IEEE P802.11 Wireless LANs

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| **LB 266 Resolution for CIDs in 35.9.4.2** |
| **Date: Sept 06, 2022** |
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 Abstract

This submission proposes resolutions for following 16 CIDs received for TGbe LB266:

~~10732, 10859, 10934~~

10895, 10904, 10932,

10933, 11597, 11619, 12288

~~12404, 12520,~~ 12736, ~~12748, 12749~~

~~10914~~

R3: remaining CIDs {10732, 10859, 10934; 12404, 12520, 10914; }

# Revisions:

* Rev 0: Initial version of the document.
* Rev 1: add 10914, remove two CIDs {12748, 12749} (put them in doc 1470)
* Rev 2: revised text
* Rev 3: develop/revise resolution for the remaining 6 CIDs (page 5)
* Rev 4: add text for option 3 (10732 etc.)
* Rev 5. revise text for option 3 (10732 etc.)

***TGbe editor: The baseline for this document (r0-2) is 11be D2.1.1, P802.11REVme\_D1.3 and P802.11ax D8.0***

***TGbe editor: The baseline for this document (r3…) is 11be D2.2, P802.11REVme\_D1.4 and P802.11ax D8.0***

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 TGbe Draft. This introduction is not part of the adopted material.

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

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

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| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 10732 | Insun Jang | 35.9.4.2 | 512.41 | How can non-AP EHT STAs, which does not support rTWT, differentiate any existing quite interval is overalpping or not? If they don't understand rTWT parameters, we need to handle how it can work | As in the comment | **Revised**See discussion below. Group with {10732, 10859, 10934}. |
| 10859 | Jinsoo Choi | 35.9.4.2 | 512.42 | The sentence "Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist." is not enough delivering the meaning of what this intends for. Need to add more text to clarify the purpose and required protocol/signaling. | As in comment | **Revised**See discussion below. Group with {10732, 10859, 10934}. |
| 10934 | Thomas Handte | 35.9.4.2 | 512.42 | "Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist." How can a non-AP EHT STA with dot11RestrictedTWTOptionImplemented set to false destinguish if a signaled quiet interval can be ignored, because it is a overlapping quiet interval or cannot be ignored because it is not an overlapping quiet interval? Since the Non-AP EHT STA doesn't support r-TWT, it may not parse the TWT element to figure out the status of a quiet interval | Please clarify or delete the sentence. A solution would be: "Non-AP EHT STAs with dot11RestrictedTWTOptionImplemented set to true may behave as..." | **Revised**See discussion below. Group with {10732, 10859, 10934}. |
| 10895 | Charlie Petterson | 35.9.4.2 | 512.30 | "An r-TWT scheduling AP may schedule at most one quiet interval that overlaps with a r-TWT SP" and "Overlapping quiet intervals may be scheduled by including one or more Quiet elements in the Beacon and Probe Response frames that the EHT AP transmits" seems to be conflicting. You cannot schedule at most 1 overlapping quiet interval by including several quiet elements. | Change the second paragraph to "An overlapping quiet interval may be scheduled by including a Quiet element as part of one or more Quiet elements in the Beacon and Probe Response frames that the EHT AP transmits" | **Rejected**Disagree with the comment that the two sentences conflict.The statement “at most one quiet interval that overlaps with a R-TWT SP” means that, for each SP, there can be at most one such an overlapping interval – either one or zero.The second sentence is located in a new paragraph and describes that such quiet intervals are scheduled by using Quiet elements.Note that each Quiet element can define one or a series of quiet intervals with period being in unit of Beacon interval. A R-TWT schedule may have many SPs if it’s periodic, and the period is in unit of TU. In addition, there might be more than one R-TWT schedules. Hence AP, if wishes to, may need to schedule multiple Quit elements. |
| 10904 | Akira Kishida | 35.9.4.2 | 512.25 | The quiet interval should be not 1 TU but variable (duration of r-TWT SP, at maximum) for flexible protection of latency sensitive traffic. | As in the comment. | **Rejected**Quiet intervals are intended to be used to achieve similar protection support as from EHT STAs that supports R-TWT. The requirement for EHT STAs supporting R-TWT is to give right-of-way when a R-TWT SP starts (by stopping their TXOP before the SP starts …) such that the chance a R-TWT STA can win the medium is increased. The existing rule doesn’t require the EHT STA to stay quiet \*during\* a R-TWT SP.Similar discussion happened during the development of this text and the group agreed to proceed with this path. |
| 12288 | KENGO NAGATA | 35.9.4.2 | 512.25 | The quiet interval should be not 1 TU but variable (duration of r-TWT SP, at maximum) for flexible protection of latency sensitive traffic. | As in the comment. | **Rejected**Quiet intervals are intended to be used to achieve similar protection support as from EHT STAs that supports R-TWT. The requirement for EHT STAs supporting R-TWT is to give right-of-way when a R-TWT SP starts (by stopping their TXOP before the SP starts …) such that the chance a R-TWT STA can win the medium is increased. The existing rule doesn’t require the EHT STA to stay quiet \*during\* a R-TWT SP.Similar discussion happened during the development of this text and the group agreed to proceed with this path. |
| 10932 | Thomas Handte | 35.9.4.2 | 512.25 | "An r-TWT scheduling AP may schedule at most one quiet interval that overlaps with a r-TWT SP." However, the next sentence says "Each such quiet interval..." which suggest that there may be multiple overlapping quiet intervals | Suggest to rewrite "Such a quiet interval..." because there is just one not multiple. | **Revised**Disagree with the comment (because a R-TWT schedule may have many SPs if the schedule is periodic) but agree that the proposed text may fit slightly better.**TGbe editor: please make the change indicated in this doc 11-22/1471r2 tagged by #10932.** |
| 10933 | Thomas Handte | 35.9.4.2 | 512.30 | "Overlapping quiet intervals may be scheduled by including one or more Quiet elements..." We should clarify that these Quiet elements define same overlapping quiet interval. | As in comment, otherwise it contradicts with first sentence of this subclause. | **Revised**Don’t see the contradiction. Nevertheless, reword to make the intention clearer.**TGbe editor: please make the change indicated in this doc 11-22/1471r2 tagged by #10933.** |
| 11597 | Vishnu Ratnam | 35.9.4.2 | 512.25 | The quiet element provides a hard quieting mechanism where traffic of all STAs is stopped. The spec should provide for a soft prioritization mechanism, where only some TIDs or ACs of nonAP MLDs have to comply with the quieting. This can enable a soft-prioritized version of rTWT. | Propose a "prioritized quiet element" with an indication of TIDs or ACs that need to comply with the quieting. | **Rejected**Disagree with the comment. The quiet interval is to quiet legacy STAs for 1 TU from the R-TWT SP start time. Legacy STAs don’t support R-TWT and hence are not R-TWT SP members. It doesn’t make sense to differentiate what TIDs/ACs are being scheduled by them to tx. Also, note that the quiet time is only 1 TU (not what was already brought up but declined to allow duration to be upto SP duration.).  |
| 11619 | Lei Wang | 35.9.4.2 | 512.23 | Based on the title of subclause 35.9.4.2, it seems that the overlapping quiet interval scheduling is used to make the non-AP STAs quiet during an r-TWT SP. However, since the quieting channel mechanism was first introduced in VHT, then the question is what happens in the BSSs with STAs prior-to VHT in 2.4GHz band or 5GHz band. | Please clarify how to handle the situation where a BSS has STAs prior-to VHT in 2.4GHz band or 5GHz band. | **Rejected**There are two types of quiet intervals defined by the Quiet element (not VHT specific) and Quiet channel element (VHT specific). The overlapping quiet intervals are using the first type, Quiet element, to schedule, as described by the second paragraph in 35.9.4.2. A NOTE after the second paragraph adds further clarification. |
| 12404 | Rojan Chitrakar | 35.9.4.2 | 512.41 | "Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist." why? Only EHT STAs that are members of the r-TWT SP should be exempted. | Modify as "Non-AP EHT STAs that are members of the corresponding r-TWT SP may behave as if overlapping quiet intervals do not exist." | **Rejected**The proposed text would require non-supporting EHT STAs to respect overlapping quiet intervals. However, the current text aligns with the passed text in SP#345 and corresponding motion which balance different opinions. Prefer not to deviating from that agreement. |
| 12520 | Mao Yang | 35.9.4.2 | 512.41 | The original intention of introducing r-TWT is to guarantee the low latency performance. But, the rule that "Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist" directly contradicts the objective of r-TWT. It leads to collision between EHT STAs at any r-TWT SPs. | Delete this rule. | **Rejected**Understand the intention of the comment. However, the current text aligns with the passed text in SP#345 and corresponding motion which balance different opinions. Prefer not to deviating from that agreement. |
| 10914 | Kiseon Ryu | 35.9.4.2 | 512.42 | An r-TWT STA that is not a member of the r-TWT SP should consider overlapping quiet intervals. | Replace "Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist." with "Non-AP EHT STAs with dot11RestrictedTWTOptionImplemented set to false may behave as if overlapping quiet intervals do not exist." | **Accepted** |
| 12736 | Pascal VIGER | 35.9.4.2 | 512.42 | As per 35.9.4.1 , a non-AP EHT STA with dot11RestrictedTWTOptionImplemented set to true as a TXOP holder shall ensure the TXOP ends before the start time of any r-TWT SPs, or shall check if there is enough time for the frame exchange if not involved in TXOP.As per 35.9.4.2 , Non-AP EHT STAs may behave as if overlapping quiet intervals do not exist.Does that mean that a non-AP EHT STA with dot11RestrictedTWTOptionImplemented set to false can do medium access during a TWT SP? | as per comment, confirm behavior of EHT STA with dot11RestrictedTWTOptionImplemented set to false. | **Rejected**Both statements in the comment are correct and do not conflict. They don’t imply that a non-AP EHT STA that doesn’t support R-TWT can \*not\* transmit during a R-TWT SP – the only exception so far is that, such a STA, if choose not to ignore the overlapping quiet interval, it won’t contend for the channel during the first TU since the SP’s start time. |
| ~~12748~~ | ~~Patrice Nezou~~ | ~~35.9.4.2~~ | ~~512.25~~ | ~~An r-TWT scheduling AP may schedule at most one quiet interval that overlaps with a r-TWT SP. Each such quiet interval, referred to as an overlapping quiet interval in this subclause, if scheduled, shall have a duration of 1 TU, and shall start at the same time as the corresponding r-TWT SP.~~~~Comment: Usage of quiet element is not sufficient to ensure an accurate starting time of the service period because the support of the quiet element is not mandatory for all STAs.~~ | ~~Additional mechanism is required.~~ | **~~Revised~~**~~Agree in principle. Added TWT protection (NAV protection) for broadcast TWT.~~**~~TGbe editor: no further change is needed as the proposed change has been implemented by 11-22/1470 tagged by #10874,11782.~~** |
| ~~12749~~ | ~~Patrice Nezou~~ | ~~35.9.4.2~~ | ~~512.25~~ | ~~An r-TWT scheduling AP may schedule at most one quiet interval that overlaps with a r-TWT SP. Each such quiet interval, referred to as an overlapping quiet interval in this subclause, if scheduled, shall have a duration of 1 TU, and shall start at the same time as the corresponding r-TWT SP.~~~~Comment: It is unfair for legacy STAs to stop their transmission at the beginning of the service period because legacy STAs cannot be registered to transmit low latency traffics during the service period.~~ | ~~A mecanism to address the unfairness should be introduced~~ | **~~Revised~~**~~Agree in principle. Added TWT protection (NAV protection) for broadcast TWT.~~**~~TGbe editor: no further change is needed as the proposed change has been implemented by 11-22/1470 tagged by #10874,11782.~~** |

**Discussion on CID 10732, 10859 and 10934:**

Baseline reference as in P802.11REVme\_D1.3

**9.4.2.22 Quiet element**



(P1290, L44)

The Quiet Count field is set to the number of TBTTs until the beacon interval during which the next quiet interval starts. The value of 0 is reserved.

**Option 1:** Use the reserved value 0 in the <Quiet Count> subfield for an EHT AP to indicate that the corresponding quiet intervals are for R-TWT SP start time protection purpose.

**Option 2**: Add text, something like the following –

If an EHT STA that doesn’t support R-TWT and wishes to ignore the overlapping quiet intervals, it needs to parse the Restricted TWT parameter set field and determine which quiet intervals.

* This is already implied, so the resolution for this option is to add a note.

**Option 3**: Use that {Quiet Duration == 0} (meaning 1TU) as the indicator. This means normal quiet interval cannot use 1 TU as duration.

* Some members expressed concerns 1) using duration as an implicit indicator; 2) losing the option of using 1 TU for measurement.

**If option 2 is selected:**

## 35.8.4.2 Quieting STAs during R-TWT SPs(#10893)(#11109)

***TGbe editor: Please revise the last paragraph in 35.8.4.2 as follows, and if option 2 is selected, insert a new paragraph as shown:***

Non-AP EHT STAs (#10914)with dot11RestrictedTWTOptionImplemented set to false may behave as if overlapping quiet intervals do not exist.

(#10732,10859,10934)NOTE – If a non-AP EHT STA chooses to ignore a set of overlapping quiet intervals, the STA needs to obtain R-TWT SPs information as specified in 35.8.3 (R-TWT SPs announcement).

**If option 3 is selected:**

## 11.8.3 Quieting channels for testing

***TGbe editor: Please insert the following paragraph after the 4th paragraph (An AP may stop scheduling quiet intervals…) as follows:***

(#10732,10859,10934)An EHT AP shall not transmit a Quiet element that has the duration of quiet interval set to 1 TU, unless the Quiet element is transmitted by an R-TWT scheduling EHT AP to schedule an overlapping quiet interval that starts at the same time as an R-TWT SP.

## 35.9.4.2 Quieting STAs during R-TWT SPs (#10893)(#11109)

***TGbe editor: Please revise the first two paragraph in 35.9.4.2 as follows:***

An (#11109)R-TWT scheduling AP may schedule at most one quiet interval that overlaps with (#10892)an R-TWT SP. (#10932)Such a quiet interval, referred to as an overlapping quiet interval in this subclause, if scheduled, shall have a duration of 1 TU, and shall start at the same time as the corresponding R-TWT SP.

(#10933)To schedule overlapping quiet intervals for one or more R-TWT SPs that belong to one or more periodic or aperiodic R-TWT schedules, the EHT AP may do so by transmitting one or more Quiet elements in Beacon and Probe Response frames. ~~Overlapping quiet intervals may be scheduled by including one or more Quiet elements in the Beacon and Probe Response frames that the EHT AP transmits.~~ An EHT AP affiliated with an AP MLD shall not include in its transmitted Beacon or Probe Response frames any Quiet elements that correspond to overlapping quiet intervals that are scheduled and advertised by other APs affiliated with the same AP MLD (see 35.3.11 (Multi-link procedures for channel switching, extended channel switching, and channel quieting)).