IEEE P802.11  
Wireless LANs

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| Issues with resolutions to CIDs 2592 and 2684 | | | | |
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Abstract

This document describes some issues with the previously adopted resolutions to CIDs 2592 and 2694. Ramifications are proposed.

Revision history:

R0: initial submission.

R1: based on offline suggestions from Rojan, added MaxChannelTime parameter in the MLME-WURDiscovery.request primitive, and consolidated the parameters in the MLME-WURDiscovery.confirm primitive into BSSDescriptionfromWDSet, using a style similar to BSSDescriptionfromFDSet that is obtained from FILS Discovery, according to 802.11ai-2016 and REVmd D2.1. These changes are either highlighted or colored.

**Introduction**

Subclause 6.3.124 and description of MLME-WURDISCOVERY.indication primitive is added to P802.11ba D2.1 to resolve CIDs 2592 and 2694. Furthermore, the use of MLME-WURDISCOVERY.indication primitive is described in subclause 30.11 (WUR Discovery), as follows:

* WUR Discovery

“…

A WUR non-AP STA with dot11WURDiscoveryImplemented equal to true may perform WUR scanning to discover WUR APs. Upon receipt of a WUR Discovery frame, an MLME-WURDISCOVERY.indication primitive may be issued by the MLME to inform the SME of the discovered WUR AP. (#2513, #2514)”

**Discussions**

Essentially, MLME-WURDISCOVERY.indication is a wrong primitive to use here. With only a few exceptions, almost all actions specified across the MLME SAP in 802.11 are initiated by the SME of a STA with an ACTION.request primitive, in most cases, including one or more parameters that the MLME of the STA needs in order for the MAC sub-layer to perform the action. In response, the MLME of the STA returns an ACTION.confirm primitive to the SME to notify the result. In this kind of actions, ACTION.indication primitive is for the peer STA, not the STA itself. The exceptions, where an action is initiated by the MLME of a STA with an ACTION.indication primitive, are used for the MLME to report an error or failure detected by the MAC sub-layer, to the SME of the STA. These exceptions are:

* 6.3.21 MIC (michael) failure event
* 6.3.21.1 MLME-MICHAELMICFAILURE.indication
* 6.3.24 MLME-PROTECTEDFRAMEDROPPED
* 6.3.24.1 MLME- PROTECTEDFRAMEDROPPED.indication
* 6.3.94 PN event report
* 6.3.94.2 MLME-PN-EXHAUSTION.indication
* 6.3.94.3 MLME-PN-WARNING.indication

Clearly, WUR discovery belongs to the former type of actions, not the later, for the following reasons:

1. Just defining the MLME-WURDISCOVERY.indication primitive for the MLME to report the result to the SME means that the MAC sub-layer will initiate a WUR discovery action on its own, contradicting to the 802.11 reference model and the different roles of MAC, MLME, and SME each plays in accordance with that reference model.
2. For the MAC sub-layer to perform WUR discovery, the MLME needs parameters from the SME, for example, information about where to scan (such as the WUR Discovery Channel info), how long to scan, and optionally, what to scan for (such as the Transmitter ID, CompressedBSSID\_MSB, and Compressed SSID of the WUR AP). There is no way to pass on these parameters from the SME to the MLME using the MLME-WURDISCOVERY.indication primitive, because an ACTION.indication primitive is passed in the opposition direction.
3. WUR discovery is similar to scan (Subclause 6.3.3). Today, MLME-SCAN.request and MLME-SCAN.confirm primitives are used on the scanning STA, and MLME-SCAN.indication and MLME-SCAN.response primitives are used on its peer STA. So, defining MLME-WURDISCOVERY.indication primitive for the WUR scanning STA would create inconsistency with the basedline.

In conclusion, the WUR discovery action should use MLME-WURDISCOVERY.request and MLME-WURDISCOVERY.confirm primitives, instead of MLME-WURDISCOVERY.indication primitive.

**Suggested ramifications**

Update the resolutions to CIDs 2592 and 2694 with text changes that

* define MLME-WURDISCOVERY.request and MLME-WURDISCOVERY.confirm primitives in 6.3.124, instead of MLME-WURDISCOVERY.indication primitive, where
  + the MLME-WURDISCOVERY.request primitive may include parameters such as WURDiscoveryChannelList, MaxChannelTime, Transmitter ID, CompressedBSSID\_MSB, and Compressed SSID,
  + the MLME-WURDISCOVERY.confirm primitive includes BSSDescriptionFromWDSet to return a set of the same parameters that are specified in the MLME-WURDISCOVERY.indication primitive in P802.11ba D2.1, for each discovered WUR AP, and
* specify theWUR discovery procedure in 30.11 in accordance with the new primitives.

Detailed instruction and text changes begin on the next page. (Note: the previously adopted resolution to CID 2513 does not need to be changed. However, the text changes in subclause 30.11 in this document, related to the use of MLME-WURDISCOVERY.request primitive and MLME-WURDISCOVERY.confirm primitive, supersedes the text related to the use of MLME-WURDISCOVERY.indication primitive at the same location from the previously adopted resolution to CID 2513.)

**Motion:**

Move to revise the resolutions to CIDs 2592 and 2694 to read:

“Revised. Agree in principle with the commenter. MLME SAPs related to WUR Scanning are added.

TGba editor to incorporate the changes shown in 11-19/650r1.”

***<Change #1. Instruction to Editor: modify subclause 6.3.124 (WUR Discovery) in P802.11ba D2.1 as highlighted below.>***

* WUR Discovery(#2592,#2694)
* General

The following MLME primitives support the WUR discovery procedure described in 30.11 (WUR Discovery).

6.3.124.2 MLME-WURDISCOVERY.request

6.3.124.2.1 Function

This primitive requests a survey of a WUR Discovery frame.

6.3.124.2.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-WURDISCOVERY.request(

WURDiscoveryChannelList,

MaxChannelTime,

Transmitter ID,

CompressedBSSID\_MSB,

Compressed SSID)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| WURDiscoveryChannelList | A set of operating class and channel information as defined in 9.4.1.22  (Operating Class and Channel field) | Each channel is  selected from the  valid channel range  for the appropriate  PHY and carrier set | Specifies the WUR discovery channels that are examined when scanning for a WUR Discovery frame. |
| MaxChannelTime | Integer | >2 | The maximum time (in TU) to spend on  each WUR discovery channel when scanning for WUR Discovery frames. |
| Transmitter ID | Integer | As defined in 30.4.2 (Transmitter ID) | The Transmitter ID of the WUR AP to be discovered. This parameter is optionally present. |
| CompressedBSSID\_MSB | Integer | As defined in 9.10.3.3 (WUR Discovery frame format) | The 12 MSBs of the compressed BSSID of the WUR AP to be discovered. This parameter is optionally present. |
| Compressed SSID | Integer | As defined in 9.10.3.3 (WUR Discovery frame format) | The 16 LSBs of the Short-SSID of the WUR AP to be discovered. This parameter is optionally present. |

6.3.124.2.3 When generated

This primitive is generated by the SME for a WUR non-AP STA to determine if there are other BSSs that it can join.

6.3.124.2.4 Effect of receipt

This request initiates the WUR discovery procedure.

* 6.3.124.3 MLME-WURDISCOVERY.confirm
* 6.3.124.3.1 Function

This primitive indicates the receipt of a WUR Discovery frame during WUR discovery procedure.

* 6.3.124.3.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-WURDISCOVERY.confirm(

BSSDescriptionFromWDSet,

ResultCode)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| BSSDescriptionFromWDSet | Set of  BSSDescriptionFromWDs | N/A | The BSSDescriptionFromWDSet is returned to indicate the results of the WUR discovery derived from WUR Discovery frames. It is a set containing zero or more instances of a BSSDescriptionFromWD. Present if both dot11WUROptionImplemented and dot11WURDiscoveryImplemented are true;  Otherwise, not present. |
| ResultCode | Enumeration | SUCCESS,  NOT\_SUPPORTED | Indicates the result of the MLME-WURDISCOVERY.confirm primitive. |

Each BSSDescriptionFromWD consists of the parameters shown in the following table for a WUR AP discovered.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| Transmitter ID | Integer | As defined in 30.4.2 (Transmitter ID) | The Transmitter ID of the WUR AP carried in the ID field of the WUR Discovery frame. |
| CompressedBSSID\_MSB | Integer | As defined in 9.10.3.3 (WUR Discovery frame format) | The 12 MSBs of the compressed BSSID of the WUR AP carried in the Type ype Dependent ependentControl field of the WUR Discovery frame.(#Ed) |
| Compressed SSID | Integer | As defined in 9.10.3.3 (WUR Discovery frame format) | The 16 LSBs of the Short-SSID of the WUR AP. |
| Operating Channel | Operating class and channel information as defined in 9.4.1.22  (Operating Class and Channel field) | As defined in 9.10.3.3 (WUR Discovery frame format) | Specifies the primary channel of the WUR AP. |

* 6.3.124.3.3 When generated

This primitive is generated by the MLME to report the operating environment of the STA. It is issued after receiving an MLME-WURDISCOVERY.request primitive.

* 6.3.124.3.4 Effect of receipt

The SME is notified of the results of the WUR discovery procedure.

***<Change #2. Instruction to Editor: modify subclause 30.11 (WUR Discovery) in P802.11ba D2.1 as highlighted below. Note to TGba Editor: The text changes in subclause 30.11 below revises and supersedes the text regarding the use of MLME-WURDISCOVERY.indication primitive at the same location from the previously adopted resolution to CID 2513.>***

* WUR Discovery

…

A WUR non-AP STA with dot11WURDiscoveryImplemented equal to true may perform WUR scanning to discover WUR APs. Upon receipt of the MLME-WURDISCOVERY.request primitive, the WUR non-AP STA shall perform WUR discovery procedures according to the parameters given in the primitive. The WURDiscoveryChannelList parameter indicates the WUR discovery channel(s) to be scanned. The MaxChannelTime parameter indicates the maximum time (in TU) to spend on each WUR discovery channel within the WURDiscoverChannelList parameter when scanning for WUR Discovery frames. The Transmitter ID parameter, if present in the primitive, indicates the Transmitter ID of the WUR AP to be discovered. The CompressedBSSID\_MSB parameter, if present in the primitive, indicates the 12 MSBs of the compressed BSSID of the WUR AP to be discovered. The Compressed SSID parameter, if present in the primitive, indicates the 16 LSBs of the Short-SSID of the WUR AP to be discovered. When none of the Transmitter ID, CompressedBSSID\_MSB, and Compressed SSID parameters are present in the MLME-WURDISCOVERY.request primitive, the WUR non-AP STA scans for WUR Discovery frames from any WUR APs.~~matching all the parameters given in the MLME-WURDISCOVERY.request primitive,~~ After scanning one WUR discovery channel, the WUR non-AP STA shall initiate scanning in another WUR discovery channel if at least one WUR discovery channel within the WURDiscoveryChannelList parameter has not yet been scanned. When the WUR non-AP STA has completed scanning all indicated WUR discovery channels, it returns the scan results via an MLME-WURDISCOVERY.confirm primitive. (#2513, #2514)