IEEE P802.11
Wireless LANs

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| Proposed802.11TGai Specification Text for enhanced active scanning procedure for FILS |
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Abstract

The submission contains normative text for enhancing active scanning procedure to preferred AP based on the Section 6.2.10 in Specification Frame for TGai [1]

# Background

Texts related to the active scanning procedure to preferred AP [3] were adopted in 11ai Specific framework document [1] at last meeting as follows.

* ***STA may send a probe request frame including the AP configuration change count of a preferred AP if the STA has the system information of the preferred AP during the active scanning procedure.***
* ***AP may send an optimized probe response frame including only the parameters which need to be received by the STA when the AP receives the probe request frame including the AP configuration change count.***

This contribution proposes the detailed texts related to it for TGai Specification Document.

# Conventions

In this contribution, the proposed 802.11ai Sepcification Document text will be presented as an amendment text based on the baseline 802.11 standard, 802.11-2012 [Ref-2]. The following format conventions are used:

1. The new added text is marked asblue underline text;
2. The deleted text is marked as~~red strikethrough text~~;
3. The unchanged baseline standard text stays in black text in the context of proposed TGai specification text;
4. The editorial instruction is marked as*italic text highlighted by Yellow*;
5. The quoted TGai SFD text is marked as *green italic text*; and
6. Any other text, e.g., discussions, proposed motions, etc., is in black text, but not in the context of proposed TGai specification text.

# Proposed 802.11ai Specification Text

**6.3.3 Scan**

**6.3.3.2 MLME-SCAN.request**

**6.3.3.2.2 Semantics of the service primitive**

*Change the clause as shown*

The primitive parameters are as follows:

MLME-SCAN.request(

 BSSType,

 BSSID,

 SSID,

 ScanType,

 ProbeDelay,

 ChannelList,

 MinChannelTime,

 MaxChannelTime,

 RequestInformation,

 SSID List,

 ChannelUsage,

 AccessNetworkType,

 HESSID,

 MeshID,

 APConfigurationChangeCount,

 VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| APConfigurationChangeCount | As defined in 8.4.2.ai6 | As defined in 8.4.2.ai6 | When a specific BSSID is indicated in the MLME-SCAN.request, the AP ConfigurationChangeCount associated with the stored configuration of the AP may be provided. |

* + - 1. Probe Request frame format

*Add new element to Table 8-26 as shown*

The frame body of a management frame of subtype Probe Request contains the information shown in (#33)

|  |
| --- |
| Table 8–26 Probe Request frame body   |
| Order | Information | Notes |
| 16 | AP Configuration Change Count | The AP Configuration Change Count is optionally present if dot11FILSActivated is true. |
|  Last | Vendor Specific | One or more vendor-specific (#1684)elements are optionally present(#29). These (#1684)elements follow all other (#1684)elements(#1221). |

* + - 1. Probe Response frame format

*Add new element to Table 8-27 as shown.*

The frame body of a management frame of subtype Probe Response contains the information shown in See additional details and procedures in 9.18.3 and 10.1.4. (#33)

|  |
| --- |
|  |
| Table 8–27 Probe Response frame body   |
| Order | Information | Notes |
| 55 | AP Configuration Change Count | The AP Configuration Change Count is optionally present if dot11FILSActivated is true. |
|  Last-l | Vendor Specific | One or more vendor-specific (#1684)elements are optionally present(#29). These (#1684)elements follow all other (#1684)elements(#1221). |
| Last-n | Requested Elements | Elements requested by the Request element of the Probe Request frame are present if dot11MultiDomainCapabilityActivated is true.See 10.1.4.3.2. |

**8.4.2.1 General**

*Add the new Element IDs to Table 8-54:*

**Table 8—54 Element IDs**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Element Id | Length | Extensible  |
| AP Configuration Change Count element (See 8.4.2.ai6) | <ANA> | 1 |  |

**8.4.2.ai6 AP Configuration Change Count element**

*Add new element type to the element type list.*

An AP Configuration Change Count element indicates the change of system information within a BSS. The format of the AP Configuration Change Count element is shown in Figure 8-ai6.

|  |  |  |
| --- | --- | --- |
| Element Id | Length |  AP Configuration Change Count  |
| Octets: 1 | 1 | 1 |

**4 B5 B7e 8-ai2 CILS Cri refer to the same parameter defined in TSPEC.Figure 8-ai6—AP Configuration Change Count element format**

The Element Id is equal to the AP Configuration Change Count element value in Table 8-54.

The value of the Length field is the length of the element and set to 1.

The AP Configuration Change Count field is 1 octet in length and is defined as an unsigned integer initialized to 0, that increments when an update has occurred to any of the elements inside a Beacon frame or a Probe Response frame as described in 10.1.4.1.

**10.1.4.1 General**

*Add the following texts at the end of the subclause 10.1.4.1*

The AP with dot11FILSActivated equals to true shall increase by one the value (modulo 256) of the AP Configuration Change Count when an update occurs to any of the elements inside a Beacon frame or a Probe Response frame with the exceptions of the following dynamic information:

* TimeStamp
* Time advertisement
* BSS AC access delay
* BSS Average Access Delay
* BSS Available Admission Capacity
* TPC Report element
* Beacon Timing
* BSS Load
* Extended BSS Load

**10.1.4.3.8 FILS active scanning procedure to preferred AP**

 *Add the new Clause 10.1.4.3.8 as shown*

A non-AP STA with dot11FILSActivated equals to true may retain a BSS Information Set of the preferred AP which the STA previously obtained. A BSS Information Set is a set of information inside the Beacon frame or the Probe Response frame, which excludes the dynamic information as described in 10.1.4.1.

The AP with dot11FILSActivated equals to true shall retain AP Configuration Change Count (CCC) List which consists of the previous and current AP Configuration Change Counts and the identifiers of the changed elements that are associated with each AP Configuration Change Count. AP may store a limited number of AP Configuration Change Counts in the AP CCC List.

A non-AP STA may send a Probe Request frame including the AP Configuration Change Count if the STA has the BSS Information Set associated with the AP Configuration Change Count of the preferred AP.

When an AP receives a Probe Request frame including a matched BSSID and an AP Configuration Change Count from a STA, the AP should compare the received AP Configuration Change Count with the AP Configuration Change Counts stored in its AP Configuration Change Count (CCC) List. If the received AP Configuration Change Count value matches with the current AP Configuration Change Count value, the AP shall send an optimized Probe Response frame including only mandatory fields (i.e., Timestamp, Capability, Beacon Interval), AP Configuration Change Count, and dynamic IEs(see 10.1.4.1). If the received AP Configuration Change Count value matches with one of the stored AP Configuration Change Count values but it is not the current value of AP Configuration Change Count, the AP shall send an optimized Probe Response frame including only mandatory fields, AP Configuration Change Count, dynamic IEs, and the elements which need to be updated by the STA. When an AP receives the Probe Request frame with an invalid AP Configuration Change Count, the AP shall send a regular Probe Response frame instead of an optimized Probe Response frame.

# References:

[1] IEEE 802.11-12/151r13 Specification Framework for TGai

[2] IEEE Std 802.11 – 2012

[3] IEEE 802.11-12/1034r4 Ehanced scanning procedure for FILS

**Motion-1:** To authorize the Editor to incorporate the text changes proposed in contribution IEEE 802.11-12/1114r5 (*11-12-1114-05-00ai-tgai-specification text for enhanced active scanning procedure for fils*) to the draft TGai Draft Specification Document.

Yes: \_\_\_\_\_\_\_\_\_\_\_\_; No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; Abstain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_