IEEE P802.11  
Wireless LANs

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| --- | --- | --- | --- | --- |
| LB 200 Comment Resolution for 9.48 | | | | |
| Date: 2014-05-12 | | | | |
| Author(s): | | | | |
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Abstract

This submission proposes resolutions for comments in clause 9.48 of TGah Draft 1.0 with the following CIDs:

1071, 1542, 1543, 1640, 1896, 2086, 2814, 2827, 1261, 2791, 2419, 2422, 2423, 1430, 1431, 1432, 1433, 1434, 2302

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** |
| 1071 | 205.11 | 9.48 | I don't believe that the security properties of a relay have been adequately considered.  In particular while an endpoint can enforce encryption on its link to the relay AP, it loses control of its data beyond that point. The relay AP might chose not to encrypt the data. | Describe an extension to RSNA policy wherein an endpoint STA can be assured that any data sent by it (or to it from the root AP) is encrypted on the second leg. | Reject:  Comment failed to identify a real issue.  Response to the commenter:  This is the same thing today, after AP, the link may or may not be secure. The end to end security should be done at the Application layer if needed. |
| 1542 | 205.10 | 9.48 | Relay Security needs to be clear, how does the security work from an STA connecting to the Relay | Clarify how the Relay security is being done | **Withdrawn by the commenter** |
| 1543 | 205.10 | 9.48 | Relay Operation is not flexible to be able to enabled/disabled by the Relay or its parent | Add a new Information element to handle enable/disbaleing the Relay Operation and add the required negotiation | Agree with the commenter. Proposed resolution is adopted.  Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1640 | 205.10 | 9.48 | The description of Relay operation needs a diagram showing the various roles. | Add a diagram to section 9.48 that shows the various roles, including Relay STA, Relay AP, non-AP STA etc. | Agree with the commenter. Proposed resolution is adopted.  Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1896 | 227.11 | 9.48 | The description in 4.12 line 30 onwards should be opening this Clause 9 description as the general introduction. Then the Relay AP, Relay STA and Root AP would make sense. | Move from P25 the text in 4.12 to be the opening description for Clause 9.48. Then in Clause 4.12 just have a general description as per previous comments. | Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 2086 | 227.60 | 9.48 | This mechanism seems to add frame exchanges to the cell, reducing useful airtime. It makes sense only if we define that relays do not relay management frames (association etc) from relay client STAs, and implement a mechanism to avoid that this list be transmitted every time a client gets disassociated (for example, send the list when a message for a disconnected client gets sent to the relay) | Add context as to when this feature may be needed, for example only when relay do not relay management frames. Also include an option to update this table only at configurable intervals, not every time a client joins or leaves the cell. | Reject:  Based on the text, it is clear that the management frames are not forwarded by the Relay since it specifically mentioned MSDUs. So I think there is no further indication for that. |
| 2814 | 205.10 | 9.48 | Relay Operation may need some clarification or explanation. | Add some diagrams, figures, text, etc. | Agree with the commenter in principal.  Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 2827 | 205.00 | 9.48 | Coordinaged transmission among Root AP BSS and Relay BSSes is necessary. Since Relays can extend physical coverage of the Root AP to the area where the Root AP could not reach originally, there will be more hidden node problems among Root AP, Relays and STAs associated with them. In order to prevent the hidden node problem within the extended BSS, Relay BSS operation has to be coordinated by Root AP. | Add coordinated transmission mechanism for Relay BSS in the draft. Details are TBD. | Reject:  Comment failed to identify a real issue. |

**Discussion:** *None.*

* **Relay operation**

**Instructions to TGah Editor: *add the following subcluase at the beginning of this claase :***

**9.48.1 General**

An example of a Relay function is illustrated in Figure 1: Relay Architecture, where Relay 1 and Relay 2 are Relays, both of which consisting of a Relay STA and a Relay AP, whose Relay STAs are associated with an AP that is a Root AP. STA 1 and STA 2 are non-AP STAs associated with the Relay AP of Relay 1. STA3 and STA4 are non-AP STAs associated with the Relay AP of Relay 2. Frames from STA 1 and STA 2 are forwarded via the Relay AP of Relay 1 to the Relay STA of Relay 1 and then to the Root AP. Similarly, frames from the Root AP are forwarded to STA 1 and to STA 2 via the Relay STA and the Relay AP of Relay 1.



Figure 1: Relay Architecture

**9.48.2 Relay Operation**

**Instructions to TGah Editor: *Change this subclause as follows :***

A non-AP STA with dot11RelaySTACapable set to true shall include the Relay Activation element in (Re-)Association Request and Probe Request frames.

A non-AP STA with dot11RelaySTACapable equal to true may include a Relay Activation element with Relay Activation Mode subfield equal to 1 in (Re-)Association Request , Probe Request, Relay Activation Request or Probe Activation Response frames. A non-AP STA with dot11RelaySTACapable equal to true may transmit a Relay Activation Request frame to the AP with which it is associated.

A non-AP STA shall not transmit a Relay Activation element that has the Enable Relay Function and the Request subfields equal to 1 if the most recently received Relay element from the AP to which it is associated had the No More Relay Indicator subfield equal to 1.

A non-AP STA with dot11RelaySTACapable equal to false shall not include the Relay Activation element in any frames that it transmits.

A non-AP STA transmitting a Relay Activation element shall set the Direction subfield of the element to 0. An AP transmitting Relay Activation element shall set the Direction subfield of the element to 1.

The AP that is the intended receiver of a frame that contains a Relay Activation element with Relay Activation Mode subfield equal to 1 shall respond with the appropriate frame (Probe, (Re-)Association, Relay Acttivation Response) that contains a Relay Activation element with Relay Activation Mode subfield equal to 0.

The STA shall transmit Relay Activation Response frame if it receives the corresponding Relay Activation element in a Relay Activation Request frame.

The STA that is the intended receiver of a frame that contains a Relay Activation element with Relay Activation Mode subfield equal to 1 and Enable Relay Function subfield equal to 0 shall respond with a frame that contains a Relay Activation element with Relay Activation Mode and Enable Relay Function subfields equal to 0.

A non-AP STA with dot11RelaySTACapable equal to true shall set dot11RelaySTAOperation to false unless:

1. It receives a Relay Activation element from the AP to which it is associated with Enable Relay Function subfield equal to 1 and Relay Activation Mode subfield equal to 0 as a response of a transmitted Relay Activation element with Enable Relay Function and Relay Activation Mode subfield equal to 1.
2. It transmits a Relay Activation element to the AP to which it is associated with Enable Relay Function subfield equal to 1 and Relay Activation Mode subfield equal to 0 as a response of a received Relay Activation element with Enable Relay Function and Relay Activation Mode subfield equal to 1.

Under which, it shall set dot11RelaySTAOperation to true.

An AP STA with dot11RelaySupport equal to true may include a Relay Activation element with Relay Activation Mode subfield equal to 0 in (Re-)Association Response, Probe Response , Relay Activation Request or Relay Activation Response frames.

The AP in a Relay shall set the dot11RelayAPOperation to true only if dot11RelaySTAOperation of the non-AP STA in the Relay is true, otherwise it shall set the dot11RelayAPOperation to false.

A Relay AP shall include a Relay element in transmitted Beacon, Short Probe Response and Probe Response frames.

A Relay AP shall set the No More Relay Flag subfield of a Relay element to 1 if the No More Relay Flag subfield of the latest Relay element received from its parent AP was set to 1. A Relay AP may set the No More Relay Flag subfield of the Relay element to 1 in order to limit the number of Relays in its associated STAs.

An AP with dot11RelaySupport set to true shall include the Relay element in its Beacon frames and may include the Relay element in its Probe Response, Short Probe Response and (Re-)Association Response frames.

A Root AP is defined as an AP with dot11RelaySupport set to true that sets the Hierarchy Identifier field of transmitted Relay elements to 0.

A Relay AP shall not set the Hierarchy Identifier field of transmitted Relay elements to 0.

In a Relay, the Relay AP shall use the same SSID as the AP to which the Relay STA is associated.

A Relay STA of a Relay shall send a Reachable Address Update element that contains the current list of reachable addresses to the AP to which it is associated when one of the following conditions occurs:

* A new non-AP STA associates with the Relay AP of the Relay
* A non-AP STA is disassociated or deauthenticated from the Relay AP of the Relay
* A Reachable Address Update frame is received at the Relay AP of the Relay

The Relay STA generating a Reachable Address element (under conditions 1 and 2 of above) shall set the Initiator MAC address field of the element to its MAC address. The Relay STA shall set the Add/ Remove subfield to 1 if the STA identified by the MAC Address subfield of Reachable Address field is associated to the Relay AP of the Relay and shall set the Add/ Remove subfield to 0 if the STA identified by the MAC Address subfield of Reachable Address field disassociate from the Relay AP of the Relay. The Relay STA shall set the Relay Capable subfield of the Reachable Address field of the Reachable Address element to 1 only if the STA identified by the MAC address subfield of the Reachable Address field has indicated that it is capable of Relay function, otherwise, it shall set it to 0.

The Relay STA that forwards the Reachable Address received at the Relay AP of the Relay shall not modify the element.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1261 | 206.01 | 9.48.1 | What is relayed is MSDUs. This is of critical importance because it means the relay entity sits above the MAC SAP. It means that reassembly, duplicate filtering, A-MSDU unpacking are done prior to relay. It means that TXOP sharing cannot be used to forward a partial MSDU, i.e. you can't start transmitting it on the 2nd hop until the whole MSDU has been received. It means that the forwarded MSDU is fragmented according to the settings at the second hop prior to transmission. | Change any description of relaying as relating to "frames" to "MSDUs". Including the following locations: 206.1, 206.50, 3.13, 3.18, 3.23, 3.33, 3.62.  Also consider adding the list of characteristics in the comment to the intro at 9.48. | Accept:  TGah Editor to make the changes as proposed by the CID 1092 |

**Discussion:** *None.*

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

**Instructions to TGah Editor: *Change this subclause as follows:***

MSDUs received from a local LLC sublayer at the MAC SAP of 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 anA-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 received from a local LLC sublayer at the MAC SAP of 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 theAP (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)

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2791 | 206.52 | 9.48.2 | 9.48.2 should include the ways to avoid Beacon collision and the collision of relayed Probe Request at Root AP. | Descibe the mitigation technique of Beacon Collision avoidance utilizing SST to allocate different sub-channel for each Relay station, which introduce an alternative sub-channel usage along with each hop of 2 hop Relay forwarding of group addressed frames. | Reject:  Comment failed to identify a real issue. |

**Discussion:** *None.*

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

**Instructions to TGah Editor: *Change this subclause as follows:***

Group addressed MSDUs received from a local LLC sublayer at the MAC SAP of a Relay STA are forwarded via the WM to an 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 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 received from a local LLC sublayer at the MAC SAP of an AP (including a Root AP and a Relay AP) are forwarded via the WM to an appropriate Relay STA and its associated non-AP STAs, 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)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2419 | 135.07 | 8.5.25 | Why are Relay Actions separate from S1G Actions? Ditto Flow Control Actions | Make Reachable Address Updates and the Flow Control Actions S1G Actions. Or if the point is the difference in Robustness, at least merge Relay and Flow Control Actions | Reject:  To enable potential use of Relay function and Flow Controls outside 802.11ah. |
| 2422 | 135.12 | 8.5.25.1 | The usual Action field blurb is missing | Add the usual blurb (see e.g. 8.5.24.1) | Reject:  The comment failed to identify a real issue.  Response to the commenter:  It is not clear what the blurb referred to. In the baseline there are many sub clauses defined similar to here, for example Revmc1.4: 8.6.17 (mesh Action) |
| 2423 | 136.01 | 8.5.25.2 | The reference to Reachable Address elements needs to be specific and should be more canonical | Something like "The RA field contains zero or more RA elements as specified in [...]." | Reject:  The Reachable address element is defined in 8.4.2.170p |

**Discussion:** *None.*

* Relay Action frame details

**Instructions to TGah Editor: *Change this subclause as follows:***

* Relay Action field

The Relay Action field values are specified in Relay Action field values.

|  |  |
| --- | --- |
| * Relay Action field values | |
| Relay Action field value | Description |
| 0 | Reachable Address Update |
| 1 | Relay Activation Request |
| 2 | Relay Activation Response |
| 3-255 | Reserved |

* Reachable Address Update frame format

The Reachable Address Update frame is used to update the addresses that can be reached through a Relay STA. The format of the Reachable Address Update frame Action field is shown in Reachable Address Update frame Action field format.

|  |  |
| --- | --- |
| * Reachable Address Update frame Action field format | |
| Order | Information |
| 1 | Category |
| 2 | Relay Action |
| 3 | Reachable Address element |

The Category field is 1 octet and is set to the value in Table 8-39 (Category values) for category Relay Action.

The Relay Action field is set to the value in Relay Action field values representing Reachable Address Update.

The one or more Reachable Address elements specify the addresses that can be reached through the Relay STA.

* + - 1. Relay Activation Request frame format

The Relay Activation Request frame is used by the STA or AP to Request start or terminate of a Relay function. The format of the Relay Activation Request frame Action field is shown in Table 1 (Relay Activation Request frame)

|  |  |
| --- | --- |
| Table 1: Relay Activation Request frame | |
| Order | Information |
| 1 | Category |
| 2 | Relay Action |
| 3 | Relay Activation element |

The Category field is 1 octet and is set to the value in Table 8-39 (Category values) for category Relay Action.

The Relay Action field is set to the value in 8-363I representing Relay Activation Request.

Relay Activation Mode subfield of Relay Activation element (as specified by 8.4.2.170q) including in Relay Activation Request frame is set to 1.

* + - 1. Relay Activation Response frame format

The Relay Activation Response frame is used by the STA or AP to confirm or reject of starting or terminating the Relay function. The format of the Relay Activation Response frame Action field is shown in Table 2 (Relay Activation Response frame)

|  |  |
| --- | --- |
| Table 2: Relay Activation Response frame | |
| Order | Information |
| 1 | Category |
| 2 | Relay Action |
| 3 | Relay Activation element |

The Category field is 1 octet and is set to the value in Table 8-39 (Category values) for category Relay Action.

The Relay Action field is set to the value in 8-363I representing Relay Activation Response.

Relay Activation Mode subfield of Relay Activation element (as specified by 8.4.2.170q) including in Relay Activation Response frame is set to 0.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1430 | 112.43 | 8.4.2.170o | a network may have a limit on the number of supporting Relays | Add a field to Relay Element "No More Relay is allowed" and when it sets by a STA, there cannot be any more Relay enabled or associated to that STA. | Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1431 | 113.18 | 8.4.2.170p | use of Reachable Address is not efficient enough, every time a STA leaves or join the network, all the Addresses should be sent to the parent node. | Add a "Add/Remove" field to the Reachable Address frame | Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1432 | 113.18 | 8.4.2.170p | Initiated Recahable Address MAC address may be required to be added in the Reachable Address frame for some of the features to work fine | Add the "initiator MAC Address" field to the Reachable Address Frame | Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1433 | 113.18 | 8.4.2.170p | A root AP may want to know what are the STAs operating as a Relay in the network. | Add a "Relay Indicator" bit for each MAC address in the Reachable Address frame to indicate if that STA is a Relay Capable STA | Revised:  TGah editor to make changes shown in 11-14-0642r2 |
| 1434 | 113.18 | 8.4.2.170p | Reachable Address maybe included in Probe Resuest and (RE)Association Request | Enable the Reachable Address IE to be included in Probe or (RE)Association Request | Accept:  TGah editor to include the Reachable Address in Probe Request and (Re)Association Request as indicated in the CID 1434 |
| 2302 | 113.25 | 8.4.2.170p | When a STA leaves a relay STA, it is diffcult for the relay STA to indicate the new reachable STAs. | Allow a relay STA to describe the STA(s) that leave it. | Revised:  Proposed resolution is the same as CID 1431. |

**Discussion:** *None.*

* Relay element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Element ID | Length | Relay Control | RootAP BSSID |
| Octets: | 1 | 1 | 1 | 0 or 6 |
| * Relay element format | | | | |

The format of Relay Control is shown in Figure 2: Relay Control field format.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | |
|  | Hierarchy Identifier | No More Relay Flag | |
| Bits: | 7 | 1 | |
| Figure 2: Relay Control field format | | | | | |

The Relay element contains parameters necessary to support the Relay operation.

The Hierarchy Identifier subfield indicates whether the AP is a Root AP or whether it relays an SSID, as specified in Hierarchy Identifier subfield.

|  |  |
| --- | --- |
| * Hierarchy Identifier subfield | |
| Hierarchy Identifier | **Meaning** |
| 0 | Root AP |
| 1 | Relayed SSID |
| 2-127 | Reserved |

If No More Relay Indicator subfield is set to 1, it indicates if the BSS does not allow any new Relay function.

The RootAP BSSID field indicates the BSSID of the root AP. The RootAP BSSID field is present if the Hierarchy Identifier subfield is sets to a non zero value. Otherwise the RootAP BSSID field is not present.

* Reachable Address element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  |  |  |  |  |  |  |
|  | Element  ID | | Length | Initiator MAC Address | Address Count  Field | Reachable Addresse 1 | Reachable Address 2 | … | Reachable Address n |
| Octets: | 1 | | 1 | 6 | 1 | 7 | 7 |  | 7 |
|  | | Reachable Address element format | | | | | | | |

Initiator MAC address indicates the MAC address of the Relay STA that initiates the Reachable Address element.

Address Count field is an integer representing the number of addresses in the Reachable Addresses field.

The format of Reachable Address field is shown in **Figure 3: Reachable Addresses field format**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Add / Remove | Relay Capable | Reserved | MAC Address |
| Bits: | 1 | 1 | 6 | 48 |
| **Figure 3: Reachable Addresses field format** | | | | |

Add / Remove subfield is set to 1 if the MAC address is the Address of a new STA joining the Relay.

Add / Remove subfield is set to 0 if the MAC address is the Address of a STA leaving the Relay.

Relay Capable subfield is set to 1 if the STA is Relay Capable, otherwise it is set to 0.

MAC Address subfield is set to the MAC address of the STA that joins or leaves the BSS.

*TGah editor to insert the following sub-clause after Reachable Address element:*

**8.4.2.170q Relay Activation element**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Element  ID | Length | Relay Function | |
| Octets: | 1 | 1 | 1 | |
| Figure : Relay Activation element format | | | | |

The format of Relay Function field is shown in Figure 5 (Relay Activation element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 -B7 |
|  | Relay Activation Mode | Direction | Enable Relay Function | Reserved |
| Bits: | 1 | 1 | 1 | 5 |
| Figure : Relay Activation element format | | | | |

The Relay Activation Mode subfield is set to 1 to indicate that this element is a Relay Activation Request. The Relay Activation Mode subfield is set to 0 to indicate the Relay Activation Response.

The Direction subfield is set to 1 if the Relay Activation element is sent by the AP. The Direction subfield is set to 0 if the Relay Activation is sent by the STA.

The Enable Relay Function subfield is set to a value based Direction and Relay Activation Subfield as described in Table 3 (Enable Relay Function subfield values).

|  |  |  |
| --- | --- | --- |
| **Table 3: Enable Relay Function subfield values** | | |
|  | Relay Activation Mode=1 (Request) | Relay Activation Mode=0 (Response) |
| Direction =1  (from AP) | If the Enable Relay Function subfield is set to 1, it indicates that the STA can operate as a Relay and if it is set to 0 it indicates AP demands the STA to terminate the Relay function. | If the Enable Relay Function subfield is set to 1, it indicates that the STA is allowed to operate as a Relay and if it is set to 0, it indicates the STA cannot operate as a Relay. |
| Direction =0  (from STA) | If the Enable Relay Function subfield is set to 1, it indicates that the STA desires to activate its Relay function and if it is set to 0, it indicates that the STA desires to terminate its Relay function. | If the Enable Relay Function subfield is set to 1, it indicates that the STA activates its Relay function and if it is set to 0, it indicates that the STA terminates its Relay function. |

Bits 3-7 of the Relay Activation element are reserved.

*TGah Editor to add the following as a new row to the Tabel 8-55 (Element IDs):*

|  |  |  |
| --- | --- | --- |
| Relay Activation | <ANA> | Yes |

*TGah editor to add the following row to the Tables* ***8-29 to 8-34***

|  |  |  |
| --- | --- | --- |
| Xx | Relay Activation element | The Relay Activation element is optionally present if dot11RelaySTACapable is true. |

***TGah editor to include the “RelayActivation” and the following row in the corresponding tables in the following subclauses:***

* ***6.3.3.2 MLME-SCAN.request***
* ***6.3.3.3 MLME-SCAN.confirm***
* ***6.3.7.2 MLME-ASSOCIATE.request***
* ***6.3.7.3 MLME-ASSOCIATE.confirm***
* ***6.3.7.4 MLME-ASSOCIATE.indication***
* ***6.3.7.5 MLME-ASSOCIATE.response***
* ***6.3.8.2 MLME-REASSOCIATE.request***
* ***6.3.8.3 MLME-REASSOCIATE.confirm***
* ***6.3.8.4 MLME-REASSOCIATE.indication***
* ***6.3.8.5 MLME-REASSOCIATE.response***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| RelayActivation | Relay Activation Element | As defined in **8.4.2.170q** | Indicates if the STA wants to start working as a Relay (in request) or if the AP asks or deny Relay operation (in response) |

***TGah editor to include the “RelayActivation” and the following row in the corresponding tables in the following subclauses:***

* ***6.3.7.5 MLME-ASSOCIATE.response***
* ***6.3.8.5 MLME-REASSOCIATE.response***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Relay | Relay Element | As defined in 8.4.2.170n | Indicates the support of the Relay Operation by the STA transmitting the IE. |

***TGah editor to modify the following rows of the Table of the subclause 6.3.3.3.2 (Semantics of the service primitive) as the following***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** | **IBSS Adoption** |
| Relay | As defined in frame format | As defined in 8.4.2.170n (Relay element) | The Relay element is present in the S1G Beacon(#2519) only if dot11RelayAPOperation or if dot11RelaySupport is true. The Relay element is optionally presents in (short) Probe Response if dot11Relay-Support is true. More description is provided in 9.49 (Relay operation). | Do not adopt |
| Relay Activation | As defined in frame format | As defined in 8.4.2.170q (RelayActivation element) | The Relay Activation element is present in the Probe Request if dot11RelaySTACapable is true. The Relay element is optionally presents in (short) Probe Response if dot11Relay-Support is true. More description is provided in 9.49 (Relay operation). |  |

***TGah Editor to modify the Annex C shown in doc number 518r1 with the following:***

dot11RelaySupport OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station is capable of accepting a Relay to associate to it. The capability is disabled, otherwise."

DEFVAL { false }

::= { dot11S1GStationConfigEntry 32 }

dot11RelayAPOperation OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity or the SME.

Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates that the Relay AP operation is enabled. The Relay AP operation is disabled otherwise."

DEFVAL { false }

::= { dot11S1GStationConfigEntry 33 }

dot11RelaySTACapable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is a Relay STA inside a Relay This should not be modified during the life of the STA"

DEFVAL { true }

::= { dot11S1GStationConfigEntry 34 }

dot11RelaySTAOperation OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity or the SME.

Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates that the Relay STA operation is enabled. This attribute can be modified during the life of the STA in the BSS by sending Relay Activation element. The Relay STA operation is disabled otherwise."

DEFVAL { false }

::= { dot11S1GStationConfigEntry 35 }