IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Active-Scanning-Resolution-Text | | | | |
| Date: 2013-11-13 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Jarkko Kneckt | Nokia Corporation | Otaniementie 19 B, 02150 Espoo Finland |  | [Jarkko.Kneckt@Nokia.com](mailto:Jarkko.Kneckt@Nokia.com) |
| Jae Seung Lee | ETRI | 161 Gajeong-dong,  Yuseong-gu, Daejeon, Korea | +82 42 860 1326 | jasonlee@etri.re.kr |

Abstract

The submission contains a normative text to comment resolutions assigned to Jarkko Kneckt and normative text as proposed by submission 13-1317r0. The comments indicate the text that is incorporated from 13-1317r0.

The submission shows the changes to the IEEE802.11ai D1.1 and these changes are proposed to be incorporated to the next 802.11ai draft. The comment resolutions are proposed in submission 13/1268r1. The submission incorporates the normative text also from submissions 13-1317 and 13-1323.

The submission incorporates 802.11ai changes and uses the IEEE802.11mc D2.0 as a base standard.

88 CIDs are solved. The solved CIDs are:

2031, 2037, 2038, 2069, 2070, 2178, 2179, 2181, 2183, 2254,

2255, 2256, 2258, 2259, 2261, 2262, 2263, 2264, 2265, 2266,

2284, 2285, 2354, 2356, 2359, 2401, 2408, 2466, 2546, 2946,

2947, 2948, 2949, 2947, 2948, 2949, 2950, 2951, 3008, 3017,

3018, 3044, 3094, 3128, 3129, 3130, 3131, 3145, 3146, 3183,

3184, 3185, 3186, 3187, 3188, 3189, 3224, 3225, 3293, 3307,

3309, 3311, 3312, 3313, 3314, 3328, 3329, 3330, 3332, 3333,

3334, 3335, 3336, 3337, 3349, 3350, 3351, 3352, 3353, 3354,

3358, 3371, 3372, 3373, 3374, 3375, 3376, and 3380.

**6. Layer Management**

**6.3 MLME SAP interface**

**6.3.3 Scan**

**6.3.3.2 MLME-SCAN.request**

**6.3.3.2.2Semantics of the service primitive**

*Instructions to the editor: Change the primitives table as shown:*

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| FILSRequestParameters [CID2254] | FILS Request Parameter element | As defined in 8.4.2.177 (FILS Request Parameters element) | The parameters used in determining whether to transmit a Probe Response frame. This parameter is optionally present when dot11FILSActivated is true. |
| ReportingOption | Enumeration | IMMEDIATE, CHANNEL\_SPECIFIC, AT\_END | Indicates the result reporting mode. When immediate reporting is requested, every STA that is discovered during the scanning process shall be immediatly returned via MLME-SCAN.confirm using INTERMEDIATE\_SCAN\_RESULT as the ResultCode. [CID2921]This parameter is optionally present when dot11FILSActivated is true. |
| APConfigurationChangeCount | AP Configuration Change Count element | As defined in 8.4.2.184 (AP Configuration Change Count element) | When a specific BSSID is indicated in the MLMESCAN.request and dot11FILSActivated is true, the AP ConfigurationChangeCount associated with the stored configuration of the AP is optionally present~~, when dot11FILSActivated is true~~. [CID3094] |

**6.3.3.3 MLME-SCAN.confirm**

**6.3.3.3.1 Function**

This primitive returns the descriptions of the set of BSSs detected by the scan process. Multiple MLME-SCAN.Confirm primitives may be issued when the MLME-SCAN.request has ReportingOption parameter set to CHANNEL\_SPECIFIC or to AT\_END. [CID 2356]

**6.3.3.3.2 Semantics of the service primitive**

*Instructions to the editor: Change the primitives list as shown:*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| BSSDescriptionFromFDSet | Set of BSSDescriptionFromFD | N/A | TheBSSDescriptionFromFDSet is returned to indicate the results of the scan request derived from FD frames. It is a set containing zero or more instances of a BSSDescriptionFromFD. Present if dot11FILSActivated is true. |
| ResultCode | Enumeration | SUCCESS, INTERMEDIATE\_SCAN\_RESULT,  NOT\_SUPPORTED | Indicates the result of the MLME- SCAN.confirmprimitive. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Type | Valid range | Description | IBSS Adoption |
| ANQP Configuration Sequence Number | Integer | 0 - 255 | The ANQP Configuration Sequence Number of the found BSS. This parameter is optionally present when dot11FILSActivated is true. [CID2813] | Do not adopt. |
| Differentiated ~~i~~Initial ~~l~~Link ~~s~~Setup information | Differentiated initial link setup information element which includes the ILSC information field and the ILS Time field[CID2255] | As defined in 8.4.2.187 (Differentiated Initial Link Setup element) | Includes the ILSC information field and the ILS Time field. This parameter is optionally present, when dot11FILSActivated is true. [CID2255] [CID2813] | Do not adopt. |

The BSSDescriptionFromFDSet parameter is present if dot11FILSActivated is true.[CID2258] Each BSSDescriptionFromFD~~Set~~ [CID3018]consists of the following information items:



**6.3.3.3.3 When generated**

***Change 6.3.3.3.3 as follows:***

This primitive is generated by the MLME as a result of an MLME-SCAN.request primitive or if dot11FILSActivated is true, by[CID2262] an MLMESCAN-STOP.request primitive following an MLME-SCAN.request primitive to ascertain the operating environment of the STA. If dot11FILSActivated is true, t~~T~~he primitive is invoked to provide a ~~report on~~ found BSS report that matches the setting in the MLME-SCAN.request's ReportingOption parameter. [CID2262] ~~as indicated in the ReportingOption MLME-parameter of the MLME-SCAN.request primitive.~~

**6.3.3.3.4 Effect of receipt**

***Change 6.3.3.3.4 as follows:***

~~As indicated by the ResultCode,~~ T~~t~~he SME is notified of ~~the intermediate or final~~ results of the scan procedure. If dot11FILSActivated is true, these results may be intermediate results, according to the value of the ResultCode. [CID2263]

***Insert a new clause 6.3.3.4 and subclauses as follows:***

**6.3.3.4 MLME-SCAN-STOP.request**

**6.3.3.4.1 Function**

This primitive terminates any ongoing scan.

**6.3.3.4.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-SCAN-STOP.request (

)

**6.3.3.4.3 When generated**

This primitive is generated by the SME as means of stopping ~~any~~ all [CID2265]ongoing active or passive [CID2070] scan processes in the STA.[CID2264]

**6.3.3.4.4 Effect of receipt**

This request terminates any ongoing scan procedures. ~~The passive and active scanning is stopped immediately after the primitive is received as described in 10.1.4.2 (Passive scanning) and 10.1.4.3.2 (Sending a probe response Active scanning procedure). The confirmation of the scan termination is provided through an MLME-SCAN.confirm primitive.~~ [CID2266]

**6.3.5.2.2 Semantics of the service primitive**

***Change the primitive parameter list as follows:***

MLME-AUTHENTICATE.request(

PeerSTAAddress,

AuthenticationType,

AuthenticateFailureTimeout,

Content of FT Authentication elements,

Content of SAE Authentication Frame,

Multi-band local,

Multi-band peer,

ILSUserPriority

FILSWrappedData,

VendorSpecificInfo)

*Instructions to Editor: make the following changes to the Description text of ILSUserPriority (in line 23 page 14 of 802.11ai D1.0).*

Specifies the type of traffic for a device to transmit. This parameter is optionally present when dot11FILSActivated is true. [CID2813]

*Instructions to Editor: make the following changes to the Description text of FILS Wrapped Data (in line 29 page 14 of 802.11ai D1.0).*

Used for the STA and AP to communicate data used by the FILS authentication algorithm. This parameter is optionally present when dot11FILSActivated is true. [CID2813]

**6.3.5.3 MLME-AUTHENTICATE.confirm**

**6.3.5.3.2 Semantics of the service primitive**

*Instructions to Editor: make the following changes to the Description text of FILS Wrapped Data (in line 7 page 15 of 802.11ai D1.0).*

Used for the STA and AP to communicate data used by the FILS authentication algorithm. This parameter is optionally present when dot11FILSActivated is true. [CID2813]

**6.3.5.5 MLME-AUTHENTICATE.response**

**6.3.5.5.2 Semantics of the service primitive**

*Instructions to Editor: make the following changes to the Description text of FILS Wrapped Data (in line 46 page 15 of 802.11ai D1.0).*

Used for the STA and AP to communicate data used by the FILS authentication algorithm. This parameter is optionally present when dot11FILSActivated is true. [CID2813]

**6.3.7 Associate**

**6.3.7.2 MLME-ASSOCIATE.request**

**6.3.7.2.2 Semantics of the service primitive**

*Instructions to Editor: make the following changes to the Description text of ILSUserPriority (in line 46 page 16 of 802.11ai D1.0).*

Specifies the type of traffic for a device to transmit. This parameter is optionally present when dot11FILSActivated is true. [CID2813]

**8.3.3.9 Probe Request frame format**

*Instructs to Editor: Insert new rows/elements to Table 8-26(note that table numbers will be changing) as follows:*

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 18 | FILS Request Parameters | The FILS Request Parameters element is ~~are~~ [CID2284] optionally present if dot11FILSActivated is true. |
| 19 | AP-CCC | The AP-CCC element [CID2284] is optionally present if dot11FILSActivated is true. |

**8.3.3.10 Probe Response frame format**

*Instructions to the Editor: Change Table 8-27(note that table numbers will be changing) as follows, inserting 5 new rows and changing one existing row;*

**Table 8-25—Reassociation Response frame body**

****

**8.4.2.177 FILS Request Parameters element**

*Instructions to Editor: make the following changes as shown*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Parameter Control Bitmap | FILS Criteria | MAXDelayLimit | RCPI Limit | OUI Response Criteria | MaxChannelTime |
| Octets: | 1 | 1 | 1 | 0 or 1 | 0 or 1 | 0 or 1 | 0 or 1 | 0 or 1 |



The Element ID is equal to the FILS Request Parameters element value in Table 8-54 (Element IDs).

The Parameter Control Bitmap field is 1 octet in length and illustrated in Figure 8-401cu (Parameter Control Bitmap field). Bits 0 to 4 of the Parameter Control Bitmap field correspond to the Parameter fields that are present in the IE respectively. 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.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 | B~~5~~6- B7[CID3198] |
|  | FILS Criteria Present | Max Delay Limit Present | Minimum Data Rate Present | RCPI Limit Present | OUI Response Criteria Present | Max Channel Time  Present | Reserved |
| Bits | 1 | 1 | 1 | 1 | 1 | 1 | 3 |

*Instructions to Editor: Append the following text to the end of the clause*

The MaxChannelTime field contains the value of MaxChannelTime of the MLME-SCAN.request represented in an unsigned integer of units of 200 microseconds. It presents the time that the transmitter will be available after the transmission of the Probe Request to receive the Probe Responses since it contains the value of MaxChannelTime as shown in Figure 10-3c (Example of active scanning process when Probe Request frame is addressed to individual address.) and Figure 10-3d (Example of active scanning process when Probe Request frame is addressed to broadcast address.).

**~~8.4.2.178 Probe Response Reception Time element~~**

***Instructions to the editor: Delete clause 8.4.2.178. Delete or redirect all***

**~~~~**

**~~Figure 8-401cs—Probe Response Reception Time element~~**

~~The Element ID is equal to the Probe Response Reception Time element value in Table 8-54 (Element IDs).~~

~~The MaxChannelTime field contains the value of MaxChannelTime of the MLME-SCAN.request represented in an unsigned integer of units of 200 microseconds. It presents the time that the transmitter will be available after the transmission of the Probe Request to receive the Probe Responses since it contains the value of MaxChannelTime as shown in Figure 10-3c (Example of active scanning process when Probe Request frame is addressed to individual address.) and Figure 10-3d (Example of active scanning process when Probe Request frame is addressed to broadcast address.).~~

**10. MLME**

**10.1 Synchronization**

**10.1.4 Acquiring synchronization, scanning**

**10.1.4.1 General**

***Change the third and seventh paragraph in 10.1.4.1 of as follows:***

Upon receipt of the MLME-SCAN.request primitive, a STA shall perform scanning. All ESSs are scanned unless the scanned ESSs are limited by the MLME-parameters. [CID3183, CID3184] The SSID parameter indicates the SSID for which to scan. The SSID List parameter indicates one or more SSIDs for which to scan. To become a member of a particular ESS using passive scanning, a STA shall scan for Beacon and DMG Beacon frames containing that ESS’s SSID, returning all Beacon and DMG Beacon frames matching the desired SSID in the BSSDescriptionSet parameter of the corresponding MLME-SCAN.confirm primitive with the appropriate bits in the Capability Information field or DMG Capabilities field indicating whether the Beacon frame or DMG Beacon frame came from an infrastructure BSS, PBSS, or IBSS. If the value of dot11RMMeasurementPilotActivated is greater than 1, the STA shall additionally scan for Measurement Pilot frames, returning in the BSSDescriptionFromMeasurementPilotSet parameter all Measurement Pilot frames that equal the requested BSSID of the corresponding MLME-SCAN.request primitive and are not already members of the BSSDescriptionSet. If dot11FILSActivated is true, the STA shall additionally scan for FILS Discovery frames, returning in the BSSDescriptionFromFDSet parameter all FILS Discovery frames of the scanned ESSs ~~that equal the requested~~ ~~BSSID of the corresponding MLME-SCAN.request primitive~~ [CID3186]and are not already members of the BSSDescriptionSet. To actively scan, the STA shall transmit Probe request frames containing a wildcard SSID (see 8.4.2.2) [CID3187], the desired SSID or one or more SSID List elements elements, but a DMG STA might also have to transmit DMG Beacon frames or perform beamforming training prior to the transmission of Probe Request frames. When the SSID List element is present in the Probe Request frame, one or more of the SSID elements may include a wildcard SSID (see 8.4.2.2). The exact procedure for determining the SSID or SSID List values in the MLME-SCAN.request primitive is not specified in this standard. When a STA scans for a BSS whose AP does not support the SSID List element, or for a BSS for which AP support of the SSID List element is unknown, the SSID element with an SSID or wildcard SSID shall be included in the MLME-SCAN.request primitive. Upon completion of scanning, an MLME-SCAN.confirm primitive is issued by the MLME indicating all of the BSS information received.

Upon receipt of an MLME-SCAN.request primitive with the SSID parameter equal to the wildcard SSID, the STA shall passively scan for any Beacon, DMG Beacon, FILS Discovery or Measurement Pilot frames, or actively transmit Probe Request or DMG Beacon frames containing the wildcard SSID, as appropriate depending upon the value of ScanMode. Upon completion of scanning, an MLME-SCAN.confirm primitive is issued by the MLME indicating all of the BSS information received.

**10.1.4.2 Passive scanning**

***Instructions to the editor: Remove the following paragraph (added by 802.11ai) from the subclause. 802.11aidoes not cause any changes to the clause.***

~~If the MLME receives an MLME-SCAN-STOP.request primitive, the STA shall immediately stop the ongoing passive scanning process at the scanned channel, and shall not continue the passive scanning process at unscanned channels listed in the ChanneList parameter of the MLME-SCAN.request primitive. The MLME shall issue an MLME-SCAN.confirm primitive with the BSSDescriptionSetcontaining the gathered information since the previous issue of MLME-SCAN.comfirm primitive, or if the primitive has not been issued since the beginning of the scan, having the ResultCode set to SUCCESS.~~

**10.1.4.2.1 Passive scanning for non-DMG STAs**

***Instructions to the editor: Insert the following paragraph to the end of the subclause.The subclause is new text to be added to new draft of 802.11ai. The text is very similar to the text in 10.1.4.2 of the 802.11ai D1.1and the changes shown to the previous text in 10.1.4.2.***

If the MLME receives an MLME-SCAN-STOP.request primitive, the STA shall immediately stop the ongoing passive scanning process at the scanned channel, and shall not continue the passive scanning process at unscanned channels listed in the ChanneList parameter of the MLME-SCAN.request primitive. The MLME shall issue an MLME-SCAN.confirm primitive with ~~the~~ one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848]containing the gathered information since the previous issue of MLME-SCAN.comfirm primitive, or if the primitive has not been issued since the beginning of the scan, having the ResultCode set to SUCCESS.

**10.1.4.2.2 Passive scanning for DMG STAs**

***Instructions to the editor: Insert the following paragraph to the end of the subclause.The subclause is new text to be added to new draft of 802.11ai. The text is very similar to the text in 10.1.4.2 of the 802.11ai D1.1and the changes shown to the previous text in 10.1.4.2.***

If the MLME receives an MLME-SCAN-STOP.request primitive, the STA shall immediately stop the ongoing passive scanning process at the scanned channel, and shall not continue the passive scanning process at unscanned channels listed in the ChanneList parameter of the MLME-SCAN.request primitive. The MLME shall issue an MLME-SCAN.confirm primitive with ~~the~~ one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848]containing the gathered information since the previous issue of MLME-SCAN.comfirm primitive, or if the primitive has not been issued since the beginning of the scan, having the ResultCode set to SUCCESS.

**10.1.4.3.2 Sending a probe response Active scanning procedure**

***Instructions to the editor: This clause shows the changes that the next version of the 802.11ai should make to the 802.11mc D2.0.***

Upon receipt of the MLME-SCAN.request primitive with ScanType indicating an active scan, a STA shall use the following procedure:

For each channel to be scanned:

a) Wait until the ProbeDelay time has expired or a PHYRxStart.indication primitive has been received.

b) Perform the Basic Access procedure as defined in 9.3.4.2 (Basic access).

c) If the STA is a DMG STA:

1) Start generation of DMG Beacon frames according to the rules described in 10.1.3.4 (DMG Beacon generation before network initialization) if the STA intends to transmit DMG Beacon frames with the Discovery Mode field set to 1.

2) Otherwise, optionally proceed to step (e).

d) If a DMG Beacon frame is received, perform the beamforming training defined in 9.36.5 (Beamforming in A-BFT).

e) If the STA is a DMG STA, perform the basic access procedure defined in 9.3.4.2 (Basic access).

f) If the STA is a FILS STA, the STA should proceed to step i) if the STA has received a broadcast addressed Probe Request frame and both of the following conditions are true:

1) The Probe Request has a Wildcard SSID or the same SSIDs as present in MLME-SCAN.request primitive.

2) The FILS Request Parameters element is not present in the received Probe Request or the FILS Request Parameters element of the Probe Request frame has only fields that are present in the MLME-SCAN.request primitive and for every field that is present in the FILS Request Parameters element of the Probe Request 10.1.4.3.3 allows the same or more responses as the FILS Request Parameters element present in the MLME-SCAN.request primitive. [CID2946, CID3189]

g) If the STA is a FILS STA, the STA should proceed to sub-step 1) of Step j) if the STA has received a broadcast addressed Probe Response or a Beacon or a Measurement Pilot or an FILS Discovery frame containing:

1) The SSID of the received frame is the same as present in the MLME-SCAN.request primitive.

2) If the FILS Request Parameters element is present in MLME-SCAN.request primitive, the received frame fulfills the 10.1.4.3.3 conditions for the FILS Request Parameters element of the MLME-SCAN.request primitive. [CID2946, CID3189]

h~~f~~) Send a probe request to the broadcast destination address or, in the case of a DMG STA only:

1) Following the transmission of an SSW-Feedback frame, send a probe request to the MAC address of the DMG STA addressed by the SSW-Feedback frame and

2) Optionally, following the reception of an SSW-Feedback frame, send a probe request to the MAC address of the DMG STA that transmitted the SSW-Feedback frame.

In all these cases, the probe request is sent, with the SSID and BSSID from the MLMESCAN.request primitive. When transmitted by a DMG STA, the probe request includes the DMG Capabilities element. When the SSID List is present in the MLME-SCAN.request primitive, send one or more Probe Request frames, each with an SSID indicated in the SSID List and the BSSID from the MLME-SCAN.request primitive.

i~~g~~) Set the Probe Timer to 0 and start ~~a~~ the Probe T~~t~~imer if the STA is a non-DMG STA or, in case of a DMG STA set to the Probe Timer 0 and start ~~a~~ the Probe T~~t~~imer either immediately following the transmission of the first Probe Request on this channel or if no Probe Request is transmitted on this channel.

j~~h~~) If PHY-CCA.indication (busy) primitive has not been detected before the ProbeTimer reaches MinChannelTime and the STA is a non-DMG STA, then

~~1) Set the NAV to 0 and scan the next channel.~~

~~2) Otherwise, when the timer reaches MaxChannelTime, process all received probe responses.~~

***Instructions to the editor: The remaining part of this step is new text. The text is similar to the text in 802.11ai D1.1. The changes to the D1.1 of the same text are shown here.***

~~go~~ proceed to step k~~f~~, else while the Probe Timer is less than the MaxChannelTime:

1. Process any received probe responses and Beacons;

2) ~~Process any received Beacons,~~ If the STA is a FILS STA, process any received measurement pilot~~s~~ and FILS Discovery frames ~~if dot11FILSActivated is true in the STA~~ [CID2181];

3) If dot11FILSActivated is true in the STA, ReportingOption is IMMEDIATE, and new AP or new information of the AP is detected, issue MLME-SCAN.confirm primitive with the Result-Code equal to INTERMEDIATE\_SCAN\_RESULT and ~~the~~ one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848] containing information of the detected AP;

4) If dot11FILSActivated is true and the ReportingOption is CHANNEL\_SPECIFIC, ~~issue~~ at the time when the Probe Timer reaches the MaxChannelTime issue [CID3222]an MLME-SCAN.confirm primitive, with the ResultCode equal to INTERMEDIATE\_SCAN\_RESULT and ~~the~~ one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848] containing information of all APs that have been discovered from the scanned channel.

k~~m~~) Set NAV to 0 and scan the next channel.

See Figures 10-4 (~~Probe response~~Active scanning when Probe Request is addressed to individual address) and 10-4ai (Active scanning when Probe Request is addressed to broadcast address) for non-DMG STAs.

**~~~~**

****

**Figure 10-4—~~Probe response~~Active scanning when Probe Request is addressed to individual address.**

****

**Figure 10-4ai—Active scanning when Probe Request frame is addressed to broadcast address.**

See Figure 10-5 (Active scanning for DMG STAs) for DMG STAs that generate DMG Beacon frames with the Discovery Mode field set to 1. ~~.~~

When all channels in the ChannelList have been scanned, the MLME shall issue an MLME-SCAN.confirm primitive with ~~the~~ one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848] containing all of the information gathered during the scan.

If the MLME receives an MLME-SCAN-STOP.request primitive, the STA shall immediately stop the scanning of the channel. The STA shall not continue the active scanning process at unscanned channels listed in the ChannelList parameter of the MLME-SCAN.request primitive. The MLME shall issue an MLMESCAN.confirm primitive with the ResultCode set to SUCCESS and one or more BSSDescriptionSet, BSSDescriptionFromFDSet, or BSSDescriptionFromMeasurementPilotSet [CID2848] containing all of the information gathered during the scan.

***Instructions to the editor: These texts are moved from 10.1.4.3.5 to the end of 10.1.4.3.2 [CID3189].These are new text to the clause, however, the changes are shown against old text in D1.1.***

~~A Probe Request frame may contain Probe Response Reception Time element.~~ When ~~present,~~ the MaxChannelTime field of the ~~Probe Response Reception Time~~  FILS Request Parameters element of the Probe Request frame is present, the value of the MaxChannelTime field is set to the MaxChannelTime of the MLME-SCAN.request as defined in 8.4.2.17~~8~~7.

The SSID List element shall not be included in a Probe Request frame in an IBSS.

****

**10.1.4.3.3 ~~Sending a probe response 7~~ Probe response criteria[CID2359]**

***Instructions to the editor: This clause shows the changes that the next version of the 802.11ai should make to the 802.11mc D2.0.***

STAs, subject to the criteria below, receiving Probe Request frames shall respond with a probe response only if the Address 1 field in the probe request is the broadcast address or the specific MAC address of the STA, and either of the following applies:

1. The STA is a mesh STA and the Mesh ID in the probe request is the wildcard Mesh ID or the specific Mesh ID of the STA.

b) The STA is not a mesh STA and

1) The SSID in the probe request is the wildcard SSID, the SSID in the probe request is the specific SSID of the STA, or the specific SSID of the STA is included in the SSID List element, and

2) The Address 3 field in the probe request is the wildcard BSSID or the BSSID of the STA.

Additionally, STAs with dot11InterworkingServiceActivated equal to true, receiving a Probe Request frame~~s~~ [CID2770] containing an Interworking field in the Extended Capabilities element ~~is set~~ equal to 1 shall examine the Interworking element in the received Probe Request frame and respond with a probe response only if

— The HESSID field, if present in the Interworking element, is the wildcard HESSID or the HESSID of the STA, and

— The Access Network Type field in the Interworking element is the wildcard Access Network Type or the Access Network Type of the STA.

Additionally, STAs with dot11FILSActivated equal to true receiving a Probe Request frame with FILS Request Parameters element shall respond to Probe Request frame only if all the criteria below that are present in the corresponding Probe Request frame are met:

1. The Max Delay Limit field of the FILS Request Parameters indicates a delay larger than the selected average access delay of the responding STA. The BSS Delay Criteria field of the FILS Criteria field of the FILS Request Parameters element indicates the selected average access delay for the comparison as defined in 8.4.2.177. If the compared average access Delay indicates value 255 Measurement not available, the STA shall respond and the response shall include BSS AC Access Delay element as described in 8.4.2.46 and Average Access Delay as described in 8.4.2.21. If the compared Average Access Delay indicates value 254 Service unable to access channel, the response shall not be transmitted.
2. The HT Support Criteria of the FILS Criteria field of the FILS Request Parameters element is 1 and the responding STA is HT STA.
3. The VHT Support Criteria of the FILS Criteria field of the FILS Request Parameters element is 1 and the responding STA is VHT STA.
4. The Minimum Data Rate field of the FILS Request Parameters element indicates a data rate lower than the one that can be provided over the MAC\_SAP.
5. The RCPI Limit field of the FILS Request Parameters element as described in 8.4.2.177 indicates RCPI lower than the RCPI of the Probe Request frame.
6. The STA knows the OUIs as specified by the OUI Response Criteria of the FILS Request Parameters element as explained in 8.4.2.177 (FILS Request Parameters element).

If the MaxChannelTime field of the FILS Request Parameters element is present in the Probe Request frame, the responding STA with dot11FILSActivated true shall discard the pending untransmitted Probe Response frame 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 MaxChannelTime field of the FILS Request Parameters element of the Probe Request frame. If the MaxChannelTime field is not present in the Probe Request frame, transmission time of the pending untransmitted Probe Response frame by the responding STA is only limited by the retransmission procedure in 9.19.2.6 (Retransmit Procedures).

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. There is one exception to the rule. The STA shall respond to Probe Request frame which includes the Element ID of the RCPI element in the Requested Element Ids of the Request element.

Only the following STAs respond to probe requests:

— DMG STAs that are not members of a PBSS that are performing active scan as defined in 10.1.4.3.2 (Active scanning procedure)

— Multi-band capable non-AP STAs for which the last received probe request included a Multi-band element

— APs

— PCPs

— STAs in an IBSS

— STAs in an MBSS

A result of the procedures defined in this subclause is that in each non-DMG infrastructure BSS, and in each IBSS there is at least one STA that is awake at any given time to receive and respond to probe requests. In an MBSS, STAs might not be awake at any given time to respond to probe requests. In an infrastructure BSS or in an IBSS, a STA that sent a Beacon frame shall remain in the Awake state and shall respond to probe requests, subject to criteria in the next paragraph, until a Beacon frame with the current BSSID is received. If the STA is contained within an AP, it shall remain in the Awake state and always respond to probe requests, subject to criteria in the next paragraph. There may be more than one STA in an IBSS that responds to any given probe request, particularly in cases where more than one STA transmitted a Beacon or DMG Beacon frame following the most recent TBTT, either due to not receiving successfully a previous Beacon or DMG Beacon frame or due to collisions between beacon transmissions.

In an infrastructure BSS or in an IBSS, STAs receiving Probe Request frames shall respond with a probe response when the SSID in the probe request is the wildcard SSID or matches the specific SSID of the STA or when the specific SSID of the STA is included in the SSID List element~~. Furthermore,~~ , except that [CID3336] a STA with dot11RadioMeasurementActivated true receiving a probe request with a DSSS Parameter Set element containing a Current Channel field value that is not the same as the value of dot11CurrentChannel shall not respond with a probe response. A DMG STA that is not member of a PBSS but that is performing active scan as defined in 10.1.4.3.2 (Active scanning procedure), an AP, and a PCP shall respond to all probe requests meeting the above criteria if the transmit antenna of the DMG STA is trained to transmit to the STA from which a probe request was received. In an IBSS a STA that transmitted a Beacon or DMG Beacon frame since the last TBTT shall respond to group addressed Probe Request frames. A STA in an IBSS shall respond to Probe Request frames sent to the individual address of the STA.

If a STA with dot11FILSActivated equal to true receives two or more Probe Request frames that meet the criteria to respond as specified above ~~in 10.1.4.3.6~~ and the STA has dot11OmitReplicateProbeResponses true, the responding STA may transmit a probe response or a beacon frame as a response to all Probe Request frames. [CID 2040, 2773, 2849, 2952, 3190, 3338]

~~The STA with dot11FILSActivated equal to true may choose not to respond to Probe Request frames addressed to broadcast address if the responding STA receives an acknowledged probe response addressed to the requesting STA containing the SSID of the responding STA.~~ [CID 3010, 2041, 2774, 3339, 2850, 2953, 2775]

**10.1.4.3.4 Sending a response to probe request**

***Instructions to the editor: These texts are moved from 10.1.4.3.2, and 10.1.4.3.5 These are new text to the clause. Renumber the clause 10.1.4.3.4 PCP selection in a PBSS to be the last clause of the active scanning text to be clause number 10.1.4.3.6.***

~~If dot11FILSActivated is true, Probe Response frames shall be transmitted either as directed frames to the address of the STA that generated the probe request or to the broadcast address. If dot11FILSActivated is false, Probe Response frames shall be transmitted as directed frames to the address of the STA that generated the probe request.~~

A STA in which dot11FILSActivated is true that transmits a Probe Response frame shall either set the Address 1 field to the address of the STA that generated the probe request or shall set it to the broadcast address if the STA that generated the probe request is indicating FILS Capability. The Address 1 field shall be set to the address of the STA that generated the probe request if the STA is not indicating FILS Capability.

A STA in which dot11FILSActivated is false that transmits a Probe Response frame shall set the Address 1 field to the address of the STA that generated the probe request.

~~Probe Response frames shall be sent as directed frames to the address of the STA that generated the probe request.~~

Additionally, when an AP with dot11FILSActivated equal to true, responds to a Probe Request frame~~s~~ containing a FILS Capability field in the Extended Capabilities element equal to 1, the AP shall transmit Probe Response frame in a PPDU using a rate other than a DSSS/CCK (Clause 16 or Clause 17) rate. [CID3335]

Requested Element IDs in the Request element shall be included in the Probe Response if the responding STA supports it. In an improperly formed Request element, a STA may ignore the first element requested that is not ordered properly and all subsequent elements requested. In the probe response frame, the STA shall return the requested elements in the same order as requested in the Request element.

If dot11RadioMeasurementActivated is true and if the Request element of the Probe Request includes the RCPI element ID, the STA shall include in the Probe Response an RCPI element containing the measured RCPI value of the received Probe Request frame. If no measurement result is available, the RCPI value shall be set to indicate that a measurement is not available.

If dot11FILSActivated equal to true and if the Request element of the Probe Request includes the Reduced Neighbor Report Request element ID ~~field of the FILS Request Parameters element of the Probe Request is 1~~, the Probe Response or Beacon frame ~~of a STA with dot11FILSActivated~~ may include the Reduced Neighbor Report element if the criteria as defined in 10.1.4.3.3~~6~~ are met for the included BSS. A Reduced Neighbor Report element is included in the Probe Response frame for each BSS of which information is available. The reported BSSs may have different primary channels to the responding STA.

A STA in which ~~If~~ dot11InterworkingServiceActivated is true~~, the STA~~ may include in the Probe Response frame an ANQP Configuration Sequence Number element containing the current sequence number of the AP's GAS configuration information. The current AP's ANQP Configuration information can be acquired by GAS query mechanism as described in 10.24.3.

***Instructions to the editor: delete the clause 10.1.4.3.5 and renumber the following clauses accordingly. [CID2354][CID3128]***

***Instructions to the editor: delete the clause 10.1.4.3.6 and renumber the following clauses accordingly.***

***Instructions to the editor: delete the clause 10.1.4.3.7 and renumber the following clauses accordingly.***

***Instructions to the editor: delete the clause 10.1.4.3.8 and renumber the following clauses accordingly.***

***Instructions to the editor: delete the clause 10.1.4.3.9 and renumber the following clauses accordingly.***

**Annex C**

(normative)

***Insert new MIB variables as shown below***

dot11BeaconResponseDuration OBJECT-TYPE

SYNTAX Unsigned32(0..~~65535~~100)

MAX-ACCESS Read-Only

STATUS Current

Description

“This is a control variable.

It is written by an external management entity.

Changes take effect as soon as practical in the implementation.

This attribute indicates the duration in units of ~~32~~ 0.1 microseconds. If the duration from the reception of the Probe Request frame to the TBTT is less than the value, the STA does not transmit a ProbeResponse frame as response to the Probe Request frame.”

DEFVAL {~~100~~50}