IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normative text for Probe Request parameters | | | | |
| Date:2012-09-14 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Jarkko Kneckt, Mika Kasslin, Gabor Bajko | Nokia Corporation | Otaniementie 19, 02150 Espoo Finland | +358504821550 | Jarkko.Kneckt@Nokia.com |
| Ping Fang**,** Yunsong Yang | Huawei Technologies Co. Ltd. | Bldg. 7, Vision Software Park, Road Gaoxin South 9, Nanshan District, Shenze, Guangdong, China, 518057 | +86755 36839346 | Ping.Fang@Huawei.com |
| Givon Park, Kiseon Ryu | LG Electronics | LG R&D Complex 533, Hogye-1dong, Dongan-Gu, Anyang, Kyungki, 431-749, Korea | +82-31-450-1879 | Giwon.Park@lge.com |
| Lei Wang | InterDigital Communications | 781 Third Ave., King of Prussia, PA 19406 | +1 858 205 7286 | leiw@billeigean.com |

Abstract

The submission contains normative text for response criteria to Probe Request frame.

The submission is related to 11-12-151r12 proposed Specification Framework Document requirements 6.1.2, 6.2.2, 6.2.4 and 6.2.6.

**6.3.3 Scan**

**6.3.3.2 MLME-SCAN.request**

**6.3.3.2.2 Semantics of the service primitive**

*Instructions to Editor: Change the clause as shown with track changes:*

The primitive parameters are as follows:

MLME-SCAN.request(

BSSType,

BSSID,

SSID,

ScanType,

ProbeDelay,

ChannelList,

MinChannelTime,

MaxChannelTime,

RequestInformation,

SSID List,

ChannelUsage,

AccessNetworkType,

HESSID,

MeshID,

FILS Request Parameters,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| FILS Request Parameters | As defined in 8.4.2.ai1 | As defined in 8.4.2.ai1 | The parameters define the responding STAs. |

* + - 1. Probe Request frame format

*Instructions to Editor: Add new element to Table 8-26 as shown with track changes.*

The frame body of a management frame of subtype Probe Request contains the information shown in Table 8–26 Probe Request frame body  (#33)

|  |  |  |
| --- | --- | --- |
| Table 8–26 Probe Request frame body | | |
| Order | Information | Notes |
| 14 | FILS Request Parameters | The FILS Request Parameters are 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). |

**8.4.2.ai1 FILS Request Parameters element**

*Instructions to Editor: Add new element type to the element type list.*

The FILS Request Parameters element in Probe Request frame are used as criteria to response with Probe Response transmission as defined in 10.1.4.3.5(Criteria to respond to probe request). The FILS Request Parameters is defined in Figure 8-ai1.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element Id | Length | Parameter Control Bitmap | FILS Criteria | Max Delay Limit | Minimum Data Rate | Received Signal Strength Limit | OUI Response Criteria |
| Octets: 1 | 1 | 1 | 0 or 1 | 0 or 1 | 0 or 3 | 0 or 1 | 0 or 2 |

**4 B5 B7e 8-ai2 CILS Cri refer to the same parameter defined in TSPEC.Figure 8-ai1—FILS Request Parameters element**

The Element Id is equal to the FILS Request Parameters element value in Table 8-ai.

The value of the Length field is the length of the element and set to value between 3 and 10 depending on the values of Para Bitmap field.

The Parameter Control Bitmap field is 1 octet in length and illustrated in Figure 8-ai2. Bits 0 to 4 of the Parameter Control Bitmap field correspond to the Parameter fields 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 B7

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FILS Criteria | Max Delay Limit | Minimum Data Rate | Received Signal Strength Limit | OUI Response Criteria | Reserved |

**Bits: 1 1 1 1 1 3**

**4 B5 B7e 8-ai2 CILS Cri refer to the same parameter defined in TSPEC.Figure 8-ai2 — Parameter Control Bitmap field**

The FILS Criteria field is 1 octet in length and is illustrated in Table 8-ai2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Comprehensive Response | BSS Delay Criteria | HT Support Criteria | VHT Support Criteria | Reserved |
| Bits: | 1 | 3 | 1 | 1 | 2 |

**4 B5 B7e 8-ai2 CILS Cri refer to the same parameter defined in TSPEC.Figure 8-ai3 — FILS Criteria field**

The Comprehensive Response field is set to 1 to indicate that the information of other BSSs are requested to be included to the Neighbor Report elements of the Probe Response frame that is transmitted as a response to the Probe Request and otherwise the field is set to 0.

The BSS Delay Criteria field values and the selection of the delay of the criteria to respond to the probe request as explained in 10.1.4.3.5 (Criteria to respond to probe request) is provided in Table 8-ai3(Mapping of BSS Delay Criteria field).

**Table 8-ai3 —BSS Delay Criteria field**

|  |  |
| --- | --- |
| Value | Explanation |
| 0 | The delay criteria is set to average access delay of the AC\_BK |
| 1 | The delay criteria is set to average access delay of the AC\_BE |
| 2 | The delay criteria is set to average access delay of the AC\_VI |
| 3 | The delay criteria is set to average access delay of the AC\_VO |
| 4 | The delay criteria is set to average access delay of all ACs |
| 5 – 6 | Reserved |
| 7 | Delay criteria is not in use |

The HT Support Criteria field is set to 1 to indicate that responding STA must be HT capable and otherwise set to 0.

The VHT Support Criteria field is set to 1 to indicate that responding STA must be VHT capable and otherwise set to 0.

The Max Delay Limit field is an unsigned integer in units of 200µs to calculate the value of the maximum access delay for delay criteria as indicated by the BSS Delay Criteria field of the FILS Criteria of the FILS Request Parameters element. Value 0 is reserved. The use of the maximum access delay and the delay criteria are explained in 10.1.4.3.5 (Criteria to respond to probe request).

The Minimum Data Rate field is 3 octets long and contains an unsigned integer in units of kilobits per second that specifies the lowest total data rate specified at the MAC\_SAP, , for transport of MSDUs or A-MSDUs that the STA is going to transmit. The minimum MAC\_SAP data rate does not include the MAC and PHY overheads incurred in transferring the MSDUs or A-MSDUs.

The Received Signal Strength Limit (RSSL) field is an unsigned integer. The receiver of Probe Request frame is obliged to respond, if the reception power of the frame is equal or higher than -82dBm + RSSL value \* 0.5dBm. Value 255 indicates that receiver is obliged to respond regardless of the reception power of the Probe Request frame.

OUI Response Criteria field is a bitmap, in which the bits corresponds to the Vendor Specific elements of the Probe Request frame in order of presence, bit0 corresponds to the first Vendor Specific element, bit1 corresponds the second and so on. A bit in the OUI Response Criteria field is set to 1 to indicate that the receiver must know the Organization Identifier field of the corresponding Vendor Specific element in order to be obliged to respond to the request and otherwise set to 0. If the number of the Vendor Specific elements of the Probe Request frame is less than the number of bits of the OUI Response Criteria field, the remaining bits of the OUI Response Criteria field are set to 0.

**10.1.4.3.5 Criteria to respond to probe request**

*Instructions to Editor: Add the new Clause 10.1.4.3.5*

Only APs and STAs in an IBSS or in an MBSS respond to probe requests. A result of the procedures defined in this subclause is that in each infrastructure BSS and 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 respond to probe requests, subject to criteria in the next paragraphs. 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 frame following the most recent TBTT, either due to not receiving successfully a previous Beacon frame or due to collisions between beacon transmissions.

STAs receiving Probe Request frames shall respond only if the criteria below are met:

a) The Address 1 field in the probe request is the broadcast address or the specific MAC address of the STA, and either item b) or item c) below.

b) The STA is a mesh STA and

1) The Mesh ID in the probe request is the wildcard Mesh ID or the specific Mesh ID of the STA.

c) The STA is not a mesh STA and

1) The SSID in the probe request is the wildcard SSID, or 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 Probe Request frames containing an Interworking field in the Extended Capabilities element set 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.

STAs with dot11RadioMeasurementActivated equal to true receiving a Probe Request frame with a DSSS Parameter Set element containing a Current Channel field value that different from the value of dot11CurrentChannel shall not respond to Probe Request frame.

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 access delay as indicated by the BSS Delay Criteria field of the FILS Criteria field of the FILS Request Parameters element is less than the value as specified in the Max Delay Limit field of the FILS Criteria field of the FILS Request Parameters element as explained in 8.4.2.ai1(FILS Request Parameters element)
2. The HT Support Criteria of the FILS Criteria field of the FILS Request Parameters element is set to 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 set to 1 and the responding STA is VHT STA.
4. The Minimum Data Rate field of the FILS Request Parameters element indicates lower data rate that can be provided over the MAC\_SAP.
5. The Received Signal Strength field of the FILS Request Parameters element indicates lower reception power limit than the reception power of the Probe Request frame as explained in 8.4.2.ai1(FILS Request Parameters element).
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.ai1(FILS Request Parameters element).

**10.1.4.3.7 Sending a response to probe request**

*Instructions to Editor: Add the text to the new Clause 10.1.4.3.7*

If the Comprehensive Response field of the FILS Request Parameters element of the Probe Request, the Probe Response or Beacon frame may include information of other BSSs.The other BSSs information is carried in Neighbor Report elements of the Probe Response or Beacon frame, if the criteria as defined in 10.1.4.3.5.(Criteria to respond to probe request) are met for the included BSSs.The BSSs which information is included may have different primary channel as the responding STA. When information of other BSSs is included, the Probe Response or Beacon frame shall include NeighborList element.

**Annex C**

(normative)

*Instructions to Editor: Add new MIB variable as shown below*

dot11FILSActivated OBJECT-TYPE

SYNTAX Boolean

MAX-ACCESS Read-Only

STATUS Current

Description

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is capable of supporting fast initial link setup. The capability is disabled, otherwise."

DEFVAL { false }

dot11BeaconResponseDuration OBJECT-TYPE

SYNTAX Unsigned32(0..65535)

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 microseconds. If the duration from the reception of the Probe Request frame to the TBTT is less than the value, the STA transmits a Beacon frame as response to the Probe Request frame."

DEFVAL { 100 }