IEEE P802.11
Wireless LANs

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| Passive Scanning Enhancements |
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|  |  |  |  |  |

Abstract

The document implements passive scanning enhancements for FILS.

The passive scanning enhancements enable:

1. Possibility to include Neighbor Report elements in Beacon, Probe Response and Measurement Pilot frames.
2. Possibility to transmit unsolicited Probe Response frame addressed to the broadcast address to fill the gaps between the beacon, probe response and measurement pilot frames.

**References:**

11-12-239-01-00ai-Passive-Scanning-Enhancements.ppt

11-11-1619-03-00ai-Active-Scanning.docx

**8.3.3.2 Beacon frame format**

*Instructions to Editor: Add new element to Table 8-20 as shown with track changes*

The frame body of a management frame of subtype Beacon contains the information shown in Table 8-20.

**Table 8-20—Beacon frame body**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 56 | Scanning Frame Transmission Interval  | The Scanning Frame Transmission Interval is present if dot11FILSActivated is true and dot11PassiveScanningTXInterval is set to non-zero value.  |
| 57 | Neighbor Report  | The Neighbor Reports are 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**

*Instructions to Editor: Add new element to Table 8-27 as shown with track changes.*

The frame body of a management frame of subtype Probe Response contains the information shown in Table 8-27. See additional details and procedures in 9.18.3 and 10.1.4, respectively.

**Table 8-27—Probe Response frame body**

|  |  |  |
| --- | --- | --- |
| Order | **Information** | **Notes** |
| 55 | Scanning Frame Transmission Interval  | The Scanning Frame Transmission Interval is present if dot11FILSActivated is true and dot11PassiveScanningTXInterval is set to non-zero value.  |
| 56 | Neighbor Report | The Neighbor Reports are optionally present if dot11FILSActivated is true. |
| Last*–1* | Vendor Specific | One or more vendor-specific (#1684)elements are optionally present(#29). These (#1684)elements follow all other (#1684)elements(#1221), except the Requested (#1684)elements. |
| Last–*n* | Requested (#1684)elements | Elements requested by the Request (#1684)element of the Probe Request frame are present(#29) if dot11MultiDomainCapabilityActivated(#1005) is true. See 11.1.3.2.1 (Sending a probe response).(11k) |

**8.4.2.ai5 Scanning Frame Transmission Interval element**

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

**Table 8-ai8—Scanning Frame Transmission Interval element**

|  |  |  |
| --- | --- | --- |
| Element Id | Length | Max Interval |
| Octets: 1 | 1 | 1 |

The Element Id is equal to the Scanning Frame Transmission Interval value in Table 8-ai.

The value of the Length field is the length of the Scanning Frame Transmission Interval in octets and set to 1.

The Max Interval field represents the number of time units (TUs) after which AP transmits a Probe Response frame addressed to broadcast address, if conditions as described in clause 10.1.4.2.3(Coordination of Beacon, Probe Response and Measurement Pilot transmissions) are met. The Max Interval field is set to the value of dot11PassiveScanningTXInterval.

**8.5.8.3 Measurement Pilot frame format**

*Instructions to Editor: Change the Table 8-212 as shown below. Change the paragraph below the Table 8-212 as shown below.*

**Table 8-212—Optional subelement IDs for Measurement Pilot frame**

|  |  |  |  |
| --- | --- | --- | --- |
| Subelement ID | Name | Length filed (Octets) | Extensible |
| 0-70 | Reserved |   |   |
| 71 | Multiple BSSID | 1 to 255 | Subelements |
| 72 | Scanning Frame Transmission Interval | 1 |   |
| 73 | Neighbor Report | 1 to 255 | Subelements |
| 74~~2~~-220 | Reserved |   |   |
| 221 | Vendor Specific | 1 to 255 |   |
| 222-255 | Reserved |   |   |

The Multiple BSSID, Scanning Frame Transmission Interval, Neighbor Report and Vendor Specific subelements have the same format as the Multiple BSSID, Scanning Frame Transmission Interval, Neighbor Report and Vendor Specific elements (see 8.4.2.48, 8.4.2.ai5, 8.4.2.39 and 8.4.2.38, respectively). Multiple Neighbor Report and Vendor Specific subelements may be included in the list of optional subelements.

**10.1.4.2 Passive scanning**

*Instructions to Editor: Delete the current clause 10.1.4.2 and incorporate the new clauses 10.1.4.2.1, 10.1.4.2.2, and 10.1.4.2.3*

**10.1.4.2.1 Introduction**

*Instructions to Editor: Add new clauses 10.1.4.2.1*

The passive scanning STA receives transmitted frames and detects the available BSSs. The details of the passive scanning procedures are as specified in the following subclauses.

**10.1.4.2.2 Passive scanning procedure**

*Instructions to Editor: Add new clauses 10.1.4.2.2*

If the ScanType parameter of the MLME-SCAN.request indicates a passive scan, the STA shall listen to each channel scanned for no longer than a maximum duration defined by the MaxChannelTime parameter of the MLME-SCAN.request primitive. During the listening, the MLME shall issue MLME-SCAN.received primitive with the BSSDescriptionSet containing information of the AP when Probe Response, Measurement Pilot or Beacon frame is received from the AP for the first time.

**10.1.4.2.3 Coordination of Beacon, Probe Response and Measurement Pilot transmissions**

*Instructions to Editor: Add new clauses 10.1.4.2.3*

When the dot11PassiveScanningTXInterval is set to non-zero value, the AP shall include the Passive Scanning Transmission Interval element to all Beacon, Probe Response and Measurement Pilot frames it transmits. The Max Interval field of the Passive Scanning Transmission Interval element shall be set to the value of the dot11PassiveScanningTXInterval.

When the Passive Scanning Transmission Interval element is included, the AP shall transmit a Probe Response frame to broadcast address according to one of the following alternatives:

Alternative 1:

* The AP has not transmitted Beacon, Probe Response or Measurement Pilot frame within the duration indicated in the Max Interval.

Alternative 2:

* The AP has not transmitted Beacon, Probe Response or Measurement Pilot frame within the duration indicated in the Max Interval and the AP has not received a Beacon, Probe Response or Measurement Pilot frame that included the AP in the Neighborlist element of the frame within the duration indicated in the Max Interval.

The passive scanning operation is shown in figure 10-ai1.



**Figure 10-ai1—Example of passive scanning and coordination of Probe Response (PR RN), Beacon (BN) and Measurement Pilot (MP) transmissions**

**Annex C**

(normative)

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

dot11PassiveScanningTXInterval 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 time units (TUs) after which AP transmits a Probe Response frame addressed to broadcast address, if conditions as described in clause 10.1.4.2.3(Coordination of Beacon, Probe Response and Measurement Pilot transmissions) are met. DEFVAL { 20 }