IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB 203 Comment Resolution for part of 9.49 | | | | |
| Date: 2014-09-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| George Cherian |  |  |  |  |
| Menzo Wentink |  |  |  |  |

Abstract

This submission proposes resolutions for comments in clause 9.49 of TGah Draft 2.0 with the following CIDs (TOT 11 CIDs):

* 3042, 3876, 4115, 3032, 3373, 3629, 3952, 3953, 3875, 4101, 3877

Revisions:

* Rev 0: initial version of the document

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGah Editor: Editing instructions preceded by “TGah Editor” are instructions to the TGah editor to modify existing material in the TGah draft. As a result of adopting the changes, the TGah editor will execute the instructions rather than copy them to the TGah Draft.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3042 | 304.24 | 9.49.1 | In Draft 1 we had 1-hop relay operation. In draft 2 we have 2-hop relay operation. Can we expect 3-hop relay operation in Draft 3? | This is beyond the scope of the PAR. It is unnecessary complexity. If mesh is important, ensure that .11s can be used in the .11ah STAs. | Revised -  The figure is an example with a single relay hop, so it seems better to remove the mention of a hop count. The proposed changes realize this.  Relay helps to achieve the PAR requirement of 1 km range. Relay extends a wireless link without wireless connections between APs and without mesh connections, which are the focus of 11s.  TGah editor to remove "two-hop" from the draft.  Note to the editor: this is an inline editing instruction. |
| 3876 | 303.46 | 9.49.1 | Can a Relay also have a local LLC? Is such an LLC a client of the Relay STA's MAC SAP, or the Relay AP's MAC SAP, or could there be an LLC interfacing to a MAC SAP for both? | A submission will be required. | Revised -  Referring to the LLC is probably not required, so it can be removed. The proposed changes realize this.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 3876. |
| 4115 | 303.40 | 9.49.1 | The function in which 11ah relay is allowing is a fronhaul relaying capability built in and coordinated within MAC layer, rather than an embedded backhaul relaying capability above LLC layer. Hence, an entity for fronthaul relaying above MAC SAP (MSAP) and below LLC is required in parallel to other bridging functions, specifically for a fronthaul (2hop) forwarding. | Change "A Relay is an entiry that logically consists of a relay AP and a relay-STA." to "A Relay is an entiry that logically consists of a relay AP, a relay-STA and a Fronthaul relaying entity below LLC." | Revised -  There are several possible ways to connect the Relay-AP and the Relay-STA-- by a relay function as suggested in the comment, or by a bridge, etc. Therefore it will be better if the standard does not limit this to a single method by referring to the LLC or to a fronthaul function. The reference to the LLC is removed as part of the proposed changes.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 4115. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3032 | 304.57 | 9.49.2 | "The STA shall transmit Relay Activation Response frame" -- what is the antecedent for this STA? | "The" -> "A" | Accepted  Note to the editor: this is an inline editing instruction. |
| 3373 | 304.35 | 9.49.2 | "Probe Activation Response frames"-->"Relay Activation Response frames". | As in comment | Accepted  Note to the editor: This is the same resolution for CIDs 4112, 4150 that are already included D2.1. |
| 3629 | 305.48 | 9.49.2 | Sending the complete list of reachbale MAC addresses (potentially hundreds of them) every time a MAC associates or disassociates seems extremely inefficient, with a potential to clog the celle with these update messages | Modify the update mechanism to add or remove the MAC address that changes, and keep the general updates to larger intervals | Rejected –  It is expected that the Reachable Address element is exchanged between STAs in large intervals of time as relay operation is expected to be setup between STAs that have relatively low mobility. However it is possible that these STAs can lose their internal state and as a consequence also the list of reachable addresses creating non-consistent tables. If sending the full list is still thought to be an issue please submit a contribution next LB. |
| 3952 | 304.27 | 9.49.2 | The subclause 9.46.2 specifies the procedures to enable / disable Relay function, which is used from SME. The contents of 9.46.2 shall be placed under clause 10 (MLME). Also, if Relay function is enabled / disabled after Relay-STA is associated to a Root-AP, it may be necessary to use Relay Activation Request / Response frame exchange to avoid service interruption. MLME SAP interfaces to use Relay Activation Request / Response frame exchange are necessary. | Insert a new subclause 10.50 (Relay operation) and move the contents of subclause 9.46.2 to a new subclause 10.50.1 Relay activation procedure. Also, insert a new subclause 6.3.116 (Relay operation) and specify MLME SAP interfaces to enable / disable Relay function. e.g. MLME-RELAYACTIVATE.request, MLME-RELAYACTIVATE.confirm, MLME-RELAYACTIVATE.indication, and MLME-RELAYACTIVATE.response. | Revised -  Agree to add the suggested MLME primitives.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 3952. |
| 3953 | 304.35 | 9.49.2 | Probe Activation Response frames are not exist. Relay Activation Response frames shall be used. | Replace "Probe Activation Response" by "Relay Activation Response". | Accepted  Note to the editor: This is the same resolution for CIDs 4112, 4150 that are already included D2.1. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3875 | 306.7 | 9.49.3 | This paragraph is very confusing. "MSDUs received from a local LLC sublayer at the MAC SAP of a Relay STA" seems like it must be describing an MSDU coming with an MA-UNITDATA.request. How could such an MSDU possibly be destined for the Relay STA (the LLC wouldn't pass such a frame down to the MAC for transmission). It seems this should be a discussion of Data frames received over-the-air at the Relay AP, and how the Relay AP decides to forward the frame to the Relay STA, or pass it up to the local LLC. Then, such frames forwarded to the Relay STA would be sent via the wireless medium to the associated AP. | A submission will be required. | Revised -  Referring to the LLC is probably not required in this location, so it can be removed. The proposed changes realize this.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 3875. |
| 4101 | 306.7 | 9.49.3 | A local LLC sublayer is not neccesarily involved for 11ah relay. | Chnage to "MSDUs received from relaying entity above MAC SAP of a relay-STA which are not destined for the relay-STA are forwarded via the WM to the AP....." | Revised -  Referring to the LLC is indeed not required in this location, so it can be removed. The proposed changes realize this.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 4101. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3877 | 306.57 | 9.49.4 | If group addressed frames are forwarded in both directions, how are group addressed 'relfection' problems and source entity mobility resolved? This is effectively the same challenges as 11ak is trying to address; how is the 11ah Relay function different from the 11ak bridging function? | A submission will be required. | Revised -  The intended behavior is that group packets travel as unicast to the Root AP and then go down the tree as group transmissions by the Root AP and the relay-APs. This is clarified by the proposed changes.  A rule that appeared to be missing but which was presented in 11-13/68r0 is that group addressed MSDUs received at a relay-AP shall not be forwarded to the WM as a broadcast transmission, but instead be forwarded to the relay-STA. This rule is added by the proposed changes.  TGah editor to make the changes shown in 11-14/1117r0 under all headings that include CID 3877. |

**TGah Editor: *Insert the following subclauses at the end of clause 6 (Layer management) (#3952):***

**6.3.116 Relay (de-)activation**

**6.3.116.1 General**

The following MLME primitives support the signaling of relay activation and deactivation procedure.

**6.3.116.2 MLME-RELAYACTIVATE.request**

**6.3.116.2.1 Function**

This primitive requests that a Relay Activation Request frame be sent to a peer entity.

**6.3.116.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-RELAYACTIVATE.request(

PeerSTAAddress,

RelayActivation

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC Address | Any valid individual MAC Address | Specifies the address of the peer MAC entity with which to perform the relay (de-)activation procedure. |
| RelayActivation | Relay Activation element | As defined in 8.4.2.170q (Relay Activation element) | Specifies the proposed service parameters for the Relay Activation Request. |

**6.3.116.2.2.1 When generated**

This primitive is generated by the SME to request that a Relay Activation Request frame be sent to the peer entity.

**6.3.116.2.2.2 Effect of receipt**

On receipt of this primitive, the MLME constructs a Relay Activation Request frame. The STA then attempts to transmit this to the peer entity.

**6.3.116.3 MLME-RELAYACTIVATE.confirm**

**6.3.116.3.1 Function**

This primitive reports the result of a relay (de-)activation request/response procedure.

**6.3.116.3.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-RELAYACTIVATE.confirm(

PeerMACAddress,

RelayActivation

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| Peer MAC Address | MAC Address | Any valid individual MAC Address | Specifies the address of the peer MAC entity with which to perform the relay (de-)activation request/response procedure. |
| RelayActivation | Relay Activation element | As defined in 8.4.2.170q (Relay Activation element) | Specifies service parameters for the Relay Activation Response. |

**6.3.116.3.3 When generated**

This primitive is generated by the MLME as a result of an MLME-RELAYACTIVATE.request and indicates the results of the request. This primitive is generated when the STA receives a Relay Activation Response frame from the peer entity.

**6.3.116.3.4 Effect of receipt**

On receipt of this primitive, the SME should operate according to the procedure in 9.42h (Relay operation).

**6.3.116.4 MLME-RELAYACTIVATE.indication**

**6.3.116.4.1 Function**

This primitive indicates that a Relay Activation Request frame was received from a peer entity.

**6.3.116.4.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-RELAYACTIVATE.indication(

PeerSTAAddress,

RelayActivation

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MACAddress | Any valid individual MAC Address | The address of the peer MAC entity from which a Relay Activation Request frame was received. |
| RelayActivation | Relay Activation element | As defined in 8.4.2.170q (Relay Activation element) | Specifies the proposed service parameters for Relay Activation Request. |

**6.3.116.4.3 When generated**

This primitive is generated by the MLME when a valid Relay Activation Request frame is received.

**6.3.116.4.4 Effect of receipt**

On receipt of this primitive, the SME should operate according to the procedure in 9.42h (Relay operation).

**6.3.116.5. MLME-RELAYACTIVATE.response**

**6.3.116.5.1 Function**

This primitive is generated in response to a received Relay Activation Request frame and requests the transmission of a Relay Activation Response frame.

**6.3.116.5.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-RELAYACTIVATE.response(

PeerSTAAddress,

RelayActivation

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MACAddress | Any valid individual MAC Address | The address of the non-AP STA MAC entity from which a Relay Activation Response frame was received. |
| RelayActivation | Relay Activation element | As defined in 8.4.2.170q (Relay Activation element) | Specifies service parameters for the Relay Activation Response. |

**6.3.116.5.3 When generated**

This primitive is generated by the SME to request that a Relay Activation Response frame be sent to a peer entity to convey relay activation information.

**6.3.116.5.4 Effect of receipt**

On receipt of this primitive, the MLME constructs a Relay Activation Response frame. The STA then attempts to transmit this to the peer entity indicated by the PeerSTAAddress parameter.

***TGah Editor: Make the following changes in section 9.49.3 (#3876, 3875, 4101):***

**9.49.3 Addressing and forwarding of individually addressed relay frames**

MSDUs at a relay-STA which are not destined for the relay-STA are forwarded via the WM to the AP to which it is associated, using either a 4-address frame format or an A-MSDU format.

The addressing of the 4-address frame shall be as follows in this case:

— Address 1 is the MAC address of the AP (the receiver of the MPDU)

— Address 2 is either the MAC address or the AID of the relay-STA (the transmitter of the MPDU)

— Address 3 is the DA of the MSDU (the destination address of the MSDU).

— Address 4 is the SA of the MSDU (the source address of the MSDU)

The addressing of the frame containing an A-MSDU shall be as follows in this case:

— Address 1 is the MAC address of the AP (the receiver of the MPDU)

— Address 2 is either the MAC address or the AID of the relay-STA (the transmitter of the MPDU)

— Address 3 is the MAC address of the AP (the BSSID)

• If the frame is a Short frame then Address 3 is not present

— DA in A-MSDU subframe header is the DA of the MSDU (the destination address of the MSDU)

— SA in A-MSDU subframe header is the SA of the MSDU (the source address of the MSDU)

MSDUs at an AP which are not destined for the AP or one of its associated non-AP STAs are forwarded via the WM to an appropriate relay-STA, using either a 4-address frame format or an A-MSDU format.

The addressing of a 4-address frame shall be as follows in this case:

— Address 1 is either the MAC address or the AID of the relay-STA (the receiver of the MPDU)

— Address 2 is the MAC address of the relay-AP (the transmitter of the MPDU)

— Address 3 is the DA of the MSDU (the destination address of the MSDU)

— Address 4 is the SA of the MSDU (the source address of the MSDU)

The addressing of a frame containing an A-MSDU shall be as follows in this case:

— Address 1 is either the MAC address or the AID of the relay-STA (the receiver of the MPDU)

— Address 2 is the MAC address of the relay-AP (the transmitter of the MPDU)

— Address 3 is the MAC address of the AP (the BSSID)

• If the frame is a Short frame then Address 3 is not present

— DA in A-MSDU subframe header is the DA of the MSDU (the destination address of the MSDU)

— SA in A-MSDU subframe header is the SA of the MSDU (the source address of the MSDU)

***TGah Editor: Make the following changes in section 9.49.5(#3876, 3877):***

**9.49.4 Addressing and forwarding of group addressed relay frames**

Group addressed MSDUs at a relay-STA are forwarded via the WM to the AP to which the relay-STA is associated, using either a 4-address frame format or an A-MSDU format.

The addressing of the 4-address frame shall be as follows in this case:

— Address 1 is the MAC address of its associated AP (the receiver of the MPDU)

— Address 2 is either the MAC address or the AID of the relay-STA (the transmitter of the MPDU)

— Address 3 is the DA of the MSDU (the group address).

— Address 4 is the SA of the MSDU (the source address of the group addressed MSDU)

The addressing of the frame containing an A-MSDU shall be as follows in this case:

— Address 1 is the MAC address of its associated AP (the receiver of the MPDU)

— Address 2 is either the MAC address or the AID of the relay-STA (the transmitter of the MPDU)

— Address 3 is the MAC address of its associated AP (the BSSID) and not present in a Short frame

— DA in A-MSDU subframe header is the DA of the MSDU (the group address)

— SA in A-MSDU subframe header is the SA of the MSDU (the source address of the group addressed MSDU)

Group addressed MSDUs at a Root AP or a relay-AP are forwarded via the WM using a 3-address frame format.

The addressing of a 3-address frame shall be as follows in this case:

— Address 1 is the DA of the MSDU (the group address)

— Address 2 is the MAC address of the AP (the BSSID)

— Address 3 is the SA of the MSDU (the source address of the group addressed MSDU)

Group addressed MSDUs received via the WM at a relay-AP shall not be forwarded to the WM as a broadcast transmission, but instead be forwarded to the relay-STA.

These rules ensure that group addressed MSDUs in a relay network first travel to the Root AP as a unicast transmission, after which they travel down the tree as group transmissions by the Root AP and the Relay-AP(s).