IEEE P802.11
Wireless LANs

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| Proposed resolution for CIDs Related to Quiet Time Period |
| Date: 2019-07-14 |
| Author(s): |
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Abstract

This submission proposes resolutions for comments related to TGax D4.0 subclause 26.17.5 and 9.4.2.249 with the following CIDs:

20085, 20086, 20642, 21052, 21053, 21054, 21056, 21057, 21058, 21059, 20571, 20647, 20961, 20962, 20963, 20964, 20965, 20966, 20967, 20968, 21055, 20101, 20102, 20103, 20483, 20484

Revisions:

Rev 0: Initial version of the document.

Rev 1: Text changes proposed during presentation; Changed all “requesting STA” to “QTP requesting STA”; defined “QTP period” and changed all “quiet time period” to “QTP period”. Changed comment resolution to CID 20571 and provided corresponding text changes. Changed comment resolution to CID 20961.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **commenter** | **Section** | **Pg / Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 20085 | Abhishek Patil | 26.17.5.1 | 436.50 | Briefly explain how the mechanism works - i.e., a STA makes a request to the AP and AP in turn informs it's associated STAs to remain quiet during the specified period. Associated non-APS STAs may choose to honor the request. | As in comment | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20085** |
| 20086 | Abhishek Patil | 26.17.5.1 | 436.64 | What is the expected behavior if a non-AP STA has indicated support for QTP? Does it honor the request and remain quiet during the specified time period? Since it is up to the STA to request Quiet Time, a capability bit is not required in the non-AP STA side. | Provide clarification on what is the expectation from a non-AP STA that has indicated support by setting the QTP Support bit in HE Capabilities element. | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20086** |
| 20642 | Mark RISON | 26.17.5.1 | 436.52 | "An HE STA may ignore the request and access the channel by following the CCA rule as specified in 26.2(HE channel access)." -- there are multiple rules in 26.2, and there are other subclauses that describe channel access | Change the cited text at the referenced location to "An HE STA may ignore the request." | **Revised**Agree with the commenter in principle. Delete the discussion of channel access by a STA that ignores the QTP.**TGax editor, please make changes as shown in 11-19/1163r1CID 20642** |
| 21052 | Matthew Fischer | 26.17.5.1 | 436.52 | Various clarifications needed to the QTP text. | Merge the paragraph beginning with "An HE STA may ignore the request" with the previous paragraph to clarify which request is being referenced. Also, the reference subclause 26.2 (HE Channel Access) contains more than just "CCA rules" so change "CCA rules" to "medium access rules" and 26.2 is a supplement to the basic rules, so add a reference to each of 10.3 (DCF) and 10.24 (HCF) | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21052** |
| 21053 | Matthew Fischer | 26.17.5.1 | 436.61 | Wrong name | Change “QTP Capability” to “QTP Support” | **Revised****TGax editor, please make changes as shown in 11-19/1163r1CID 21053** |
| 21054 | Matthew Fischer | 26.17.5.1 | 436.56 | Rearrange for clarity. The sentence beginning with "An HE STA that decides" is in a paragraph that includes discussion of support and non support and therefore confuses the question of "deciding" with "supporting". | Move the sentence that begins "An HE STA that decides" to the previous paragraph and while you are at it, change "quiet" to "quiet during a QTP" - also the sentence says that the plural, counters, are suspended, but then says "resume it" which is singular - the sentence needs to be rewritten to fix this. It also does not say when the suspend starts, this needs to be added to the sentence. | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21054** |
| 21056 | Matthew Fischer | 26.17.5.2 | 437.39 | Named elements do not exist. For example, this subclause mentions the "Quiet Time Period Request element" but there is no such thing. There is only a QTP element with some subtype field, so you can either say the QTP element with subtype equal to blah, or you can state that a QTP Request is a frame containing a QTP element with subtype equal to blah, and then continue to use the term QTP request. There are several instances of this problem. | Fix the unsupported references to elements that do not exist. | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21056** |
| 21057 | Matthew Fischer | 26.17.5.2 | 438.13 | Item c) has no precedent - that is, this item should be qualified by the condition that the AP has accepted a request and for such accepted requests, the AP may perform the action described in c) at some time before, exactly | Fix the text per the comment, e.g. "At the start time for an accepted Quiet Time Period, the AP may". You should change "may transmit" to "may schedule for transmission" | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21057** |
| 21058 | Matthew Fischer | 26.17.5.2 | 437.41 |

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| The service specific identifier is not well described here or in the element subfield description. The determination of the value of this field is not described. In particular, the intended peer of a QTP might decide to be quiet, not knowing that it is the peer to be addressed during the QTP! Is the QTP to be used only one direction, such that the peer can respond only but not initiate so that matching QTP must be set up, and if so, wouldn't it be nice to coordinate so that both peers have the same QTP? Also, if I were a STA that saw a quiet setup frame and thought that I was not participating and then suspended my backoff, i'd probably decide that since I cannot do anything else, this might be a great time to go to sleep and if the owner of the QTP wants to reach me, he's screwed! | You probably need to pass the SSI to the peer so it knows that it should be using the QTP for initiating as well as responding. Although how that Ssi is associated with some particular peer operation would be needed as well... |

 | You probably need to pass the SSI to the peer so it knows that it should be using the QTP for initiating as well as responding. Although how that Ssi is associated with some particular peer operation would be needed as well... | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21058** |
| 21059 | Matthew Fischer | 26.17.5.2 | 437.50 | The language in item c) is too vague - it says when a QTP setup is received - but doesn't the STA need to determine if the service specific identifier in that setup frame matches one in which it is a participant? Actually, if it does not match, then it needs to be quiet - so two fixes are needed here. | Per the comment, indicate that a STA should transmit only if the service specific ID matches one for which it received an accept and if not, then the STA has the option to be quiet. Note that any STA can ignore the QTP, so the statement cannot be a "shall only transmit" | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21059** |
| 20571 | Mark RISON |  | check | "no vendor specific" -- this restriction is unnecessary | Delete the sentence at the end of Subclauses 9.6.31.3, 9.6.31.4 and 9.6.32.2. At the end of 9.6.31.2 change "vendor-specific" to "Vendor Specific" | RevisedAgree with the commenter in principle. For action frames except compressed beamforming/CQI frame, it is not necessary to restrict them from carrying vendor specific elements. Keep the restriction only for HE Compressed Beamforming/CQI frame.**TGax editor, please make changes as shown in 11-19/1163r1CID 20571** |
| 20647 | Mark RISON |  |  | QTP is sometimes referred to as "QTP operation", sometimes "QTP mechanism", sometimes "QTP procedure", sometimes plain "QTP" | Refer to it using one term throughout | RevisedAgree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20647** |
| 20961 | Mark RISON | 9.4.2.249.1 | 194.62 | ", which is the octet immediately after the HE Action field (Quiet Time Period frame)," is duplication | Delete the cited text at the referenced location | Accepted**TGax editor, please make changes as shown in 11-19/1163r1CID 20961** |
| 20962 | Mark RISON | 9.4.2.249.1 | 194.62 | " A Control field in the Quiet Time Period element, which is the octet immediately after the HEAction field (Quiet Time Period frame), specifies the type of actions of the Quiet Time Period action frame" is duplicated a few lines later | Delete the cited text at the referenced location (keep the full stop, to give to the previous sentence, which is missing one). Also delete "The first 2 bits define the operations. The remaining 6 bits are reserved." at line 65 | Accepted**TGax editor, please make changes as shown in 11-19/1163r1CID 20962** |
| 20963 | Mark RISON | 9.4.2.249.1 | 194.61 | "The Quiet Time Period element is carried in Quiet Time Period Action frame (see 9.6.31.1 (HE Action field))" is duplication (and should be "frames", and is missing a full stop) | Delete the cited text at the referenced location | AcceptedAgree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20963** |
| 20964 | Mark RISON | 9.4.2.249.1 | 195.18 | "The first two-bits defines the value and are referred to as Quiet Time Period Subtype field. The remaining 6 bits are reserved. Table 9-321f (Control field encoding) shows the encoding of the Control field." Make up your mind. If the first two bits are the QTPS field then the values 3-255 can't all be reserved. Also missing article. And what is "first two"? | Change to "The two LSBs define the subtype and are referred to as the Quiet Time Period Subtype field. The remaining 6 bits are reserved. Table 9-321f (Control field encoding) shows the encoding of the Quiet Time Period Subtype field.", and change "type" to "subtype" in the previous sentence. Change the Table 9-321f caption to "Quiet Time Period Subtype field encoding". Change the bottom left cell of that table to just "3" | AcceptedAgree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20964** |
| 20965 | Mark RISON | 9.4.2.249.1 | 194.54 | Lots of articles are missing in subclause | Add missing articles to subclause | RevisedAgree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20965** |
| 20966 | Mark RISON | 9.4.2.249 | 197.15 | "The Control field of values 2 indicate the Quiet Time Content is for Quiet Time Period Response operation." is duplication | Delete the cited text at the referenced location | AcceptedAgree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20966** |
| 20967 | Mark RISON | 9.4.2.249 | 196.54 | "The HE STAs participated in the peer-to-peer operation are given preference to transmit frames in the period. " is behaviour not format | Delete the cited text at the referenced location | AcceptedAgree with the commenter in principle.**11-19/1163r1** |
| 20968 | Mark RISON | 9.4.2.249 | 195.44 | Inconsistent last para | Change the last para of 9.4.2.249.2/3/4 to "The Service Specific Identifier field contains an identifier assigned by a peer-to-peer application to identify a specific peer-to-peer operation that is due to take place during the quiet time period." | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20968** |
| 21055 | Matthew Fischer | 9.4.2.249.1 | 195.18 | The description of the fields does not really match the table. The description says that two bits are a single subfield and the other six bits are reserved, yet the table shows values for an 8 bit field. Make the description and the table match. | Make the description and the table match - either one 8 bit field with 3 valid values, or two subfields. | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 21055** |
| 20101 | Albert Petrick | 9.4.2.249.3 | 196.48 | Grammar | Change text to read: “A repetition count equal to 0 indicates the set up time of the quiet time period is for a one time operation.” | **Accepted****TGax editor, please make changes as shown in 11-19/1163r1CID 20101** |
| 20102 | Albert Petrick | 9.4.2.249.3 | 196.49 | Grammar | Change text to read: "A repetition count equal to 0xFF indicates the setup of the quiet time period is cancelled." | **Accepted****TGax editor, please make changes as shown in 11-19/1163r1CID 20102** |
| 20103 | Albert Petrick | 9.4.2.249.3 | 196.54 | Grammar | Change text to read: "The HE STAs that participate in the peer-to-peer operation are given preference to transmit frames in the period." | **Revised**Agree with the commenter in principle.**TGax editor, please make changes as shown in 11-19/1163r1CID 20103** |
| 20483 | Mark Rison | 9.4.2.249.4 | 197.15 | "The Control field of values 2 indicate the Quiet Time Content is for Quiet Time Period Response operation." is grammatically broken and duplicative of Table 9-321f | Delete the cited text at the referenced location | **Accepted**Agree with the commenter in principle.**11-19/1163r1** |
| 20484 | Mark Rison | 9.4.2.249.4 | 197.01 | "The content of Quiet Time Content subfield" missing article | Add "the" after "of" in the cited text at the referenced location | **Accepted** |

***TGax editor: change the paragraph in 26.17.5 as follows:***

**26.17.5 Quiet HE STAs in an HE BSS**

**26.17.5.1 General**

 Quiet Time Period (QTP) is an optional feature that defines a period of time (QTP period) that is intended to be used primarily for the exchange of specific frames between a STA requesting a QTP and its peers using peer-to-peer links. The particular frames to be exchanged using peer-to-peer links during the QTP period are identified by a service specific identifier. The determination of which frames are associated with the service specific identifier is beyond the scope of the standard. The method for selection of the service specific identifier by the peer-to-peer operation is beyond the scope of the standard.[20085]

An AP that supports QTP is a QTP AP and shall set the QTP Support field to 1 in HE Capabilities elements that it transmits and shall set the QTP Support field to 0 otherwise. A non-AP HE STA that supports QTP is a QTP non-AP STA and shall set the QTP Support field to 1 in HE Capabilities elements that it transmits and shall set the QTP Support field to 0 otherwise. [20086, 21053]

A QTP non-AP STA may request its QTP AP to set up a QTP and if successful, the QTP AP informs other associated QTP non-AP STAs of the QTP and of the service specific identifier associated with that QTP. [20085, 20086]

During the QTP, the QTP non-AP STAs should not exchange frames that are not associated with the service specific identifier. QTP non-AP QTP A QTP non-AP STA that decides to stay quiet during a QTP period suspends the decrementing of its backoff counters at the start time of the QTP period and resumes them when the QTP period ends. [20085, 20086, 20642, 21052, 21054, 20647][20642, 21052][20086, 21053]

NOTE— Otherwise, a STA that does not stay quiet does not suspend the decrementing of its backoff counters.

**26.17.5.2 QTP Requesting STA procedure**

A QTP requesting STA is a QTP non-AP STA that requests a QTP.

Upon the reception of an MLME-QTP.request primitive, a QTP requesting STA shall perform the following procedure (Figure 26-13 (Quiet time period operation))

a) If a QTP requesting STA is associated with a QTP AP, , the QTP requesting STA sends a QTP Request frame which is a Quiet Time Period Action frame (9.6.31.3 (Quiet Time Period Action frame details)) with the Control field of the Quiet Time Period element indicating the Quiet Time Period Request subtype. The QTP Request frame indicates the duration, interval, and type of operation (indicated by Service Specific Identifier). The QTP requesting STA may include multiple Quiet Time Period elements with Request subtype in one QTP Request frame for multiple types of frames associated with different service specific identifiers. [21056]

b) A QTP Response frame is a Quiet Time Period Action frame (9.6.31.3 (Quiet Time Period Action frame details)) with the Control field of the Quiet Time Period element indicating Quiet Time Period Response subtype. If a QTP Response frame is received with the dialog token matching the request token with a status code set to a value of SUCCESS, the QTP AP has confirmed the reception of the QTP Request frame, and the MLME shall issue an MLME-QTP.confirm primitive indicating the success of the procedure. [21056]

c) A QTP Setup frame is a Quiet Time Period Action frame (9.6.31.3 (Quiet Time Period Action frame details)) with the Control field of the Quiet Time Period element indicating Quiet Time Period Setup subtype. If a QTP Setup frame is received, at the start time for a QTP period the QTP requesting STA may schedule frames for transmission that are associated with the service specific identifier indicated in the QTP Setup frame and should not transmit frames that are not associated with the service specific identifier. [2—[20085]

**26.17.5.3 Responding AP procedure**

Upon receipt of a QTP request, a QTP AP shall operate as follows (Figure 26-13 (Quiet time period operation)):

a) The MLME of the AP shall issue an MLME-QTP.indication primitive. [21056]

b) Upon receipt of the MLME-QTP.response primitive, the AP may respond by sending a broadcast QTP Response frame. [21056]

1) If the status code in the broadcast QTP Response frame is SUCCESS, the AP accepts the request. The AP shall schedule the quiet period(s) according to the accepted request. Contained in the transmitted QTP Response frameis a copy of the dialog token from the QTP requesting STA. The QTP procedure shall be terminated if the number of quiet periods exceeds the value of the Repetition Count field specified. [21056]

2) If the status code in the broadcast QTP Response frame is REJECTED, the AP indicates that the request cannot be fulfilled.

3) If the status code in the broadcast QTP Response frame is COUNTERED, the AP counters the request with recommended values and the current request is rejected. Upon receiving the counter-proposal, a QTP STA can send a new QTP Request frame to set up another QTP period. [21056]

c) At the start time for a quiet time period, the AP may schedule for transmission a QTP Setup frame. The AP shall set the Quiet Period Duration field of the QTP Setup frame to a value no larger than indicated in the Quiet Period Duration field of the QTP Request frame sent by the QTP requesting STA. [21056, 21057, 21059]

NOTE—The AP is not required to transmit a QTP Setup frame when a scheduled QTP period arrives. The interference mitigation protocol is to provide an AP a tool to manage and avoid interference. How or whether the AP will transmit a QTP Setup frame when a scheduled QTP periods arrives is not in the scope of this specification.

***TGax editor: change the paragraph in 9.4.2.249 as follows:***

9.4.2.249 Quiet Time Period element

9.4.2.249.1 General

20967] . [20961, 20962, 20963]

[20962, 20964]

The format of the Quiet Time Period element is shown in Figure 9-772v (Quiet Time Period element format).

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

A one octet Control field specifies the subtype of the Quiet Time Period element. The two LSBs define the subtype and are referred to as the Quiet Time Period Subtype field. The remaining 6 bits are reserved. Table 9-321f ( Quiet Time Period Subtype field encoding) shows the encoding of the Quiet Time Period Subtype field. [20964, 20966]

Table 9-321f—Quiet Time Period Subtype field encoding [20964, 20966, 21055]

|  |  |
| --- | --- |
| Quiet Time Period Subtype field value | Meaning |
| 0 | Quiet Time Period Setup |
| 1 | Quiet Time Period Request |
| 2 | Quiet Time Period Response |
| 3 | Reserved |

The Quiet Time Content field is a variable length field and carries information of quiet time operation indicated by the value in the Control field. [20965]

9.4.2.249.2 Quiet Time Period Setup

The Quiet Time Period Setup subtype defines a period of time for QTP [20647] (see 26.17.5 (Quiet HE STAs in an HE BSS)). The QTP period can be used by an AP to mitigate interference by reducing the contention from HE STAs in a period that gives preference to HE STAs participating in the exchange of specific frames using peer-to-peer links.

The content of the Quiet Time Content subfield in the Quiet Time Period Setup subtype is shown Figure 9-772w (Quiet Time Content subfield format in Quiet Time Period Setup subtype).

The Quiet Period Duration field is set to the duration of the QTP period, in units of 32 μs, that is no larger than the value indicated in the Quiet Period Interval subtype field of the Quiet Time Period Request subtype sent by the QTP requesting STA.

The Service Specific Identifier field indicates specified frame exchanges using peer-to-peer links during which HE STAs that have requested participation might transmit frames during the QTP period. [20968]

9.4.2.249.3 Quiet Time Period Request

The Quiet Time Period Request subtype defines a periodic sequence of QTP periods that the QTP requesting STA requests the QTP AP to schedule.

The content of the Quiet Time Content subfield in the Quiet Time Period Request subtype is shown

Figure 9-772x (Quiet Time Content subfield format in Quiet Time Period Request subtype).

The Dialog Token field identifies the Quiet Time Period Response subtype to which the Quiet Time Period Request subtype corresponds.

The Quiet Period Offset field is set to the offset of the first QTP period from the TBTT expressed in TUs.

The Quiet Period Interval field is set to the requested interval between the start of two consecutive QTP periods, expressed in TUs.

The Quiet Period Duration field is set to the duration of the QTP period in units of 32 μs.

The Repetition Count field is set to the number of requested QTP periods. A repetition count equal to 0 indicates the setup time of the QTP period is for a one time operation. [20101] A repetition count equal to 0xFF indicates the setup of the QTP period is canceled. [20102]

The Service Specific Identifier field contains an identifier assigned by a peer-to-peer application to identify specified frame exchanges using peer-to-peer links during which HE STAs that have requested the participation of the specified frame exchanges might transmit frames during the QTP period..[20103, 20968, 20967]

9.4.2.249.4 Quiet Time Period Response

The Quiet Period Response subtype defines the feedback information from the AP that received the Quiet Time Period Request element. If an AP decides not to accept the value requested by the QTP requesting STA, the AP can set different values carried in the Quiet Period Response frame.

The content of the Quiet Time Content subfield in the Quiet Time Period Response subtype is shown in

Figure 9-772y (Quiet Time Content subfield format in Quiet Time Period Response subtype). [20484]

 [20483]

The Dialog Token field identifies the Quiet Time Period Request subtype to which this Quiet Time Period Response subtype corresponds.

The Status Code field indicates the status of a requested operation. The value of the status code is shown in Table 9-321g (Status Code).

The Quiet Period Offset field is set to the offset of the start of the first QTP period from the transmission time of the preamble of the PPDU that contains the Quiet Time Period Response subtype, 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 interval between the start of two consecutive quiet time periods, expressed in TUs.

The Quiet Period Duration field is a one octet field with resolution of 32 μs.

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

The Service Specific Identifier field indicates specified frame exchanges using peer-to-peer links during which HE STAs that have requested the participation of the frame exchanges might transmit frames during the QTP period. [20103, 20968]

***TGax editor: make the following change in 9.6.31.2 as follows:***

9.6.31.2 HE Compressed Beamforming/CQI frame format

No Vendor Specific elements are present in the HE Compressed Beamforming/CQI frame. [20571]

***TGax editor: make the following change in 9.6.31.3 as follows:***

9.6.31.3 Quiet Time Period Action frame details

 [20571]

***TGax editor: make the following change in 9.6.31.4 as follows:***

9.6.31.4 OPS frame format

[20571]

***TGax editor: make the following change in 9.6.32.2 as follows:***

9.6.32.2 HE BSS Color Change Announcement frame format

[20571]

***TGax editor: make the following change in 9.3.3.13 as follows:***

9.3.3.13 Action frame format

The frame body of an Action frame contains the information shown in Table 9-45 (Action frame body and Action No Ack frame body.

Table 9-45—Action frame body and Action No Ack frame body

|  |  |
| --- | --- |
| Order | Information |
| 1 | Action |
| Last - 2 | One or more vendor-specific elements are optionally present.These elements are absent when the Category subfield of the Action field is Vendor-Specific, Vendor-Specific Protected, or Self-protected or when the Category subfield of the Action field is VHT and the VHT Action subfield of the Action field is VHT Compressed Beamforming, or when the Category subfield of the Action field is HE and the HE Action subfield of the Action field is HE Compressed Beamforming/CQI. [20571] |
| … | … |
|  |  |
|  |  |