IEEE P802.11
Wireless LANs

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| Comment Resolution on 6 GHz Regulatory |
| Date: 2021-05-07 |
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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.

# CID 598, 599

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 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-12Add 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**

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 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 a C2C Access Point will also be required to be enabled using an indoor access point. Hence, a new device category should be added to Table E-12.

[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 598, 599**

**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 and Client-to-Client Access Point.

**Instruction to Editor:**

Implement the proposed text updates for CIDs 598 and 599 in <https://mentor.ieee.org/802.11/dcn/21/11-21-0790-00-000m-revme-cc35-6g-comments.docx>

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

*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

* 6 GHz band in the United States

In the United States, when operating in the 6 GHz band, 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 in the United States.

|  |
| --- |
| * Regulatory Info subfield encoding in the United States
 |
| Value | Description |
| 0 | Indoor Access Point |
| 1 | Standard Power Access Point |
| 2 | Very Low Power Access Point |
| 3 | Client-to-Client Access Point |
| 4-7 | Reserved |

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 in the United States.

|  |
| --- |
| * Maximum Transmit Power Category subfield encoding in the United States
 |
| Value | Description |
| 0 | Default |
| 1 | Subordinate Device |
| 2-3 | Reserved |

An AP that is an Indoor Access Point per regulatory rules shall send at least two Transmit Power Envelope elements in Beacon and Probe Response frames as follows:

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

An AP that is a Standard Power Access Point, Very Low Power Access Point or a Client-to-Client Access Point per regulatory rules 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

A regulatory client EIRP PSD value advertised by an AP that is a Standard Power Access Point shall be set to the highest value that meets the authorized client transmit power limits for the corresponding category obtained from the AP's 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 Access Point 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 Access Points, 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 Subordinate Device, it may ignore any other received Transmit Power Envelope elements that indicate other values in the Maximum Transmit Power Category subfield.

A non-AP STA that is a Fixed Client Device per regulatory rules may ignore any received Transmit Power Envelope elements it receives from an AP that it has identified (from interpretation of the Regulatory Info field in the HE Operation element) as a Standard Power Access Point.

NOTE—A non-AP STA that is a Fixed Client per regulatory rules must ensure it abides by regulatory limits it has obtained from an AFC system.

A non-AP STA that wants to communicate with a Client-to-Client Access Point shall also meet the regulatory requirements of the Client-to-Client device category as defined by the regulatory.

# CID 596, 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 |

**Discussion**

Following are countries/regions where WLAN is allowed to operate in the 6 GHz band by the respective regulatories.

Countries allowing LPI, VLP and SP APs:

* USA

Countries allowing LPI and VLP APs:

* Brazil
* Costa Rica
* EU
* Korea
* UK

Countries allowing LPI APs:

* Chile
* Guatemala
* Honduras
* UAE

For discussion purposes, the proposed text update has two potential options.

**Proposed Resolution: CIDs 596, 600**

**Revised**.

**Note to Commenter:**

Instruction to Editor below extends Annex E.2.7 to cover countries other than USA which supports WLAN operation in the 6 GHz band.

**Instruction to Editor:**

Implement the proposed text updates for CIDs 596 and 600 in <https://mentor.ieee.org/802.11/dcn/21/11-21-0790-00-000m-revme-cc35-6g-comments.docx>

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

**--- BEGIN Option 1**

*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. And the third octet of the dot11CountryString (in hexadecimal) is 0x04. 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 in regulatory domains where operation in the 6 GHz is permitted. Not all values defined in Table E-12 may 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 reserved when operating in that regulatory domain.

|  |
| --- |
| * Regulatory Info subfield encoding
 |
| Value | Description |
| 0 | Indoor Access Point |
| 1 | Standard Power Access Point |
| 2 | Very Low Power Access Point |
| 3 | Client-to-Client Access Point |
| ~~2~~4-7 | Reserved |

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. Not all values defined in Table E-13 may 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 reserved when operating in that regulatory domain.

|  |
| --- |
| * Maximum Transmit Power Category subfield encoding
 |
| Value | Description |
| 0 | Default |
| 1 | Subordinate Device |
| 2-3 | Reserved |

When operating in the 6 GHz band outside of the United States, an AP that is an Indoor Access Point per regulatory rules shall send at least one Transmit Power Envelope elements 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 the United States, an AP that is an Indoor Access Point per regulatory rules shall send at least two Transmit Power Envelope elements in Beacon and Probe Response frames as follows:

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

An AP that is a Standard Power Access Point, Very Low Power Access Point or a Client-to-Client Access Point per regulatory rules 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

A regulatory client EIRP PSD value advertised by an AP that is a Standard Power Access Point shall be set to the highest value that meets the authorized client transmit power limits for the corresponding category obtained from the AP's 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 Access Point 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 Access Points, 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 Subordinate Device, it may ignore any other received Transmit Power Envelope elements that indicate other values in the Maximum Transmit Power Category subfield.

A non-AP STA that is a Fixed Client Device per regulatory rules may ignore any received Transmit Power Envelope elements it receives from an AP that it has identified (from interpretation of the Regulatory Info field in the HE Operation element) as a Standard Power Access Point.

NOTE—A non-AP STA that is a Fixed Client per regulatory rules must ensure it abides by regulatory limits it has obtained from an AFC system.

A non-AP STA that wants to communicate with a Client-to-Client Access Point shall also meet the regulatory requirements of the Client-to-Client device category as defined by the regulatory.

**--- END Option 1**

**--- BEGIN Option 2**

*Instruction to Editor: Add the following at D0.0 P4355L25.*

E.2.7.2 6 GHz band in Brazil, Costa Rica, European Union, Republic of Korea, United Kingdom

When operating in the 6 GHz band in a country listed in Table E-X1, the Country String field in the Country element is set to the value of dot11CountryString specified in Table E-X1.

**Table E-X1 – dot11CountryString for 6 GHz band in Brazil, Costa Rica, Republic of Korea, United Kingdom**

|  |  |  |
| --- | --- | --- |
| **Country** | **ISO 3166-1 alpha-2 code** | **dot11CountryString(in hexadecimal)** |
| Brazil | BR | 0x42, 0x52, 0x04 |
| Costa Rica | CR | 0x43, 0x52, 0x04 |
| Republic of Korea | KR | 0x4B, 0x52, 0x04 |
| United Kingdom | GB | 0x47, 0x42, 0x04 |
| NOTE – The first two octets of dot11CountryString indicate the two character country code as defined by the ISO 3166-1 alpha-2 code. The third octet indicates that Table E-4 is in use (see Annex C). |

When operating in the 6 GHz band in a country which is a member of the European Union, the Country String field in the Country element is set as follows:

* The first two octets is the two character country code as defined by the ISO 3166-1 alpha-2 code.
* The third octet is (in hexadecimal) 0x04, which indicates that Table E-4 is in use (see Annect 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-X2 when operating in the 6 GHz band in the countries listed in Table E-X1 or countries which are member of the European Union.

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| --- |
| Table E-X2 – Regulatory Info subfield encoding in Brazil, Costa Rica, European Union, Republic of Korea, United Kingdom |
| **Value** | **Description** |
| 0 | Indoor Access point |
| 1 | Reserved |
| 2 | Very Low Power Access Point |
| 3-7 | Reserved |

The Maximum Transmit Power Category subfield of the Transmit Power Envelope element is interpreted as shown in Table E-X3 when operating in the 6 GHz band in the countries listed in Table E-X1 or countries which are member of the European Union.

|  |
| --- |
| Table E-X3 – Maximum Transmit Power Category subfield encoding in Brazil, Costa Rica, European Union, Republic of Korea, United Kingdom |
| Value | Description |
| 0 | Default |
| 1-3 | Reserved |

An AP shall send at least one Transmit Power Envelope elements in Beacon and Probe Response frames as follows:

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

E.2.7.3 6 GHz band in Chile, Guatemala, Honduras

When operating in the 6 GHz band in a country listed in Table E-X4, the Country String field in the Country element is set to the value of dot11CountryString specified in Table E-X4.

**Table E-X4 - dot11CountryString for 6 GHz band in Chile, Guatemala, Honduras**

|  |  |  |
| --- | --- | --- |
| **Country** | **ISO 3166-1 alpha-2 code** | **dot11CountryString(in hexadecimal)** |
| Chile | CL | 0x43, 0x4C, 0x04 |
| Guatemala | GT | 0x47, 0x54, 0x04 |
| Honduras | HN | 0x48, 0x4E, 0x04 |
| NOTE – The first two octets of dot11CountryString indicate the two character country code as defined by the ISO 3166-1 alpha-2 code. 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-X5 when operating in the 6 GHz band in the countries listed in Table E-X4.

|  |
| --- |
| Table E-X5 – Regulatory Info subfield encoding in Chile, Guatemala, Honduras |
| **Value** | **Description** |
| 0 | Indoor Access point |
| 1-7 | Reserved |

The Maximum Transmit Power Category subfield of the Transmit Power Envelope element is interpreted as shown in Table E-X6 when operating in the 6 GHz band in the countries listed in Table E-X4.

|  |
| --- |
| Table E-X6 – Maximum Transmit Power Category subfield encoding in Chile, Guatemala, Honduras |
| Value | Description |
| 0 | Default |
| 1-3 | Reserved |

An AP shall send at least one Transmit Power Envelope elements in Beacon and Probe Response frames as follows:

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

**--- END Option 2**

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