IEEE P802.11  
Wireless LANs

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| Resolutions for CIDs 20082, 20160, 20169 and 20080 on 11ai/D7.0 | | | | | |
| Date: 2016-05-13 | | | | | |
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Abstract

This submission contains proposed resolutions to comments on TGai D7.0, related to Multiple BSSID, MaxChannelTime and MinChannelTime support.

References herein are to TGai Draft 7.0.

R0 – initial version, with CIDs: 20082, 20160, 20169, 20080, 20162, and 20170.

R1 – added correction of Max Channel Time field’s units to match MaxChannelTime parameter to MLME-SCAN.request.

**CIDs 20169, 20160, 20082, 20080:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 20169 | 98.39 | 11.1.4.3.2 | FILS provides mechanisms to prevent wasting bandwidth with unnecessary Probe Requests, and Probe Responses that won't be useful to the client STA due to varying criteria. Large bandwidth savings can also be achieved by eliminating useless Probe Responses that come too late to be useful. | Change "may" to "shall". Throughout the rest of the document, make it mandatory to include Max Channel Time field in Probe Requests for FILS STAs. The onerous implementation costs for Max Channel Time are on the AP, and that has been resolved by making the AP response to Max Channel Time a "should" requirement in the last ballot cycle. |
| 20160 | 98.39 | 11.1.4.3.2 | Max Channel Time:  Comment: FILS provides mechanisms to prevent wasting bandwidth with unnecessary Probe Requests, and Probe Responses that won't be useful to the client STA due to varying criteria. Large bandwidth savings can also be achieved by eliminating useless Probe Responses that come too late to be useful. | Change FILS Stay from MAY to SHALL:  Make it mandatory to include Max Channel Time field in Probe Requests for FILS STAs. The onerous implementation costs for Max Channel Time are on the AP, and that has been resolved by making the AP response to Max Channel Time a "should" requirement in the last ballot cycle.  Align this position throughout the rest of the document. |
| 20082 | 96.30 | 11.1.4.3.2 | CIDs 10651-10653 were rejected on the basis that "If the MaxChannelTime is advertised to the AP, then the AP can 100% sure that the STA is not on the channel after MaxChannelTime and unnecessary Probe Responses can be avoided by stopping the transmission of Probe Response by the AP after MaxChannelTime.  The AP should transmit Probe Response after MinChannelTime since the STA may be on the channel after MinChannelTime.  So, indicating MaxChannelTime is more useful for preventing unnecessary Probe Responses". However, the STA may also not be on the channel after MinChannelTime. In that case indicating MinChannelTime would be more useful for preventing unnecessary probe responses | Indicate both Min and Max, and let the AP decide whether to be pessimistic or optimistic (a decision that is outside the scope of the standard) |
| 20080 | 99.41 | 11.1.4.3.4 | "When the Max Channel Time field of the FILS Request Parameters element of the Probe Request frame is present" -- well, when is it present, in fact? Nothing seems to ever require its presence | Add some words to explain when it ought to be present |

**Discussion:**

**CIDs 20169 and 20160:**

See 11-16/0587.

Also, note that while P98.39 says:

A FILS STA may indicate its MaxChannelTime in the Max Channel Time field of the FILS Request Parameters element of the Probe Request frame to prevent the responding STA from transmitting the Probe Response after the time indicated by the MaxChannelTime has elapsed.

P98.44 has the following statement:

The Max Channel Time field shall be set to the MaxChannelTime of the MLME-SCAN.request primitive as defined in 9.4.2.177 (FILS Request Parameters element).

The MaxChannelTime parameter is not optional in the MLME-SCAN.request in the REVmc baseline, nor made optional in TGai. Thus, the two sentences are contradictory, anyway.

**CID 20080:**

By making the inclusion of MaxChannelTime mandatory in the FILS Request Parameters element of Probe Requests, there is no longer any need for the conditional (or to list the conditions).

**CID 20082:**

By making the inclusion of MaxChannelTime mandatory, we have enabled one mechanism so that the AP \_knows\_ that transmitting a Probe Response beyond that time is not useful. Adding a second mechanism with a “hint” to the AP that it \_might not\_ be useful between MinChannelTime and MaxChannelTime is not going to significantly advance interoperability performance. Generally, the features of TGai are an attempt to give more information to the STA to allow it to operate as efficiently as possible. Similarly, an AP is probably going to decide to send a Probe Response to a STA that \_might\_ be gone off channel, in case it has not actually gone off channel and it could use the information. Adding new/additional ambiguity to the Standard does not seem to be sufficiently helpful.

**Related, but aside:**

At 63.47, TGai currently has the following statement:

The Max Channel Time field (see 11.1.4.3.5 (Contents of a probe response)) contains the value of MaxChannelTime parameter of the MLME-SCAN.request primitive represented in an unsigned integer of units of 200 μs.

However, the MaxChannelTime parameter to the MLME-SCAN.request primitive is in units of TUs. A granularity in the frame format that is finer than the values to which it can be set, is not an efficient use of protocol. So, the frame format should be changed to encode this field in TUs.

**Proposed Resolutions:**

CID 20169: REVISED. At P98.39, change “may indicate” to “shall indicate”.

CID 20160: REVISED. At P98.39, change “may indicate” to “shall indicate”.

CID 20080: REVISED.

At P99.41, change as follows:

If the FILS Request Parameters element is present in the Probe Request frame, the responding FILS STA should discard any Probe Response frame that has not been transmitted as a response to the Probe Request frame when the elapsed time measured from the end of the reception of the Probe Request frame by the MAC entity of the responding STA exceeds the time indicated by value of the Max Channel Time field of the FILS Request Parameters element of the Probe Request frame. If the FILS Request Parameters element is not present in the Probe Request frame, transmission time of the Probe Response frame to the Probe Request frame by the responding STA is only limited by the retransmission procedure in 10.22.2.10 (Retransmit Procedures).

In 9.4.2.177, change Figures 9-586d and 9-586e, and associated text as follows:

**9.4.2.177 FILS Request Parameters element**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Element ID | Length | Element ID Extension | Parameter Control Bitmap | Max Channel  Time | FILS Criteria | Max Delay Limit |

Octets: 1 1 1 1 1 0 or 1 0 or 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Minimum  Data  Rate | RCPI  Limit | OUI  Response  Criteria | ~~Max Channel~~  ~~Time~~ |  |

Octets: 0 or 3 0 or 1 0 or 2 ~~0 or 1~~

**Figure 9-586d—FILS Request Parameters element format**

B0 B1 B2 B3

|  |  |  |  |
| --- | --- | --- | --- |
| FILS Criteria Present | Max Delay Limit Present | Minimum Data  Rate Present | RCPI Limit Present |

Bits: 1 1 1 1

B4 B5 B6 B7

|  |  |  |  |
| --- | --- | --- | --- |
| OUI Response  Criteria Present | ~~Max Channel Time Present~~ |  | Reserved |

Bits: 1 ~~1~~ 1 1

**Figure 9-586e—Parameter Control Bitmap field**

Bits 0 to ~~64~~ of the Parameter Control Bitmap field correspond to the Parameter fields that are conditionally present in the element. A value of 1 in a bit indicates the corresponding parameter is present, and the value of 0 indicates the corresponding parameter is not present.

At 63.47, change as follows:

The Max Channel Time field (see 11.1.4.3.5 (Contents of a probe response)) contains the value of MaxChannelTime parameter of the MLME-SCAN.request primitive represented in an unsigned integer of units of TUs.

<End of CID 20080 changes.>

CID 20082: REJECTED. This just adds ambiguity in expected AP behavior, and does not seem to significantly help the problem of useless Probe Responses, due to leaving the choice up to the AP implementation.

**CIDs 20162, 20170:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 20162 | 84.27 | 9.6.8.36 | Non-Transmitted BSS:  FILS Discovery  Comment: In typical high density deployments, there are 4 or more SSIDs configured and beaconed per AP, in practice. Thus there can be a significant bandwidth savings from combining these, using Multiple BSSID support. The bandwidth gain accrues not just from use of Multiple BSSIDs in Beacon Frames but there is also significant gain available through the use of the Multiple BSSID feature in Probe Responses. The Probe Response gain is available even when not all devices on the network support the Multiple BSSID feature. This feature has been in 802.11 since 802.11v (2011); it needs a push to get traction to get it implemented and used. | Remove the Multiple BSSIDs Presence Indicator. Instead, make Multiple BSSID support mandatory for TGai devices. |
| 20170 | 84.27 | 9.6.8.36 | In typical high density deployments, there are 4 or more SSIDs configured and beaconed per AP, in practice. Thus there can be a significant bandwidth savings from combining these, using Multiple BSSID support. This feature has been in 802.11 since 802.11v (2011); it needs a push to get traction to get it implemented and used. | Remove the Multiple BSSIDs Presence Indicator. Instead, make Multiple BSSID support mandatory for TGai devices. |

**Discussion:**

See 11-16/0586.

**Proposed Resolutions:**

CID 20169, 20170: REVISED. Add the following editing instructions to the TGai Draft:

***Change the following row in the table in 6.3.11.2.2:***

**6.3.11.2 MLME-START.request**

**6.3.11.2.2 Semantics of the service primitive**

|  |  |  |  |
| --- | --- | --- | --- |
| MultipleBSSID | As defined in  Multiple  BSSID  Element in  9.4.2.46  (Multiple  BSSID  element) | As defined in Multiple  BSSID Element in  9.4.2.46 (Multiple  BSSID element) | This element is optionally present when  dot11RMMeasurementPilotActivated is a  value between 2 and 7 and the AP is a  member of a Multiple BSSID Set (see  11.11.14 (Multiple BSSID Set)) with two or  more members, or if  dot11MultiBSSIDActivated is true.  This element is present when dot11FILSActivated is true and the AP is a member of a Multiple BSSID Set with two or more members. |

***Change the following text, as shown:***

**11.1.3.8 Multiple BSSID procedure**

Implementation of the Multiple BSSID capability is optional for a WNM STA and for a DMG STA. Implementation of the Multiple BSSID capability is mandatory for a FILS STA.

***Change the following row in the table in Annex B.4.19:***

**B.4.19 WNM extensions *(continued)***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| \*WNM6 | Multiple BSSID Support | 11.1.3.8  (Multiple  BSSID  procedure),  11.1.4  (Acquiring  synchronizatio  n, scanning),  11.11.14  (Multiple  BSSID Set) | CFWNM:O  CF32:M | Yes □ No □ N/A □ |