IEEE P802.11
Wireless LANs

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| Fix inconsistencies in 11.1.3.8 (Multiple BSSID Procedure) |
| Date: May 1, 2018 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Po-Kai Haung | Intel |  |  |  |
| Jouni Malinen | Qualcomm Inc. |  |  | jouni@qca.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |
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Abstract

Since support multiple BSSID is mandatory for non-AP HE STAs, it is critical that TGax fixes inconsistencies found in section 11.1.3.8.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revised based on offline feedback
* Rev 2: Further revision based on offline discussion
* Rev 3: Added DMG Beacon case to the sentence that defines what ‘an element specific to a BSS’ means
* Rev 4: Some more updates
	+ Updated discussion #6 – the Probe Response case is handled in the last sentence of the previous paragraph.
	+ Added (s) for Multiple BSSID element in the following sentence since the profile may span more than one element:
		- “When a nontransmitted BSSID profile is present in the Multiple BSSID element(s) of the Beacon frame or Probe Response frame, the AP or PCP shall include all elements that are specific to this BSS.”

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. This introduction is 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.***

**The following discussion topics apply to section 11.1.3.8 (802.11-2016 Page 1588)**

**Discussion #1:**

There is ambiguity on whether the term mandatory (or optional) element refer to the elements in a Beacon frame or the nontransmitted BSSID profile carried in the Multiple BSSID element. In addition, it is not clear as to which elements are required to be present (i.e., mandatory) in a nontransmitted BSSID profile. The proposed changes provide clarification.

**Discussion #2:**

The following two sentences conflicts with each other. We propose to delete the first sentence to resolve the conflict.

*The AP or PCP may include all other elements in the nontransmitted BSSID profile.*

*If any of the optional elements are not present in a nontransmitted BSSID profile, the corresponding values are the element values of the transmitted BSSID.*

The inheritance model is efficient and preferred. A nonTxBSSID inherits an element from the TxBSSID if it is not advertised in the nonTxBSSID profile. A nonTxBSSID shall include an element if it is specific to the BSS or has a value different from the one advertised by the TxBSSID. Such (inheritance) design will keep the mgmt. frame size small. Without inheritance, a mgmt. frame from the TxBSSID is expected to include every optional element for each nonTxBSSID of the set which can quickly lead to a very large frame size (or even exceeding the max PPDU size).

**Discussion #3:**

Probe Response frame may also carry more than one Multiple BSSID element due to the element size limit (255 octets). In addition, the sentence cited below is confusing. We propose to make minor modification to emphasize the intended meaning.

*If two or more are given, the profile is considered to be the complete set of all elements given in all such Multiple BSSID elements sharing the same BSSID index.*

**Discussion #4:**

The following two sentences conflicts with each other. We propose to delete the first sentence to resolve the conflict. Also see discussion #2.

*Since the Multiple BSSID element is also present in Probe**Response frames, an AP or PCP may choose to advertise the complete or a partial profile of a BSS**corresponding to a nontransmitted BSSID only in the Probe Response frames.*

*When a nontransmitted BSSID profile**is present in the Multiple BSSID element of the Probe Response frame, the AP or PCP shall include all**elements that are specific to this BSS.*

**Discussion #5:**

The action prescribed in the following two sentences would require an unassociated STA to scan several beacons before it can get the complete profile of a particular nonTxBSSID. Further, since there is no indication of whether the profile received so far is complete or not. Therefore, there is an ambiguity on how many beacons to scan before the STA knows that it has received complete information for that BSSID. Further, such inheritance based on historic information does not align with the baseline behaviour as compared with a single BSS configuration. We propose to delete these two sentences to maintain consistency with signal BSS configuration and eliminate any ambiguity. Also see discussion #2.

*When a station receives a Beacon frame or DMG Beacon frame with a Multiple BSSID element that consists of a nontransmitted BSSID profile with only the mandatory elements, it may inherit the complete profile from a previously received Beacon frame, DMG Beacon frame, or Probe Response frame,* *or it may send a Probe Request frame to obtain the complete BSSID profiles.*

*Each Beacon element not transmitted in a nontransmitted BSSID subelement is inherited from previous Beacon, DMG Beacon, or Probe Response frame in which the element is present, except for the Quiet element, which shall take effect only in the Beacon frame or DMG Beacon frame that contains it and not carry forward as a part of the inheritance.*

**Discussion #6:**

The following sentence is removed and Probe Response case is covered by the last sentence of the previous paragraph.

*An AP or PCP is not required to include all supported nontransmitted BSSID profiles in a Probe Response frame, and may choose to only include a subset based on any criteria.*

* **Multiple BSSID procedure**

***TGax Editor: Please modify the following paragraph in this section (802.11ax D2.2, P219L23):***

The BSSID of the AP belonging to a multiple BSSID set is referred to as the transmitted BSSID if the AP includes the Multiple BSSID element in the Beacon frame that it transmits. In a multiple BSSID set, there shall not be more than one AP corresponding to the transmitted BSSID. The BSSID of an AP belonging to a multiple BSSID set is a nontransmitted BSSID if the AP's BSSID is derived according to 9.4.2.46 (Multiple BSSID element) and 9.4.2.74 (Multiple BSSID-Index element). Among all AP STAs in multiple BSSID set, only the AP corresponding to the transmitted BSSID shall transmit a Beacon frame.

***TGax Editor: Please modify the following two paragraphs in this section (802.11-2016, P1588):***

A nontransmitted BSSID profile represents information about a particular nontransmitted BSSID and consists of a set of elements that are carried in the Nontransmitted BSSID Profile subelement of the Multiple BSSID element. ~~The~~ Each nontransmitted BSSID profile, at a minimum, shall include the elements that are mandatory for that BSS (i.e., Nontransmitted BSSID Capability element (see 9.4.2.72), SSID element (see 9.4.2.2), ~~and~~ Multiple BSSID-Index element (see 9.4.2.74) and FMS Descriptor element (see 9.4.2.75) when dot11FMSActivated is true and the TIM element (see 9.4.2.6) indicates there are buffered group addressed frames for this nontransmitted BSSID) ~~for each of the supported BSSIDs~~. ~~The AP or PCP may include all other elements in the nontransmitted BSSID profile.~~ The AP or PCP may include two or more Multiple BSSID elements containing elements for a given BSSID index in ~~one~~ a Probe Response frame, a Beacon frame or a DMG Beacon frame. ~~If two or more are given, the~~ A nontransmitted BSSID profile consists ~~is considered to be the complete set~~ of all elements ~~given~~ carried in all such Multiple BSSID elements sharing the same BSSID index. ~~Since the Multiple BSSID element is also present in Probe Response frames, an AP or PCP may choose to advertise the complete or a partial profile of a BSS corresponding to a nontransmitted BSSID only in the Probe Response frames. In addition, the~~ An AP or PCP may ~~choose to~~ include only a partial list of nontransmitted BSSID profiles in the Probe Response or Beacon frame or DMG Beacon frame or to include different sets of nontransmitted BSSID profiles in different Beacon frames or DMG Beacon frames.

~~When a station receives a Beacon frame or DMG Beacon frame with a Multiple BSSID element that consists of a nontransmitted BSSID profile with only the mandatory elements, it may inherit the complete profile from a previously received Beacon frame, DMG Beacon frame, or Probe Response frame, or it may send a Probe Request frame to obtain the complete BSSID profiles. Each Beacon element not transmitted in a nontransmitted BSSID subelement is inherited from previous Beacon, DMG Beacon, or Probe Response frame in which the element is present, except for the Quiet element, which shall take effect only in the Beacon frame or DMG Beacon frame that contains it and not carry forward as a part of the inheritance. An AP or PCP is not required to include all supported nontransmitted BSSID profiles in a Probe Response frame, and may choose to only include a subset based on any criteria.~~ When a nontransmitted BSSID profile is present in the Multiple BSSID element(s) of the Beacon frame or Probe Response frame, the AP or PCP shall include all elements that are specific to this BSS. An element is considered to be specific to a BSS if it’s value is different from the corresponding element advertised by the transmitted BSSID or if the nontransmitted BSSID satisfies the condition as specified in the Table 9-27 (Beacon frame body) for a non-DMG AP or Table 9-41 (DMG Beacon frame body) for a DMG AP for that element to be present while the transmitted BSSID does not satisfy the corresponding condition. If any of the ~~optional~~ elements carried in the Beacon frame or DMG Beacon frame or Probe Response frame of the transmitted BSSID are not present in a nontransmitted BSSID profile, the corresponding values are the element values of the transmitted BSSID.

* **Multiple BSSID element**

***TGax Editor: Please make the following changes to this section:***

***Change the 2nd paragraph as follows:***

The ~~Max BSSID~~ MaxBSSID Indicator field contains a value assigned to *n*, where 2*n* is the maximum number of BSSIDs in the multiple BSSID set, including the reference BSSID (see 11.11.14 (Multiple BSSID set)). The actual number of BSSIDs in the multiple BSSID set is not explicitly signaled.

***Change the 7th paragraph as follows:***

The Nontransmitted BSSID Profile subelement contains a list of elements for one or more APs or DMG STAs that have nontransmitted BSSIDs, and is defined as follows:

* For each nontransmitted BSSID, the Nontransmitted BSSID Capability element (see 9.4.2.72 (Nontransmitted BSSID Capability element)) is the first element included, followed by a variable number of elements, in the order defined in Table 9-27 (Beacon frame body) for a non-DMG AP or Table 9-41 (DMG Beacon frame body) for a DMG AP.
* The SSID element (see 9.4.2.2 (SSID element)) and multiple BSSID-index ~~subelements~~ element (see 9.4.2.74 (Multiple BSSID-Index element)) are included in the Nontransmitted BSSID Profile subelement.
* The FMS Descriptor element (see 9.4.2.75 (FMS Descriptor element)) is included in the Nontransmitted BSSID Profile subelement if dot11FMSActivated is true for the BSS using this nontransmitted BSSID and if the Multiple BSSID element is included in a Beacon frame and if the TIM ~~field~~ element (see 9.4.2.6 (TIM element)) indicates there are buffered group addressed frames for this nontransmitted BSSID.
* The Timestamp and Beacon Interval fields, TIM element, DSSS Parameter Set, IBSS Parameter Set, Country, Channel Switch Announcement, Extended Channel Switch Announcement, Wide Bandwidth Channel Switch, Transmit Power Envelope, Supported Operating Classes, IBSS DFS, ERP Information, HT Capabilities, HT Operation, VHT Capabilities, ~~and~~ VHT Operation, HE Capabilities, HE Operation, BSS Color Change Announcement, and Spatial Reuse Parameter Set elements are not included in the Nontransmitted BSSID Profile subelement; the values of these elements for each nontransmitted BSSID are always the same as the corresponding transmitted BSSID element values.
* Any element specific to the BSS or whose content is different from the transmitted BSSID is included in the Nontransmitted BSSID Profile subelement.