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### IEEE P802.11 Wireless LANs

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| 11ax D1.0 MAC Comment Resolution for | | | | |
| Date: 2017-09-10 | | | | |
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Abstract

This submission proposes resolutions for comments of TGax Draft 1.0 and the proposed change is for TGax Draft 1.4

CIDs: 5068, 6048 ,6804 ,6805 ,6807, 6814 ,6815 ,5230 ,6816 ,8243 ,8421 ,8422 ,8244 ,8245 ,8289 ,8622 ,9593, 5952

(18 CIDs)

Revisions:

* Rev 0: Initial version of the document.

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D1.0 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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5068 | 208.24 | 27.16.3.3 | How to set Duration field in MAC header? Is it same as Duration field of QTP setup IE? | please clarify | Rejected: The duration filed in the MAC is set according to 802.11 specification. The duration filed in MAC header is different from the duration filed in the QTP element. There is no relationship between the two duration fields. |
| 6048 | 208.18 | 27.16.3.3 | If an HE AP has associated legacy non-AP STAs and the AP has established quiet period, then is the AP allowed to send data to the legacy STAs, or beacons during the quiet period. | Please clarify. | Rejected: Any HE STA, AP or non-AP or non-HE STA can send data in the quiet period following the channel access rule, as this is a best effort feature for interference mitigation. |
| 6804 | 207.57 | 27.16.3.2 | Unclear and ungrammatical text: "can transmit frames belongs to the requested type of STA-to-STA operation". What does this mean? | Clarify. | Duplicated: Resolved in CID 6806, 700r1. |
| 6805 | 207.57 | 27.16.3.2 | Imprecise (possibly) normative text: "When a Quiet Time Period Setup frame is received, the requested(/r) HE STA can/may transmit". Isn't the whole point that that these "quiet times" repeat themselves periodidcally up to some limit, potentially at least? So whatever is being described here, it can't be the period immediately after reception of the setup frame. | Add appropriate text to clarify when the requester HE STA can or may transmit whatever it is supposed to be transmitting under this protocol. | Rejected: The setup frame ( defined in 9.4.2.242.1) serves as a paging function for AP to inform HE STAs that the specific peer-to-peer operation identified by the Service Specific Identifier have preference to access the channel.  Even with repetition, AP can still decide whether the preference should give to the peer-to-peer operation based on the loading of the BSS. |
| 6807 | 207.59 | 27.16.3.2 | There's something odd about the entire discussion in subsection c. On the surface it seems to discuss the frames that may be sent in a QTP. But earlier, in 27.16.3.1, it is stated that non-participating HE STAs "should" not transmit during a quiet period. From this we can infer that remaining quiet during this "quiet period" is optional, and any and all HE STAs may transmit any frames they like during the same period. So what role does subsection c play? Where does the behavior it describes fall on the shall / should may spectrum? | Reword to clarify the role this subsection plays. Assuming that we keep the "should"s in 27.16.3.1, perhaps the best that can be done is to recast this subsection as a suggested example of what can be done. ("For example, an HE STA may ... .') | Duplicated: Resolved in CID 6809, 700r1. |
| 6814 | 208.35 | 27.16.3.3 | During these "quiet periods", other HE STAs that follow the recomemnded procedure are held off the air. But there is no requirement that the requester HE STA actually has to transmit anything. Thus we have a procedure that permits STAs to reserve the medium without any requirement that it should actually be used, or any convenient method of terminating its use if the requester HE STA does not transmit (or is not allowed to transmit, under the CCA rules). This is the epitome of bad practice. The recommended practice should be modified so that other HE STAs are allowed to transmit once it becomes clear that this quiet period is not going to be used. | Modify the "should" statements in 27.16.3.1 to something appropriately shorter than the fll quiet period. | Revised: Agree with the suggestion. Addition text is added to resolve the comment. |
| 6815 | 208.35 | 27.16.3.3 | In the illustrative example of behavior by the AP, we have the statement that the AP "shall" schedule the quiet period(s) according to the accepted request. The dividing line between mandatory and optional is very murky here since the example is introduced with a "may". But taking the "shall" at face value, we have the peculiar situation where a requester HE STA may request many repetitions of a quiet period, then not transmit during the first few quiet periods, and the AP would still be compelled to issue new QTP setups according to the original schedule. This is bad practice. Requests to hold the medium silent for transmissions that never arrive should not be honored. | Modify the language to make it clear (after clarifying the whole shall / should / may status of the whole mechanism) that an AP is under no obligation to issue QTP setup frames, regardless of any previously "accepted" request. | Revised: Agree. Additional text is added to 27.16.4.1 to address the comment. |
| 5230 | 207.07 | 27.16.3.1 | According to 9.4.2.225, "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", so that means that all the other STAs in the BSS must receive the Quiet Time Period Request frame in order to know when the Quiet Time Period starts. I doubt this will work, as many HE STAs will not receive the Request Frame, e.g. hidden nodes, power save. | The simplest fix is to delete the protocol | Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.  The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period. |
| 6816 | 208.35 | 27.16.3.3 | The entire quiet time period mechanism is odd and unconvincing. Legacy devices will not understand, and will not remain quiet. Even for HE STAs, it is just a recommendation that the device "should" remain quiet, which is usually not worth anything. In a dense environment in which some devices follow the recommendation and others do not, the "quiet period" will actually be quite noisy. So what's the point? Apart from that the mechanism, even if it worked, would allow devices to make arbitrary reservations of the medium without a requirement for actually using it, and without a method of canceling unused quiet periods; even if this worked, it shouldn't be allowed. | Delete the "quiet time period" and all references to it in the draft. | Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.  The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period. |
| 8243 | 207.09 | 27.16.3 | It is not clear does this scheme quiet all the STAs in the BSS except two STAs doing sta-to-sta, or it keeps a set of STA not quiet. If a set of STA are not quiet, how this will help STA-to-STA communication. | Clarify | Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.  The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period. |
| 8421 | 207.01 | 27.16.3 | The QPT procedure is incomplete. It appears to be a frame exchange between a station and the AP that performs no function. From the name it appears to require that some undefined set of STAs not transmit for a certain amount of time. How a STA determines it is part of this set is not defined. What the AP does as a result of a setup exchange is not defined either. | Remove feature by deleting 9.4.2.223-225 and 27.16.3 | Duplicated: CID 6816. The interference mitigation optional protocol is to provide an AP a tool to mitigate interference. How or whether AP will transmit Quiet Time Period Setup frame when a scheduled quiet time periods arrives is an implementation. The protocol is relatively simple and will do no harm to the HE BSS operation. |
| 8422 | 80.10 | 9.4.2.218.2 | The QPT Support capability is not clear. QPT operation is not defined. | Remove the QPT Support field | Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.  The operation and companion elements of the operation are defined in is defined in 9.4.2.224. |
| 8244 | 207.01 | 27.16.3 | What is the impact of Quieting all (or most of the STAs) on the BSS throughput. Has there been any study to quantify the impact? | discuss the impact on BSS throughput | Rejected: It is up to an AP to decide whether to enable the quiet time period. The algorithm is out of scope of the specification. Any impact to HE BSS throughput if any is due to AP’s decision not because of the protocol. |
| 8245 | 207.01 | 27.16.3 | There are many references in this clause that this feature is intended for STA-to-STA operation. However this operation is not defined together with the STA-to-STA signaling and communication | Define the missing operations | Rejected: The STA-to-STA (peer-to-peer) signalling is not part of the feature. It is up to the peer-to-peer protocol to define the signalling protocol. This feature compliments the peer-to-peer operation. |
| 8289 | 207.04 | 27.16.3.1 | There is a mis-configuration for EDCA contention between Quiet time period mode and MU EDCA Parameter mode: when a STA has both traffic to deliver STA2STA (during QTP period) and MU UL to AP (outside QTP period), what EDCA configuration to use ? | The MU EDCA mode is not able to support STA2STA communication. Instead of applying a penalty of EDCA parameters, it would be better efficient to let backoff counters count down as usual with no penalty, and to condition the transmission of data (when one EDCA backoff is down to zero) according QTP on/off mode. - In case of QTP period is off, then the MU EDCA mode may prevent any EDCA access. Thus the backoff down to zero is simply re-drawn. - In case of QTP period is on when a backoff counter reaches zero, if the data stored in the associated traffic queue include data to be addressed to another STA different from the access point (i.e. it is STA2STA data), then this data is transmitted. next the backoff counter is redrawn. | Revised: Agree with the comment. The revised text is included in 27.16.4.1. |
| 8622 | 207.57 | 27.16.3.2 | Unclear sentence "the requested HE STA can transmit frame belongs to the requested type of STA-to-STA operation" | Improve wording | Duplicated: CID 6806, 700r1. |
| 9593 | 208.27 | 27.16.3 | Specific method of setting QTP by QTP setup frame is not described. Specific procedure for STAs received QTP setup frame need to be described. | Define it. | Rejected: The basic procedure is defined in PL 281-43-45 and 282 5-13 (in draft 1.3) |
| 5952 | 207.15 | 27.16.3.2 | The spec only provides the methods to setup new Quiet Time Periods. But once a periodic Quiet Time Period is configured, there should be some ways to cancel it when necessary. | As suggested | Resolved in 9.4.242.3 |

**Discussion:**

5068 Rejected: The duration filed in the MAC is set according to 802.11 specification. The duration filed in MAC header is different from the duration filed in the QTP element. There is no relationship between the two duration fields.

6048 Rejected: Any HE STA, AP or non-AP or non-HE STA can send data in the quiet period following the channel access rule, as this is a best effort feature for interference mitigation.

6804 Duplicated: Resolved in CID 6806, 700r1.

6805 Rejected: The setup frame ( defined in 9.4.2.242.1) serves as a paging function for AP to inform HE STAs that the specific peer-to-peer operation identified by the Service Specific Identifier have preference to access the channel.

Even with repetition, AP can still decide whether the preference should give to the peer-to-peer operation based on the loading of the BSS.

6807 Duplicated: Resolved in CID 6809, 700r1.

6814 Revised: Agree with the suggestion. Addition text is added to resolve the comment.

6815 Revised: Agree. Additional text is added to 27.16.4.1 to address the comment.

5230 Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.

The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period.

6816 Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.

The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period.

8243 Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.

The protocol is meant to be deterministic or guaranteed. The protocol will do no harm to BSS operation even if no STA volunteered to stay silent in a quiet time period.

8421 Duplicated: CID 6816. The interference mitigation optional protocol is to provide an AP a tool to mitigate interference. How or whether AP will transmit Quiet Time Period Setup frame when a scheduled quiet time periods arrives is an implementation. The protocol is relatively simple and will do no harm to the HE BSS operation.

8422 Rejected: The proposed feature provides an HE AP with a tool to mitigate interference when there are peer-to-peer operations in the HE BSS.

The operation and companion elements of the operation are defined in is defined in 9.4.2.224.

8244 Rejected: It is up to an AP to decide whether to enable the quiet time period. The algorithm is out of scope of the specification. Any impact to HE BSS throughput if any is due to AP’s decision not because of the protocol.

8245 Rejected: The STA-to-STA (peer-to-peer) signalling is not part of the feature. It is up to the peer-to-peer protocol to define the signalling protocol. This feature compliments the peer-to-peer operation.

8289 Revised: Agree with the comment. The revised text is included in 27.16.4.1.

8622 Duplicated: CID 6806, 700r1.

9593 Rejected: The basic procedure is defined in PL 281-43-45 and 282 5-13 (in draft 1.3)

5952 Resolved in 9.4.242.3

**Propose:**

Revised the following text per discussion and editing instructions in 11-17/0693r0.

***Instruction to the TGax Editor: The***

***Instruction to the TGax Editor: Since 27.16.3 becomes 27.16.4 in draft 1.3, the proposed changes is applied to 27.26.4***

**27.16.4 Quiet(#6797) HE STAs in a HE BSS**

**27.16.4.1 General**

The QTP (Quiet time period) is an optional feature that(#6809) defines a period for peer-to-peer(#5344) operation during which only HE STA(#6793) which supports the peer-to-peer(#5344) operation may(#5744) transmit frames. During the period an HE STA should not transmit frames unless it participates in (#6794)peer-to-peer(#5344) operation. All HE STAs in the HE BSS not participating peer-to-peer(#5344) operation should stay quiet in the period.[6814] All HE STAs in the HE BSS not participating peer-to-peer(#5344) operation may access the channel by following the CCA rule if it has high priority traffic to send. 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. [8289] An HE STA decides to stay quiet pause its countdown counter and resume count down when a quiet period ends. An STA can continue the countdown if choose not to be silent.

**27.16.4.2 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 27-14 (Quiet(#6797) 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 [3041, 9112] Service Specific Identifier ). The requester HE STA may include multiple Quiet Time Period Request elements in one frame for multiple types of peer-to-peer(#5344) operations.
2. If a Quiet Time Period Response frame is received with the dialog token matching the(#6799) 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 primi-tive indicating the success of the procedure.
3. When a Quiet(#6801) Time Period Setup frame is received, the requester(#6802) HE STA may(#5744) transmit frames(#6806). The transmission of a frame by HE STA(#6793) in this period shall follow the CCA rules.

NOTE 1—The HE STA can use the GAS protocol to transport an element that informs an AP about the type(s) of [5344]peer-to-peer operations that the HE STA supports.(#9107)

NOTE 2—The frames belong to the requested type of peer-to-peer operation indicated by the vendor specific service identifier of the Quiet Time Period Response.(#6806)

**27.16.4.3 Procedure at the responder AP**

A responder AP may operate as follows (Figure 27-14 (Quiet(#6797) Time Period operation)):

a) When a QTP Request frame is received from an HE STA, the MLME shall issue an MLME-QTP.indication primitive.

b) Upon receipt of the MLME-QTP.response primitive, the AP may respond by sending Quiet Time Period Response frame.

1) 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.

2) If the status code is REJECTED, the AP indicated the request can not be fulfilled.

3) [3034] If the status code is Countered, the AP counters the request with recommended values and the current request is rejected. [3043]. Upon receiving the Countered, an HE STA shall send a new the Quiet Time request frame to set up the quiet time period.

c) 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 HE STA(#6793) which supports the operation indicated by the Vendor Specific Service Identifier field of the Quiet Time Period Setup element may(#5744) transmit frames in the quiet time period. The responder AP shall set the Quiet Period Duration field of Quiet Time Period Setup frame to a(#6813) value no larger than indicated in Quiet Period Duration field of the Quiet Time Period Request element sent by the requester HE STA.

[6815] Notes: AP is not required to transmit Quiet Time Period Setup frame when a scheduled quiet time periods arrives. The interference mitigation protocol is to provide an AP a tool to mitigate interference. How or whether AP will transmit Quiet Time Period Setup frame when a scheduled quiet time periods arrives is not in the scope of this specification.