IEEE P802.11
Wireless LANs

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| D1.0 Remaining Comment Resolutions on Probe Response |
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Abstract

This document proposes resolutions on remaining CIDs 2777 and 2768 that are related to sending a probe response frame.

Changes in the text refer to: Draft P802.11ai/D1.1

Comments

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| **CID** | **Clause**  | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed****Resolution** |
| 2777 | 10.1.4.3.8 | 76 | 35 | if the Probe Response Reception time element is not present the default value of MaxProbeResponseTime should be used. however this text is non specific as to what should the AP STA do in this case. | in case a the Probe Req from an 11ai STA did not include a Probe Response Reception Time Element, limit the AP to compare the time difference to the next TBTT to within the defualt MaxProbeResponseTime. |  Revised. Current text does not include behavior when the MaxChannelTime is not included in the Probe Request.Changed the text accordinglySee detailed discussion and editing instruction in 11-14/0110r1 |
| 2768 | 10.1.4.3.5 | 74 | 1 | it is not clear how MaxChannelTime is different than other parameters coming from MLME-SCAN.request and resulting in a fields within the Probe Request and its IEs. | remove paragraph 1 L1-4 in p74. | Reject. The MaxChannelTime may be present in Probe Request. When the field is present, the description how to set the field needs to be provided.  |

Discussion on CID 2777

CID 2777 is on the following text in TGai D1.0:

**10.1.4.3.8 Probe response collision avoidance**

 “The STA should not respond to Probe Request frames addressed to individual or broadcast address if the next TBTT of the responding STA is within dot11BeaconResponseDuration and is no later than any deadline of Probe Response Reception Time if the Probe Response Reception Time element is present in any Probe Request frame.”

The intention of this sentence is to make an AP to replace the probe responses with its beacon that will be transmitted at the next TBTT if the duration from the reception of the Probe Request frame to the next TBTT is very short.

The next TBTT should be no later than MaxChannelTime (Probe Response Reception Time) of the requesting STA to use the replacement, since the STA will scan the next channel after MaxChannelTime, and the STA cannot receive the beacon that is a replacement of the probe response to the STA if the next TBTT is later than its MaxChannelTime.

But, current text does not include behavior when the MaxChannelTime is not included in the Probe Request.

**Off-line discussion during last November 2013 Meeting:**

The following changes were made by 11-13-1269r6 during November 2013 Meeting:

**10.1.4.3.8 Probe response collision avoidance**

The STA with dot11FILSActivated equal to true should not respond to Probe Request frames addressed to individual or broadcast address if the next TBTT of the responding STA is within dot11BeaconResponseDuration and is no later than any deadline of MaxChannelTime indicated in the FILS Request Parameter element ~~Probe Response Reception Time~~ ~~if~~ when the MaxChannelTime field ~~Probe Response Reception Time element~~ is present in any of Probe Request frames. If the Probe Request frame indicates FILS Capability and the MaxChannelTime field of the FILS Request Parameter element is not present, the STA should not respond to the Probe Request frame if the next TBTT of the responding STA is within dot11BeaconResponseDuration.

But, still there have been concerns on whether to apply this mechanism to legacy (non-11ai STA) or not.

There are three cases for responding to Probe Requests with a beacon instead of Probe Responses by FILS AP:

1. The STA transmitting the Probe Request is FILS capable and the MaxChannelTime field is included in the Probe Request
2. The STA transmitting the Probe Request is FILS capable and the MaxChannelTime field is not included in the Probe Request
3. The STA transmitting the Probe Request is NOT a FILS capable STA

For case 1, the FILS AP can check the MaxChannelTime of the requesting STA.

For case 2, the FILS AP cannot check the MaxChannelTime of the requesting STA, but if dot11BeaconResponseDuration is chosen to be a small value (e.g, less than or equal to 5ms), then most of the 11ai STA can receive the Beacon frame which is replaced with Probe Response frames (MinChannelTime of the STA is usually 5ms).

For case 3, depending on the implementation, some non-FILS STAs may use the Beacon frame replaced with Probe Response frames, but some non-FILS STA may keep waiting for the Probe Response although it has been replaced by a beacon by the FILS AP, and may retransmit another Probe Request.

But if we limit this beacon replacement mechanism to only FILS STAs, then the effectiveness of this mechanism will be reduced, since there will be still many non-FILS STAs even in the future and the FILS AP cannot replace many probe responses with a beacon.

**Straw Poll:**

**Do you support to apply the replacement of the Probe Responses with a beacon to the legacy (non-11ai) STAs?**

**Y: 2**

**N: 1**

**A: 7**

* Straw Poll result (Tuesday AM2 Session) shows just a narrow margin. The group has decided not to exclude the legacy STA from the beacon replacement this time, and discuss this issue again if someone brings a presentation that shows that this feature causes significant problem to legacy STAs.

FILS AP responds to Probe Requests with a beacon instead of Probe Responses under the following cases:

1. The STA transmitting the Probe Request is FILS capable and the MaxChannelTime field is included in the Probe Request, and the next TBTT of the AP is within dot11BeaconResponseDuration and is no later than MaxChannelTime indicated in the Probe Request.
2. The STA transmitting the Probe Request is FILS capable and the MaxChannelTime field is not included in the Probe Request, and the next TBTT of the AP is within dot11BeaconResponseDuration.
3. The STA transmitting the Probe Request is NOT a FILS capable STA, and the next TBTT of the AP is within dot11BeaconResponseDuration.

Otherwise, the beacon replacement should not be used.

* *See Editing instruction 1*

**Proposed resolution**:

 Revised

See the Editing instructions 1 in 11-14/0110r1

**Editing Instruction 1**:

***Change the sentence in Section 10.1.4.3.8 of TGai Draft D1.1 as follows: (P78L61)***

**10.1.4.3.8 Probe response collision avoidance**

When the MaxChannelTime field ~~Probe Response Reception Time element~~ is present in any of Probe Request frames, ~~T~~the STA with dot11FILSActivated equal to true should not respond to Probe Request frames addressed to individual or broadcast address if the next TBTT of the responding STA is within dot11BeaconResponseDuration and is no later than any deadline of MaxChannelTime indicated in the FILS Request Parameter element of the Probe Request frames~~Probe Response Reception Time~~ ~~if~~.

When the MaxChannelTime field is not present in the Probe Request frame, the STA should not respond to the Probe Request frame if the next TBTT of the responding STA is within dot11BeaconResponseDuration.