### IEEE P802.11Wireless LANs

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| 11ba D2.1 MAC Comment Resolution for Miscellaneous CIDs Part II |
| Date: 2019-05-13 |
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Abstract

This submission proposes resolutions for comments of TGba Draft D2.1 with the following CIDs:

2784, 2785, 2055, 2037, 2176, 2216, 2217, 2221, 2222, 2224, 2682, 2695, 2199, 2229

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Review 2784, 2785, 2055, 2037, 2682 and ready for motion. Defer the rest.
* Rev 2: Review 2176, 2216, 2217, 2221, 2222, 2224, 2695, 2199, 2229

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 D2.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGba D2.1 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** |
| 2784 | Yongho Seok | 43.29 | 9.4.2.291 | For WUR Vendor Specific frame operation, the WUR STA and WUR AP may need to exchange the vendor specific signaling information.Please append the vendor specific subelement to the WUR Operation element. | As in comment. | Rejected –We note that based on table 9-45, vendor specific element can already be present in WUR setup frame. Further, Vendor specific element can also be present in beacon, (re)association request/response, probe request/response frames. As a result, there is no need to add further vendor specific element.  |
| 2785 | Yongho Seok | 44.45 | 9.4.2.292 | For WUR Vendor Specific frame operation, the WUR STA and WUR AP may need to exchange the vendor specific signaling information.Please append the vendor specific subelement to the WUR Mode element. | As in comment. | Rejected –We note that based on table 9-45, vendor specific element can already be present in WUR setup frame. Further, vendor specific element can also be present in beacon , (re)association request/response, probe request/response frames. As a result, there is no need to add further vendor specific element.  |
| 2055 | Alfred Asterjadhi | 73.58 | 30.8.1 | Could not find the requirement (note the requirement) for the AP to schedule for transmission a WUR Wake up frame to the STA if DL BUs are available at the PCR. Also it is not clear what WUR frame the AP generates within the SP if the AP does not have any DL BUs to be sent to the STA. Please explicitly state the requirement for both cases (Yes DL BUs available and No DL BUs available keeping in mind that the STAs need some certainty that they are in range with the AP). | As in comment. | Revised – Agree in principles with the commenter. We add a general sentence for this. We also change the title of 30.7.3 and 30.7.4 to differentiate from the title of 30.8.2 and 30.8.3.TGba editor to make the changes shown in 11-19/0749r2 under all headings that include CID 2055 |
| 2037 | Alfred Asterjadhi | 52.57 | 9.4.2.292 | The WUR Mode element does not have an identifier of a particular session. As such a STA and an AP can only negotiate one periodicity. This seems to be very limiting. Please add an identifier to allow multiple periodicities. If complexity is a concern then specify that certain STAs cannot support more than one session. | As in comment. | Rejected – Multiple negotiation sessions create complexity for the WUR negotiation, which is supposed to be a simple operation. For example, there will be questions on whether a WUR AP can indicate different IDs or group IDs or other paramters in different negotiation sessions. There will be many additional rules on just expanding the negotiations to multiple sessions, which is not necessary.  |
| 2682 | Woojin Ahn | 72.34 | 30.7.3 | "the next service period" is ambiguous. What happens if the non-AP STA wakes up in the middle of a SP? | Please clarify | Revised – Agree in principle with the commenter. The original text alreadys clarify that it is the next service period after considering transition delay, and we simply move the corresponding text up front. TGba editor to make the changes shown in 11-19/0749r2 under all headings that include CID 2682 |
| 2695 | Xiaofei Wang | 19.27 | 3.2 | The definition of WUR mode seems to explicitly exclude the case that the STA cannot enter the low power mode for scanning for WUR discovery frames while not associated with an AP. This may have a big impact on power consumptions for STAs that are in the unassociated state when scanning for new APs to associate with. | Provide a definition for WUR mode that will at least not exclude the case that an unassociated STA can enter the low power mode WUR mode and trying to scan for WUR discovery frames | Rejected – For an unassociated st, there is no negotiated WUR power management service, and it is entirely implementation specific for the WUR non-AP STA to alternate between the WUR awake state and the WUR doze state.  |
| 2176 | Joseph Levy | 19.27 | 3.2 | the WUR mode definition is very confusing as it provides 3 states - 2 that the WUR non-AP STA can be in and a 3 state "doze state". Which doesn't exist when the WUR mode is active. | Replace the definition with: "A power save mode negotiated between a WUR AP and a WUR non-AP STA such that when the WUR non-AP STA is in power save mode the WUR non-AP STA may alternates between the WUR awake state and the WUR doze state." | Rejected – It is clarified in 18/1494r4 that WUR mode is not a new “power save mode.” Also note that power save mode already has its meaning in the baseline. It is also worth noting that alternating between WUR awake state and WUR doze state only has its meaning if a WUR non-AP STA is in doze state, where the WUR non-AP STA can not receive non-WUR PPDU.  |
| 2216 | Joseph Levy | 68.60 | 30.7.1 | It is unclear as to what WUR mode is. Is WUR mode the mode in which a non-AP STA is in WUR awake state or WUR doze state, or is it a mode in which when a non-AP STA activates PS it then will move into either WUR awake state or WUR doze state (WUR mode is a mode of a non-AP STA that is in active mode). It is more clear that WUR mode suspend is a "state" where the STA is either in active mode or a legacy PS mode. | Clarify what is meant by WRU mod and WUR mode suspend. | Rejected – It is clarified in 18/1494r4 that WUR mode and WUR mode suspend are negotiation statuses agreed between a WUR AP and a WUR non-AP STA. In WUR mode, the WUR non-AP STA follows WUR duty cycle schedule if the WUR non-AP STA is in doze state. In WUR mode suspend, the WUR non-AP STA keeps all the negotiated WUR parematers that can be used later. For detailes, please see the definition in 30.7.3 and 30.7.4. |
| 2217 | Joseph Levy | 68.60 | 30.7.1 | When a non-AP STA is using WUR power management service I would assume it is in WUR awake or WUR doze state. What does WUR mode suspend have to do with WUR power management service. A STA in WUR mode suspend is using legacy power management. | Clarify the meaning of this sentence. | Rejected – A WUR non-AP STA that is in WUR mode suspend still keeps all the negotiated WUR parameters. As a result, the WUR operation can be resumed later by switching into WUR mode. As a result, WUR mode suspend is still part of the WUR power management service.  |
| 2221 | Joseph Levy | 72.4 | 30.7.3 | The statement that the WUR non-AP STA can be in one of two WUR power states is confusing, as there are many other states that a WUR non-AP STA may be in. | Clarify that a WUR non-AP STA that has completed setting up a WUR mode, when it activates PS mode will be in one of these two states. | Rejected – A WUR non-AP STA can be in these two WUR power states for receiving WUR discovery frame and does not need to even associate with a WUR AP. |
| 2222 | Joseph Levy | 72.15 | 30.7.3 | It needs to be made clear as to what WUR mode is. Is it the mode in which a WUR non-AP STA is in after WUR mode setup and before PS mode has been activated or is it when an non-AP STA is in WUR awake or WUR doze state? | Clarify if this is WUR mode or in PS mode with WUR mode. | Rejected – It is clarified in 18/1494r4 that WUR mode is a negotiation status agreed between a WUR AP and a WUR non-AP STA. In WUR mode, the WUR non-AP STA follows WUR duty cycle schedule if the WUR non-AP STA is in doze state.  |
| 2224 | Joseph Levy | 73.14 | 30.7.4 | The statement that the "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 if the WUR non-AP STA is in the doze state." is very confusing. If WUR awake state and WUR doze state are simply PS modes, then the above should simply state that the WUR AP may send a Wake-up frame when the non-AP STA is in the WUR awake state. This state will only occur when the PS is active and a WUR mode has been negotiated with the WUR AP. Simply stating doze state is not the equivalent of say PS is active. Doze state is a specific PS state and has nothing in common with WUR awake state. | Correct the sentence as suggested in the comment. | Rejected –Simply changing the statement to say non-AP STA is in PS mode is not correct. In PS mode, non-AP STA may still be in awake state, where the WUR operation is not even relevant. It is then technical correct to say that WUR operation only needs to be defined when it is relevant, i.e., the WUR non-AP STA is in doze state. In other cases, the WUR power state of the WUR non-AP STA is implementation specific.  |
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| 2199 | Joseph Levy | 63.22 | 30.1 | Given the unique way that WUR is designed to function more information is required in 30.1 to explain the capabilities and set-up of the features of WUR APs and WUR non-AP STAs. It needs to be clear that WUR mode is a PS mode: 1) That before any WUR PS mode functionality is allowed the WUR AP and WUR non-AP STA must negotiate/set up an agreed WUR PS mode. 2) That the agreed WUR PS mode can be suspended, and how it is suspended. 3) That there are additional capabilities have been introduced beyond just the WUR PS mode, e.g. WUR discovery, WUR group PPDUs, WUR synchronization. | Provide an introduction of WUR functionality that clarifies the introduced WUR features and how they are used/interact. If desired the commenter is willing to provide a contribution to resolve this comment. | Rejected – It is clarified in 18/1494r4 that WUR mode is not a new “power save mode.” Also note that power save mode already has its meaning in the baseline. We also note that in 4.3.15a Wake-up radio (WUR) AP and WUR non-AP STA, it is described that WUR power management procedure is defined in 30.7, where all the details are provided. |
| 2229 | Joseph Levy |  |  | The removal of PCR and WURx from the specification and making WUR functionality a PS mode has caused many changes to the specification. The use of PS mode and WUR mode seem to be confused throughout the specification. Also the definition of WUR mode is unclear, is it the mode the WUR non-AP STA is in after a successful WUR setup negotiation or is it the PS mode where the WUR non-AP STA is assumed to toggle between WUR awake and WUR doze states. Also the architectural restrictions of the WUR mode only existing between an AP and its associated STA have not really been made obvious. The current architecture does not allow for the case where a 5 GHz STA is allowed to be woken up by a 2.4 GHz WUR AP transmitting to a 2.4 GHz WUR non-AP STA, which I thought was an agreed use case for WUR. | Please clarify the restrictions that the current architecture will impose on WUR capability. As the current architecture only allows for an AP or STA to exist in one band, there is no such thing as a dual band AP or STA. Both the AP and the STA are well defined logical entities. Only devices that contain more than one AP or STA that can operate in multiple bands. | Rejected – We also note that the current definition of WUR mode clarifies that it is a negotiation status based on the exchange defined in table 30-1.*wake-up radio (WUR) mode: A negotiation status between a WUR AP and a WUR non-AP STA such that the WUR non-AP STA alternates between the WUR awake state and the WUR doze state when the WUR non-AP STA is in the doze state.*We note that the current spec allows an associated sta to scan any supported band (2.4/5/6) while in doze state.  |

**Discussion:** *None.*

**Propose:** Revised for CID 2055, 2682 per discussion and editing instructions in 11-19/0749r2.

***TGba editor: Change 30.7.3 WUR AP operation as follows:***

* WUR non-AP STA operation

(…existing texts …)

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

* The WUR non-AP STA shall be in the WUR awake state during the WUR duty cycle schedule agreed between WUR AP and WUR non-AP STA if the WUR non-AP STA is in the doze state. The WUR non-AP STA may be in the WUR doze state outside the WUR duty cycle schedule agreed between the WUR AP and the WUR non-AP STA if the WUR non-AP STA is in the doze state.
* The WUR non-AP STA may be in the WUR doze state after the WUR non-AP STA completes a successful frame exchange with the WUR AP, which informs the WUR AP that the WUR non-AP STA is in the awake state.
* The WUR non-AP STA may not listen for Beacon frame if 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 schedule is suspended,
* The WUR non-AP STA may not be in the awake state during the negotiated service period of schedule between the WUR AP and the WUR non-AP STA
* After the WUR non-AP STA receives a WUR Wake-up frame addressed to it from the WUR AP with an indication of individually addressed BU(s), the WUR non-AP STA shall be in the awake state at the earliest service period, which has end time larger than the received time of the frame plus the transition delay indicated by the WUR non-AP STA in the WUR Capabilities element, following the existing PS operation (e.g., individual TWT) agreed between the WUR AP and the WUR non-AP STA(#2682)
* The parameters of the negotiated service period for the WUR non-AP STA’s 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 30.8 (Wake-up Operation).

NOTE - The WUR non-AP STA might not wake up at the exact start time of the earliest service period.(#2682)

(…existing texts….)

* WUR AP operation

For each WUR non-AP STA that requests WUR power management service from 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.If a WUR non-AP STA is in WUR mode, then:

* A WUR AP shall schedule a WUR Wake-up frame for transmission to the WUR non-AP STA to notify the WUR non-AP STA that the WUR AP intends to have operation with the WUR non-AP STA as described in 30.8.2 (WUR AP operation) and 30.8.3 (WUR non-AP STA operation) if the WUR non-AP STA is in the doze state.(#2055)
* 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 if the WUR non-AP STA is in the doze state.
* The existing negotiated service period between WUR AP and WUR non-AP STA for the WUR non-AP STA’s schedule is suspended:
* After the WUR AP transmits a WUR Wake-up frame addressed to the WUR non-AP STA with an indication of individually addressed buffered BU(s), the WUR AP expects that the WUR non-AP STA is in the awake state at the earliest service period, which has end time larger than the received time of the frame plus the transition delay indicated by the WUR non-AP STA in the WUR Capabilities elements, following the existing PS operation (e.g., individual TWT) agreed between the WUR AP and the WUR non-AP STA.(#2682)
* The parameters of the negotiated service period for the WUR non-AP STA’s 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 30.8 (Wake-up Operation).

NOTE - The WUR non-AP STA might not wake up at the exact start time of the earliest service period.(#2682)

(…existing texts….)