IEEE P802.11
Wireless LANs

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| D1 Comment Resolution, brianh, part 8 |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Brian Hart | Cisco Systems | 170 W Tasman Dr, San Jose, CA 95134, USA |  | brianh@cisco.com |
| Jonghyun Park | LGE |  |  | jonghyun10.park@lge.com |
| Reza Hedayat | Cisco Systems |  |  | rehedaya@cisco.com |
| Youhan Kim | Qualcomm |  |  | youhank@qca.qualcomm.com |
| Yongho Seok | LGE |  |  | yongho.seok@lge.com |
| Illsoo Sohn | LGE |  |  | illsoo.sohn@lge.com |

##### Baseline is 11ac D1.2. Changes indicated by a mixture of Word track-changes and instructions. For equation changes, Latex notation is sometimes used. E.g. a\_{xyz}^b denotes axyzb

MAC CIDs re-addressed: 3405, 3420

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3405 | Seok, Yongho | 48.33 | 8.4.2.25 | Quiet element is defined to assist in making channel measurements without interference from other STAs in the BSS. VHT devices use wider band, where some channels do not require quieting for DFS. Quieting all subband could be inefficient.  | Allow Quiet element to indicate which subbands needs to be quiet. | AGREE IN PRINCIPLE (MAC: 2011-09-22 03:02:38Z): Editor to make changes shown in document 11-11-1322r2 for CIDs 3405 and 3420; then additional changes in 11/1384r0. |
| 3420 | Seok, Yongho | 48.33 | 8.4.2.25 | Quiet element is defined to assist in making channel measurements without interference from other STAs in the BSS. VHT devices use wider band, where some channels do not require quieting for DFS. Quieting all subband could be inefficient.  | Allow Quiet element to indicate which subbands needs to be quiet. | AGREE IN PRINCIPLE (MAC: 2011-09-22 03:02:38Z): Editor to make changes shown in document 11-11-1322r2 for CIDs 3405 and 3420; then additional changes in 11/1384r0. |

**Discussion**:

See 11/1385 for motivation.

Define QC(QM=x) as Quiet Channel element with the AP Quiet Mode field equal to x.

Then the two modes of operation that we want to support:

* In the beacon and probe response: zero or more Quiet + **zero** QC(QM=0) + zero or more QC(QM=1) elements.
	+ The Quiet and QC(QM=1) elements all work independently
	+ The Quiet elements define their part of the quiet schedule, during which they quiet the whole band for all STAs
	+ Whereas the QC(QM=1) elements define their part of the quiet schedule, during which they just quiet the secondary 80 MHz channel for all STAs.
* In the beacon and probe response: one or more Quiet + **one** QC(QM=0) + zero or more QC(QM=1) elements.
	+ The Quiet and QC(QM=1) elements still work independently
	+ The one QC(QM=0) element applies to all Quiet elements
	+ The Quiet elements, as modified by QC(QM=0), define their part of the quiet schedule, during which they quiet
		- the whole band for non-VHT STAs
		- the secondary 80 MHz channel for VHT STAs and all client-to-AP transmissions within the primary 80 MHz channel
	+ Whereas the QC(QM=1) elements define their part of the quiet schedule, during which they just quiet the secondary 80 MHz channel for all STAs.

**Change:**

Table 8-19—Beacon frame body

|  |  |  |
| --- | --- | --- |
| 66  | Quiet Channel  | The Quiet Channel element is optionally present if dot11VHTOptionImplemented is true, and either dot11SpectrumManagementRequired or dot11RadioMeasurementActivated is true.(#3405) |

Table 8-26—Probe Response frame body

|  |  |  |
| --- | --- | --- |
| 70 | Quiet Channel | The Quiet Channel element is optionally present if dot11VHTOptionImplemented is true, and either dot11SpectrumManagementRequired or dot11RadioMeasurementActivated is true.(#3405) |

Table 8-53—Element IDs

|  |  |  |  |
| --- | --- | --- | --- |
| Quiet Channel(#3405)  | <ANA>  | 3 or 9  | Yes |

8.4.2.147 Quiet Channel element(#3405)

The Quiet Channel element is used to indicate that the secondary 80 MHz channel of a VHT BSS is to be

quieted during a quiet interval indicated by either a Quiet element (see 8.4.2.25 (Quiet element)) or the Quiet Channel element if its AP Quiet Mode field is equal to 1. Furthermore, the Quiet Channel element indicates the conditions under which the primary 80 MHz channel of the VHT BSS may be used during the quiet interval. The format of the Quiet Channel element is shown in Figure 8-ac25.

The Element ID field is defined in Table 8-53 (Element IDs).

The Length field specifies the number of octets in the element following the Length field.

The AP Quiet Mode field specifies STA behavior during the quiet intervals. When communications to the AP are allowed within the primary 80 MHz channel of the BSS, then the AP Quiet Mode field is set to 1. Otherwise, the AP Quiet Mode field is set to 0.

When the AP Quiet Mode field is equal to 1, then the Quiet Count field, Quiet Period field, Quiet Duration field and Quiet Offset field are included in the Quiet Channel element; otherwise these fields are not included in the Quiet Channel element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID  | Length  |  | AP Quiet Mode | Quiet Count (optional) | Quiet Period (optional) | Quiet Duration (optional)  | Quiet Offset (optional) |
| Octets:  | 1  | 1  |  | 1 | 0 or 1 | 0 or 1 | 0 or 2 | 0 or 2 |

Figure 8-ac25—Quiet Channel element format

The Quiet Channel element may be included in Beacon frames, as described in 8.3.3.2 (Beacon frame format), and Probe Response frames, as described in 8.3.3.10 (Probe Response frame format). The use of the Quiet Channel element is described in 10.9.3 (Quieting channels for testing).

**10.9.3 Quieting channels for testing**

***Change as follows:***(#3405)

An AP in a BSS or a mesh STA in an MBSS may schedule quiet intervals by transmitting one or more Quiet elements or one or more Quiet Channel elements with the AP Quiet Mode field equal to 1 in Beacon frames and Probe Response frames.

A non-VHT AP shall not transmit a Quiet Channel element. An AP shall not transmit a Quiet Channel element with the AP Quiet Mode equal to 0 in frames that do not include at least one Quiet element. An AP shall not transmit more than one Quiet Channel element with the AP Quiet Mode equal to 0. An AP shall not transmit a Quiet Channel element if the BSS operating channel width is not either 160 MHz or 80+80 MHz.

When an AP transmits a Quiet Channel element with the AP Quiet Mode field equal to 1, then the AP shall include the Quiet Count field, Quiet Period field, Quiet Duration field and Quiet Offset field; otherwise the AP shall not include these fields in the Quiet Channel element.

The AP or mesh STA may stop scheduling quiet intervals or change the value of the Quiet Period field, the Quiet Duration field, and the Quiet Offset field in Quiet elements or Quiet Channel elements with the AP Quiet Mode field equal to 1 as required.

Only the most recently received Beacon frame or Probe Response frame defines all future quiet intervals; therefore, quiet intervals based on older Beacon frames or Probe Response frames shall be discarded.

Only the STA that is the DFS owner in an IBSS may specify a schedule of quiet intervals, by transmitting one or more Quiet elements or Quiet Channel elements with the AP Quiet Mode field equal to 1 in the first Beacon frame establishing the IBSS. All STAs in an IBSS shall continue these quiet interval schedules by including appropriate Quiet elements or Quiet Channel elements with the AP Quiet Mode field equal to 1 in any transmitted Beacon frames or Probe Response frames.

Multiple independent quiet intervals may be scheduled, so that not all quiet intervals have the same timing relationship to TBTT, by including multiple Quiet elements or Quiet Channel elements with the AP Quiet Mode equal to 1 in Beacon frames or Probe Response frames.

Control of the channel is lost at the start of a quiet interval, and the following quieting rules apply:

— the NAV is set by all the non-VHT STAs in the BSS for the length of the quiet interval established by a Quiet element

— the NAV is set by all the VHT STAs in the BSS for the length of the quiet interval established by a Quiet element if a Quiet Channel element with the AP Quiet Mode equal to 0 was not sent or received with the Quiet element

—a VHT STA in the BSS shall not transmit PPDUs that occupy the secondary 80 MHz channel or transmit PPDUs to the AP during the quiet interval established by a Quiet element if a Quiet Channel element with the AP Quiet Mode equal to 0 was sent or received with the Quiet element.

- a VHT STA shall not transmit PPDUs that occupy the secondary 80 MHz channel during the quiet interval established by a Quiet Channel element with the AP Quiet Mode field in the Quiet Channel element equal to 1.

- Transmission by any non-VHT STA in the BSS of any MPDU and any associated acknowledgment of the BSS within either the primary channel or the secondary channel (if present) shall be complete before the start of the quiet interval.

- Transmission by any VHT STA in the BSS of any MPDU and any associated acknowledgment of the BSS shall be complete before the start of the quiet interval established by a Quiet element if a Quiet Channel element with the AP Quiet Mode equal to 0 was not sent or received with the Quiet element.

— Transmission by any VHT STA in the BSS of any PPDUs that occupy the secondary 80 MHz channel or are directed to the AP, and any associated acknowledgment of the BSS, shall be complete before the start of the quiet interval established by a Quiet element if a Quiet Channel element with the AP Quiet Mode equal to 0 was sent or receivedwith the Quiet element.

- Transmission by any VHT STA in the BSS of any PPDUs that occupy the secondary 80 MHz channel and any associated acknowledgment of the BSS shall be complete before the start of the quiet interval established by a Quiet Channel element with the AP Quiet Mode field in the Quiet Channel element equal to 1.

If, before starting transmission of an MPDU, there is not enough time remaining for an exchange to complete, so that the first transmission in the exchange would be disallowed by the quieting rules, then the STA shall defer the transmission by selecting a random backoff time, using the present CW (without advancing to the next value in the series). The short retry counter and long retry counter for the MSDU or A-MSDU are not affected.

**B.4.23.1 VHT MAC features**

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| --- | --- | --- | --- | --- |
| **Item** | **Protocol capability** | **References** | **Status** | **Support** |
| VHTM15 | Quiet Channel Element |  |  |  |
| VHTM15.1 | Quiet Channel element sent by AP or mesh STA | 8.3.3.2 (Beaconframe format),8.3.3.10 (ProbeResponseframe format), 8.4.2.147 (Quiet Channel element), 10.9.3 (Quieting channels for testing) | (CF1 OR CF21) AND CF10 AND CFac:O | Yes 🞎 No 🞎 N/A 🞎 |
| VHTM15.2 | Quiet Channel element sent by an independent STA | 8.3.3.2 (Beaconframe format),8.3.3.10 (ProbeResponseframe format), 8.4.2.147 (Quiet Channel element), 10.9.3 (Quieting channels for testing) | CF2 AND CF10 AND CFac:O | Yes 🞎 No 🞎 N/A 🞎 |
| VHTM15.3 | Quiet Channel element received by an independent STA or mesh STA | 8.3.3.2 (Beaconframe format),8.3.3.10 (ProbeResponseframe format), 8.4.2.147 (Quiet Channel element), 10.9.3 (Quieting channels for testing) | (CF2 OR CF21) AND CF10 AND CFac:M | Yes 🞎 No 🞎 N/A 🞎 |