contained in the BSSBasicRateSet parameter is encoded with the MSB set to 0, and bits 6 to 0 are set in the same way as for a rate contained in the BSSBasicRateSet parameter (e.g., a 2 Mb/s rate not contained in the BSSBasicRateSet parameter is encoded as X'04'). ~~The MSB of each Supported Rate octet in other management frame types is ignored by receiving STAs.~~(#7448)

Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the encoded value for the selector as found in Table 9-78 (BSS membership selector value encoding) (e.g., an HT PHY BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as X'FF'). A BSS membership selector that has the MSB (bit 7) set to 1 in the Supported Rates and BSS Membership Selectors(#3508) element is defined to be basic. ***<para break>***

The MSB of each octet in the Supported Rates field ~~octet~~ in other management frame types is ignored by receiving STAs.

The valid values for BSS membership selectors and their associated features are shown in Table 9-78 (BSS membership selector value encoding).

NOTE—Because the BSS membership selector and supported rates are carried in the same field, the BSS membership selector value cannot match the value corresponding to any valid supported rate. This allows any value (#7291)to be determined as either a supported rate or a BSS membership selector.

|  |
| --- |
| * BSS membership selector value encoding
 |
| Value | Feature | Interpretation |
| 127 | HT PHY | Support for the mandatory features of Clause 19 (High Throughput (HT) PHY specification) is required in order to join the BSS that was the source of the Supported Rates and BSS Membership Selectors(#3508) element or Extended Supported Rates and BSS Membership Selectors(#3508) element containing this value. |
| 126(11ac) | VHT PHY | Support for the mandatory features of Clause 21 (Very High Throughput (VHT) PHY specification) is required in order to join the BSS that was the source of the Supported Rates and BSS Membership Selectors(#3508) element or Extended Supported Rates and BSS Membership Selectors(#3508) element containing this value. |

See 11.1.4.6 (Operation of Supported Rates and BSS Membership Selectors element and Extended Supported Rates and BSS Membership Selectors element).(#63)

* Extended Supported Rates and BSS Membership Selectors(#3508) element

The Extended Supported Rates and BSS Membership Selectors(#3508) element specifies the rates in the OperationalRateSet parameter, as described in the MLME-(#3359)JOIN.request and MLME-(#3359)START.request primitives, and zero or more BSS membership selectors ~~values that~~, where these are not carried in the Supported Rates and BSS Membership Selectors(#3508) element. The Information field is encoded as 1 to 255 octets, where each octet describes a single supported rate or BSS membership selector (see Figure 9-139 (Extended Supported Rates and BSS Membership Selectors element format)).

|  |  |  |
| --- | --- | --- |
| Element ID | Length | Extended Supported Rates |
| 1 | 1 | 1–255 |
| * Extended Supported Rates and BSS Membership Selectors(#3508) element format
 |

The Element ID and Length fields are defined in 9.4.2.1 (General).(#139)

Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each rate contained in the BSSBasicRateSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the data rate, if necessary rounded up to the next 500 kb/s, in units of 500 kb/s (e.g., a 1 Mb/s rate contained in the BSSBasicRateSet parameter is encoded as X'82'). Each rate in the OperationalRateSet parameter not contained in the BSSBasicRateSet parameter is encoded with the MSB set to 0, and bits 6 to 0 are set in the same way as for a rate contained in the BSSBasicRateSet parameter (e.g., a 2 Mb/s rate not contained in the BSSBasicRateSet parameter is encoded as X'04'). ~~The MSB of each Extended Supported Rate octet in other management frame types is ignored by receiving STAs.(#7448)~~

Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the encoded value for the selector as found in Table 9-78 (BSS membership selector value encoding) (e.g., an HT PHY BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as X'FF'). A BSS membership selector that has the MSB (bit 7) set to 1 in the Extended Supported Rates and BSS Membership Selectors(#3508) element is defined to be basic.

The MSB of each Extended Supported Rate octet in other management frame types is ignored by receiving STAs.

The valid values for BSS membership selectors and their associated features are shown in Table 9-78 (BSS membership selector value encoding).

NOTE—Because the BSS membership selector and supported rates are carried in the same field, the BSS membership selector value cannot match the value corresponding to any valid supported rate. This allows any value (#7291)to be determined as either a supported rate or a BSS membership selector.

~~The Extended Supported Rates and BSS Membership Selectors(#3508) element has the format shown in Figure 9-139 (Extended Supported Rates and BSS Membership Selectors element format).~~

|  |  |  |  |
| --- | --- | --- | --- |
|  | ~~Element ID~~ | ~~Length~~ | ~~Extended Supported Rates~~ |
| ~~Octets:~~ | ~~1~~ | ~~1~~ | ~~1–255~~ |
| * ~~Extended Supported Rates and BSS Membership Selectors(#3508) element format~~
 |

See 11.1.4.6 (Operation of Supported Rates and BSS Membership Selectors element and Extended Supported Rates and BSS Membership Selectors element).

*Alternative for the ESRaBMSe subclause:*

* Extended Supported Rates and BSS Membership Selectors(#3508) element

The Extended Supported Rates and BSS Membership Selectors(#3508) element specifies the rates in the OperationalRateSet parameter, as described in the MLME-(#3359)JOIN.request and MLME-(#3359)START.request primitives, and zero or more BSS membership selectors ~~values that~~, where these are not carried in the Supported Rates and BSS Membership Selectors(#3508) element. The Information field is encoded as 1 to 255 octets, where each octet describes a single supported rate or BSS membership selector (see Figure 9-139 (Extended Supported Rates and BSS Membership Selectors element format)).

|  |  |  |
| --- | --- | --- |
| Element ID | Length | Extended Supported Rates |
| 1 | 1 | 1–255 |
| * Extended Supported Rates and BSS Membership Selectors(#3508) element format
 |

The Element ID and Length fields are defined in 9.4.2.1 (General).(#139)

The format and interpretation of each octet of the Extended Supported Rates field is the same as that of an octet in the Supported Rates field in a Supported Rates and BSS Membership Selectors**(#3508)** element (see 9.4.2.3).

~~Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each rate contained in the BSSBasicRateSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the data rate, if necessary rounded up to the next 500 kb/s, in units of 500 kb/s (e.g., a 1 Mb/s rate contained in the BSSBasicRateSet parameter is encoded as X'82'). Each rate in the OperationalRateSet parameter not contained in the BSSBasicRateSet parameter is encoded with the MSB set to 0, and bits 6 to 0 are set in the same way as for a rate contained in the BSSBasicRateSet parameter (e.g., a 2 Mb/s rate not contained in the BSSBasicRateSet parameter is encoded as X'04'). The MSB of each Extended Supported Rate octet in other management frame types is ignored by receiving STAs.(#7448)~~

~~Within Beacon, Probe Response, Association Response, Reassociation Response, Mesh Peering Open, and Mesh Peering Confirm (#100)frames, each BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as an octet with the MSB (bit 7) set to 1, and bits 6 to 0 are set to the encoded value for the selector as found in Table 9-78 (BSS membership selector value encoding) (e.g., an HT PHY BSS membership selector contained in the BSSMembershipSelectorSet parameter is encoded as X'FF').~~

~~The Extended Supported Rates and BSS Membership Selectors(#3508) element has the format shown in Figure 9-139 (Extended Supported Rates and BSS Membership Selectors element format).~~

|  |  |  |  |
| --- | --- | --- | --- |
|  | ~~Element ID~~ | ~~Length~~ | ~~Extended Supported Rates~~ |
| ~~Octets:~~ | ~~1~~ | ~~1~~ | ~~1–255~~ |
| * ~~Extended Supported Rates and BSS Membership Selectors(#3508) element format~~
 |

~~See 11.1.4.6 (Operation of Supported Rates and BSS Membership Selectors element and Extended Supported Rates and BSS Membership Selectors element)~~

At 37.58 change “Supported Rate” to “(Extended) Supported Rate octet”.

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID 8172 in <this document>, which effect the requested alignment of the wording.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8088Mark RISON6.5.4.2538.9 | Does the "PHY header" include the SERVICE field for all PHYs (e.g. Figure 17-1---PPDU format for OFDM)? If so, then its length is dependent on the datarate of the PHY payload, which is awkward for things like aPHYHeaderLength | Define the PHY header as not including the SERVICE field, where that field is in the Data portion of the PPDU |

Discussion:

aPHYHeaderLength is defined at 538.9 as “The current PHY’s header length (in microseconds), excluding

aPHYSigTwoLength if present.”

For things like DSSS and HR/DSSS it’s all fine (Figures 15-1 and 16-2 respectively): the SERVICE field is sent at a known PHY rate and so the duration of the PHY header is fixed.

However for things like OFDM, HT and VHT it’s more problematic (Figures 17-1, 19-1 and 21-4 respectively), because the PHY header includes a SERVICE field that is in the Data field and hence has a non-fixed duration, although Figures 19-1 and 21-4 don’t explicitly indicate what the “PHY header” consists of.

Proposed resolution:

REVISED

At 538.9, after “excluding aPHYSigTwoLength if present” add “and the SERVICE field if it is in the Data field of the PPDU”.

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID 8179Mark RISON10.13.61339.25 | This NOTE in clause 10.13.6 cites a restriction based on rules in 10.13.1 regarding prohibition of inclusion of MPDUs of more than one TID. However, it does not appear that 10.13.1 (and, in particular, the Tables 9-425 to 9-429) impose this stated restriction. The actual scope of what TIDs can be included in an A-MPDU does have implications that can affect MAC implementations. (Repeat of unsatisfied but important D5.0 comment) | Harmonize the statements in 10.13.6, 10.13.1, and the tables 9-425 to 9-429 regarding the permissible contents of an A-MPDU. If the NOTE is correct, clarification is probably needed in 10.13.1 and/or the tables. If the NOTE is incorrect, it should be removed. |

Discussion:

The NOTE in 10.13.6 is:

NOTE—An A-MPDU is prohibited by the rules in 10.13.1 (A-MPDU contents) from carrying MPDUs of more than one TID.

10.13.1 in turn references Table 9-424:

According to its context (defined in Table 9-424 (A-MPDU contexts)), an A-MPDU shall be constrained so that it contains only MPDUs as specified in the relevant table referenced from Table 9-424 (A-MPDU contexts).

Table 9-424 lists 5 contexts; the details of what is allowed in each are in Tables 9-425 to Table 9-429.

So, do any of these contexts allowed an A-MPDU to have MPDUs for more than one TID?

9.425, A-MPDU contents in the data enabled immediate response context, allows “QoS Data frames with a TID that corresponds to a Delayed or HT-delayed block ack agreement.” (though it does have a restriction in another case: “QoS Data frames with the same TID, which corresponds to an HT-immediate block ack agreement”).

9.426, A-MPDU contents in the data enabled no immediate response context, allows “QoS Data frames with a TID that corresponds to a Delayed or HT-delayed block ack agreement.” and “QoS Data frames with a TID that does not correspond to a block ack agreement.”.

9-427, A-MPDU contents in the PSMP context, allows “QoS Data frames in which the Ack Policy field is equal to PSMP Ack or Block Ack and with a TID that corresponds to an HT-immediate block ack agreement.”, “QoS Data frames with a TID that corresponds to a Delayed or HT-delayed block ack agreement.” and “QoS Data frames with a TID that does not correspond to a block ack agreement.”

9-428, A-MPDU contents MPDUs in the control response context, does not allow Data frames and 9-429, A-MPDU contents in the VHT single MPDU context, only allows one MPDU.

It seems that except for the specific case of QoS Data frames under HT-immediate BA and not under PSMP, you can have an A-MPDU carrying MPDUs of more than one TID.

Proposed resolution:

REVISED

Delete the NOTE in 10.13.6 (at 1339.25).

|  |  |  |
| --- | --- | --- |
| Identifiers | Comment | Proposed change |
| CID Mark RISON |  |  |

Discussion:

Proposed changes:

Proposed resolution:

REVISED

Make the changes shown under “Proposed changes” for CID in <this document>, which

**References:**

802.11mc/D6.0