IEEE P802.11
Wireless LANs

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| TGah D0.1 Comment Resolutions on MAC |
| Date: 2013-07-12 |
| Author(s): |
| Name | Affiliation | Address | Phone | Email |
| Bo Sun | ZTE Corporation | ZTE Building, No.9 Wuxingduan, Xifeng Rd., Xi’an, China | +86-29-687009411837 | Sun.bo1@zte.com.cn |
| Yonggang Fang | ZTE TX |  |  | yfang@ztetx.com |

Abstract: **MAC Comment Resolution for CID 163, Clauses 8.4.2.170s**

##### CIDs for Clause 24.1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 163 | Bo Sun | 8.4.2.170s | 97.31 | Detailed function description of Relay Discovery IE has been accepted in the spec framework. Corresponding text should be provided for the spec draft. | Specify the detailed design of Relay Discovery IE as the spec framework described. | **Revise**Modify the specification to include the detailed relay discovery information element as proposed in this document. |
|  |  |  |  |  |  |  |

**Discussion**: Note, the Relay Discovery IE description was covered in sub-clause 8.4.2.170s Relay Discovery element in 11ah spec draft D0.1, while is moved to sub-clause 8.4.2.170r Relay Discovery element in 11ah spec draft D0.2.

*TGah Editor: Please modify the row at ln20/pg39 of Table 8-30—Probe Request frame body in sub-clause 8.3.3.9 Probe Request frame format in 11ah spec draft D0.1 as following:*

|  |  |  |
| --- | --- | --- |
| TBD | Relay Discovery | The Relay Discovery element is optionally present if ~~TBD~~ dot11RelayDiscoveryOptionImplemented is true |

*TGah Editor: Please modify the row at ln9/pg40 of Table 8-31—Probe Response frame body in sub-clause 8.3.3.10 Probe Response frame format in 11ah spec draft D0.1 as following:*

|  |  |  |
| --- | --- | --- |
| TBD | Relay Discovery | The Relay Discovery element is optionally present if ~~TBD~~ dot11RelayDiscoveryOptionImplemented is true |

*TGah Editor: Please replace the text in 8.4.2.170s Relay Discovery element in 11ah spec draft D0.1 with following text:*

The format of Relay Discovery element is shown in Figure 8-xxxa (Relay Discovery element format).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Relay Discovery Info | UL Min Data Rate | UL Mean Data Rate | UL Max Data Rate | DL Min Data Rate | DL Mean Data Rate | DL Max Data Rate | Delay Bound Requirement/ Channel Utilization | Min PHY Rate Requirement/ Relay Station Count |
| Octets | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 or 1 | 0 or 1 |

**Figure 8-xxxa Relay Discovery element format**

The Element ID field is set to the value for Relay Discovery element defined in Table 8-55 (Element Ids).

The Length field is one octet in length and specifies the length of the Relay Discovery element in octets.

The Relay Discovery Info field is one octet in length. The Relay Discovery Info field contains information indicating whether some or all following fields are included in the Relay Discovery IE. The structure of Relay Discovery Info field is shown in Figure 8-xxxb (Relay Discovery Info field format).

The UL Min Data Rate field is one octet in length. When UL Min Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the UL minimum data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When UL Min Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the UL minimum data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The UL Mean Data Rate field is one octet in length. When UL Mean Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the UL mean data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When UL Mean Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the UL mean data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The UL Max Data Rate field is one octet in length. When UL Max Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the UL maximum data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When UL Max Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the UL maximum data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The DL Min Data Rate field is one octet in length. When DL Min Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the DL minimum data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When DL Min Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the DL minimum data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The DL Mean Data Rate field is one octet in length. When DL Mean Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the DL mean data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When DL Mean Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the DL mean data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The DL Max Data Rate field is one octet in length. When DL Max Data Rate field is included in a Relay Discovery element in a Probe Request frame, it indicates the DL maximum data rate of the direct link between the non-AP STA and AP in the unit of 100kbps. When DL Max Data Rate field is included in a Relay Discovery element in a Probe Response or Beacon frame, it indicates the DL maximum data rate of the relay link between the Relay and its associated AP in the unit of 100kbps.

The Delay Bound Requirement/Channel Utilization field is zero or one octet in length and is an optional field. When included in the Relay Discovery element of a Probe Request frame and the Delay and Rate Requirement Included field in the Relay Discovery Info field of the Relay Discovery element set to 1, the Delay Bound Requirement/Channel Utilization field indicates the delay bound requirement of the connection through the Relay. When included in the Relay Discovery element that is included in a a Probe Response or a Beacon frame and the Utilization and Count Included field in the Relay Discovery Info field of the Relay Discovery element set to 1, the Delay Bound Requirement/Channel Utilization field denotes the ratio of time that relay observes the busy level on the relay link between the Relay and AP, with value “100” indicating 100% busy level and value “0” indicating idle (value “101” to “255” are reserved).

The Min PHY Rate Requirement/Relay Station Count field is zero or one octet in length and is an optional field. When included in the Relay Discovery element of a Probe Request frame and the Delay and Rate Requirement Included field in the Relay Discovery Info field of the Relay Discovery element set to 1, the Min PHY Rate Requirement/Relay Station Count field indicates the minimum PHY data rate set required by the requesting STA. When included in the Relay Discovery element of a Probe Response or a Beacon frame and the Utilization and Count Included field in the Relay Discovery Info field of the Relay Discovery element set to 1, the Min PHY Rate Requirement/Relay Station Count field denotes the number of non-AP STAs currently associated with the Relay.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Relay Station Indication | Min Data Rate Included | Mean Data Rate Included | Max Data Rate Included | Delay and Rate Requirement Included/ Utilization and Count Included | Information Not Available | Optional Information Not Available | Reserved |
| Bits | B0 | B1 | B2 | B3 | B4 | B5 | B6  | B7 |

**Figure 8-xxxb Relay Discovery Info field format**

The Relay Station Indication field in Figure 8-xxxb is set to 1 if the Relay Station Indication field is included in a Relay Discovery element transmitted by a Relay. Otherwise, the Relay Station Indication field is set to 0.

The Min Data Rate Included field is set to 1 if UL Min Data Rate field and DL Min Data Rate field are included in the Relay Discovery element. Otherwise, the Min Data Rate Included field is set to 0.

The Mean Data Rate Included field is set to 1 if UL Mean Data Rate field and DL Mean Data Rate field are included in the Relay Discovery element. Otherwise, the Mean Data Rate Included field is set to 0.

The Max Data Rate Included field is set to 1 if UL Max Data Rate field and DL Max Data Rate field are included in the Relay Discovery element. Otherwise, the Max Data Rate Included field is set to 0.

The Delay and Rate Requirement Included/Utilization and Count Included field is set to 1 if Delay Bound Requirement/Channel Utilization field and Min PHY Rate Requirement/Relay Station Count field are included in the Relay Discovery element. Otherwise, the Delay and Rate Requirement Included/Utilization and Count Included field is set to 0.

The Information Not Available field is set to 1 if the relay cannot provide the requested information in the fixed fields of Relay Discovery element. Otherwise, the Information Not Available field is set to 0.

The Optional Info Not Available field is set to 1 if the relay cannot provide the requested information in the optional fields. Otherwise, the Optional Info Not Available field is set to 0.

*TGah Editor: Please modify sub-clause 9.32n.3.4 Relay discovery procedure in 11ah spec draft D0.1 as following:*

**9.32n.3.4 Relay discovery procedure**

A single-hop direct ~~path~~link is a one-hop ~~path~~link between a non-AP STA performing an active scan for R~~r~~elays ~~STAs~~, and the root AP.

A relay ~~path~~link is a two-hop ~~path~~link between a non-AP STA performing an active scan for R~~r~~elays ~~STAs~~, and the root AP through the R~~r~~elay ~~STA~~.

A non-AP STA that performs active scanning ~~shall~~may use the Probe Request frame with~~for~~ R~~r~~elay ~~STA~~ D~~d~~iscovery element when Relay discovery procedure is implemented. ~~The Probe Request frame may optionally include~~ A non-AP STA with dot11RelayDiscoveryOptionImplemented set to true may transmit a Probe Request frame including a Relay Discovery element with link budget information for the single-hop ~~path~~link and additional QoS requirements for the relay ~~path~~link. This information shall be conveyed using the Relay Discovery element as defined in sub-clause 8.4.2.170r (Relay Discovery element) if present. The formula for calculating link budget and QoS requirements are implementation specific.

~~The contents of link budget information and QoS requirement fields in the Relay Discovery element are TBD.~~

A R~~r~~elay ~~STA~~ with dot11RelayDiscoveryOptionImplemented set to true that receiv~~ing~~s a Probe Request frame becomes eligible to be a R~~r~~elay ~~STA~~ for this non-AP STA if the link budget and QoS requirements are met and the SSID matches. If these requirements are met, a R~~r~~elay ~~STA~~ may respond to the non-AP STA with a Probe Response frame as ~~and offer to be~~ a R~~r~~elay ~~STA~~ candidate for this non-AP STA. A R~~r~~elay ~~STA~~ may optionally include link budget information between the R~~r~~elay ~~STA~~ and its associated AP in a Probe Response frame or a Beacon frame. The principle for this operation is to reduce the number of Probe Responses sent from R~~r~~elay ~~STA~~s.

~~Based on the number of~~ When multiple Probe Responses received, the non-AP STA selects a designated R~~r~~elay ~~STA~~ among the R~~r~~elay ~~STA~~ candidates.