IEEE P802.11
Wireless LANs

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| CR for 6GHz – Active Scanning Part I |
| Date: 2019-01-14 |
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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

R3: Clarified the wildcard SSID handling for g)

R4: Changed Short SSID element to Short SSID field. Clarified the clause 11.1.4.3.4. Added limitation for the number of SSIDs and Short SSIDs.

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 19/61r4. |
| 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 19/61r4. |
| 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 19/61r4. |

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 fields | As described in 9.4.2.XXX(Short SSID List element) | One or more Short SSID fields that are optionally present when dot11ShortSSIDListImplemented is true. *(#15651, 15832, 15023)* |

**9.4.2.1 General**

**TGax Editor: *Include the Short SSID List to the Table 9-95 above the Reserved Element.***

**Table 9-95—Element IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Element ID | Element ID Extension | Extensible | **Fragmentable** |
| Short SSID List(see 9.4.2XXX(Short SSID List element)) *(#15651, 15832, 15023)* | 255 | ANA | Yes | No |
| Reserved | 255 | 56 - 255 |  |  |

**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 dot11ShortSSIDListImplemented is true. Not present otherwise. *(#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).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element Id | Length | Element Id Extension | Short SSID List |
| Octets: | 1 | 1 | 1 | variable |

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

The Element Id, Length and the Element Id Extension are defined in 9.4.2.1 (General).

The Short SSID List field contains the one or more four octets long Short SSID fields for which the STA is requesting information. The Short SSID List element is included in Probe Request frames, as described 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)*

**TGax Editor: Modify 1) and 3) of criteria g), and add the 4) and 5) to the criteria 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: *(#15651, 15832, 15023)*

1)  The SSID in the Probe Request frame is the wildcard SSID

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

2a) The dot11ColocatedRNRImplemented is true, the SSID in the Probe Request frame matches the SSID of an AP that is co-located with the STA and the AP is reported by the STA in a Reduced Neighbor Report element in Beacons and broadcast addressed Probe Responses according to the rules defined in 27.16.1a.1 (Out of band discovery of 6 GHz BSS).

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.

3a)The dot11ColocatedRNRImplemented is true, the dot11SSIDListImplemented is true, the SSID List element is present in the Probe Request frame and includes the SSID corresponding to an AP that is co-located with the STA and the AP is reported by the STA in a Reduced Neighbor Report element in Beacons and broadcast addressed Probe Responses according to the rules defined in 27.16.1a.1 (Out of band discovery of 6 GHz 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 STA's BSS.

4a) The dot11ColocatedRNRImplemented is true, 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 an AP that is co-located with the STA and the AP is reported by the STA in a Reduced Neighbor Report element in Beacons and broadcast addressed Probe Responses according to the rules defined in 27.16.1a.1 (Out of band discovery of 6 GHz BSS).

27.16.1a.1 Scanning in the 6 GHz band

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

An AP operating in the 6 GHz band and APs co-located with an AP in the 6 GHz band, that have dot11RNRImplemented set to true, shall set dot11ShortSSIDListImplemented to true. *(#15651, 15832, 15023)*

In 6 GHz band, a STA shall include no more than one Short SSID and SSID to a Probe Request frame it transmits.

NOTE – In bands, other than 6 GHz, the number of Short SSIDs and SSIDs in a Probe Request frame is not limited. *(#15651, 15832, 15023)*

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

**C.3 MIB Detail**

**TGax Editor: Append the following two rows to the list:**

dot11AutonomousBSSColorInUseReportingImplemented TruthValue,

dot11ShortSSIDListImplemented TruthValue,

dot11ColocatedRNRImplemented TruthValue. *(#15651, 15832, 15023)*

**TGax Editor: Append the following two paragraphs 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}

dot11ColocatedRNRImplemented 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 Reduced Neighbor List element

 including co-located BSSs information in 6 GHz band

 in Probe Response, Beacon and FILS Discovery frames. The capability is

 disabled otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 28}