IEEE P802.11
Wireless LANs

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| --- |
| Quiet Time Period |
| `Date: 2016 - 10  |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Chao-Chun Wang | MediaTek |  |  |  |
| Dengyu Qiao | Huawei Technologies |  |  |  |
| Yingpei Lin | Huawei Technologies |  |  |  |
| Jun Zhu | Huawei Technologies |  |  |  |
| Hongjia Su | Huawei Technologies |  |  |  |
| Yunbo Li | Huawei Technologies |  |  |  |

Abstract

This document contains the proposed text for 11ax Draft with respect to quiet time period

**CIDS addressed by this resolution include:**

**TBD**

This document provides the text for quiet time period

**9.4.2.213 HE Capabilities element**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 B4 | B5 B7 | B8 B9 | B10 B11 | B12 B14 |
|  | PPE Thresholds Present | TWT Requester Support | TWT Responder Support | Fragmentation Support | Maximum Number of Fragmented MSDUs | Minimum Fragment Size | Trigger Frame MAC Padding Duration | Multi-TID Aggregation Support |
| Bits: | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B15 B16 | B17 | B18 | B19 | B20 | B21 | B22 | B23 | B24 B27 |
|  | Largest Constellation With DCM | Maximum Nss With DCM | UL MU Response Scheduling Support | A-BSR Support | Ng = 16 For SU Feedback Support | Ng = 16 For MU Feedback Support | Codebook Size {4, 2} For SU Support | Codebook Size {7, 5} For MU Support | Punctured Preamble Support |
| Bits: | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |

|  |  |  |
| --- | --- | --- |
|  | B28 | B29 B31 |
|  | QTP Support | Reserved |
| Bits: | 1 | 3 |

Figure 9-ax-2 HE Capabilities Information field format

***Insert the following paragraph at the end of 9.4.2.213:***

The QTP Support field indicates support by an HE STA for Quiet Time Period (QTP) operation as described in 11.47 (Quieting HE STAs in a HE BSS). If the field is set to 1, the HE STA supports QTP functionality. Otherwise, set to 0.

***Instruction to Editor: Add the following section in the next version of 11ax specification***

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Figure 11-53a Quieting Time Period operation

**9.4.1.11 Action field**

*Insert the following rows (ignoring the header row) into the table below*

Table 9-47 Category values

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code | Meaning | See subclause | Robust | Group addressed privacy |
| 25a | Quiet Time Period | 9.6.23a (Quiet Time Period Action frame details) | No | No |

***Instruction to Editor: Add the following section at the end of 9.4.2.175***

**9.4.2.175a Quiet Time Period Setup element**

The Quiet Time Period Setup element defines a period for an STA-to-STA operation (see 11.47 (Quieting HE STAs in a HE BSS)).

This quiet time period may be used to improve the probability of channel access for HE STAs participating in the STA-2-STA operation.

The Quiet Time Period Setup element is shown Figure 9-589a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Element ID | Length | Quiet Period Duration | Vender Specific Service Identifier |
| Octets: | 1 | 1 | 2 | 2 |

Figure 9-589a Quiet Time Period Setup element format

The Element ID and Length fields are defined in 9.4.2.1 (General).

The Quiet Duration field is set to duration, expressed in TUs, no larger than the value indicated in the Quiet Period Duration field of the Quiet Time Period Request element sent by the requestor HE STA.

The Vendor Specific Service ID field indicates a specified operation, and the HE STA supporting it can transmit frames. The Vendor Specific Service ID field contains a public unique identifier assigned by the IEEE.

**9.4.2.175b Quiet Time Period Request element**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  | Element ID | Length | Dialog Token | Quiet Period Offset | Quiet Period Duration | Quiet Period Interval | Repetition Count | Vender Specific Service Identifier |
| Octets: | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 |

Figure 9-589b Quiet Time Period Request element format

The Quiet Time Period Request element defines a periodic sequence of quiet periods that the requester HE STA requests the responder AP to schedule. The format of the Quiet Time Period Request element is shown in Figure 9-589b(Quiet Time Period Request element format).

The Element ID and Length fields are defined in 9.4.2.1 (General).

The Dialog Token field is used to identify the Quiet Time Period request and response dialog.

The Quiet Period Offset field is set to the offset of the start of the first quiet period from the Quiet Time Period Request frame that contains this element, expressed in TUs. The reference time is the start of the preamble of the PPDU that contains this element.

The Quiet Period Interval field is set to the spacing between the start of two consecutive quiet time periods, expressed in TUs.

The Quiet Duration field is set to duration of the Quiet Period, expressed in TUs.

The Repetition Count field is set to the number of requested quiet periods.

The Vendor Specific Service Identifier field indicates a specified operation, and the HE STA supporting it can transmit frames. The Vendor Specific Service Identifier field contains a public unique identifier assigned by the IEEE.

**9.4.2.175c Quiet Time Period Response element**

The Quiet Period Response element defines the feedback information from the AP that received the Quiet

Period Request element. The format of the Quiet Period Response element is shown in Figure 9-589c (Quiet Time

Period Response element format).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  | Element ID | Length | Dialog Token | Quiet Period Offset | Quiet Period Duration | Quiet Period Interval | Repetition Count | Vender Specific Service Identifier | Status Code |
| Octets: | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 |

The Element ID and Length fields are defined in 9.4.2.1 (General).

The Dialog Token field is used to identify the Quiet Time Period request and response dialog.

The Quiet Period Offset field is set to the offset of the start of the first quiet period from the Quiet Time Period Request frame that contains this element, expressed in TUs. The reference time is the start of the preamble of the PPDU that contains this element.

The Quiet Period Interval field is set to the spacing between the start of two consecutive quiet time periods, expressed in TUs.

The Quiet Duration field is set to duration of the Quiet Period, expressed in TUs.

The Repetition Count field is set to the number of requested quiet periods.

The Vendor Specific Service ID field indicates a specified operation, and the HE STA supporting it can transmit frames. The Vendor Specific Service ID field contains a public unique identifier assigned by the IEEE.

The Status Code field is;

***Instruction to Editor: Add the following section at the end of 9.6.23***

**9.6.23a Quiet Time Period Action frame details**

**9.6.23a.1 Quiet Time Period Action field**

Several Action frame formats are defined to support Quiet Time Period functionality for STA-to-STA operation. A Quiet Time Period Action field, in the octet immediately after the Category field, differentiates the Quiet Time Period Action frame formats. The Quiet Time Period Action field values associated with each frame format within the Quiet Time Period category are defined in Table 9-418a

Table 9-418a Quiet Time Period Action field values

|  |  |
| --- | --- |
| **Value** | **Meaning** |
| 0 | Quiet Time Period Setup |
| 1 | Quiet Time Period Request |
| 2 | Quiet Time Period Response |
| 3-255 | Reserved |

**9.6.23a.2 Quiet Time Period Setup frame format**

The Quiet Time Period Setup frame is an Action No Ack frame of category Quiet Time Period. It is sent by AP to set up a quiet period for the operation indicated by Quiet Time Period Setup element. The Action field of a Quiet Time Period Setup frame contains the information shown in Table 9-418b (Quiet Time Period Setup frame Action field format).

Table 9-418b Quiet Time Period Setup frame Action field format

|  |  |
| --- | --- |
| Order | Information |
| 1 | Category |
| 2 | Quiet Time Period Action |
| 3 | Quiet Time Period Setup element (See 9.4.2.175a) |

**9.6.23a.3 Quiet Time Period Request frame format**

The Quiet Time Period Request frame is an Action frame of category Quiet Time Period. It is sent by HE STA to request a quiet period for the operation indicated by Quiet Time Period Request element. The Action field of a Quiet Time Period Setup frame contains the information shown in Table 9-418c (Quiet Time Period Request frame Action field format).

Table 9-418c Quiet Time Period Request frame Action field format

|  |  |
| --- | --- |
| Order | Information |
| 1 | Category |
| 2 | Quiet Time Period Action |
| 3 | Quiet Time Period Request element (See 9.4.2.175b) |

**9.6.23a.4 Quiet Time Period Response frame format**

The Quiet Time Period Response frame is an Action frame of category Quiet Time Period. It is sent by AP to indicate the status of a requested quiet period. The Action field of a Quiet Time Period Response frame contains the information shown in Table 9-418d (Quiet Time Period Response frame Action field format).

Table 9-418d Quiet Time Period Response frame Action field format

|  |  |
| --- | --- |
| Order | Information |
| 1 | Category |
| 2 | Quiet Time Period Action |
| 3 | Quiet Time Period Response element (See 9.4.2.175c) |

**11.50 Quieting HE STAs in a HE BSS**

**11.50.1 General**

The QTP (Quiet time period) defines a period for an STA-to-STA operation during which only the HE STA which supports the STA-to-STA operation can transmit frames. During the period an HE STA should not transmit frames unless it participates in the STA-to-STA operation. All HE STAs in the HE BSS not participating the STA-2-STA operation should stay quiet in the period.

An AP that supports QTP shall set the QTP Support field in the AP’s HE Capabilities element to 1 and shall set the QTP Capability field to 0 otherwise.

**11.50.2 Procedure at the requester HE STA**

Upon the reception of an MLME-QTP.request primitive, an HE STA shall perform the following procedure to start the Quiet Time Period Operation (Figure 11-53a (Quieting Time Period operation)):

1. If responder AP and requester HE STA are QTP capable as indicated by the QTP Support field in the HE Capabilities element, the requester HE STA sends a Quiet Time Period Request frame indicating the duration, interval, and type of operation (indicated by vendor specific service type). The requester HE STA may include multiple Quiet Time Period Request elements in one frame for multiple types of STA-2-STA operations.
2. If a Quiet Time Period Response frame is received with the matching dialog token and request token with a status code set to a value of SUCCESS, the AP has confirmed the reception of the Quiet Time Period Request element, and the MLME shall issue an MLME-QTP.confirm primitive indicating the success of the procedure.
3. When a Quite Time Period Setup frame is received, the requested HE STA can transmit frame belongs to the requested type of STA-2-STA operation indicated by the vendor specific service identifier of the Quiet Time Period Response. The transmission of a frame by the HE STA in this period shall follow the CCA rules.

NOTE—The GAS protocol can be used by an HE STA to inform an AP the type of STA-to-STA operations.

**11.50.3 Procedure at the responder AP**

A responder AP may operate as follows (Figure 11-53a (Quieting Time Period operation)):

1. When a QTP Request frame is received from an HE STA, the MLME shall issue an MLME-QTP.indication primitive.
2. Upon receipt of the MLME-QTP.response primitive, the AP may respond by sending Quiet Time Period Response frame.
3. If the result code is SUCCESS, the request is accepted. The responder AP shall schedule the quiet period(s) according to the accepted request. Contained in the transmitted Quiet Time Period Response frame is the copy of the request token from the requester HE STA. The QTP procedure shall be terminated if the number of quiet periods exceeds the value of the Repetition Count field specified.
4. If the result code is REJECTED, the request has not been fulfilled.
5. When the scheduled quiet time periods arrive, the responder AP may transmit a Quiet Time Period Setup frame including Quiet Time Period Setup element. Only the HE STA which supports the operation indicated by the Vendor Specific Service Identifier field of the Quiet Time Period Setup element can transmit frames in the quiet time period. The responder AP shall set the Duration field of Quiet Time Period Setup frame to the value no larger than indicated in Quiet Period Duration field of the Quiet Time Period Request element sent by the requestor HE STA.