###  **IEEE P802.11Wireless LANs**

|  |
| --- |
| Channel Usage |
| Date: 2024-03-11 |
| Author(s): |
| Name | Affiliation | Address | Phone | Email |
| Brian Hart | Cisco Systems |  |  | brianh@cisco.com |
| Binita Gupta | Cisco Systems |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Abstract**

CID 22286

**Revisions:**

* Rev 0: Initial version

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 22286 | Brian Hart | 11.21.15 | 403.14 | Channel Usage should be updated to account for REVme changes | Following REVme, at each of P403L14 and P403L35, change to "— The channel usage information as part of channel selection processing \* when starting a noninfrastructure BSS or an off-channel TDLS direct link, or \* when switching the channel of an existing noninfrastructure BSS or off-channel TDLS direct link" | RevisedSubstantially agree with commenter, and also a) extend to repeated bulleted list and b) omit setting the capability bit for this 11be Channel Usage feature and c) drop the dynamic aspects of the 11be Channel Usage feature.TGbe editor: please apply changes under CID 22286 in 24/0313r1 (i.e., D5.01) then further apply the changes under CID 22286 in 24/0578 <motionedRev> |

**Discussion**

The original 11v Channel Usage feature comprises a request / response exchange or unsolicited response. Since a) devices might support the 11be Channel Usage feature without supporting the request / response exchange, and b) there is little value in sending a capability bit to indicate that an element is being sent *in the same frame*, then it is more informative if a STA that *only* supports gratuitous Channel Usage does not set the Channel Usage capability bit (i.e., its meaning can be retained for the request / response exchanges). Therefore, identify the 11be Channel Usage via the “gratuitous” adjective (since “unsolicited” is used with Channel Usage already). Related, remove the dynamic aspects of the gratuitous Channel Usage feature as these could raise some interop issues.

***Change text***

***TGbe editor: please change the draft as indicated by the Word track changes, using 11beD5.01 as the baseline***

**Table 9-62—Beacon frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <Last assigned + 6> | Channel Usage | Zero or more Channel Usage elements are present if dot11ChannelUsageActivated or dot11ChannelUsageGratuitousActivated is true. |

**Table 9-65—Association Response frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <Last assigned + 6> | Channel Usage | Zero or more Channel Usage elements are present if dot11ChannelUsageActivated or dot11ChannelUsageGratuitousActivated is true. |

**Table 9-67—Reassociation Response frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <Last assigned + 6> | Channel Usage | Zero or more Channel Usage elements are present if dot11ChannelUsageActivated or dot11ChannelUsageGratuitousActivated is true. |

11.21.15 Channel usage procedures

***TGbe editor: please incorporate the following text from 802.11REVmeD5.0 into the draft then change it as indicated by the Word track changes***

***Change the first paragraph as follows:***

The channel usage procedures may be used to assist the STA that operates a channel-usage-aidable BSS or an off-channel TDLS direct link to better coexist with a set of channel-usage-aiding BSSs by

* exchanging Channel Usage Request and Channel Usage Response frames with an AP of the channel-usage-aiding BSS set or receiving an unsolicited Channel Usage Response frame from the AP, or
* receiving a Beacon frame containing gratuitous Channel Usage element(s) from an associated AP, or
* exchanging Probe Request and Probe Response frames containing Channel Usage element(s), or
* receiving a Beacon frame or a (Re)Association Response frame containing gratuitous Channel Usage element(s) from an unassociated AP.

The first two mechanisms provide trusted channel usage; the final two mechanisms provide untrusted channel usage. The term channel usage signifies trusted and untrusted channel usage. The second and fourth mechanisms provide gratuitous channel usage.

***TGbe editor: please consider incorporating the following text from 802.11REVmeD5.0 (which immediately follows the previous para) into the draft as context for the new following para***

Implementation of (#3311)channel usage is optional for a WNM STA. A STA that implements (#3311)channel usage has dot11ChannelUsageImplemented equal to true. When dot11ChannelUsageImplemented is true, dot11WirelessManagementImplemented shall be true, or the STA shall support(#546) acting as an S-AP within a CCSS. A STA with dot11ChannelUsageActivated equal to true shall support channel usage and shall set to 1 the Channel Usage field of the Extended Capabilities elements that it transmits.

Implementation of gratuitous channel usage is optional for a WNM STA. A STA that implements gratuitous channel usage has dot11ChannelUsageGratuitousImplemented equal to true. When dot11ChannelUsageGratuitousImplemented is true, dot11WirelessManagementImplemented shall be true, or the STA shall support(#546) acting as an S-AP within a CCSS. If dot11ChannelUsageImplemented is true, dot11ChannelUsageGratuitousImplemented shall be true. A STA with dot11ChannelUsageGratuitousActivated or dot11ChannelUsageActivated equal to true shall support gratuitous channel usage.

***Insert the following paragraph after the 25th paragraph (“When the Channel Usage element in a received Probe Request...”)***

An AP may also include one or more gratuitous Channel Usage elements in Beacon frames and (Re)Association Response frames. Such gratuitous elements:

* do not establish a peer-to-peer TWT agreement, and
* may provide partial channel usage information and/or may not be individualized for the recipient’s traffic.

***Change the now-shifted 27th and 28th paragraphs as follows:***

The AP may send an unsolicited group addressed or individually addressed Channel Usage Response frame to the STAs that have requested channel usage information if the corresponding channel usage information needs to be updated. The Country element shall be included in the unsolicited and/or group addressed Channel Usage Response frame. The AP may include the Power Constraint information and EDCA Parameter in the Channel Usage Response frame. The values of the fields in the Power Constraint and EDCA Parameter Set elements included in the Channel Usage Response frame shall be the same values of the fields in the Power Constraint and EDCA Parameter Set elements that are transmitted by the AP. The Country element shall be included in a (Re)Association Response frame that contains gratuitous Channel Usage element(s).

In trusted channel usage, upon~~Upon~~ receipt of a gratuitous Channel Usage element in ~~the Probe Response~~a Beacon frame from the associated AP or upon receipt of a Channel Usage element in a Channel Usage Response frame, the receiving STA may use the following:

* The channel usage information as part of channel selection processing
	+ when starting a channel-usage-aidable BSS or an off-channel TDLS direct link, or
	+ when switching the channel of an existing channel-usage-aidable BSS or off-channel TDLS direct link
* The Power Constraint element, if present, as part of determining its maximum transmit power for transmissions for the channel-usage-aidable BSS or an off-channel TDLS direct link
* The EDCA Parameter Set element, if present, as part of determining its EDCA parameters for transmissions for the channel-usage-aidable BSS or an off-channel TDLS direct link
* The QMF Policy element, if present and dot11QMFActivated is true, as part of determining its classification of Management frames for transmissions for the channel-usage-aidable BSS or an off-channel TDLS direct link

***Insert the following paragraph after the now-shifted 28th paragraph (“In trusted channel usage, upon...”)***

In untrusted channel usage, upon receipt of a gratuitous Channel Usage element in a Beacon frame from an unassociated AP, a (Re)Association Response frame or upon receipt of a Channel Usage element in a Probe Response frame, the receiving STA may use the following:

* The channel usage information as part of channel selection processing
	+ when starting a channel-usage-aidable BSS or an off-channel TDLS direct link, or
	+ when switching the channel of an existing channel-usage-aidable BSS or off-channel TDLS direct link
* The Power Constraint element, if present, as part of determining its maximum transmit power for transmissions for channel-usage-aidable BSS or an off-channel TDLS direct link
* The EDCA Parameter Set element, if present, as part of determining its EDCA parameters for transmissions for channel-usage-aidable BSS or an off-channel TDLS direct link
* The QMF Policy element, if present and dot11QMFActivated is true, as part of determining its classification of Management frames for transmissions for channel-usage-aidable BSS or an off-channel TDLS direct link

***Change the last paragraph as follows:***

If either a recommended operating class, or a recommended channel, or both are not supported or understood by the recipient, or if the operating country of the sender is unknown, the recipient shall discard the corresponding channel usage recommendation. A STA that has not requested channel usage information shall discard an unsolicited group addressed Channel Usage Response frame. While a STA’s most recently received individually addressed and broadcast channel usage recommendations from the STA’s associated AP differ, the STA should give higher priority to the individually addressed channel usage recommendation. A STA that performs both trusted and untrusted channel usage should give higher priority to the trusted channel usage information.

Dot11WirelessMgmtOptionsEntry ::=

SEQUENCE {

(#6016)dot11ChannelUsageCapabilityNotificationImplemented Truth-Value,

dot11ChannelUsageGratuitousImplemented Truth-Value,

dot11ChannelUsageGratuitousActivated Truth-Value

}

…

dot11ChannelUsageGratuitousImplemented 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, indicates that the station implementation is capable of supporting gratuitous channel usage."

::= { dot11WirelessMgmtOptionsEntry 67}

dot11ChannelUsageGratuitousActivated OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity or the SME.

Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates that gratuitous channel usage is enabled. Gratuitous channel usage is disabled when both this attribute and dot11ChannelUsageActivated are false."

DEFVAL { false}

::= { dot11WirelessMgmtOptionsEntry 68}