IEEE P802.11
Wireless LANs

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| **Proposed Resolution to CID 7043** |
| **Date:** 2017-07-03 |

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Abstract

This submission proposes resolutions for comment CID 7043 related to TGax D1.2.

NOTE- The proposed changes on this document is based on TGax D1.2

Revisions:

* Rev 0: Initial version of the document.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 6036 | Jarkko Kneckt | 225 | Currently, the AID may be allocated to a STA only in association. There should be a mechanims to allocate preassociation AID to be able to transmit MU DL PPDUs and HE Trigger-based PPDUs to preassociated STAs. | Please allow the AP to distribute preassociation AID in probe response frame or as part of the UL OFDMA based random access. | Aggree in principleREVISEDTGax editor to make the changes shown in 11-17/1046r0 |

**Discussion**

Abstract

This document provides resolutions for the following CIDs on Clause 25.9.3. The baseline for this comment resolution document is 802.11ax Draft 0.1.

* CIDs: 705, 706

UL OFDMA-based random access can be used for an unassociated STA to send an association request. The AP allocates RUs for random access, and shall respond with a Multi-STA BlockAck Frame in an SU PPDU if the AP receives a management frame, such as Association Request frame, which is sent by the unassociated non-AP HE STA(s) through OFDMA random access.The AP shall set the AID subfield in the Per STA Info field of the Multi-STA BlockAck frame to 2045 without assigning AIDs to the unassociated non-AP HE STA(s).

Since no AID assignment to the unassociated STAs in the Multi-STA BlockAck frame as acknowledgements to the association requests from multiple non-AP HE STAs through random access, the AP has to individually send association responses to each of the STAs without being able to utilize DL OFDMA.

In order to provide an efficient association procedure for multiple STAs, we propose that an AP may transmit a broadcast Association Response frame in an SU PPDU to unassociated STAs. The frame exchange is shown below.



A simple calculation is shown as below to illustate the gain:

Assume:

80MH; **BPSK 1/2; BCC**

37 STAs send association request frame through random access;

The number of bytes in a unicast association response frame is A, which is about 150;

The number of bytes in a Broadcast association response is calculated as follows:

12 bytes for TIM Broadcast Respons element and 30 bytes for TWT element;

The number of bytes in a broadcast association response frame: A+ per user info \*37 = A+ 54\*37

The time for broadcast association responseframe exchange is given as below:

Time for Broadcast association response:

 **= 2668us**

Time for Uplink OFDMA ACK: 

Time for the Broadcast association response frame exchange: **2668+16+248 = 2932us**

Time for multiple unicast association response frame exchanges using DCF ( Eg.37 STAs):

Time for Unicast association response:

 = 208us

Time for Uplink OFDMA ACK: 

Time for 37 uniccast association response frame exchange: **37\* (208us+16us+44us) = 9916us**

The time required for association response procedure is reduced by 70%.

**Proposed resolution**

***Detailed implementation of the resolution***

Make the following changes to TGax D 1.3.

9.3.4 Extension frames

***TGax editor: add the paragraphs below as follows:***

Insert the following subclause (9.3.4.4, including Figure 9-64a and Table 9-42a) after 9.3.4.3:

9.3.4.4 Broadcast Association Response frame format

The Broadcast Association Response frame is used to respond to association Request frames it has received from multiple STAs.

The format of the Broadcast Association Response frame is shown in Figure 9-64a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frame Control | Duration | BSSID | Frame Body | FCS |

Octets: 2 2 6 variable 4

Figure 9-64a—Broadcast Association Response frame fromat

The Duration field contains a duration value as defined in 9.2.5.

The BSSID field indicates the BSSID of the BSS for which the association requests are received.

The Frame Body field of the Broadcast Association Response frame contains the elements listed in Table 9-42a.

Table 9-42a—Broadcast Association Response frame body

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 0 | System Info element | See Figure 9-64b |
| 1 | User Info element  | See Figure 9-64c |

|  |  |  |
| --- | --- | --- |
| Element ID | Length  | Optional Subelements |

Octets: 1 1 variable

Figure 9-64b System Info element format

The Element ID and Length fields are defined in 9.4.2.1.

Table 9-151—Optional subelement IDs for System Info

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 0 | Capability Information | See Figure 9-X1 |
| 1 | Supported Rates and BSS Membership Selectors | This field is not present if dot11DMGOptionImplemented is true. |
| 2 | Extended Supported Rates and BSS Membership Selectors  | The Extended Supported Rates and BSS Membership Selectors element is present if there are more than eight supported rates and is optionally present otherwise. This element is not present if dot11DMGOptionImplemented is true. |
| 3 | EDCA Parameter Set | The EDCA Parameter Set Element is present if dot11QosOptionImplemented is true; otherwise not present. |
| 4 | RCPI | The RCPI element is present if dot11RMRCPIMeasurementActivated is true. |
| 5 | RSNI | The RSNI element is present if dot11RMRSNIMeasurementActivated is true. |
| 6 | RM Enabled Capabilities | RM Enabled Capabilities element is present if dot11RadioMeasurementActivated is true. |
| 7 | Mobility Domain  | An MDE is present in an Association Response frame when dot11FastBSSTransitionActivated is true and this frame is a response to an Association Request frame that contained an MDE (i.e., an FT initial mobility domain association exchange).  |
| 8 | Fast BSS Transition | A Fast BSS Transition element (FTE) is present in an Association Response frame when dot11FastBSSTransitionActivated is true, dot11RSNAActivated is true, and this frame is a response to an Association Request frame that contained an MDE (i.e., an FT initial mobility domain association exchange in an RSN). |
| 9 | DSE registered location | The DSE Registered Location element is present if dot11LCIDSERequired is true. |
| 10 | Timeout Interval (Association Comeback time) | A Timeout Interval element (TIE) containing the Association Comeback time is present when dot11RSNAActivated is true, dot11RSNAProtectedManagementFramesActivated is true, and the association request is rejected with a status code REFUSED\_TEMPORARILY. |
| 11 | HT Capabilities | The HT Capabilities element is present when dot11HighThroughputOptionImplemented is true. |
| 12 | HT Operation | The HT Operation element is included by an AP when dot11HighThroughputOptionImplemented is true. |
| 13 | 20/40 BSS Coexistence  | The 20/40 BSS Coexistence element is optionally present when the dot112040BSSCoexistenceManagementSupport is true. |
| 14 | Overlapping BSS Scan Parameters | The Overlapping BSS Scan Parameters element is optionally present if dot11FortyMHzOptionImplemented is true. |
| 15 | Extended Capabilities | The Extended Capabilities element is present if any of the fields in this element are nonzero. |
| 16 | BSS Max Idle Period | The BSS Max Idle Period element is present if dot11WirelessManagementImplemented is true. |
| 17 | QoS Map  | The QoS Map element is present if dot11QosMapActivated is true and the QoS Map field in the Extended Capabilities element of the corresponding Association Request frame is 1. |
| 18 | QMF Policy | The QMF Policy element is present if dot11QMFActivated is true and the QMFActivated subfield is 1 in the Extended Capabilities element in the Association Request frame that elicited this Association Response frame. |
| 19 | Multi-band | The Multi-band element is optionally present if dot11MultibandImplemented is true. |
| 20 | DMG Capabilities | The DMG Capabilities element is present if dot11DMGOptionImplemented is true.  |
| 21 | DMG Operation | The DMG Operation element is present if dot11DMGOptionImplemented is true.  |
| 22 | Multiple MAC Sublayers | The Multiple MAC Sublayers element is present if dot11MultipleMACActivated is true. |
| 23 | Neighbor Report | One or more Neighbor Report elements is present if the Reason Code is REJECTED\_WITH\_SUGGESTED\_BSS\_TRANSITION. |
| 24 | VHT Capabilities | The VHT Capabilities element is present when the dot11VHTOptionImplemented is true. |
| 25 | VHT Operation | The VHT Operation element is present when the dot11VHTOptionImplemented is true; otherwise, it is not present. |
| 26 | Operating Mode Notification  |  The Operating Mode Notification element is optionally present if dot11OperatingModeNotificationImplemented is true. |
| 27 | Future Channel Guidance | The Future Channel Guidance element is optionally present if dot11FutureChannelGuidanceActivated is true. |
| 28 | Vendor Specific | One or more vendor-specific elements are optionally present. These elements follow all other elements. |
| .... |  |  |
| 55 | HE Capabilities | The HE Capabilities element is present when dot11HEOptionImple-mented is true; otherwise it is not present. |
| 56 | HE Operation | The HE Operation element is present when dot11HEOptionImplemented is true; otherwise it is not present. |
| 57 | BSS Color change Announcement | The BSS Color Change Announcement element is optionally present when dot11HEOptionImplemented is true; otherwise it is not present. |
| 58 | Spatial Reuse Parameter Set | The Spatial Reuse Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise it is not present. |
| 59 | MU EDCA Parameter Set | The MU EDCA Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |
| 60 | RAPS | The RAPS element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element ID | Length  | Status code | STA identifier | AID | Optional Subelements |

 Octets: 1 1 2 6 2  variable

Figure 9-64b user Info element format

The Element ID and Length fields are defined in 9.4.2.1.

The STA identifier field is set to the MAC address of an unassociated STA transmitting the association request frame.

The AID field contains a value assigned by the AP to the STA indicated in the STA identifier field during association.

Table 9-151—Optional subelement IDs for User Info

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 0 | TIM Broadcast Response  | The TIM Broadcast Response element is present if dot11TIMBroadcastActivated is true and the TIM Broadcast Request element is present in the Association request frame that elicited this Association Response frame. |
| 1 | TWT | The TWT element is present if dot11TWTOptionActivated is true and the TWT element is present in the Association Request frame that elicited this Association Response frame.The TWT element is optionally present if dot11TWTOptionActivated is true and the TWT Requester Support field in the HE Capabilities in the Association Request frame that elicited this Association Response frame is 1.Otherwise, the TWT element is not present. |

9.4.2 Elements

9.4.2.1 General

***TGax editor: add the paragraphs below as follows:***

Table 9-77 Element IDs

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Element ID | Element ID Extension | Extensible |
| System Info element | 255 | 43 | Yes |
| User Info element | 255 | 44 | Yes |

9.4.2.237 HE Capabilities element

9.4.2.237.2 HE MAC Capabilities Information field

***TGax editor: add the paragraphs below as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ... | QTP Support | BQR Support | SR Responder | NDP Feedback Report support | OPS Support | Broadcast Association Response Support | Reserved  |

Bits: 1 1 1 1 1 1 1

Figure 9-589ck—HE MAC Capabilities Information field format

Table 9-262z—Subfields of the HE MAC Capabilities Information field

|  |  |  |
| --- | --- | --- |
| Broadcast Association Response Support | Indicates support by a non-AP HE STA for receiving broadcast association response frame ;Indicates support by an HE AP for transmitting broadcast association response frame; | A STA sets the Broadcast Association Response Support to 1 when the dotBroadcastAssociationResponse-OptionImplemented is true. Otherwise the STA sets the Broadcast Association Response Support to 0. |

11.3.5Association, reassociation, and disassociation

***TGax editor: add the paragraphs below as follows:***

11.3.5.10 Broadcast association response

AP may send a broadcast association Response in an SU PPDU format to respond to association Request frames it has received from multiple STAs that set the Broadcast Association Response Support subfield in the HE capabilities to 1. An MU-BAR Trigger frame for scheduling UL acknowledgement can be transmitted to trigger the acknowledgement.