IEEE P802.11  
Wireless LANs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Indoor Enabled AP Signaling | | | | | | Date: 2024-3-11 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm Technologies, Inc. |  |  | [youhank@qti.qualcomm.com](mailto:youhank@qti.qualcomm.com) | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes text update to address interoperability issue in indoor enabled AP signaling:

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

## Discussion

Various regulatory bodies are exploring the option of enabling Client-to-Client (C2C) operation in the 6 GHz band, with Japan being the first to enable such operation. While details of the regulatory rules may vary between different regulatory domains, C2C devices in general needs to be ‘enabled’ to use the C2C rules by being able to hear an ‘enabling’ indoor AP, such as the LPI or standard power indoor APs.

IEEE 802.11 had included a mechanism for an AP to indicate that it is an indoor enabled AP (the IEEE terminology for “C2C”) by designating the Regulatory Info (RegInfo) value of 3 in the HE Operation element. However, field tests revealed that Linux kernel based products have an issue where WLAN scan result does not include APs whose RegInfo value is 3. Hence, these client devices cannot connect to the indoor enabled APs as they are not able ‘discover’ the indoor enabled APs. Affected Linux kernel based products include Android devices, laptops/PCs using Linux, and various IOT devices based on Linux. This is not an issue of a particular vendor’s implementation, but rather an issue in the Linux kernel affecting all devices using Linux. Such an issue has created reservation in OEM vendors from deploying C2C AP functionality into the market. While the WLAN community should strive to update the Linux kernel to fix the issue, countless client devices already deployed in the field may choose not to update their Linux kernel, hence the interoperability issue will continue to exist. See <https://mentor.ieee.org/802.11/dcn/25/11-25-0140-00-000m-indoor-enabled-ap-signaling.pptx> for further prior discussion on this.

Previous discussion with members of the IEEE 802.11 community has raised the following points.

* The current RegInfo in the HE Operation element is not very extensible for further regulatory updates/fixes. Hence, it would be better to come up with a more flexible/extensible framework to be able to accommodate future (potentially unforeseen) updates/fixes related to regulatory topics.
  + To this end, this document introduces a new “AP Regulatory Information element”.
* In regulatory domains where VLP is allowed, using RegInfo = 2 (VLP) in the HE Operation element could allow the affected client devices to at least successfully include the AP in the WLAN scan result, and maintain connection under VLP regulations at least – avoiding the extreme scenario of no WLAN connection at all.
  + The new “AP Regulatory Information element” could then inform ‘new’ clients that this AP is actually using the C2C regulations as well.
* There was also feedback preferring to be able to continue to use the existing RegInfo = 3 to indicate an indoor enabled AP, recognizing that some clients would never associate to such APs. For example, the AP could have some upper layer intelligence on whether interoperability with affected client devices is an issue for the AP or not, and the AP could choose to use the existing RegInfo = 3 when the interoperability issue is not a concern.
  + As such, the existing scheme using RegInfo = 3 is not deprecated, giving AP implementation a choice to use either the existing RegInfo = 3 method or the new AP Regulatory Information element method.

At high level, this document provides three ways for an indoor enabled AP to advertise that it is an indoor enabled AP.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Method | RegInfo field in HE Operation element | Indoor Enabled AP field in AP Regulatory Information element | Expected Behavior of Non-AP STA | |
| Existing Linux based non-AP STA | New non-AP STAs with dot11APRegInfoSupport set to true |
| 1 | Set to 3 (C2C) | The element is not included, or the element is included and the field is set to 1 | No connection w/ the AP. | For non-Linux based non-AP STA, no connection w/ the AP until Linux kernel is fixed and updated by the STA.  For other non-AP STAs, recognize that the AP is a C2C AP. |
| 2 | Set to 2 (VLP) | Set to 1 | Recognize as VLP AP. | Recognize as C2C AP. |
| 3 | Set to 7 (AP role not relevant) | Set to 1 | Unknown. | Recognize as C2C AP. |

## Proposed Text Update

*Instruction to TGmf Editor: Edit the TGmf draft as shown below.*

**9.3.3.2 Beacon frame format**

Table 9-62 – Beacon frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | AP Regulatory Information | The AP Regulatory Information element is optionally present if dot11APRegInfoSupport is true. |

**9.3.3.6 Association Response frame format**

Table 9-65 – Association Response frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | AP Regulatory Information | The AP Regulatory Information element is optionally present if dot11APRegInfoSupport is true. |

**9.3.3.8 Reassociation Response frame format**

Table 9-67 – Reassociation Response frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | AP Regulatory Information | The AP Regulatory Information element is optionally present if dot11APRegInfoSupport is true. |

**9.3.3.10 Probe Response frame format**

Table 9-69 – Probe Response frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | AP Regulatory Information | The AP Regulatory Information element is optionally present if dot11APRegInfoSupport is true. |

**9.4.2 Elements**

**9.4.2.1 General**

Table 9-130 – Element IDs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** | **Fragmentable** |
| AP Regulatory Information (see 9.4.x.X1 AP Regulatory Information element) | 255 | <ANA> | Yes | No |

**9.4.2.311 Non-AP STA Regulatory Connectivity element**

Table 9-417 – Regulatory Connectivity field

|  |  |  |
| --- | --- | --- |
| **Subfield bit or bits** | **Subfield name** | **Interpretation** |
| 0 | Connectivity With Indoor AP Valid | Indicates whether the Connectivity With Indoor AP subfield is reserved or not: Set to 0 if the Connectivity With Indoor AP subfield is reserved. Set to 1 if the Connectivity With Indoor AP subfield is valid. |
| 1 | Connectivity With Indoor AP | Indicates whether operating under the control of an indoor AP and an indoor standard power AP is implemented (see E.2.7).  For a non-AP STA:  Set to 0 if not implemented.  Set to 1 if implemented.  Reserved for a non-AP STA that is incapable of operating as a STA 6G in the current regulatory domain and for an AP.  Reserved if the Connectivity With Indoor AP Valid subfield is set to 0.  See NOTE. |
| 2 | Connectivity With SP AP Valid | Indicates whether the Connectivity With SP AP subfield is reserved or not:  Set to 0 if the Connectivity With SP AP subfield is reserved.  Set to 1 if the Connectivity With SP AP subfield is valid. |
| 3 | Connectivity With SP AP | Indicates whether at least one of the following is implemented: operating under the control of an SP AP and an indoor standard power AP and operating as a fixed client device (see E.2.7).  For a non-AP STA:  Set to 0 if not implemented.  Set to 1 if implemented.  Reserved for a non-AP STA that is incapable of operating as a STA 6G in the current regulatory domain and for an AP.  Reserved if the Connectivity With SP AP Valid subfield is set to 0.  See NOTE. |
| 4 | Connectivity With Updated Indoor Enabled AP Valid | Indicates whether the Connectivity With Updated Indoor Enabled AP subfield is reserved or not:  Set to 0 if the Connectivity With Updated Indoor Enabled AP subfield is reserved. Set to 1 if the Connectivity With Updated Indoor Enabled AP subfield is valid. |
| 5 | Connectivity With Updated Indoor Enabled AP | Indicates whether the non-AP STA has dot11APRegInfoSupport set to true (i.e., is capable of recognizing that an AP that sets the Indoor Enabled AP field in the AP Regulatory Information element as described in E.2.7 is an indoor enabled AP).  For a non-AP STA:  Set to 0 if dot11APRegInfoSupport is false.  Set to 1 if dot11APRegInfoSupport is true.  Reserved for a non-AP STA that is incapable of operating as a STA 6G in the current regulatory domain and for an AP.  Reserved if the Connectivity With Updated Indoor Enabled AP Valid subfield is set to 0. |
| 6 to 8 × (Length – 1) – 1 | Pad | Reserved |
| NOTE—This field is informative (e.g., for troubleshooting), has no regulatory purpose, and does not imply a need for any action by a peer STA. | | |

*Instruction to TGmf Editor: Add the following subclause to the TGmf draft.*

**9.4.2.X1 AP Regulatory Information element**

The AP Regulatory Information element carries information related to regulatory rules specific to the country for the channel in which the BSS is currently operating. Country is identified by the Country String field in the Country element.

NOTE – The 6 GHz Operation Information field of the HE Operation element also carries information related to regulatory rules when the BSS is operating in the 6 GHz band. See E.2.7.

The format of the AP Regulatory Information element is defined in Figure 9-X1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Presence | 6 GHz Information |
| Octets: | 1 | 1 | 1 | 1 | variable |

Figure 9-X1 – AP Regulatory Information element format

NOTE – Additional fields may be added as additional regulatory information is included in the AP Regulatory Information element.

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1.

The format of the Presence field is defined in Figure 9-X2.

|  |  |  |
| --- | --- | --- |
|  | B0 | B1 B7 |
|  | 6 GHz Information Present | Reserved |
| Bits: | 1 | 1 |

Figure 9-X2 – Presence field format

The 6 GHz Information Present field in the Presence field is set to 1 to indicate that the 6 GHz Information field is present in the AP Regulatory Information element. Otherwise, the 6 GHz Information Present field is set to 0.

The 6 GHz Information field is defined in Figure 9-X3.

|  |  |  |
| --- | --- | --- |
|  | 6 GHz Reg Info | Observed Enabling AP List |
| Octets: | 1 | *N* × 6 |

Figure 9-X3 – 6 GHz Information field format

The 6 GHz Reg Info field is defined in Figure 9-X4.

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 B3 | B4 B7 |
|  | Indoor Enabled AP | Observed Enabling AP Count | Reserved |
| Bits: | 1 | 3 | 4 |

Figure 9-X4 – 6 GHz Reg Info field format

The Indoor Enabled AP field is set to 1 to indicate that the AP is an Indoor Enabled AP by having successfully received an enabling signal (as defined by the regulatory rules) from at least one indoor AP or an indoor standard power AP, and is set to 0 otherwise.

The Observed Enabling AP Count field indicates the number of APs included in the Observed Enabling AP List field (*N* in Figure 9-X3).

The Observed Enaling AP List field in the 6 GHz Information field contains of *N* BSSID fields. Each BSSID field has the same format as a MAC address, and indicates the BSSID of the indoor AP or indoor standard power AP from which the AP transmitting this AP Regulatory Information element has received an enabling signal from.

*Instruction to TGmf Editor: Edit the TGmf draft as shown below.*

**11.2.3.14 TIM Broadcast**

**…**

The following events about the BSS parameters of the AP shall classify as a critical update:

1. Inclusion of a Channel Switch Announcement element
2. Inclusion of an Extended Channel Switch Announcement element
3. Modification of the EDCA parameters element
4. Inclusion of a Quiet element
5. Modification of the DSSS Parameter Set
6. Modification of the HT Operation element
7. Inclusion of a Wide Bandwidth Channel Switch element
8. Inclusion of a Channel Switch Wrapper element
9. Inclusion of an Operating Mode Notification element
10. Inclusion of a Quiet Channel element
11. Modification of the VHT Operation element
12. Modification of the HE Operation element
13. Insertion of a Broadcast TWT element

m1) Insertion or removal of a Broadcast TWT Parameter Set field in a Broadcast TWT element

1. Inclusion of the BSS Color Change Announcement element
2. Modification of the MU EDCA Parameter Set element
3. Modification of the Spatial Reuse Parameter Set element
4. Modification of the UORA Parameter Set element
5. Insertion of an Index Adjustment Factor field in a Multiple BSSID Configuration element

r1) Modification of the EHT Operation element

r2) Inclusion, modification or removal of a Transmit Power Envelope element, if the AP is an EHT AP

r3) Inclusion, modification or removal of the AP Regulatory Information element.

*Instruction to TGmf Editor: Edit the TGmf draft as shown below.*

**Annex C**

**C.3 MIB detail**

Dot11StationConfigEntry ::= SEQUENCE

{

…

dot11APRegInfoSupport Truthvalue

}

…

dot11APRegInfoSupport OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by STA capabilities.

This attribute, when true at an AP, indicates that the AP supports including the AP Regulatory Information element in Beacon, (Re)Association Response and Probe Response frames. Otherwise, indicates that the AP does not support including the AP Regulatory Information element in Beacon, (Re)Association Response and Probe Response frames.

This attribute, when true at a non-AP STA,indicates that the non-AP STA supports interpreting AP Regulatory Information element included in Beacon, (Re)Association Response and Probe Response frames. Otherwise, indicates that the non-AP STA does not support interpreting the AP Regulatory Information element included in Beacon, (Re)Association Response and Probe Response frames."

::= { dot11APRegInfoSupport <AppropriateValueToBeAssignedByEditor> }

**Annex E**

**E.2 Band-specific operating requirements**

**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 1—The first two octets indicate the United States. 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 and the 6 GHz Information field of the AP Regulatory Information element, if present, express the current operational mode of the AP. The Regulatory Info subfield in the HE Operation element is interpreted by non-AP STAs with dot11ExtendedRegInfoSupport not set to true as shown in Table E-12, and is interpreted by non-AP STAs with dot11ExtendedRegInfoSupport set to true as shown in Table E-13 when operating in the 6 GHz band.

NOTE 2—Non-AP STAs with dot11ExtendedRegInfoSupport not set to true parse B3 to B5 of the Control field as the Regulatory Info subfield, and ignore B6 of the Control field.

Each regulatory domain might have additional regulations for each Regulatory Info subfield value as well as information in the AP Regulatory Information element. Operation in such regulatory domains is subject to the additional regulations. If a non-AP STA is unable to interpret the value of the Regulatory Info field or the AP Regulatory Information element, it might still, in accordance with local regulations, be able to determine a regulatory maximum transmit power to connect to the AP using received Transmit Power Envelope element(s) and/or local sources (see 11.7.5).

Some values defined in Table E-12 and Table E-13 might not be valid in all regulatory domains. If a certain Regulatory Info subfield encoding value or fields in the 6 GHz Information field of the AP Regulatory Information element are not valid in a regulatory domain, then the value or fields are not used when operating in that regulatory domain.

|  |  |
| --- | --- |
| Table E-12 – Regulatory Info subfield interpretation by non-AP STAs with dot11ExtendedRegInfoSupport not set to true | |
| Value | Description |
| 0 or 8 | Indoor AP  An AP whose operation does not require control from an external system such as an Automated Frequency Coordination (AFC) system but operates under regulatory rules requiring indoor operation, and is subject to additional regulatory requirements intended to prohibit outdoor operation. |
| 1 or 9 | Standard power AP  An AP whose operation requires control from an external system such as an AFC system. |
| 2 or 10 | 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.  NOTE—A 6 GHz non-AP STA conformant with an amendment to a previous revision of this standard might not be able to interpret these values. |
| 3 or 11 | 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.  NOTE—A 6 GHz non-AP STA conformant with an amendment to a previous revision of this standard might not be able to interpret these values.  NOTE – An indoor enabled AP could also be indicated using the Indoor Enabled AP field in the AP Regulatory Information element without using the values 3 or 11 in the Regulatory Info subfield. |
| 4 or 12 | Indoor standard power AP (deprecated)  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.  NOTE—A 6 GHz non-AP STA conformant with an amendment to a previous revision of this standard might not be able to interpret these values. |
| 5 or 13 | Reserved |
| 6 or 14 | Reserved |
| 7 or 15 | AP role not relevant.  An AP whose operation does not affect the regulated behavior of associated or enabled devices.  NOTE 1—For instance, the transmission of Transmit Power Envelope elements by the AP might suffice.  NOTE 2—A 6 GHz non-AP STA conformant with an amendment to a previous revision of this standard might not be able to interpret these values. |

|  |  |
| --- | --- |
| Table E-13 – Regulatory Info subfield interpretation by non-AP STAs with dot11ExtendedRegInfoSupport set to true | |
| 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 operates under regulatory rules requiring indoor operation, and 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 systems. |
| 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.  NOTE – An indoor enabled AP could also be indicated using the Indoor Enabled AP field in the AP Regulatory Information element without using the value 3 in the Regulatory Info subfield. |
| 4–6 | Reserved |
| 7 | AP role not relevant  An AP whose operation does not affect the regulated behavior of associated or enabled devices.  NOTE—For instance, the transmission of Transmit Power Envelope elements by the AP might suffice. |
| 8 | Indoor standard power AP  An AP whose operation requires control from an external system such as an AFC system and also operates under regulatory rules requiring indoor operation, and is subject to additional regulatory requirements intended to prohibit outdoor operation. |
| 9–15 | Reserved |

In Table E-12 and Table E-13, a WLAN STA is not an external system.

NOTE 3—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 values 8 (indoor standard power AP) for the Regulatory Info subfield are 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.

A STA with dot11APRegInfoSupport set to true shall set dot11ExtendedRegInfoSupport to true.

A non-AP STA with dot11APRegInfoSupport set to true and is capable of operating as a STA 6G in the current regulatory domain shall set both the Connectivity With Updated Indoor Enabled AP Valid field and the Connectivity With Updated Indoor Enabled AP field to 1 in the Non-AP STA Regulatory Connectivity element.

An AP with dot11APRegInfoSupport set to true may include the AP Regulatory Information element in Beacon, (Re)Association Response or Probe Response frames. If an AP includes the AP Regulatory Information element in Beacon, (Re)Association Response or Probe Response frames, then the Presence field shall not be set to all 0s. If an AP that is not operating in the 6 GHz band includes the AP Regulatory Information element in Beacon, (Re)Association Response or Probe Response frames, then the AP shall not set the 6 GHz Information Present field to 1.

An indoor enabled AP is 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. An AP should advertise that it is an indoor enabled AP by either setting the Regulatory Info subfield in the HE Operation element to value 3 or the Indoor Enabled AP field in the AP Regulatory Information element to 1 as described in the following paragraphs.

NOTE – Some non-AP STA implementations have been reported to omit APs with Regulatory Info subfield value equal to 3 in the BSS scan results. Hence, an additional mechanism to indicate that the AP is an indoor enabled AP using the AP Regulatory Information element has been added to allow those non-AP STAs to be able to include indoor enabled APs in the BSS scan results. Both methods of indicating an indoor enabled AP (one using the Regulatory Info subfield and the other using the AP Regulatory Information element) are supported to allow implementation choice to APs.

As a first method to indicate an indoor enabled AP, the AP may set the Regulatory Info subfield in the Control field of the 6 GHz Operation Information field of the HE Operation element to value 3. In this case, the AP shall not include the AP Regulatory Information element in the same frame that carries the HE Operation element unless the AP Regulatory Information element also includes information other than the indoor enabled AP indication. If an AP which sets the Regulatory Info subfield to value 3 also includes the AP Regulatory Information element in the same frame, then the Indoor Enabled AP field in the AP Regulatory Information element shall be set to 1.

As a second method to indicate an indoor enabled AP, when operating in a regulatory domain where very low power operation is permitted, an indoor enabled AP with dot11APRegInfoSupport set to true may:

* Set the Regulatory Info subfield in the HE Operation element to value 2 (very low power AP),
* Include the AP Regulatory Information element in Beacon, (Re)Association Response and Probe Response frames with
  + The 6 GHz Information Present field in the Presence field set to 1
  + The Indoor Enabled AP field in the 6 GHz Reg Info field in the 6 GHz Information field set to 1.

As a third method to indicate an indoor enabled AP, when operating in a regulatory domain where very low power operation is not permitted, an indoor enabled AP with dot11APRegInfoSupport set to true may:

* Set the Regulatory Info subfield in the HE Operation element to value 7 (AP role not relevant),
* Include the AP Regulatory Information element in Beacon, (Re)Association Response and Probe Response frames with
  + The 6 GHz Information Present field in the Presence field set to 1
  + The Indoor Enabled AP field in the 6 GHz Reg Info field in the 6 GHz Information field set to 1.

An AP operating in a regulatory domain where very low power operation is permitted and chooses to advertise that it is operating under the indoor enabled AP regulations shall not set the Regulatory Info subfield in the HE Operation element to values other than 2 or 3. An AP operating in a regulatory domain where very low power operation is not permitted and chooses to advertise that it is operating under the indoor enabled AP regulations shall not set the Regulatory Info subfield in the HE Operation element to values other than 2 or 7.

If an indoor enabled AP includes the AP Regulatory Information element in Beacon, (Re)Association Response and Probe Response frames, the AP should include at least one indoor AP(s) or indoor standard power AP(s) from which the indoor enabled AP has received the enabling signal using the Observed Enabling AP List field in the AP Regulatory Information element.

NOTE – An indoor enabled AP might choose not to list the APs from which it has received the enabling signal (i.e., set the Observed Enabling AP Count field in the 6 GHz Reg Info field in the AP Regulatory Information element to 0) if not required by the regulatory rules.

A *fixed client device* is a non-AP STA that operates only on channels provided by an external system for the regulatory domain in which the non-AP STA is operating such as an AFC system with additional requirements specified by the regulatory domain.

A non-AP STA that is capable of operating as a STA 6G and has dot11ExtendedRegInfoSupport equal to true may transmit in a Non-AP STA Regulatory Connectivity element (see 9.4.2.311) in Probe Request frames and in (Re)Association Request frames to an HE AP that does not transmit a Country element. A non-AP STA that is capable of operating as a STA 6G and has dot11ExtendedRegInfoSupport equal to true shall transmit a Non-AP STA Regulatory Connectivity element (see 9.4.2.311) in (Re)Association Request frames to an AP that does transmit a Country element.

The Maximum Transmit Power Category subfield in the Transmit Power Information field of the Transmit Power Envelope element is interpreted as shown in Table E-14 when operating in the 6 GHz band. This table describes the non-AP STAs for which a Transmit Power Envelope element with a given Maximum Transmit Power Category field value is applicable. 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-14 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.

|  |  |
| --- | --- |
| Table E-14 – 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; Maximum Transmit Power Interpretation subfield = Regulatory client EIRP PSD

When operating in the 6 GHz band in a regulatory domain in which a subordinate device (see Table E-14) 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; Maximum Transmit Power Interpretation subfield = Regulatory client EIRP PSD

An AP that transmits a Regulatory Information field indicating indoor standard power AP shall send at least one Transmit Power Envelope element in Beacon and Probe Response frames as follows:

* Maximum Transmit Power Category subfield = Default; Maximum Transmit Power Interpretation subfield = Additional regulatory client EIRP PSD

An *SP only client* is a non-AP STA that is capable of operating under the control of a standard power AP and is incapable of operating under the control of an indoor AP per regulatory rules. An *LPI only client* is a non-AP STA that is capable of operating under the control of an indoor AP and is incapable of operating under the control of a standard power AP per regulatory rules.

A regulatory client EIRP PSD value advertised by an AP that is a 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.

A regulatory client EIRP PSD value advertised by an AP that is an indoor standard power AP shall be set o the higher of the following two values:

* 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.
* The highest value that meets the LPI only client transmit power limits authorized by the regulatory rules for the corresponding category for the corresponding 20 MHz channel.

An additional regulatory client EIRP PSD value advertised by an AP that is an 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; Maximum Transmit Power Interpretation subfield = Regulatory client EIRP

NOTE 4—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 receives a Transmit Power Envelope element with Maximum Transmit Power Category subfield that is not applicable to that non-AP STA, the non-AP STA may ignore that element.

NOTE 5—For example, if the non-AP STA is a subordinate device per regulatory rules and receives a Transmit Power Envelope element with Maximum Transmit Power Category subfield 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.

NOTE 6—For example, if the non-AP STA is a device that, per regulatory rules, determines its regulatory client transmit power entirely using sources other than the AP (see 11.7.5 (Specification of regulatory and local maximum transmit power levels)), it can ignore all received Transmit Power Envelope elements with unit interpretation of Regulatory Client EIRP PSD or Regulatory Client EIRP from that AP.

An SP only client that is associated to an indoor standard power AP that receives, from the AP, one Transmit Power Envelope element with the Maximum Transmit Power Category subfield indicating Default and with the Maximum Transmit Power Interpretation subfield indicating Regulatory Client EIRP and another Transmit Power Envelope element with the Maximum Transmit Power Category subfield also indicating Default yet with the Maximum Transmit Power Interpretation subfield indicating Additional Regulatory Client EIRP shall comply with both elements.

An SP only client that is associated to an indoor standard power AP that receives, from the AP, one Transmit Power Envelope element with the Maximum Transmit Power Category subfield indicating Default and with the Maximum Transmit Power Interpretation subfield indicating Regulatory Client EIRP PSD and another Transmit Power Envelope element with the Maximum Transmit Power Category subfield also indicating Default yet with the Maximum Transmit Power Interpretation subfield indicating Additional Regulatory Client EIRP PSD shall comply with both elements.

NOTE 7—The Transmit Power Envelope element sent by an indoor standard power AP are insufficient for a client that is not an SP only client to determine its regulatory maximum power level; rather the client uses the regulatory maximum transmit power for the channel in the current regulatory domain known by the client from other sources following 11.7.5 (Specification of regulatory and local maximum transmit power levels) and 11.7.6 (Transmit power selection).

An indoor enabled AP with dot11APRegInfoSupport set to true and the Regulatory Info subfield in the HE Operation element set to value 2 (very low power AP) shall set the regulatory client EIRP or EIRP PSD value advertised in the Transmit Power Envelope element to the same value as the AP would have used when operating as a very lower power AP.

[End of File]