IEEE P802.11
Wireless LANs

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| CR for 6GHz – 6GHz Map |
| Date: 2018-09-05 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Laurent Cariou |  |  |  | laurent.cariou@intel.com |

Abstract

This document provides CR for CIDs 15833.

1. **Introduction**

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. The introduction and the explanation of the proposed changes are not part of the adopted material.

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

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

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 15833 | 27 | 253.05 | Some channels at 6GHz are likely to be disallowed for operation because of the presence of incumbents. APs should have the ability to inform the STAs of which channels are disallowed in their location. This way, the STAs performing scanning at 6GHz, which will be needed anyway to detect 6GHz-only APs such as soft APs, will only scan the channels on which there could be operating APs and will not spend time and energy on channels that are not allowed. | Define an element or frame carrying the list of channels that are allowed in the current location, and possibly the regulatory power limits on the different bands. Define a way for a STA to query such list. | Revised – agree with the commenter. Apply the changes proposed in doc 1500r0. |

1. **Proposed changes**

Because of the presence of incumbents at 6GHz, some channels will be disabled and some channels will have power limitations in a particular location. Master APs will have this information while non-AP STAs will not.

In order to allow STAs to efficiently scan 6GHz band, especially to identify 6GHz-only APs, it is useful for the STA to get the information about what channels are enabled or power restricted, in order to focus their scan.

We should then define a 6GHz Map element that includes the list of channels that are enabled in this location and the power constraints in these channels.

We should define a way for a STA to send a request to an AP to query this information.

***Editor: Add the following subclause 9.4.2.xxx 6GHz Map element:***

9.4.2.xxx 6GHz Map element

The 6GHz Map element includes a list of channels on which transmission is allowed in their current location. The format of the 6GM Information field is determined by the value of the 6GM Control field. The format of the 6GM element is shown in Figure xxx (6GM element format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID extension | 6GM Control | 6GM Bitmap | 6GM Channel List | 6GM Power constraint list |
| Octets: | 1 | 1 | 1 | 1 | 0 or 8 | 0 or Variable | 0 or Variable |
|  |  | Figure xxx – 6GM element format(11af) |  |

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

The format of the 6GM Control subfield is defined as in Figure xxx – 6GM Control subfield format.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Bitmap/List | Power Constraints Included | 6GM Type | Reserved |
| Bits: | 1 | 1 | 3 | 3 |
|  | Figure xxx – 6GM Control subfield format (11af) |

The Bitmap/List subfield indicates if the list of channels within the 6 GHz band on which transmissions are enabled in their current location is provided with a bitmap or a list of channels. The field is set to 0 if the list of channels is provided in the form of a bitmap. The field is set to 1 if the list is provided in the form of a list of channels.

The format of the 6GM Type subfield is defined as in Table xxx – 6GM Type subfield encoding.

|  |
| --- |
| Table xxx – 6GM Type subfield encoding |
| 6GM type subfield subfield value | Description |
| 0 | Information provided per 20MHz channels defined in Annex E tables |
| 2-7 | Reserved |

The 6GM Bitmap subfield is present if the Bitmap/List subfield is set to 0. If the 6GM Type subfield is set to 0, the subfield is a bitmap that indicates which 20MHz channel is enabled for transmission in the current location. Bit i of the bitmap corresponds to the 20MHz channel with the Channel center frequency index equal to 4\*i+1 (Annex E Table 0.1 (Global operating classes) in the line with Operating class 131). The Bits 59 to 63 are reserved. A 20MHz channel is enabled for transmission in the current location if the corresponding bit of the bitmap is set to 1. A 20MHz channel is not enabled for transmission in the current location if the corresponding bit of the bitmap is set to 0.

The 6GM Channel List subfield is present if the Bitmap/List subfield is set to 1. If the 6GM Type subfield is set to 0, the 6GM Channel List subfield contains a list of 6GM Channel fields, where each 6GM Channel field has the Channel Number subfield set to the Channel center frequency index of one of the 20MHz channels in Annex E Table 0.1 in the line with Operating class 131 on which operation is enabled in their current location.

The format of the 6GM Channel subfield is defined in figure xxx (6GM Channel field format).

|  |  |
| --- | --- |
|  | B0 B7 |
|  | Channel number |
| Bits: | 8 |
|  | figure xxx (6GM Channel field format) |

The 6GM Power Constraints List subfield is present if the Power Constraints Included subfield is set to 1, otherwise it is not present. The 6GM Power Constraints List subfield contains a list of 6GM Power Constraint fields.

If the Bitmap/List subfield is set to 1, the number of 6GM Power Constraint subfields in the 6GM Power Constraints List subfield is equal to the number of 6GM Channel subfields in the 6GM Channels List subfield, and the Maximum Power Level subfield of the 6GM Power Constraint subfield of index i in the 6GM Power Constraints List subfield defines the maximum transmit power level allowed in the channel indicated by the Channel number subfield in the 6GM Channel subfield of index i in the 6GM Channels List subfield.

If the Bitmap/List subfield is set to 0, the number of 6GM Power Constraint subfields in the 6GM Power Constraints List subfield is equal to the number of bits set to 1 in the 6GM Bitmap subfield, and the Maximum Transmit Power Level subfield of the 6GM Power Constraint subfield of index i in the 6GM Power Constraints List subfield defines the maximum power level allowed in the channel corresponding to the ith bit set to 1 in the 6GM Bitmap subfield.

The format of the 6GM Power Constraint subfield is defined in figure xxx (6GM Channel field format). The Maximum power level subfield is coded as an unsigned integer in units of decibels relative to 1mW.

|  |  |
| --- | --- |
|  | B0 B7 |
|  | Maximum Transmit Power Level |
| Bits: | 8 |

 Figure xxx – 6GM Power Constraint subfield encoding

* Protected HE Action frame details
* Protected HE Action field

***Editor: Insert the following new row into Table 9-421ad (Protected HE Action field values):***

|  |
| --- |
| * Protected HE Action field values
 |
| Value | Meaning |
| 1 | 6GHz Map request |
| 2 | 6GHz Map response |
| 3-255 | Reserved |

***Editor: Insert the following subclause 9.6.29.3 6GHz Map Request frame format:***

**9.6.29.3 6GHz Map Request frame format**

The 6GHz Map Request frame is an Action frame of category Protected HE. The Action field of an 6GHz Map Request frame contains the information shown in Table xxx (6GHz Map Request frame Action field format).

|  |
| --- |
| Table xxx – 6GHz Map Request frame Action field format  |
| Order | Information |
| 1 | Category |
| 2 | Protected HE Action |

The Category field is defined in Table 9-47 (Category values).

The Protected HE Action field is defined in Table 9-421ad (Protected HE Action field values).

***Editor: Insert the following subclause 9.6.29.4 6GHz Map Response frame format:***

**9.6.29.4 6GHz Map Response frame format**

The 6GHz Map Response frame is an Action frame of category Protected HE. The Action field of an 6GHz Map Response frame contains the information shown in Table xxx ( 6GHz Map Response frame Action field format).

|  |
| --- |
| Table xxx – 6GHz Map Response frame Action field format  |
| Order | Information |
| 1 | Category |
| 2 | Protected HE Action |
| 3 | 6GHz Map report control |
| 4 | 6GHz Map element |

The Category field is defined in Table 9-47 (Category values).

The Protected HE Action field is defined in Table 9-421ad (Protected HE Action field values).

The format if the 6GHz MAP Report Control field is defined in figure xxx (6GHz MAP Report Control).

|  |  |  |
| --- | --- | --- |
|  | B0 B7 | B8 B15 |
|  | Map not available | Reserved |
| Bits: | 1 | 7 |

 Figure xxx (6GHz Map Report Control field format)

The 6GHz Map element is defined in 9.4.2.xxx (6GHz Map element) and is optionally present in the frame.

27.16.1 Basic HE BSS operation

***Editor: Add the following text to subclause 27.16.1.1 Basic HE BSS operation in the 6GHz band:***

27.16.1.1 Basic HE BSS operation in the 6GHz band

An HE AP STA may broadcast or send to a non-AP STA that indicated support for operation in the 6GHz band a 6GHz Map element in order to describe the list of channels that are enabled for operation in their current location, and the power constraints on these channels. This element may be included in a 6GHz Map Response frame, or in a protected (re)association response frames if FILS authentication is used.

An HE non-AP STA may send a 6GHz Map Request frame to any AP that is part of a Multi-band device that has an AP that operates in the 6GHz band in order to query a 6GHz Map Response that carries a 6GHz Map element in order to describe the list of channels that are enabled for operation in their current location, and their power constraints. An AP that operates in the 6GHz band or that is part of a Multi-band device that has an AP that operates in the 6GHz band shall be capable of responding to the 6GHz Map Request with a 6GHz Map response.

* Association Response frame format

***Editor: Add the following line in the***  Table 9-30 (Association Response frame body):

|  |
| --- |
| * Association Response frame body
 |
| **Order** | **Information** | **Notes** |
| 62 | 6GHz Map | The 6GHz Map element is optionally present if FILS authentication is used and the Association Response frame is protected and if the AP is operating at 6GHz or is part of a multi-band device that includes an AP operating at 6GHz. (#12383) |

* Reassociation Response frame format

***Editor: Add the following line in the***  Table 9-32 (Reassociation Response frame body):

|  |
| --- |
| * Reassociation Response frame body
 |
| **Order** | **Information** | **Notes** |
| 62 | 6GHz Map | The 6GHz Map element is optionally present if FILS authentication is used and the Association Response frame is protected and if the AP is operating at 6GHz or is part of a multi-band device that includes an AP operating at 6GHz. (#12383) |