IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Comment Resolution on 6 GHz Regulatory | | | | | | Date: 2021-05-19 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm |  |  | [youhank@qti.qualcomm.com](mailto:youhank@qti.qualcomm.com) | | Tevfik Yucek | Qualcomm |  |  |  | | Thomas Derham | Broadcom |  |  |  | | Hassan Yaghoobi | Intel |  |  |  | | Carlos Cordeiro | Intel |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following comments from comment collection on P802.11-REVme D0.0:

596, 598, 599, 600

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

R1: Updated based on offline discussion.

R2: Further refinements made.

R3: Updated based on feedback during the 5/13/2021 TGme meeting.

R4: Incorporated feedback from Mark Rison.

R5: Incorporated feedback from Mark Rison (clarify that a WLAN STA is not an external system).

R6: Updated during 5/24/2021 conference call.

# CID 596, 598, 599, 600

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 600 | E.2.7.1.6 | 4355.25 | 6 GHz band is available for use by WLAN in countries other than USA as well. Some of those countries also have multiple AP types. | Make E.2.7.1.6 applicable to all countries, or add new subclauses to address non-USA countries using 6 GHz. |
| 596 |  |  | In 802.11ax (to be merged into REVme), the HE Operation element's Regulatory Info field is defined only for US country. However there are emerging regulations in other countries where explicit indication of the AP type is useful | Expand definition of this field to other countries where needed |
| 598 | E.2.7.1.6 | 4355.25 | United States Federal Communications Commission (FCC) has issued a Public Notice [1] on January 11, 2021 and is expected to allow client devices to communicate with each other. Under these rules, known as Client-to-Client communications (C2C), client devices, such as smartphones, can communicate with each other when they can receive and decode an indoor access point enabling signal. This enabling signal can be beacons from indoor access points.  When a client device is enabled for C2C, it would need to set up its own network so that other client devices can communicate with it. Clients connecting to a C2C Access Point will be required to be anabled using an indoor access point as well. Hence, a new device category should be added to Table E-12 to indicate Access Point is operating under C2C rule. | Copy subclause E.2.7.1.6 from P802.11ax D8.0 to REVme D0.0, and make the following updates on top of it:  Add "Client-to-Client Access Point" in Table E-12  Add explanatory text to Section E.2.7.1.6: "A non-AP STA that wants to communicate with a Client-to-Client Access Point shall also meet the regulatory requirements of Client-to-Client device category as defined in regulatory rules." |
| 599 | E.2.7.1.6 | 4355.25 | FCC FNPRM from April 2020 indicates that FCC will likley allow Very Low Power operation in the 6 GHz band. However, Annex E, specifically Table E-12 does not include Very Low Power Access Point category. | Copy subclause E.2.7.1.6 from P802.11ax D8.0 to REVme D0.0, and make the following updates on top of it:  Add "Very Low Power Access Point" in Table E-12 |

**Discussion**

Regarding CIDs 596 and 600, following are countries/regions where WLAN is allowed to operate in the 6 GHz band by the respective regulatories.

Countries allowing LPI and SP APs:

* USA

Countries allowing LPI and VLP APs:

* Brazil
* Costa Rica
* EU
* Korea
* UK

Countries allowing LPI APs:

* Chile
* Guatemala
* Honduras
* UAE

As noted above, all regulatory domains so far follow similar rules (LPI, VLP, SP AP). And it is expected that most other regulatory domains considering to open up 6 GHz for WLAN operation would follow similar rules as well. Hence, it would be beneficial to generalize Annex E.2.7 applicable to any regulatory domains which permits operation in the 6 GHz band. As we generalize Annex E.2.7 from being US specific to be more globally applicable, the last paragraphse in E.2.7 pertaining to the Fixed Client Device is FCC centric, and does not require any aid from the IEEE 802.11 standard – how a Fixed Client Device behaves is described by FCC, and does not require any ‘protocol/signaling’ from IEEE 802.11. Hence, that paragraph is deleted.

Regarding CIDs 598 and 599, United States Federal Communications Commission (FCC) has issued a Further Notice of Proposed Rule Making (FNPRM) [1] to allow very low power (VLP) devices in the 6 GHz band in April 2020. A decision adding VLP category to 6 GHz rule is expected before the end of this year.

FCC has also issued a Public Notice [2] on January 11, 2021 and is expected to allow client devices to communicate with each other. This operation mode is known as Client-to-Client (C2C) communications. Under C2C rules, client devices, such as smartphones, can communicate with each other when they can receive and decode an indoor access point enabling signal. This enabling signal can be beacons from indoor access points. When a client device is enabled, it would need to set up its own network so that other client devices can communicate with it. Clients connecting to an Access Point which is a Client-to-Client device will also be required to be enabled using an indoor access point. Hence, a new device category should be added to Table E-12. Furthermore, it is possible that a Standard Power AP is located indoors, and thus could act as an indoor access point enabling C2C communications by devices which can see the Standard Power AP. In order for clients to recognize whether this Standard Power AP is located indoors or not, we need to add another device category signaling an Indoor Standard Power Access Point.

[1] <https://docs.fcc.gov/public/attachments/FCC-20-51A1.pdf>

[2] <https://docs.fcc.gov/public/attachments/DA-21-7A1.pdf>

**Proposed Resolution: CIDs 596, 598, 599, 600**

**Revised**.

**Note to Commenter:**

Instruction to Editor below copies E.2.7.1.6 from 11ax D8.0 and edits it further to define Very Low Power Access Point, Client-to-Client Device and Indoor Standard Power Access Point. Furthermore, the instruction also makes Annex E.2.7 applicable to any regulatory domains which permits operation in the 6 GHz band.

**Instruction to Editor:**

Implement the proposed text updates for CIDs 596, 598, 599 and 600 in <https://mentor.ieee.org/802.11/dcn/21/11-21-0790-06-000m-revme-cc35-6ghz-comments.docx>

**Proposed Text Updates: CIDs 596, 598, 599, 600**

*Instruction to Editor: Add the following at D0.0 P4355L25. (NOTE – this is equivalent to copying E.2.7 from P802.11ax D8.0, and then making the changes marked by the MS Word track change)*

E.2.7 6 GHz band

When operating in the 6 GHz band, Table E-4 is used for the operating classes, so the third octet of the dot11CountryString is 4. For example, when operating in the 6 GHz band in the United States, the Country String field in the Country element is set to (in hexadecimal) 0x55, 0x53, 0x04.

NOTE—The first two octets indicate the US. The third octet indicates that Table E-4 is in use (see Annex C).

The Regulatory Info subfield in the Control field of the 6 GHz Operation Information field of the HE Operation element is interpreted as shown in Table E-12 when operating in the 6 GHz band. Each regulatory domain might have additional regulations for each Regulatory Info subfield value. Operation in such regulatory domains is subject to the additional regulations. Some values defined in Table E-12 might not be valid in all regulatory domains. If a certain Regulatory Info subfield encoding value is not valid in a regulatory domain, then the value is not used when operating in that regulatory domain.

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| * Regulatory Info subfield encoding | |
| Value | Description |
| 0 | Indoor AP  An AP whose operation does not require control from an external system such as an Automated Frequency Coordination (AFC) system but that is subject to additional regulatory requirements intended to prohibit outdoor operation. |
| 1 | Standard power AP  An AP whose operation requires control from an external system such as an AFC system. |
| 2 | Very low power AP  An AP whose operation does not require control from an external system such as an AFC system, is not subject to additional regulatory requirements intended to prohibit outdoor operation, and is restricted to very low transmit power. |
| 3 | Indoor enabled AP  An AP whose operation relies on being able to successfully receive an enabling signal (as defined by the regulatory rules) from an indoor AP or an indoor standard power AP. |
| 4 | Indoor standard power AP  An AP whose operation requires control from an external system such as an AFC system and that is subject to additional regulatory requirements intended to prohibit outdoor operation. |
| 5-7 | Reserved |

In Table E-12, a WLAN STA is not an external system.

NOTE – For example, an indoor enabled AP is not a standard power AP because the indoor AP or the indoor standard power AP (from which the indoor enabled AP receives the enabling signal) are not external systems.

The value 4 (indoor standard power AP) for the Regulatory Info subfield is used instead of the value 0 (indoor AP) when the transmit power for all or part of the indoor AP’s BSS bandwidth is controlled by an external system such as an AFC system.

The Maximum Transmit Power Category subfield of the Transmit Power Envelope element is interpreted as shown in Table E-13 when operating in the 6 GHz band. Each regulatory domain might have additional regulations for each Maximum Transmit Power Category subfield value. Operation in such regulatory domains is subject to the additional regulations. Some values defined in Table E-13 might not be valid in all regulatory domains. If a certain Maximum Transmit Power Category subfield encoding value is not valid in a regulatory domain, then the value is not used when operating in that regulatory domain.

|  |  |
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| * Maximum Transmit Power Category subfield encoding | |
| Value | Description |
| 0 | Default |
| 1 | Subordinate device  A device that operates under the control of an indoor AP with additional requirements specified by the regulatory domain in which the AP is operating. |
| 2-3 | Reserved |

An AP operating in the 6 GHz band shall send at least one Transmit Power Envelope element in Beacon and Probe Response frames as follows:

— Maximum Transmit Power Category subfield = Default; Unit interpretation = Regulatory Client EIRP PSD

When operating in the 6 GHz band in a regulatory domain in which a subordinate device (see Table E-13) is supported, an AP that is an indoor AP or indoor standard power AP per regulatory rules shall also send the following Transmit Power Envelope element in Beacon and Probe Response frames:

* Maximum Transmit Power Category subfield = Subordinate device; Unit interpretation = Regulatory client EIRP PSD

A regulatory client EIRP PSD value advertised by an AP that is a standard power AP or indoor standard power AP shall be set to the highest value that meets the authorized client transmit power limits for the corresponding category obtained from the external system required by the regulatory rules, such as an AFC system, and any other client PSD regulatory rules for the corresponding 20 MHz channel.

If the regulatory client EIRP PSD values advertised by an AP that is a standard power AP or indoor standard power AP are insufficient to ensure that regulatory client limits on total EIRP are always met for all transmission bandwidths within the bandwidth of the AP's BSS, the AP shall also send a Transmit Power Envelope element in Beacon and Probe Response frames as follows:

* Maximum Transmit Power Category subfield = Default; Unit interpretation = Regulatory client EIRP

NOTE—In the case of regulatory rules where the maximum transmit power for client devices is lower than the maximum transmit power for APs, the regulatory client maximum transmit power advertised by the AP for client devices might be lower than the regulatory client maximum transmit power the AP is authorized to use for its own transmissions.

If a non-AP STA that is a subordinate device per regulatory rules receives Transmit Power Envelope elements with Local Maximum Transmit Power Category subfields indicating a subordinate device, it may ignore any other received Transmit Power Envelope elements that indicate other values in the Maximum Transmit Power Category subfield.

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