IEEE P802.11
Wireless LANs

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| LB 275 Resolution for Misc CIDs in 35.8 |
| Date: 2023-09-12 |
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Abstract

This document resolves 13 CIDs raised in LB275:

19109, 19111, 19112, 19113, 19189, 19190, 19191, 19192, 19370, 19800,

19819, 20059, 20084

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CID | Commenter | Clause | Pg/Ln | Comment | Proposed Change | Resolution |
| 19109 | Kazuto Yano | 35.8.4.1 | 615.19 | "a R-TWT" should be "an R-TWT" as in other places in this draft. | As in comment. | **Accepted** |
| 19111 | Akira Kishida | 35.8.4 | 614.46 | If multiple R-TWT SPs are overlapped on the same link, it should be clarified which operation is the correct;(1)Transmission in R-TWT SP1 scheduled earlier than R-TWT SP2 should defer transmission scheduled in R-TWT SP2 if TXOP of the transmission of R-TWT SP1 overlaps with the start of R-TWT SP2.(2)Transmission scheduled in R-TWT SP1 cannot execute its scheduled transmission because EHT STAs should check if the TXOP holder shall ensure the TXOP ends before the start time of R-TWT SP2. | As in comment.And in any case, scheduling AP should limit TXOP that can be utilized in the R-TWT SP and inform to the STAs. | **Revised**Added a NOTE.**TGbe Editor: please make change as tagged by #19111 shown in this document.** |
| 19189 | Yusuke Asai | 35.8.4 | 614.46 | It is not clear whether R-TWT SPs are allowed to be overlapped each other when they are scheduled on the same channel. Also, if the overlap is allowed, it is not clear whether a non-AP EHT STA shall check if there is enough time for the frame exchange to complete prior to all the overlapped R-TWT SPs, respectively, or the start of the frist R-TWT SP only may be enough. | Please clarify whether the overlap is allowed or not. Also, if it is allowed, please clarify whether a non-AP EHT STA shall check if there is enough time for the frame exchange to complete prior to the start of the frist R-TWT SP only or all the R-TWT SP overlapped each other. | **Rejected**Added a NOTE.**TGbe Editor: please make change as tagged by #19111 shown in this document.** |
| 19190 | Yusuke Asai | 35.8.4 | 615.13 | When R-TWT SP1 and R-TWT SP2 are scheduled on the same channel and they are overlapped in time, a transmission during the R-TWT SP1 might prevent a transmission during R-TWT SP2. In order to avoid this issue, the transmission during the R-TWT SP1 should be ensured to end before the start time of the R-TWT SP2. In this case an AP should notify this transmission limitation to non-AP STA. | Please add the following language."When more than one R-TWT SPs are overlapped in time on the same link, the transmission in the first R-TWT SPs should be ensured to end before the start time of the following R-TWT SP. | **Rejected**The suggested rule may not apply when AP can transmit simultaneously to member STAs in SP1 and SP2 using DL MU PPDU or trigger both for their UL tx – there is no need to end the tx in SP1 before SP2 starts.Added a NOTE.**TGbe Editor: please make change as tagged by #19111 shown in this document.** |
| 19112 | Akira Kishida | 35.8.4 | 615.13 | When an R-TWT SP starts, "not only a member STA but also non-member STAs that are affiliated with the scheduling AP" should be able to suspend decrementing the backoff counter of any AC that does not have any R-TWT TID(s) mapped to until it has delivered all its frames from R-TWT TID(s), and resume the decrementing afterwards or when the SP is ended. | The same as commented. | **Rejected**For non-member STAs, there is no concept of R-TWT TIDs associated with the R-TWT SP of interest, hence the suggestion doesn’t apply. |
| 19192 | Yusuke Asai | 35.8.4 | 615.13 | "When an R-TWT SP starts, a member STA may suspend decrementing the backoff counter of any AC that does not have any R-TWT TID(s) mapped to until it has delivered all its frames from R-TWT TID(s), and resume the decrementing afterwards or when the SP is ended."In order to protect latency sensitive traffic, a non-member STA affiliated with the scheduling AP may suspend decrementing the back off counter of any AC that does not have any R-TWT TID(s) mapped to as well. | The same as commented. | **Rejected**For non-member STAs, there is no concept of R-TWT TIDs associated with the R-TWT SP of interest, hence the suggestion doesn’t apply.In addition, worthy of poining out that R-TWT SP doesn’t disallow non-member STAs from transmitting their traffic; the rules defined tries to facilitate member STAs including AP to obtain channel access to tx their traffic of R-TWT TIDs. |
| 19113 | Akira Kishida | 35.8.4 | 615.18 | It is hard to understand the reason for the following sentence in 35.8.5;"When a non-AP STA, which is affiliated with a non-AP MLD and operates on one of a pair of NSTR or EMLSR or EMLMR links, is a member of a R-TWT SP on the first link; if the second non-AP STA affiliated with the same MLD is not a member of any other R-TWT SPs on the second link that overlap with the first SP, then the second non-AP STA and its associated AP (referred as the second AP), if their respective dot11RestrictedTWTOptionImplemented equal to true, should follow the rules below:--The second AP as a TXOP holder on the second link should ensure its TXOP ends no later than T amount of time before the start time of the R-TWT SP on the first link,--The second non-AP STA as a TXOP holder on the second link should ensure its TXOP ends no later than T amount of time before the start time of the R-TWT SP on the first link," | It should be clarified the reason for that as follows in the explanatory notes;"NOTE- In a case where simultaneous transmissions are scheduled on both the first link and the second link and padding is added on the first link in order to align the end time of the second link, the transmission on the first link might overlap with the R-TWT SP on the first link due to the padding. The second AP as a TXOP holder on the second link, should ensure its TXOP ends no later than T amount of time before the start time of the R-TWT SP on the first link. The STA may defer transmission by selecting a random backoff count using the present CW." | **Rejected**The scenario that the normative text is addressing is self-explaining: e.g. when AP1 – STA1 transmission (or TXOP) is undergoing on a link and may overlap with the R-TWT SP on the other link that AP2 and STA2 are members (where AP1 and AP2 are affiliated with the same AP MLD, and STA1 and STA2 are affiliated with the same non-AP MLD).The scenario given by the commenter in <proposed change> is rather a more limited case. |
| 19191 | Yusuke Asai | 35.8.4 | 615.18 | "When a non-AP STA, which is affiliated with a non-AP MLD and operates on one of a pair of NSTR or EMLSR or EMLMR links, is a member of a R-TWT SP on the first link; if the second non-AP STA affiliated with the same MLD is not a member of any other R-TWT SPs on the second link that overlap with the first SP, then the second non-AP STA and its associated AP (referred as the second AP), if their respective dot11RestrictedTWTOptionImplemented equal to true, should follow the rules below:--The second AP as a TXOP holder on the second link should ensure its TXOP ends no later than Tamount of time before the start time of the R-TWT SP on the first link,--The second non-AP STA as a TXOP holder on the second link should ensure its TXOP ends no later than T amount of time before the start time of the R-TWT SP on the first link,"The intention of the language above is not clear. There might be some situations assumed where the second AP should ensure its TXOP end before the start time of the R-TWT SP on the first link.(1) Due to the end time alignment between the first link and the second link.(2) Due to interference from the second link to the first link which overlap with the R-TWT SP on the first link. | The following language should be added in order to clarify the situation where the second AP should ensure its TXOP end before the start time of the R-TWT SP on the first link."NOTE- In a case where simultaneous transmissions are scheduled on both the first link and the second link and padding is added on the first link in order to align the end time of the second link, the transmission on the first link might overlap with the R-TWT SP on the first link due to the padding. The second AP as a TXOP holder on the second link should ensure its TXOP ends no later than Tamount of time before the start time of the R-TWT SP on the first link. The STA may defer the transmission by selecting a random backoff count using the present CW." | **Rejected**The two reasons mentioned in the comment is essential one – (2) [#1 is done due to #2], and it’s self-explaining in the MLO context: NSTR, EMLSR, EMLMR are all have their respective constraints and are not able to do simautlaenous tx/rx on two separate links independently. There is no need to add a note in this para. |
| 19800 | Abhishek Patil | 35.8.3.1 | 613.11 | The 2nd bullet mentions Multiple BSSID element which is carried in Beacon and Probe Response frames. Therefore, to be clear on which frames, add "in the Beacon and Probe Response frames that it transmits" between 'include' and 'both'. Then add a NOTE or a separate paragraph which states that (Re)Association Response frame does not include Multiple BSSID element but the TWT IE carried in the (Re)Association frame carries the rTWT schedule(s) (if any) belonging to nonTxBSSIDs in the set. | As in comment | **Revised**.Agree in principle. Discussed with the commenter and added a NOTE to address the main concern raised about the case where a multiple BSSID element is not present.**TGbe Editor: please make change as tagged by #19800 shown in this document.** |
| 19819 | Muhammad Kumail Haider | 35.8.4.1 | 614.44 | procedures->procedure in the title of this subclause | As in comment | **Accepted** |
| 20059 | Binita Gupta | 35.8.3.1 | 613.42 | The example shown in the ï»¿Table 35-4 (An example of relevant contents in a Management frame transmitted by an AP for R-TWT announcement) should be moved to Annex AF, where other examples are captured | Move the example Table to Annex AF. | **Revised.****TGbe Editor: please make change as tagged by #20059 shown in this document.** |
| 20084 | Jeongki Kim | 35.8.4.1 | 615.39 | In a r-TWT SP, non-member STA may transmit a frame (e.g., data or RTS) using EDCA to AP although AP allocates a quiet interval overlapping with the r-TWT SP, especially when AP does not allocate the overlapped quiet interval at the start of the r-TWT SP. This may degrade the performance of the latency sensitive traffic. In a r-TWT SP, if the AP wants to further protect/support the latency sensitive traffic related to TIDs of the r-TWT SP, the AP should be able to control a transmission of non-member STA (legacy STA as well as EHT STA) with minimizing the impact of the non-member STA. The group need to discuss this issue and provide a good solution for supporting a latency sensitive traffic in a r-TWT SP. | Allow AP to be able to control a transmission of a non-member STA in a r-TWT SP | **Rejected**. The group discussed this (e.g. 11-22/1036, 11-23/383r3) but couldn’t reach consensus. |
| 19370 | Brian Hart | 35.8.4.2 | 615.64 | Current requrements for overlapping quiet intervals are weak and undermines the feature. | Option A:(Preferred) Improve the spec: "A non-AP STA that is a member of an R-TWT SP may behave as if the overlapping quiet interval of the R-TWT SP, if present, does not exist."Option B: Given the weakness of the requirements on overlapping quiet intervals, leave quiet intervals intact by deleting section 35.8.4.2. | **Rejected**. The same topic was discussed as part of the comment resolutions for LB266 for CID 12404/LB266in https://mentor.ieee.org/802.11/dcn/22/11-22-1471-05, however the group could not reach consensus on a proposed change that would resolve the comment (prev SP was run 11/02/2022: 27Y, 22N, 23A.) |

**35.8.4 Channel access rules for R-TWT SPs**

**35.8.4.1 TXOP and backoff procedures rules for R-TWT SPs**

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 active R-TWT SPs that are advertised by its associated AP that does not correspond to a nontransmitted BSSID.

(#19111)NOTE 1—This applies whether the R-TWT SP overlaps with another R-TWT SP or not.

**35.8.3 R-TWT announcement**

**35.8.3.1 Rules for R-TWT scheduling AP**

…

When an AP corresponding to a transmitted BSSID advertises an R-TWT schedule for a nontransmitted BSSID in the same multiple BSSID set, it shall include both:

* a Restricted TWT Parameter Set field describing the R-TWT schedule in a broadcast TWT element carried in the nontransmitted BSSID profile of the nontransmitted BSSID in the Multiple BSSID element:
	+ with the Restricted TWT Schedule Info subfield set to 0, 1 or 2, following the same rule as above,
	+ with the Broadcast TWT ID subfield set to the TWT ID of the R-TWT schedule.
* and a Restricted TWT Parameter Set field describing the R-TWT schedule carried in a broadcast TWT element outside the Multiple BSSID element if the R-TWT schedule is active:
	+ with the Restricted TWT Schedule Info subfield set to 3,
	+ with the Broadcast TWT ID subfield set to 31.

***TGbe editor: please add a NOTE as below:***

(#19800)NOTE 1—A (Re)Association Response frame does not include a Multiple BSSID element.

***TGbe editor: please remove the text in subclause 35.8.3.1 (Rules for R-TWT scheduling AP) starting from “Table 35-4 …” and replace it with the following text:***

(#20059)An example is shown in AF.17 (Example of R-TWT announcement by an AP belonging to a multiple BSSID set).

***TGbe editor: please add a subclause in Annex AF as follows:***

**AF.17 Example of R-TWT announcement by an AP belonging to a multiple BSSID set (#20059)**

[Table AF-1 (An example of relevant contents in a Management frame transmitted by an AP for R-TWT](file:///C%3A%5C%5CUsers%5C%5CChunyu%20Hu%5C%5CAppData%5C%5CLocal%5C%5CTemp%5C%5CTemp90d6d530-c9f3-4de8-a105-04afd378d2bc_Draft%20P802.11be_D4.0%20-%20Word.zip%5C%5CWord%5C%5CTGbe_Cl_35.doc%22%20%5Cl%20%22bookmark101) [announcement)](file:///C%3A%5C%5CUsers%5C%5CChunyu%20Hu%5C%5CAppData%5C%5CLocal%5C%5CTemp%5C%5CTemp90d6d530-c9f3-4de8-a105-04afd378d2bc_Draft%20P802.11be_D4.0%20-%20Word.zip%5C%5CWord%5C%5CTGbe_Cl_35.doc%22%20%5Cl%20%22bookmark101) describes an exemplary Management frame transmitted by an AP (AP1) that belongs to a multiple BSSID set. The multiple BSSID set has two BSSIDs, one transmitted BSSID and one nontransmitted BSSID, corresponding to AP1 and AP2, respectively. In this example, AP1 and AP2 have set up an R-TWT membership with their respective associated STAs, or have not set up any R-TWT membership, respectively (denoted as present or not). For notational convenience, in this table,

1. their respective active R-TWT schedules, if present, are referred to as R1 and R2, respectively;
2. refer to the value of the Restricted TWT Schedule Info subfield carried in the corresponding TWT element as RTSIV.

The table below shows how the Management frame is constructed in three cases.

**Table AF-1—An example of relevant contents in a Management frame transmitted by an AP for R-TWT announcement**

|  |  |  |  |
| --- | --- | --- | --- |
| **R1 (of AP1)****is present** | **R2 (of AP2)****is present** | **Number of Restricted TWT Parameter Set fields outside the Multiple BSSID element, and their respective RTSIV(s)** | **Number of Restricted TWT Parameter Set fields in the nontransmitted BSSID profile carried in the Multiple BSSID element, and their respective RTSIV(s)** |
| Yes | No | 1, with RTSIV set to 1, for R1 | 0 |
| No | Yes | 1, with RTSIV set to 3, for R2 | 1, with RTSIV set to 1, for R2 |
| Yes | Yes | 2, with RTSIV set to 1 and 3, for R1 and R2, respectively | 1, with RTSIV set to 1, for R2 |

An R-TWT scheduling AP when announcing an R-TWT schedule, shall set the Target Wake Time field in the TWT element in transmitted Management frames to TSF [10:25], where TSF corresponds to the first R- TWT SP start time of the corresponding R-TWT agreement.

The R-TWT scheduling AP shall determine the start time of R-TWT SPs that happen after the first R-TWT SP (next R-TWT SP start time) in a periodic R-TWT schedule based on the start time of the first R-TWT SP and the TWT wake interval of the corresponding R-TWT schedule.