**IEEE P802.11  
Wireless LANs**

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| **LB266 – CR for R-TWT related to QoS Characteristics and SCS** | | | | |
| **Date:** October 25, 2022 | | | | |
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**Abstract**

This submission proposes resolutions for following CIDs for LB266:

10907, 12338, 12291, 12292, 13020, 13229, 13233, 12319, 12320

Revisions:

* Rev 0: Initial version of the document
* Rev 1: Revisions based on feedback in MAC Ad-hoc presentation

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.***

***TGbe editor: The baseline for this document is P802.11be D2.3.***

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| ***CID*** | ***Clause*** | ***Page*** | ***Comment*** | ***Proposed Change*** | ***Resolution*** |
| 10907 | 35.9 | 510.51 | In section 35.9, Restricted TWT (r-TWT), there is no description of how an AP utilizes the QoS Characteristics element to schedule r-TWT SPs. It should be clarified in section 35.9. Though there is some description in section 35.3.22 "Multi-link SCS procedure" of how to utilize this element, its clause is not for the case of r-TWT or non-MLO but for "Multi-link" SCS procedures. | As in the comment. | Revised  Agree in principle. Added text in 35.8.2.2 (The setup procedure) and 35.8.5 (Traffic delivery) to describe delivery and usage of QoS Characteristics element for R-TWT.  **TGbe editor, please make the changes tagged by CID #10907 in 22/1906r0.** |
| 12338 | 35.9.2.2 | 0.00 | Please clarify the relationship between rTWT and SCS mechanism. | As in comment | Revised  A non-AP EHT STA can provide QoS Characteristics elements for R-TWT TIDs through SCS mechanism. Added text in 35.8.2.2 (The setup procedure) and 35.8.5 (Traffic delivery) to describe delivery and usage of QoS Characteristics element for R-TWT.  **TGbe editor, please make the changes tagged by CID #10907 in 22/1906r0.** |
| 12291 | 9.4.2.316 | 251.40 | There is no language related to QoS characteristics element in 35.9. A procedure to transfer QoS traffic in Restricted TWT should be defined. | As in the comment. | Revised  Clause 9.4.2.316 indicates use of QoS Characteristics element for QoS traffic transfer in R-TWT. Added text in 35.8.2.2 (The setup procedure) and 35.8.5 (Traffic delivery) to describe delivery and usage of QoS Characteristics element for R-TWT.  **TGbe editor, please make the changes tagged by CID #10907 in 22/1906r0.** |
| 12292 | 9.4.2.316 | 251.40 | There is no language related to QoS characteristics element in 35.9. A sequence to inform whether the requirements in the QoS characteristics elements is satisfied or not in 11.25.2 and 35.9. | As in the comment. | Revised  Clause 9.4.2.316 indicates use of QoS Characteristics element for QoS traffic transfer in R-TWT. Added text in 35.8.2.2 (The setup procedure) and 35.8.5 (Traffic delivery) to describe delivery and usage of QoS Characteristics element for R-TWT.  **TGbe editor, please make the changes tagged by CID #10907 in 22/1906r0.** |
| 13020 | 35.9.2.2 | 511.17 | It would be useful to provide traffic characteristics and requirement to facilitate r-TWT setup and optimize its operation. Currently the only to provide this is through the SCS procedure with QoS IE. The spec should provide the flexibility to allow the rTWT setup frame to include the QoS IE and avoid extra overhead. Additionally, in many cases non-AP STA does not need to setup any TCLAS for traffic carried over rTWT SPs and hence does not need to invoke SCS procedure in those cases. | See comment. | Rejected  Agree in principle that it would be useful to provide flexibility to allow R-TWT setup to include QoS Characteristics IE to optimize delivery of QoS characteristics for R-TWT flows in the same setup exchange (vs doing a separate exchange for QoS Char IE). A proposal was made in 11-22/0034 on D1.0 for such optimization, however group could not reach consensus. Further offline discussions in D2.0 didn’t show consensus support in the group. |
| 13229 | 35.9.2.2 | 511.17 | As part of the rTWT setup procedure, a non-AP EHT STA should be able to provide QoS Characteristics parameters for low latency traffic carried over the rTWT SP, to facilitate optimized AP scheduling for low latency traffic during the rTWT SP. Currently the only way to provide QoS Characteristics parameters to the AP is through SCS procedure, however rTWT feature itself should be able to provide all the necessary parameters needed for QoS based scheduling at the AP during rTWT SPs independently which also optimizes the rTWT setup. Additionally, in many cases non-AP STA does not need to setup any TCLAS for traffic carried over rTWT SPs and hence does not need to invoke SCS procedure. | Add procedures to provide QoS Characteristics parameters for r-TWT TIDs as part of the rTWT setup. | Rejected  Agree in principle that it would be useful to provide flexibility to allow R-TWT setup to include QoS Characteristics IE to optimize delivery of QoS characteristics for R-TWT flows in the same setup exchange (vs doing a separate exchange for QoS Char IE). A proposal was made in 11-22/0034 on D1.0 for such optimization, however group could not reach consensus. Further offline discussions in D2.0 didn’t show consensus support in the group. |
| 13233 | 35.9.2.2 | 511.17 | When enhancing rTWT to support LST over a p2p link, it is also desirable to provide QoS Characteristics for LS traffic over p2p link so that the AP can determine resource allocation for p2p traffic and use the QoS Characteristics information for TXOP sharing. The QoS Characteristics element is designed to provide QoS parameters for p2p/direct link traffic. The rTWT setup should be enhanced to provide QoS Characteristics for p2p traffic by adding support for including QoS Characteristics element as part of the rTWT setup. | Enable providing QoS Characteristics parameters for LS traffic over p2p link as part of the rTWT setup. | Rejected  Group could not reach consensus on the proposal in 11-22/0034 for delivering QoS Characteristics IE as part of R-TWT setup. Further offline discussions in D2.0 didn’t show consensus support in the group. |
| 12319 | 9.4.2.313 | 231.06 | In order to decide the TWT parameters, the rTWT should be used together with the SCS mechnism. Please add the text to clarify it. | If the SCS Traffic Description Support subfield is set to 0, then the Restricted TWT Support subfield shall be set to 0. | Rejected  The Restricted TWT schedules can be setup independent of SCS mechanism based on the schedule information provided as part of the R-TWT Setup. Hence the setting of the capability bit describing support for the R-TWT feature should not be dependent on the SCS Traffic Description Support subfield setting. |
| 12320 | 9.4.2.313 | 231.11 | In order to decide the TWT parameters, the rTWT should be used together with the SCS mechnism. Please add the text to clarify it. | If the Restricted TWT Support subfield is set to 1, then the SCS Traffic Description Support subfield shall be set to 1. | Rejected  The Restricted TWT schedules can be setup independent of SCS mechanism based on the schedule information provided as part of the R-TWT Setup. Hence the setting of the capability bit describing support for the R-TWT feature should not be dependent on the SCS Traffic Description Support subfield setting. |

**Discussion:**

A non-AP EHT STA can provide QoS characteristics information for TIDs established as R-TWT TIDs, either prior to setting up an R-TWT schedule or after the R-TWT schedule setup, by sending an SCS Request frame including QoS Characteristics element(s) for the corresponding TIDs. If an R-TWT scheduling AP has received QoS Characteristics element(s) for R-TWT TIDs, it should consider received QoS characteristics information when scheduling QoS Data frames for those R-TWT TID(s) in the corresponding R-TWT SPs. Text has been added to describe this behavior for non-AP EHT STA and R-TWT scheduling AP.

## 35.8.2.2 The setup procedure

***TGbe editor: Please add following new paragraphs at the end of this subclause (#10907):***

A non-AP EHT STA which is also an R-TWT scheduled STA may signal QoS Characteristics element for a traffic flow delivered over R-TWT SPs of an R-TWT schedule in an SCS Request frame to the R-TWT scheduling AP as per procedures defined in 35.17 (EHT SCS procedure) either before or after the setup of that R-TWT schedule.

If an R-TWT scheduling AP has received QoS Characteristics element(s) from an R-TWT scheduled STA whose TID and Direction fields match an R-TWT TID and its specified direction for an R-TWT schedule setup, the R-TWT scheduling AP may use those QoS Characteristics element(s) parameters as guidance in R-TWT schedule setup.

**35.8.5 Traffic delivery**

***TGbe editor: Please add following new paragraphs at the end of this subclause (#10907):***

If an R-TWT scheduling AP has received QoS Characteristics element(s) from an R-TWT scheduled STA whose TID and Direction fields match an R-TWT TID and its specified direction for an R-TWT schedule established with that R-TWT scheduled STA, the AP should follow the additional rules below when scheduling QoS Data frames for that R-TWT TID in the corresponding R-TWT SPs:

* The R-TWT scheduling AP should schedule for transmission downlink QoS Data frames such that the Delay Bound and Minimum Data Rate parameters received in the QoS Characteristics element(s) with TID matching an R-TWT DL TID and Direction subfield indicating downlink are met for downlink QoS Data frames.
* The R-TWT scheduling AP should enable for transmission uplink QoS Data frames such that the Minimum Data Rate parameter in the QoS Characteristics element(s) with TID matching an R-TWT UL TID and Direction subfield indicating uplink is met for uplink QoS Data frames.