IEEE P802.11  
Wireless LANs

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| LB 200 cluase 9.42.2.1 comment resolution | | | | |
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Abstract

This submission proposes comment resolutions of the clause 9.42.2.1 from TGah Draft 1.0.

* CIDs: 1238, 1239, 1240, 1241, 1516, 1517, 1518, 1732, 1950, 2948, 2949, 2950.

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

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

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

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1238 | 187.01 | 9.42.2.1 | " information of periodically scheduled RAWs" - this is not good English | "details of periodically .." or "information related to periodically .." | Revised – Agree with the commenter in principle, and the proposed resolution is to modify to “information related to periodically …”  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1239 | 187.09 | 9.42.2.1 | " (short) beacon frame" - case. Frame names have initial caps. | "(Short) Beacon frame" | Accepted |
| 1240 | 187.42 | 9.42.2.1 | "LB: Long Beacon frame" - there's no such frame | "LB: Beacon frame" | Revised – Agree with the commenter in principle. For better understanding, proposed resolution is to use “DTIM Beacon frame” instead of using Long Beacon frame.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1241 | 187.46 | 9.42.2.1 | In this figure, STA2, I think, doesn't know (or care) about PRAW, but does care about its TWT. This is not shown on the figure. | Modify the figure to show how STA2 determines its wakeup times. | Revised – Agree with the commenter in principle. Proposed resolution is to show the duration for TWT that STA2 is scheduled in the figure.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1516 | 186.53 | 9.42.2.1 | Subclause 9.42.2.1 describes a procedure where the AP may allocate a PRAW during which TIM STAs are not allowed to access in order to protect non-TIM STAs access. But the procedure seems to refer to TIM STAs behavior rather than non-TIM STAs. Hence it is more appropriate to have this section under hte more generic clause of RAW operation  Also in the line: "The AP may set up RAWs to protect the TWTs for non-TIM STAs and transmit the RAW parameters to TIM STAs by including them in RPS elements in beacons." it is not clear what "them" refers to. If it is TIM STAs, the meaning of the sentence is not correct! | As in comment, also clarify the ambiguities. | Revised – Agree with the commenter in principle.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1517 | 186.53 | 9.42.2.1 | PRAW subcluase should be changed to reflect the new architecture of the RAW (RAW with subfield present)  PRAW can also be used for TIM STAs. Change the language to relfect this new behaviour. | as in the comment | Revised – Agree with the commenter in principle.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1518 | 186.61 | 9.42.2.1 | The first sentence of the paragraph is not clear. What does it mean "when the STA is associated with the AP or reschedule is needed?" | Re-phrase to make the description clearer. | Revised – Agree with the commenter in principle.  Proposed resolution is to rephrase current texts to clearly show when TWT scheduling may happen.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 1732 | 187.31 | 9.42.2.1 | There is no "IE" in IEEE 802.11. | Replace "IE" with "element" throughout the draft. | Accepted. |
| 1950 | 208.53 | 9.42.2.1 | I am a bit confused over this PRAW feature. Surely the idea of the non-TIM STA is that it only does not wan t to listen to beacons because it wants to sleep for long periods, but here we have feature that sets up periodic slots for such STAs. Now these STAs sleep for long periods so they lose syncronization with the AP so have to now resync before they can use the PRAW allocation. BUT they have now sent a packet to find out when to send a packet. How is this PRAWs really useful? Al it seems to do is penalize TIM STAs by taking away time from them. | Convince me that this is a good thing and really aids long term sleeping STAs | Rejected.  The comment failed to identify a real issue.  In response to the commenter:  Even non-TIM STAs are supposed to wake up and adjust its synchronization by checking TSF timer value before they totally lose synchronization. Therefore, current working assumption in TWT scheduling is that at least those non-TIM STAs can be in synchronized state and can wake up at their scheduled TWT timing. Therefore, assigning the TWT scheduled duration by PRAW can protect non-TIM STAs’ channel access. |
| 2948 | 186.56 | 9.42.2.1 | PRAW is no longer for non-TIM STAs only. | Delete 'non-TIM' in the first sentence. | Accepted. |
| 2949 | 186.57 | 9.42.2.1 | Identical resource allocation' is not clear | Specify that identical resource allocation may be refer to same RAW start time / RAW duration, etc. Further qualify that such resource allocation is only identical within the beacon interval of each PRAW period. | Revised – Agree with the commenter in principle.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |
| 2950 | 187.10 | 9.42.2.1 | PRAW update procedure is not clear | Specify the PRAW update rules. | Revised – Agree with the commenter in principle.  TGah editor to make changes shown in 14/0298r2 under the heading for CID 1238 to 2950. |

**Discussion:**

***CID 1516 – Agree with the commenter of CID 1516 in principle. Part of texts in subclause 9.42.2.1 describes how to protect non-TIM STAs from TIM STAs using PRAW. However, some parts in this subclause also describes general operation rule of PRAW such as how and when PRAW is indicated. As, the focus of subclause 9.42 is limited to non-TIM STAs, it is reasonable to move texts related to the general operation rule of PRAW to RAW operation related subclauses. Therefore, proposed resolution is to move texts related to general operation rule of PRAWto the subclause 9.25.***

***CID 2950 – Agree with the commenter of CID 2950 in principle. It is not clear how to indicate PRAW allocation and how to update PRAW allocation. However, as this is more related with general operation rule of PRAW and is not limited to non-TIM STAs’ operation, the proposed resolution is to describe further on PRAW indication and PRAW update in subclause 9.25 instead of 9.42. As PRAW information will not be indicated at every Short Beacon frame that it is allocated, STAs should know when next PRAW indication will be.To address this, proposed resolution is to limit scheculed PRAW indication and update of PRAW allocation to be on DTIM Beacon frame only. Also, as PRAW does not need to be indicated at every DTIM Beacon frame, each PRAW includes information on next scheduled DTIM Beacon frame that PRAW will be indicated.***

**Instructions to TGah Editor*: Change subclause 9.42.2.1 as follows:***

* Resource protection for non-TIM STAs using periodic RAW (PRAW) operation

PRAW is a series of RAWs that are allocated to one or a group of ~~non-TIM~~ STAs in a periodic manner with identical resource allocation such as RAW slot definition, RAW start time of each PRAW period, RAW group, and channel indication. An AP may indicate to TIM STAs information ~~of~~ related to scheduled RAW during which no TIM STAs are allowed to contend as described in 9.42.2, and PRAW can be used for this purpose.

When a non-TIM STA associates with an AP, ~~An~~the AP may schedule and indicate a TWT for a non-TIM STA within the PRAW duration in periodic manner~~, when the STA is associated with the AP or reschedule is needed~~. Operation details for TWT ~~is~~are described in 9.41. By allocating PRAW only for one or a group of STAs that an AP scheduled TWT, the AP can indicate to TIM STAs information ~~of~~ related to periodically scheduled RAWs during which no TIM STAs are allowed to contend. When an AP modifies on-going TWT schedule for a non-TIM STA, the AP can adjust PRAW allocation accordingly such that rescheduled TWT is within the PRAW duration.

~~PRAW allocation may be indicated by an RPS element included in Beacon and/or Probe Response frames. Once a PRAW is allocated, the allocation indication is broadcasted by the AP periodically such that every TIM STA can identify the allocation of PRAW. However, it is not necessary for an AP to indicate the PRAW allocation in every (short) beacon frame transmitted in the beacon interval for which PRAW is allocated. The allocated resource for PRAW will not be changed until updated PRAW information is broadcasted.~~

An example of the basic operation of PRAW allocation is shown in Figure 9-87 (Example of PRAW operation). In this figure, PRAW is allocated at every Short Beacon interval, but the allocation of the PRAW is indicated ~~only in~~at every DTIM Beacon frame.(#52) STA1 is a TIM STA that is not included in the PRAW allocation and STA2 is a non-TIM STA for which the AP has scheduled TWT and is included in the PRAW allocation. When STA1 listens to the Beacon frame, it can identify the allowed user group, start time, duration, and the periodicity of the allocated PRAW. As STA1 is not included in the allowed user group of the PRAW, STA1 will not access the channel during allocated PRAW in every Beacon and Short Beacon frame. And, STA2 wakes up at its scheduled TWT which is within the PRAW, and send its uplink data if it has a data frame to send.

**Instructions to TGah Editor*: Change Figure 9-87 as follows:***

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| * Example of PRAW operation |

**Instructions to TGah Editor*: Change Add the following text after subclause 9.20.5.6:***

* + - 1. Periodic RAW (PRAW) Operation

An AP may schedule a RAW in periodic manner by setting Periodic RAW Indication subfield to 1 for the RAW Assignment field of an RPS element, and this RAW is called a PRAW.

PRAW allocation may be indicated by an RPS element included in Short Beacon and/or Probe Response frames. Once a PRAW is allocated, the allocation indication is broadcasted by the AP periodically such that every TIM STA can identify the allocation of PRAW. However, it is not necessary for an AP to indicate the PRAW allocation in every Short Beacon frame transmitted in the beacon interval for which PRAW is allocated. The allocated resource for PRAW shall not be changed until updated PRAW information is broadcasted. A non-AP STA updates the PRAW information and access the channel accordingly based on the most recently successfully received PRAW indication.

If an AP allocates more than one PRAW assignments, all active PRAW assignments shall be included in one or moreRPS elements in the same (Short) Beacon frame.

An AP may extend current PRAW assignment by indicating the PRAW assignment with the PRAW Validity subfield value extended before it expires.

At each RPS element with one or more PRAW assignments included, an AP indicates next scheduled PRAW indication time at which the AP will send another RPS element with PRAW assignments. The next scheduled PRAW indication time is the closest DTIM Beacon frame before any of PRAW Validity subfield value of PRAW assignments included in current RPS element expires.

An AP may send another RPS element with PRAW assignements before next scheduled PRAW indication time. However, an AP shall not modify currently active PRAW assignment until next scheduled PRAW indication time. If an AP intends to add a new PRAW assignment, the new PRAW assignment shall be indicated from the next scheduled PRAW indication time.