802.11ba Draft Specification

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| --- |
| Spec Text Update for WUR Discovery |
| Date: 2018-06-18 |
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Abstract

This submission contains spec text to be incorporated in P802.11ba D1.0:

The content of this document is based on 11-18/0244r4 and the following motions in the SFD:

1. [Assigned D0.1] Define a type of WUR frame as WUR Discovery frame to assist the STAs to discover the BSS.

[Motion, Nov 2017, see [6] [61]]

1. [Assigned D0.3] Following information about APs’ WUR Discovery frames may be provided by the PCR :
* WUR Discovery Channel:
	+ Should be selected from a fixed subset of all possible WUR channels

[Motion, March 2018, see [8] [62]]

Revision History:

* Rev 0: Initial version of the document

***Editing instructions formatted like this are intended to be copied into the TGba Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGba Editor: Editing instructions preceded by “TGba Editor” are instructions to the TGba editor to modify or insert material in the TGba draft. As a result of adopting the changes, the TGba editor will execute the instructions rather than copy them to the TGba Draft.***

* Format of individual frame types
* Management frames
* Beacon frame format

***TGba Editor: Instruction: Insert the following row into Table 9-27 (Beacon frame body) maintaining row order:***

|  |
| --- |
| * Beacon frame body
 |
| Order | Information | Notes |
| <Last-1> | WUR Neighbor AP | The WUR Neighbor AP element is optionally present when dot11WURDiscoveryImplemented is true. |

* Probe Response frame format

***TGba Editor: Instruction: Insert the following row into Table 9-34 (Probe Response frame body) maintaining row order:***

|  |
| --- |
| * Probe Response frame body
 |
| Order | Information | Notes |
| <Last-1> | WUR Neighbor AP | The WUR Neighbor AP element is optionally present when dot11WURDiscoveryImplemented is true. |

* **Elements**
* **General**

***TGba Editor: Instruction: Insert the following new row into Table 9-77 (Element IDs) (header row shown for convenience):***

|  |
| --- |
| * **Element IDs**
 |
| **Element** | **Element ID** | **Element ID Extension**  | **Extensible** | **Fragmentable** |
| WUR Neighbor AP | 255 | <ANA> | Yes | No |

* WUR Operation element

***TGba Editor: Instruction: Modify Figure 9-589g (WUR Operation element format) as shown below:***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Element ID** | **Length** | **Element ID Extension** | **Minimum Wake-up Duration** | **Duty Cycle Period Units** | **WUR Operation class** | **WUR Channel** | **WUR Beacon Period** | **Offset of Offset of Target Wake-up radio Beacon Transmission Time (TWBTT)Target Wake-up Radio Beacon Transmission Time (TWBTT)** |
| Octets: | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | **WUR parameters** | **WUR Discovery Operating Class****(optional)** | **WUR Discovery Channel****(optional)** |
| Octets: | 1 | 0 or 1 | 0 or 1 |
| * WUR Operation element format
 |

***TGba Editor: Instruction: Insert the following sentences at the end of subclause 9.4.2.264 (WUR Operation element):***

The WUR Discovery Operating Class field and the WUR Discovery Channel field are only present when dot11WURDiscoveryImplemented is equal to true.

The WUR Discovery Operating Class field indicates the operating class in use for transmission of WUR Discovery frames by the WUR AP. The encoding is the same as the definition of Operating Class field in 9.4.1.22 (Operating Class and Channel field).

The WUR Discovery Channel field indicates the channel in use for transmission of WUR Discovery frames by the WUR AP. The encoding is the same as the definition of Channel field in 9.4.1.22 (Operating Class and Channel field).

***TGba Editor: Instruction: Insert the following new subclauses after the last subclause in 9.4.2:***

9.4.2.265 WUR Neighbor AP element

The WUR Neighbor AP element is used to advertise the WUR channels on which neighbor WUR APs transmit WUR Discovery frames. The format of the WUR Neighbor AP element is shown in Figure 9-xxx (WUR Neighbor AP element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Neighbor AP Information |
| Octets: | 1 | 1 | 1 | variable |
| Figure 9-xxx - WUR Neighbor AP element format |

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

The Neighbor AP Information field contains one or more Neighbor AP Information subfields. The format of the Neighbor AP Information subfield is shown in Figure 9-xxx (Neighbor AP Information subfield format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | WUR Discovery Operating Class | WUR Discovery Channel | Neighbor AP Count | Neighbor AP List |
| Octets: | 1 | 1 | 1 | variable |
| Figure 9-xxx - Neighbor AP Information subfield format |

The WUR Discovery Operating Class field indicates the operating class in use for transmission of WUR Discovery frames by neighboring WUR APs listed in this subfield. The encoding is the same as the definition of Operating Class field in 9.4.1.22 (Operating Class and Channel field).

The WUR Discovery Channel field indicates the channel in use for transmission of WUR Discovery frames by neighboring WUR APs listed in this subfield. The encoding is the same as the definition of Channel field in 9.4.1.22 (Operating Class and Channel field).

The Neighbor AP Count field indicates the number of neighbor AP subfields that are included in the Neighbor AP List field. The value 0 is reserved.

The Neighbor AP List field contains one or more Neighbor AP subfields. Each Neighbor AP subfield identifies one WUR AP. The format of the Neighbor AP subfield is shown in Figure 9-xxx (Neighbor AP subfield format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Short-SSID | Bitmap Control | BSSID |
| Octets: | 4 | 1 | 0 or 6 |
| Figure 9-xxx - Neighbor AP subfield format |

The Short-SSID field contains the Short-SSID as defined in 9.4.2.171.2 (Calculating the Short-SSID).

The Bitmap Control field indicates the presence of the BSSID field. The format of the Bitmap Control field is shown in Figure 9-xxx (Bitmap Control field format).

|  |  |  |
| --- | --- | --- |
|  | B0 | B1                                 B7 |
|  | BSSID Present | Reserved |
| Bits: | 1 | 7 |
| Figure 9-xxx - Bitmap Control field format |

The BSSID Present subfield is set to 1 if the BSSID field is present in the Neighbor AP subfield and is set to 0, otherwise.

The BSSID field contains the BSSID as defined in 9.2.4.3.4.

* WUR Discovery

***TGba Editor: Instruction*: *Change the paragraph below of this subclause as follows (Track changes on):***

A WUR AP with dot11WURDiscoveryImplemented equal to true shall periodically transmit WUR Discovery frames to assist WUR STAs in WUR AP discovery. The WUR AP shall include the WUR Discovery Operating Class and WUR Discovery Channel fields in the WUR Operation element to indicate the WUR channel used by the WUR AP to transmit WUR Discovery frames. s

A WUR non-AP STA may use its WURx to scan for WUR Discovery frames. Using the WURx to scan for WUR Discovery frames may be referred to as *WUR Smart Scan*.

A WUR AP with dot11WURDiscoveryImplemented equal to true may advertise on PCR the WUR channel(s) used by neighbor WUR APs to transmit WUR Discovery frames.

A WUR Neighbor APn element may be transmitted by a WUR AP with dot11WURDiscoveryImplemented equal to true in Beacon and Probe Response frames. The WUR Neighbor APn The element contains information of the WUR channels on which neighbor WUR APs transmit WUR Discovery frames.

A WUR non-AP STA receiving the WUR Neighbor AP element may use the information of the neighbor WUR APs to schedule WUR Smart Scan for faster WUR AP Discovery.

***TGba editor: Change Annex C as the following (Track changes on):***

**Annex C (normative)**

**ASN.1 encoding of the MAC and PHY MIB**

**C.3 MIB Detail**

Dot11StationConfigEntry ::= SEQUENCE

 {

 …,

 dot11FutureChannelGuidanceActivated TruthValue,

 dot11WUROptionImplemented TruthValue,

 dot11WURBeaconPeriod Unsigned32,

 dot11WURChannelSwitchActivated TruthValue,

 dot11WURDiscoveryImplemented TruthValue,

 }

…

dot11WURDiscoveryImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable. It is written by an external management entity or the SME. Changes take effect as soon as practical in the implementation. This attribute when true, indicates the capability of the STA to transmit WUR Discovery frames and WUR Neighbor AP element (see 31.10 (WUR Discovery)). The capability is disabled otherwise."

DEFVAL { false }

::= { dot11StationConfigEntry <ANA>}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* End of dot11StationConfigTable TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*