IEEE P802.11
Wireless LANs

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| Mutliband\_60GHz\_location\_capability\_publication |
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Abstract

This document presents the changes needed to enable publication of 60GHz location capabilities of STA or APs that are not collocated with the sending AP.

Discussion:

Mobile STA may have a multiband capability allowing them to transmit and receive data in both the 2.4/5GHz band and in the 60GHz band. They may also be able to use location services provided by APs in both the 60GHz band and the lower bands. Such mobile STAs may not have their 60GHz radios always active, to save power when 60GHz service is not available. We propose to enable APs in the 5GHz band to publish the availability of 60GHz location service in APs in the vicinity of the publishing AP.

The proposed methodology is to use two fields in the extended capability element. One field would indicate the existence of 60GHz APs with locations services in the vicinity of the publishing AP.

The second field will indicate that the AP is capable of providing additional information about 60GHz location services APs: their operating channels, their locations (Location Civic Information), their beacon schedule.

The information about those neighboring 60GHz APs will be provided to STA using Neighbor Report Request and Response Protocol. The mobile STA requests using the Neighbor Report Request and the AP responds with Neighbor Report Response.

***TGaz Editor: Insert the following new lines in table 9-283 extended capabilities element***

1. —Table 9-283—Extended Capabilities element

|  |  |  |
| --- | --- | --- |
| Bits | Information | Notes |
| <ANA> | PDMG/PEDMG supporting APs in the area | An AP STA sets this field to 1 to indicate that APs providing location services using PDMG/PEDMG are in the vicinity of the AP STA. Definition of vicinity is implementation dependent. The AP may be capable of providing information about those PDMG/PEDMG. |

***TGaz Editor: Insert the following before 9.4.2.24 (RSNE)***

***9.4.2.20 Measurement Request element***

*Modify the penultimate row of Table 9-100—**Measurement type definitions for measurement requests and add a row above it as follows:*

|  |  |
| --- | --- |
| Neighboring PDMG/PEDMG APs | 17 |
| Reserved | 18-254 |

***TGaz Editor: insert the following after 9.4.2.26 (Extended Capabilitie element)***

**9.4.2.36 Neighbor Report element**

*Modify Figure 9-334—BSSID Information field as follows:*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 | B3 | B4 B9 | B10 | B11 | B12 | B13 | B14 | B1~~4~~5 B31 |
|  | AP Reachability | Security | Key Scope | Capabilities | Mobility Domain | High Throughput | Very High Throughput | FTM | PDMG/ PEDMG | Reserved |
| bits: | 2 | 1 | 1 | 6 | 1 | 1 | 1 | 1 | 1 | 1~~8~~7 |

*Modify the 5th paragraph after figure 9-335 (Capabilities subfield****)*** *as follows:*

The PDMG/PEDMG field indicates that the AP supports PDMG or PEDMG positioning.

Bits 15~~4~~–31 are reserved.

***TGaz Editor: Add the following before 9.6.7***

***9.6.6* Radio Measurement action details**

**9.6.6.6 Neighbor Report Request frame format**

***Modify “Figure 9-845—Neighbor Report Request frame Action field format” as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category | Radio Measurement Action | Dialog Token | SSID(optional) | LCI MeasurementRequest(optional) | Location CivicMeasurementRequest(optional) | Neighbor PDMG/ PEDMG Request (optional) |
| octets: | 1 | 1 | 1 | 1 | variable | variable | variable |

***Add the following at the end of 9.6.6.7***

The Neighbor PDMG/PEDMG Request field is optionally present. If present it contains a Measurement Request Element with Measurement Type field equal to Neighboring PDMG/PEDMG APs (see Table 9-100- Measurement type definitions for measurement requests). The element indicates a request for a Neighbor Report Elements containing information about neighboring APs supporting PDMG/PEDMG location services. The Enable bit in the Measurement Request Mode field within the Measurement Request element is set to 0.

***TGaz Editor: Insert the following before 11.22***

**11.10.10.2 Requesting a neighbor report**

*Add the following at the end 11.10.10.2*

To request a list of neighboring APs that support PDMG/PEDMG location services, the STA shall transmit a Neighbor Report Request frame that includes a Neighbor PDMG/PEDMG APs field with Measurement Request element with the value of its Measurement Type field equal to Neighboring PDMG/PEDMG APs. A STA shall not send this type of request to an AP if the AP has set the PDMG/PEDMG supporting APs information field to 0 in the Extended Capabilities element that the STA has received. The Neighbor Report Request frame shall include an SSID element with the SSID set to wildcard SSID.

*Add the following at the end 11.10.10.3*

An AP that has set the PDMG/PEDMG supporting APs information field to 1 in the Extended Capabilities element that receives a Neighbor Report Request frame that includes a Measurement Request element with value of its Measurement Type field equal to Neighboring PDMG/PEDMG APs, shall respond with a Neighbor Report Measurement frame with a list of Neighbor Report elemenets of neighboring DMG/EDMG APs supporting location services. Per each DMG/EDMG AP, the Neighbor Report element shall include a Measurement Report subelement with the Measurement Type field equal to LCI. If available to the sending AP, the Neighbor Report element shall include a TSF subelement. The definition of which APs are neighboring APs is implementation dependent. If the AP sending the message have 60GHz location capabilities, it should be included in the list.

**References:**

**[1] RevMD D2.0**

**[2] TGaz D0.5**