### IEEE P802.11 Wireless LANs

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| 11ba D1.0 MAC Comment Resolution for WUR Power Management Part I | | | | |
| Date: 2018-11-11 | | | | |
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Abstract

This submission proposes resolutions for comments of TGba Draft D1.0 with the following CIDs:

93, 494, 983, 50, 117, 123, 124, ~~125~~, 126, 127, 128, 129, 238, 325, 414, 416, 431, 432, 536, 539, 632, 729, 730, 865, 889, 948, 978, 979, 980, 1070, ~~1071~~, 1133, 1134, 1145, 1157, 1158, 1242, 430

Revisions:

* Rev 0: Initial version of the document.

Rev 1: Further revision based on the discussion during the presentation. Remove CIDs 1071, 125 for further discussion.

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

***Editing instructions formatted like this are intended to be copied into the TGba D1.0 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 93 | Alfred Asterjadhi | 47.15 | 11.2.3.1 | Move this exception to somewhere in clause 31. This way we don't have an isolated WUR exception in the baseline which would confuse more than anything else. Also this would remove any changes to 11. | As in comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 93. |
| 494 | Joseph Levy | 47.07 | 11.2.3 | As this amendment is currently written - the device containing the non-AP STA and WURx is called a STA, it this is not changed then many changes are required in clause 11.2 to define the states of the WUR STA. This is not the preferred way to proceed as it would simply be better to add a clause describing the allowed WUR mode allowed power states. Stating that a WURx can be in one of two states WUR awake and WUR doze and that the STA is always in doze whenever WUR mode is active, as frames to the STA collocated with the WURx must be buffered by the AP when the device is in WUR mode. | Clarify the operation of WUR mode and clarify what is added and what STA and WURx behavior is while WUR mode is active. | Revised –  Agree in principle with the commenter. Descriptions in 11.2.3 are moved to 31.6. Note that the operation of WUR mode is described in Clause 31.6. States of WURx is defined in 31.6.2. Furhter, note that non-AP STA can still be in awake or doze state under WUR mode. AP simply follows the existing operation to buffer packets when the non-AP STA is in doze state.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 93. |
| 983 | Suhwook Kim | 19.05 | 3.2 | There isn't definition of "WUR Mode" | Define "WUR Mode" | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 984. |
| 50 | Albert Petrick | 53.58 | 31.6 | WUR service is called out in the text in several subclauses. Its needs clarification to be defined. |  | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 50. |
| 117 | Alfred Asterjadhi | 53.58 | 31.6 | WUR Discovery is provided to unassociated STAs. Perhaps call out that the negotiated WUR mode is the one under description here. | As in comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 117. |
| 123 | Alfred Asterjadhi | 55.24 | 31.6.2 | Can the WUR be partially powered? Please clarify | As in comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 123. |
| 124 | Alfred Asterjadhi | 55.28 | 31.6.2 | The presence of these two notes is confusing. This subclause describes the power management mechanism of the wake up radio. Is it to specify that the STA follows the baseline mechanisms for power transitions? Perhaps add a declarative sentence somewhere in the WUR mode setup subclause and another sentence that points to this subclause for the WUR counterpart. | As in comment. | Revised –  Agree in principle with the commenter. We have added description to specify that the baseline mechanism is followed by a WUR STA.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 93. |
| ~~125~~ | ~~Alfred Asterjadhi~~ | ~~55.39~~ | ~~31.6.2~~ | ~~It is not related to the PCR component state but rather tied to the reception of a WUR frame that would cause the PCR component to wake.~~ | ~~As in comment.~~ | ~~Revised –~~  ~~Agree in principle with the commenter.~~  ~~TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 125.~~ |
| 126 | Alfred Asterjadhi | 55.56 | 31.6.2 | The case of group addressed BU delivery is missing in the items. | As in comment. | Revised –  Agree in principle with the commenter. We clarify that AP and non-AP STA follows the wake-up operation defined in 31.7.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 126. |
| 127 | Alfred Asterjadhi | 55.62 | 31.6.2 | Cannot have normative behavior in a note. Please replace it with something else. | As in comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 127. |
| 128 | Alfred Asterjadhi | 56.13 | 31.6.2 | Active means not suspended. So this is a repetitive statement. Please clarify. Also until when it is suspended? Similar question applies to the WUR mode case. | As in comment. | Revised –  Agree in principle with the commenter. We revise the description in the note. For WUR Mode, the SP is suspended unless otherwise specfiiced as defined in 31.6.2.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 128. |
| 129 | Alfred Asterjadhi | 56.19 | 31.6.3 | Similar question to another one I had. Does it mean that the couple <AP, STA> can have only one WUR service between the two of them? | As in comment. | Revised –  Agree in principle with the commenter. We have clarified the definition of WUR service in 31.6.1.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 117. |
| 238 | Emily Qi | 55.62 | 31.6.2 | Change "NOTE 1" to"NOTE 3". | Change "NOTE 1" to "NOTE 3". Change "NOTE 2" at 56.1 to "NOTE 4". Change "NOTE" at 56.12 to "NOTE 5". | Rejected –  The NOTE number restarts after a new paragraph. As a result, we do not need to have a global order in a subclause. |
| 325 | Ihtisham Khalid | 56.19 | 31.6.3 | The statement "A WUR AP shall maintain for each associated WUR non-AP STA that requests WUR service a WUR status that indicates whether the WUR STA is in WUR Mode or WUR Mode Suspend." looks ambigous and may confuse the reader. | Replace the quoted text with "A WUR AP shall maintain a WUR status that indicates whether the WUR STA is in WUR Mode or WUR Mode Suspend for each associated WUR non-AP STA that requests WUR service." | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 325. |
| 414 | James Lepp | 55.41 | 31.6.2 | No need to specify the WURx doze state for the case when PCR is on. Only need to specify WURx doze state for the duty cycle in WUR Mode. Doesn't it make sense to keep the WURx running to keep the WUR TSF timer up to date anyway. WURx power usage should be insignificant compared to PCR power usage. | Leave the option to WURx Doze or not when PCR is awake up to implementation. | Revised –  Agree in principle with the commenter.  The description already allows a non-AP STA to do anything it wants when the PCR is on. The bullet just allows a non-AP STA to turn off WURx if it prefers.  We add a note to say that the WURx of the STA is implementation specific when the PCR component of the STA is in awake state.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 414. |
| 416 | James Lepp | 55.45 | 31.6.2 | "The WUR non-AP STA may not listen for Beacon frame if the PCR component of the WUR non-AP STA is in PS mode". Not sure what this means. Is this about regular PCR power save modes that exist in the base spec, or is this something to do with WUR Beacons introducted in this ammendment. Not sure what this statement adds? | Clarify or remove | Rejected –  This is related to relax the regular PS mode rule mentioned below in the baseline.  *A STA operating in PS mode with dot11NonTIMModeActivated equal to false that is not in WNM sleep mode shall periodically listen for Beacon frames, as determined by the ListenInterval parameter of the MLME-ASSOCIATE.request or MLME-REASSOCIATE.request primitive and the ReceiveDTIMs parameter of the MLME-POWERMGT.request primitive.* |
| 431 | Jarkko Kneckt | 55.53 | 31.6.2 | Please clarify what is the existing PS operation. Can it be broadcast TWT, or is it only individual TWT? | Please clarify. | Revised –  Agree in principle with the commenter. We clarify that it is for individual TWT.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 431. |
| 432 | Jarkko Kneckt | 55.58 | 31.6.2 | Please clarify what does the sentence: The parameters of the negotiated service period for the ..." mean? Can the information change at all? What is the maintained information? | Please clarify. | Rejected –  The maintained information is any parameters related to the negoatied service period. The parameters may be changed by any update procedure of negotiation service period. |
| 536 | Lei Huang | 53.58 | 31.6 | WUR discovery service can be provided by a WUR AP to non-associated STAs | 1. change "WUR is a service that may be provided by a WUR AP to its associated WUR non-AP STAs" to WUR power management is a service that may be provided by a WUR AP to its associated WUR non-AP STAs"  2. "WUR service" in 31.6 should be changed to "WUR power management service" | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 536. |
| 539 | Lei Huang | 55.24 | 31.6.2 | Both "WURx Awake" and "WURx awake" are used in D1.0. Both terms should be unified to a single term, e.g. WURx awake Similarly both "WURx Doze" and "WURx doze" are used in D1.0. Both terms should be unified to a single term, e.g. WURx doze | as per comment | Revised –  Agree in principle with the commenter. Replace “WUR Awake” with “WUR awake.” Replace “WUR Doze” with “WUR doze.”  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 539. |
| 632 | Michael Fischer | 53.58 | 31.6 | The interaction between WUR power management and the existing power management (defined in clause 11.2) is inadequately specified. It seems that there are actions which implicitly change the power management state of the WUR non-AP STA, but these are not all listed in one place, so the full scope of such couplings is not very clear. There are also combinations that do not appear to be very sensible, but may be permitted (e.g. PCR awake while WUR mode active) -- if these are useful, that should be described; if not permitted, that should be stated; if allowed but inefficient/inadvisable, there ought to be a NOTE to that effect. | Add a subclause that defines the required and/or allowed combinations of existing power management modes and WUR modes. There should also be a diagram, either in this new subclause or in clause 4, that shows the full set of available power management modes, the permissible transitions between modes, and the entity or action that initiates each transition (frame exchange, MLME primitive, etc.). | Revised –  Agree in principle with the commenter. Note that PCR can be in Active mode or PS mode when the STA is in WUR mode. The PCR can be in awake state or doze state when the STA is in WUR mode. This allows independent negotiation of WUR mode and existing power management. Same thing applies to WUR Mode suspend. We add a note to clarify this.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 632. |
| 729 | Minyoung Park | 55.22 | 31.6.2 | The "two states" in the following sentence should be clarified as "two power states" : "The WURx of a WUR non-AP STA can be in one of two states:" | Replace "two states" with "two power states" | Accepted – |
| 730 | Minyoung Park | 55.56 | 31.6.2 | "itself" is not clear in the sentence. Replace "itself" with "the WUR non-AP STA". | As shown in the comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 730. |
| 865 | Pooya Monajemi | 55.41 | 31.6.2 | It is unclear for how long the WURx can remain in doze state | Clarify for how long the PCR frame exchange allows the WUR to stay in doze | Revised –  Agree in principle with the commenter.  The description already allows a non-AP STA to do anything it wants when the PCR is on. The bullet just allows a non-AP STA to turn off WURx if it prefers.  We add a note to say that the WURx of the STA is implementation specific when the PCR component of the STA is in awake state.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 414. |
| 889 | Rojan Chitrakar | 55.37 | 31.6.2 | What about the WURx state outside of the WUR duty cycle schedule? A WUR STA whose WUR channel is not the same as the WUR primary channel may switch to WUR primary channel to receive WUR Beacon outside the WUR duty cycle schedule, is the WURx in WURx awake state during such times? | Clarify the WURx state outside of the WUR duty cycle schedule. | Revised –  Agree in principle with the commenter.  Like doze state of PCR component, the WURx doze state is from the perspective of AP. WUR non-AP is free to do anything it wanst for the WURx when the power state is in WURx doze state from the perspective of AP.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 889. |
| 948 | Stephen McCann | 55.25 | 31.6.2 | Is there a difference between a "WURx doze" state and a "doze" (P22L19) state? | Change all occurances of "doze" to "WURx doze" if applicable to the WUR feature. | Rejected -  Agree in principle with the commenter.  The doze state in P22L19 is about PCR component as shown below.  *have PCR component in the doze state*  Have checked across the spec, and all the doze state description is related to PCR component. |
| 978 | Suhwook Kim | 56.29 | 31.6.3 | "The existing negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA's PCR schedule is suspended:" "The parameters of the negotiated service period for the WUR non-AP STA's PCR schedule between the WUR AP and the WUR non-AP STA are maintained by the WUR AP." These two sentences look contradictory. Further explanation is needed in relation to the STA's operation | Clarify it | Revised –  Agree in principle with the commenter. We have similar description in 31.6.3 like 31.6.2  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 978. |
| 979 | Suhwook Kim | 56.29 | 31.6.3 | There isn't detail explanation of AP's operation when TWT is applied. | Clarify it | Revised –  Agree in principle with the commenter. We have similar description in 31.6.3 like 31.6.2  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 978. |
| 980 | Suhwook Kim | 55.51 | 31.6.2 | Are there any other examples other than TWT? There isn't condition for exception | Clarify it | Rejected –  The bullet applies to any negotiated service period like APSD. |
| 1070 | Woojin Ahn | 55.37 | 31.6.2 | Even if the PCR component is in awake state, the AP may transmit a WUR frame to the STA unless the STA has indicated that it's in awake state. In this case, it is better to receive the WUR frame. | Delete "if the PCR component of the WUR non-AP STA is in the doze state". | Rejected –  Like baseline, the power state is from the perspective of AP. Delete the “if” disallow WUR non-AP STA to use WURx to do other purpose like scanning. |
| ~~1071~~ | ~~Woojin Ahn~~ | ~~55.51~~ | ~~31.6.2~~ | ~~STA may want to use an existing PCR service period (e.g., TWT SP) when it wakes up its PCR for transmitting uplink data.~~ | ~~Modify as follow "... except that the PCR component of the STA is expected to be in awake state at the next service period following the existing PS operation (e.g., TWT) agreed between the AP and the non-AP STA if it has either received a WUR Wake-up frame addressed to itself with an indication of individually addressed buffered BU(s) or has transmitted any indication that the STA is in the awake state within that TWT SP."~~ | ~~Rejected –~~  ~~STA has to change to WUR mode suspend to enable all the SP.~~ |
| 1133 | Xiaofei Wang | 55.44 | 31.6.2 | Missing "in" in front of "the awake state" | add "in" in front of "the awake state" | Accepted - |
| 1134 | Xiaofei Wang | 56.05 | 31.6.2 | Please clarify whether the PCR of a WUR non-AP STA is expected to be in active mode or PS mode or in doze mode when in WUR Mode Suspend? Such normative behavior needs to be defined in spec text. | as in comment | Revised –  Agree in principle with the commenter. Note that PCR can be in Active mode or PS mode when the STA is in WUR mode. The PCR can be in awake state or doze state when the STA is in WUR mode. This allows independent negotiation of WUR mode and existing power management. Same thing applies to WUR Mode suspend. We add a note to clarify this.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 632. |
| 1145 | Yongho Kim | 55.60 | 31.6.2 | The WUR non-AP STA may not listen for Beacon frame if the PCR component of the WUR non-AP STA is in PS mode.' However, in that case, the WURx if WUR non-AP STA shall listen to the WUR Beacon | Add a bullet: -The WURx of WUR non-AP STA shall listen for WUR Beacon frame unless the PCR component of WUR non-AP STA is in awake state | Rejected –  In PCR, the requirement is to listen for DTIM Beacon, and there is no requirement to listen to every Beacon frame. For WUR, since there is no corresponding defininitin of DTIM, there is no need to mandate listening to WUR Beacon frame. |
| 1157 | Yoshio Urabe | 56.24 | 31.6.3 | The condition "if the PCR component of the WUR non-AP STA is in the doze state" should be removed because the WUR AP doesn't know the exact status. The doze state of the PCR component of the WUR non-AP STA is implementation dependent. In addition, "the WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA indicates that the WURx of the WUR non-AP STA is in WURx awake state" is redundant because the WUR duty cycle schedule is defined as on duration. | Replace the sentence from P56L24 with "The WUR AP may send a WUR Wake-up frame to the WUR non-AP STA in the WUR duty cycle schedule agreed between the WUR AP and the WUR non-AP STA." | Revised –  Agree in principle with the commenter.  Like baseline, the doze state is from the perspective of AP. However, agree with the revision for WUR duty cycle schedule.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 1157. |
| 1158 | Yoshio Urabe | 53.58 | 31.6 | "WUR is a service ..." should be "WUR service is a service ..." | As in comment | Revised –  Agree in principle with the commenter. We have revised the sentence to define WUR service.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 50. |
| 1242 | Yunsong Yang | 53.58 | 31.6 | This single sentence is not about procedures. It sounds more like a high level description of WUR, which can be placed in clause 4. And what type of service is it? Power management service? Clause 4.4 of the baseline document defines a number of services. Power management serice isn't one of them? Are we defining a new one? Or how is WUR service related to the other services defined in cluase 4.4 of the baseline document? | Move the cited sentence to the beginning of clause 4.3.15a, with clarification of what type of service is WUR. | Revised –  Agree in principle with the commenter. We have revised the sentence to define WUR service.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 50 and CID 536. |
| 430 | Jarkko Kneckt | 55.53 | 31.6.2 | The TWT and WUR On cycle handling is complicated and adds transmission delays. The STA should wake up PCR immediately after the PCR activation delay regardless whether it has a suspended TWT. If the STA wakes up for the next TWT SP, then it is not clear what is the next TWT SP. - The Wake up frame may be transmitted so that the PCR of the STA is available after the beginning of the TWT SP. It is unclear whether the STA wakes up for this TWT SP, or only for the next full TWT SP. - The TWT SP schedule and WUR ON schedule may mismatch and cause much longer delay than expected. Especially in congested channel small transmission delay may cause much longer transmission delay. | Please change that device wakes up after the PCR activation delay when it has received a wake up frame. If the TWT is negotiated, the non-AP STA continues to operate according to the TWT schedule after the initial PCR activation. | Revised –    Agree in principle with the commenter. We clarify that the next TWT SP is considered after the recpeiton of wake-up frame plus the PCR transition delay.  TGba editor, please make changes as shown in doc 11-18/1864r1 under all headings that include CID 430. |

**Discussion:** *None.*

**Propose:** Revised for CID 93, 984, 50, 117, 126, 127, 128, 325, 431, 536, 539, 632, 729, 730, 414, 978, 1133, 1157, 430, 889, 123 per discussion and editing instructions in 11-18/1864r1.

***TGax editor: Change WUR Awake to WUR awake in the spec. Change WUR Doze to WUR doze in the spec. (#539)***

***TGax editor: Change 3.2 Definitions specific to IEEE 802.11 as follows: (Track change on)***

* Definitions specific to IEEE 802.11

Insert the following definitions maintaining alphabetical order:

(…existing texts…)

**wake-up receiver (WURx):** A companion receiver to a primary connectivity radio with the capability to receive WUR PPDU.

**wake-up radio (WUR) Mode:** A negotiation status between a WUR AP and a WUR non-AP STA such that the WURx of the WUR non-AP STA alternates between WURx awake state and WURx doze state when the PCR component of the WUR non-AP STA is in doze state. (#984)

***TGax editor: Change 11.2.3.1 General as follows: (Track change on)***

* MLME
* Power Management
* Power management in a non-DMG infrastructure newtork
* General

***Change the 7th paragraph as follows:***

A STA operating in PS mode with dot11NonTIMModeActivated equal to false that is not~~not~~ in WNM sleep mode (#93)shall periodically listen for Beacon frames, as determined by the ListenInterval parameter of the MLME-ASSOCIATE.request or MLME-REASSOCIATE.request primitive and the ReceiveDTIMs parameter of the MLME-POWERMGT.request primitive. STAs operating in PS modes with dot11NonTIMModeActivated equal to true transmit at least one PS-Poll or trigger frame that is individually addressed to the associated AP every ListenInterval parameter used by the MLME primitives starting from the last known transition of the non-TIM STA in doze state unless it follows the TWT or NDP Paging procedure.

***TGax editor: Add 31.6.1 General as follows: (Track change on)***

* WUR power management procedure

31.6.1 General(#93)

To utilize WUR features, a WUR AP may provide WUR power management(#536) service to its associated WUR non-AP STAs as defined in 31.6.2 (WUR Mode Setup), 31.6.3 (non-AP STA operation), and 31.6.4 (AP operation).(#50)

ispower management(#536) (#117)

A WUR STA shall follow the power management procedure defined in 11.2.3 (Power management in a non-DMG infrastructure network) except that some of the rules are relaxed as defined in the subclauses below. (#93)

***TGax editor: Change 31.6.1 WUR Mode Setup as follows: (Track change on)***

31.6.2 WUR Mode Setup

(#117)

(…existing texts…)

***TGax editor: Change 31.6.2 non-AP STA Operation as follows: (Track change on)***

31.6.3 non-AP STA operation

The WURx of a WUR non-AP STA can be in one of two power(#729) states:

* WURx Awake: the WURx of the WUR non-AP STA is able(#123) to receive WUR frame.
* WURx Doze: the WURx of the WUR non-AP STA is not able to receive WUR frame.

NOTE 1—The PCR component of a WUR non-AP STA can be in awake or doze state as defined in 11.2.1 (General).

NOTE 2—The PCR component of a WUR non-AP STA can be in active mode or power save (PS) mode as defined in 11.2.3.2 (STA power management modes).

If a WUR non-AP STA is in WUR Mode, then:

* The WURx of the WUR non-AP STA shall be in WURx awake state during the WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA if the PCR component of the WUR non-AP STA is in the doze state. The WURx of the WUR non-AP STA may be in WURx doze state outisde the WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA if the PCR component of the WUR non-AP STA is in the doze state. (#889)
* The WURx of the WUR non-AP STA may be in WURx doze state after the WUR non-AP STA uses the PCR component to complete a successful frame exchange with the WUR AP, which informs the WUR AP that the PCR component of the WUR non-AP STA is in(#1133) the awake state.
* The WUR non-AP STA may not listen for Beacon frame if the PCR component of the WUR non-AP STA is in PS mode (see 11.2.3.1 (General)).
* The existing negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA’s PCR schedule is suspended:
* The PCR component of the WUR non-AP STA may not be in the awake state during the negotiated service period of PCR schedule between the WUR AP and the WUR non-AP STA
* The(#430) PCR component of the non-AP(#730) STA shall be(#430) in awake state at the next service period following the existing PS operation (e.g., individual(#431) TWT) agreed between the AP and the non-AP STA after the non-AP STA receives(#730) a WUR Wake-up frame addressed to itself from the AP(#730) with an indication of individually addressed buffered BU(s) plus the PCR transition delay indicated by the non-AP STA in the WUR Capabilities elements(#430).
* The parameters of the negotiated service period for the WUR non-AP STA’s PCR schedule between the WUR AP and the WUR non-AP STA are maintained by the WUR non-AP STA.
* The WUR non-AP STA shall follow the wake-up operation defined in 31.7 (Wake-up Operation).(#126)

NOTE 1—The WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA can(#127) be that the WURx of the WUR non-AP STA is always in WURx awake state.

NOTE 2—Examples of the negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA’s PCR schedule include individual(#431) TWT and schedule for WNM sleep mode.

NOTE 3 – The PCR component of a WUR non-AP STA can be in Active mode or PS mode when the WUR non-AP STA is in WUR Mode or WUR Mode Suspend. The PCR component of a WUR non-AP STA can be in awake state or doze state when the WUR non-AP STA is in WUR Mode or WUR Mode Suspend.(#632)

NOTE 4 – The power state of the WURx of a WUR non-AP STA is implementation specific if the PCR component of the WUR non-AP STA is in awake state. (#414)

If a WUR non-AP STA is in WUR Mode Suspend, then:

* The WURx of the WUR non-AP STA may be in WURx doze state.
* The negotiated WUR parameters between the WUR AP and the WUR non-AP STA are maintained by the WUR non-AP STA.

NOTE—If a WUR non-AP STA is in WUR Mode Suspend, the existing negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA’s PCR schedule is active (#128).

***TGax editor: Change 31.6.3 AP Operation as follows: (Track change on)***

31.6.4 AP operation

For each WUR non-AP STA that requests WUR power management(#536) service to an associated WUR AP, the WUR AP shall maintain a WUR status that indicates whether the WUR non-AP STA is in WUR Mode or WUR Mode Suspend.(#325)

When a WUR non-AP STA is in WUR Mode, then:

* The WUR AP may send a WUR Wake-up frame to the WUR non-AP STA in the WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA if the PCR component of the WUR non-AP STA is in the doze state.(#1157)
* The existing negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA’s PCR schedule is suspended:
* The AP expects that the PCR component of the non-AP STA is in awake state at the next service period following the existing PS operation (e.g., individual TWT) agreed between the AP and the non-AP STA after transmitting a WUR Wake-up frame addressed to the non-AP STA with an indication of individually addressed buffered BU(s)(#978) plus the PCR transition delay indicated by the non-AP STA in the WUR Capabilities elements(#430).
* The parameters of the negotiated service period for the WUR non-AP STA’s PCR schedule between the WUR AP and the WUR non-AP STA are maintained by the WUR AP.
* The WUR AP shall follow the wake-up operation defined in 31.7 (Wake-up Operation).(#126)

When a WUR non-AP STA is in WUR Mode Suspend, then:

* The negotiated WUR parameters between the WUR AP and the WUR non-AP STA are maintained by the WUR AP.