IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CR for 6GHz – Active Scanning Part I | | | | |
| Date: 2019-01-14 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Jarkko Kneckt | Apple | Cupertino, CA |  | jkneckt@apple.co |
| Guoqing Li | Apple |  |  |  |
| Chris Hartman | Apple |  |  |  |

Abstract

This document provides CR for CIDs 15121, 15825, 15651.

R1: Added to 11.1.4.3.2 Scanning behavior for non-AP STA a condition to set SSID to wildcard at 6 GHz band.

R2: Modified the rule g) and m) of the clause 11.1.4.3.4

1. **Introduction**

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 TGax Draft. The introduction and the explanation of the proposed changes are not part of the adopted material.

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 15121 | 27.16.1 | 369 | Spec needs to provide rules on how a non-AP STA discovers and associates with a 6GHz BSS. Need details on how 6GHz BSS presence and configuration is advertised in 5/2.4G | As in comment | Revised – agree with the commenter. Apply the changes as proposed in doc 19/61r2. |
| 15825 | 27 | 253 | 802.11ax now enables support for 6GHz band. Most devices will soon become tri-band devices. The discovery of APs and corresponding scanning time will increase and impact overhead in the channel and power/time consumption on STAs side. Full discovery of 6GHz APs should be enabled by simply scanning 2.4 and 5GHz bands only as today. This can simply be achieved by defining a multi-band collocated device that has multiple APs in different bands, and by imposing rules so that a discovery message (neighbor report, multiband element) is included in the 2.4 and 5GHz APs to describe the collocated AP at 6GHz | Define a Multiband collocated AP, that is part of a Multiband collocated device. And define rules to enable full discovery at 2.4 and 5GHz of collocated 6GHz APs. | Revised – agree with the commenter. Apply the changes as proposed in doc 19/61r2. |
| 15651 |  |  | 6GHz AP Discovery: Add the ability for a STA operating in 2.4/5GHz BSS to discover a 6GHz HE AP. | As in the comment | Revised –  Agree in principle with the comment. Proposed resolution is to include RNR in 2.4/5GHz beacons and probes.  TGax editor to make the changes shown in 19/61r2. |

1. Discussion

**Objectives of this contribution**

802.11ax voted to extend the scope of the project to operation up to 7.125GHz, in order to enable 802.11ax operation in the 6GHz band, which spans from 5935MHz to 7125MHz.

The Short SSID, a four octets long hash sum of the 1 – 31 octets long SSID is currently used in the Reduced Neighbor Report (RNR) elements to indicate the known BSSs. The Short SSID should be used also in Probe Requests to allow a STA to clarify the full SSID and to shorten the Probe Request frames.

A scanning STA should include the (Short) SSIDs of the BSSs that it desires to discover in the Probe Request frames it transmits. This allows APs to know the SSIDs which a STA is looking for. The scanning rules should mandate at least one co-located AP in 2.4 or 5 GHz band to provide information of co-located BSS that has its BSSID or (Short) SSID matching to the BSSID or (Short) SSID in the Probe Request by including an RNR element in the response.

3- **Proposed changes**

**TGax Editor: *Add the following item before the Vendor Specific element to the MLME primitive and to the following table without caption.***

**6.3.3.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-SCAN.request(

Short SSID List

VendorSpecificInfo  
)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Short SSID List | A set of Short SSID Element | As described in 9.4.2.XXX(Short SSID List element) | One or more Short SSID elements that are optionally present when dot11ShortSSIDListImplemented is true *(#15651, 15832, 15023)* |

**9.3.3.10 Probe Request frame format**

**TGax Editor: *Add the following items before the Vendor Specific element to the Table 9–40.***

**Table 9-40—Probe Request frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| 32 | Short SSID List | The Short SSID List is optionally present, if the dot11ShortSSIDListActivated is true. *(#15651, 15832, 15023)* |

**9.4.2.XXX Short SSID List element** *(#15651, 15832, 15023)*

**TGax Editor: *Add the following new clause to the 9.4.2 and renumber the clause and Figure accordingly.***

The format of the Short SSID List Element is shown in Figure 9 –XXX (Short SSID List element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | One or more Short SSID Elements |
|  | Element Id | Length | Element Id Extension | Short SSID Elements |
| Octets: | 1 | 1 | 1 | variable |

**Figure 9-XXX–Short SSID List element format**

The Short SSID Elements field contains the one or more Short SSID fields for which the STA is requesting information. The Short SSID List element is included in Probe Request frames, as descriebd in 9.3.3.10 (Probe Request frame format). The use of the Short SSID List element and frames is described in 11.1.4.3.2(Scanning behavior for non-AP STA). The Short SSID field is defined in 9.4.2.170.3 (Calculating the Short SSID).

**TGax Editor: Change the subclause as shown with track changes below*:***

**11.1.4.3.2 Scanning behavior for non-AP STA**

Send a probe request to the broadcast destination address. The probe request is sent with the SSID and BSSID from the received MLME-SCAN.request primitive. When the SSID List and/or Short SSID List is present in the MLME-SCAN.request primitive, send one or more Probe Request frames, each with one or more SSIDs indicated in the SSID List and/or Short SSID List, and the BSSID from the MLME-SCAN.request primitive(11ai). *(#15651, 15832, 15023)*

In the 6 GHz band, a STA shall not transmit a Probe Request frame to the broadcast destination address with the Address 3 field set to the wildcard BSSID and the SSID field set to the wildcard SSID, unless the Short SSID list is present with at least one Short SSID Element.

**TGax Editor: Modify step 3) of step g), and add the steps 4) to the step g) as shown below:**

**11.1.4.3.4 Criteria for sending a response**

g) The STA is not a mesh STA and none of the following criteria are met:

1)  The SSID in the Probe Request frame is the wildcard SSID and the Probe Request frame is not received at 6 GHz band. *(#15651, 15832, 15023)*

2)  The SSID in the Probe Request frame matches the SSID of the STA’s.

3)  The dot11SSIDListImplemented is true, the SSID List element is present in the Probe Request frame and includes the SSID of the STA’s BSS. *(#15651, 15832, 15023)*

4) The STA has dot11ShortSSIDListImplemented set to true, the Short SSID List element is present in the Probe Request frame and includes the Short SSID corresponding to the SSID of the STA's BSS. *(#15651, 15832, 15023)*

**TGax Editor: add the step m) and the following paragraph as shown below:**

m) The STA has dot11MultibandImplemented set to true and the STA is an AP STA and none of the following criteria are met:

1. The Address 3 field (BSSID) of the Probe Request frame does matches to the BSSID of the co-located BSS.
2. The SSID in the Probe Request frame matches the SSID of the co-located BSS.
3. The dot11SSIDListImplemented is true, the SSID List element is present in the Probe Request frame and includes the SSID of the co-located BSS.
4. The dot11ShortSSIDListImplemented is true, the Short SSID List element is present in the Probe Request frame and includes the Short SSID corresponding to the SSID of the co-located BSS. *(#15651, 15832, 15023)*

**TGax Editor: Add the following paragraph after the last criterion m) as shown below:**

If only the criteria m) are met and the AP desires the co-located BSS band to be discoverable, then at least one co-located AP at 2.4 or 5 GHz band shall transmit a Probe Response including an RNR element with the BSSID and the Short SSID of the co-located BSS in 6 GHz band. An AP may transmit a Probe Response containing an RNR element with the BSSID and the Short SSID of the co-located BSS that met the criteria m).*(#15651, 15832, 15023)*

**TGax Editor: include the following sentence to the beginning of the clause as shown below:**

27.16.1a.1 Scanning in the 6 GHz band

An AP operating in the 6 GHz band and APs co-located with an AP in the 6 GHz band shall set dot11ShortSSIDListImplemented to true. *(#15651, 15832, 15023)*

**ASN.1 encoding of the MAC and PHY MIB**

**C.3 MIB Detail**

**TGax Editor: Append the following new row to the list:**

dot11AutonomousBSSColorInUseReportingImplemented TruthValue,

dot11ShortSSIDListImplemented TruthValue. *(#15651, 15832, 15023)*

**TGax Editor: Append the following new paragraph after the item 26:**

dot11ShortSSIDListImplemented OBJECT-TYPE *(#15651, 15832, 15023)*

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 STA implementation is

capable of transmitting and receiving Short SSID List element in Probe Request

frames. The capability is disabled otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 27}