### IEEE P802.11 Wireless LANs

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| 11ba D1.1 MAC Comment Resolution for Miscellaneous Topic | | | | |
| Date: 2019-01-14 | | | | |
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Abstract

This submission proposes resolutions for comments of TGba Draft D1.1 with the following CIDs:

476, 1019, 53, 353, 81, 82, 83, 375, 376, 880, 1106, 1109, 125, 984, 1071, 1076, 1137, 118, 515, 62, 65, 76, 1027, 110, 111

Revisions:

* Rev 0: Initial version of the document.

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 D1.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGba D1.1 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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 476 | Joseph Levy | 19.22 | 3.2 | The definition of WRU primary channel seems to state that all WUR STAs have a common primary channel of operation. I don't think this is true. A particular WRU AP will have a primary channel on which it transmits beacons, but there is no requirement that all WRU APs use the same channel hence the definitions is misleading. | Replace the current definition for WUR primary channel with: wake-up radio (WUR) primary channel: The channel that a WUR AP will transmit WUR beacons on. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 476. |
| 1019 | Tomoko Adachi | 33.59 | 9.4.2.274 | Is WUR Beacon transmitted other than in the WUR primary channel? Reading subclause 31.9, it is not clear. However, in 3.2, the WUR primary channel is defined to be "The common channel of operation for all WUR STAs in which the WUR beacons are transmitted." So, from this definition, WUR Beacon can't be transmitted in channels other than the WUR primary channel. | Change the definition of WUR Channel Switching Support subfield to read "Indicates whether the WUR channel switching capability for receiving WUR Wake-up frames that are transmitted ...". | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 476. |
| 53 | Alfred Asterjadhi | 19.22 | 3.2 | Please clarify that it is for all WUR stations associated with the AP that transmits the WUR beacons. | As in comment. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 476. |
| 353 | James Lepp | 21.47 | 4.3.15a | In section 4 the requirements use terms like "WUR frame with nonzero length Frame Body field" and "and without Frame Body field". Later in section 9 the terms "variable length (VL) WUR frame" and "minimal length (ML) WUR frame" are used. | Need to harmonize this terminology in the different sections of the document. | Revised –  Agree in principle with the comment.  The term is harmonized in D1.1 as fixed length (FL) WUR Wake-up frame and variable length (VL) WUR Wake-up frame.  Note to TGba editor. This has already been included in TGba D1.1. |
| 81 | Alfred Asterjadhi | 37.22 | 9.6.32.1 | I think the Action frame will be used for suspension and resumptions. Suggest to minimize overlapp and incongruencies between this field and the one defined in the WUR mode element. | As in comment. | Rejected –  WUR Action field only indicates WUR Mode Setup or WUR Mode Teardown. It does not overlap with the request/response and enter signalling in WUR Mode element. |
| 82 | Alfred Asterjadhi | 37.57 | 9.6.32.2 | Why is the WUR Operation element included in the WUR Setup frame? | As in comment. | Rejected –  We note that WUR Operation element has WUR parameters like counter, which may need to be updated during WUR setup. |
| 83 | Alfred Asterjadhi | 38.33 | 9.6.32.3 | I am wondering if the WUR Mode Teardown frame also needs the Dialog token. In its absence it is unclear which of the WUR links the teardown is tearing down. | As in comment. | Rejected –  There is only WUR neogiation between a WUR AP and a WUR non-AP STA, which is the most recent negotiation.  As a result, WUR Teardown frame just tear down the only WUR negotiation. |
| 375 | James Lepp | 37.46 | 9.6.32.2 | In section 9.6.32.2 and table 9-517b you can indicate that the value of the WUR action is 0. |  | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 375. |
| 376 | James Lepp | 38.30 | 9.6.32.3 | In section 9.6.32.32 and table 9-517c you can indicate that the value of the WUR action is 1. |  | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 376. |
| 880 | Rojan Chitrakar | 38.05 | 9.6.32.2 | It is not enough to refer to 9.4.1.12 (Dialog Token field) for the content of the Dialog Token field. | Since the value of the Dialog token is used to match request and response frames, add sentence to clarify this: The Dialog Token field is set to a nonzero value chosen by the STA sending a WUR Setup frame with Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend Request" or "Enter WUR Mode Request" to identify the request transaction. The Dialog Token field in the WUR Setup frame with Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend Response" or "Enter WUR Mode Response" is set to the same value as the Dialog Token field of the corresponding Request frame. If the WUR Mode Setup frame is not being transmitted in response to a Request frame, then the dialog token is set to 0. | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 880. |
| 1106 | Xiaofei Wang | 37.12 | 9.6.32.1 | Not sure what "WUR purposes" are. Maybe change to "for WUR operations"? | as in comment | Revised –  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 1106. |
| 1109 | Xiaofei Wang | 38.11 | 9.6.32.2 | Since the WUR Operation element is optionally included in the WUR Mode Setup frame, it should be clearly stated so in the spec text. | Change the sentence "The WUR Operation element field contains a WUR Operation element as defined in 9.4.2.275 (WUR Operation element)." into "The WUR Operation element field, if present, contains a WUR Operation element as defined in 9.4.2.275 (WUR Operation element)." | Revised –  Agree in principle with the commenter. We remove WUR operation element in WUR Setup frame.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 82. |
| 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. | Rejected –  The cited sentence is about the WURx operation which follows the WUR duty cycle agreement when the PCR component is in the doze state. |
| 984 | Suhwook Kim | 49.05 | 31.1 | Is there any figure of state diagram for WUR Mode operation? It can better explain WUR mode behavior of the STA and AP. State transition between doze and awake of WUR and PCR should be clarified. | Add figure or state diagram | Rejected –  It is unrealistic to provide state diagram for every PS operation. First, there is no state diagram for any existing PS operation of HT, VHT, or HE features. Second, a state diagram can not capture all the request/response excahgne, acknowledgement transmission, and so on. It is envisioned that adding a state diagram will eventually become a figure with all the spec texts in the draft to make it really clear. As a result, it does not provide further information than the existing spec texts. Third, all the texts in 31.6 and 31.7 has described the normative behaviours. If there are things that need to be clarified, it is better to work on the normative texts in the corresponding clause. |
| 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 –  The commenter proposes to resume TWT service period without receiving a wake up frame and chaning WUR mode to WUR mode suspend.  We note that to resume TWT service period without receiving a wake up frame, the agreed approach is for the non-AP STA to enter WUR mode suspend through one-way explicit exchange with the AP rather than defining more implicit operation. |
| 1137 | Xiaofei Wang | 58.54 | 31.7.2 | Remedies are needed after wake up operations failed after retries. Different than existing PS mode, WUR non-AP STA needs notifications from its AP to wake up. If wake up operation fails, for example, caused by channel conditions on the WUR channel allocated to STA, this may cause loss of devices, particularly when the WUR channel is different than the WUR primary channels. | provide remedies for non-AP STAs to be woken up on its own WUR channels. | Rejected –  We note that due to the natural of unlicensed band, bad channel condition is unavoidable, and problem similar to the problem pointed out by the commenter exists today. For example, a non-AP STA may fail to receive any PCR beacon due to bad channel condition, and the existing meaure to handle this is Max Idle period.  For WUR, we see that the problem pointed out by the commeter is fundamentally the same, and we already have the Max Idle period approach. |
| 65 | Alfred Asterjadhi | 29.16 | 9.4.2.273 | Preferred duty cycle too large... It does not indicate the STA what duty cycle is okay, which means the STA would need to keep guessing. Rather let the AP tell the STA which a good duty cycle would be so that the STA can decide if to use this one. | As in comment. | Rejected –  We note that the reason of denying large duty cycle is similar to the reason of denying large listen interval as defined in Table 9-52—Status codes of the current baseline. Further, in the current baseline, there is no suggested listen interval from the existing AP, and it works just fine.  We also note that AP can already deny negotiation without specifying any reason, and STA already needs implementation specific way to guess how to do next. We think it is better for STA to use implementation specific way to decide how they want to do the next retry. |
| 118 | Alfred Asterjadhi | 54.01 | 31.6.1 | Not certain what the same infrastructure BSS means is in this context. Please clarify. Also please ensrue that the WUR mode negotiaiton is clearly specified as possible with Assoc Request etc. I.e., in the table don't call out WUR Mode Setup frames only, but rather use terms such as WUR request, WUR response, etc. | As in comment. | Revised –  Agree in principle with the commenter. WUR mode element is designed with the mindset that the negotaiton can be piggybacked in other existing negotaitions. We revise the sentence to align with the suggestion from the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 118. |
| 515 | Lei Huang | 24.18 | 9.3.3.6 | WUR Mode element should be optionally present in (Re)Association Request/Response frames to enable WUR mode negotiation during (re)association procedure, which is similar to TWT negotiation. | As per comment | Revised –  Agree in principle with the commenter. WUR mode element is designed with the mindset that the negotaiton can be piggybacked in other existing negotaitions. We revise the sentence to align with the suggestion from the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 118. |
| 1027 | Tomoko Adachi | 28.00 | 9.4.2.273 | From the procedure point of view, it is possible to assign WUR ID during association. Also the other parameters can be set during association as an initial value. Why not allow WUR Mode element in Association/Reassociation Response frames? | As in comment. | Revised –  Agree in principle with the commenter. WUR mode element is designed with the mindset that the negotaiton can be piggybacked in other existing negotaitions. We revise the sentence to align with the suggestion from the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 118. |
| 110 | Alfred Asterjadhi | 52.44 | 31.5 | The figure seems to show that there is a frame sent which is ON duraiton long, which is not correct. Please improve the depicted components in the figure to reflect WUR Setup and the scheduled service periods and the intervals separating them. | As in comment. | Revised-  Agree in principle with the commenter.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 110. |
| 111 | Alfred Asterjadhi | 52.29 | 31.5 | Please describe explicitly the negotiation procedure in this case. WUR Mode Request, WUR Mode Response, cite the acknowledgment procedure for all these action frames, and specify the possible states for the negotiation. I don't think the WUR mode setup is appropriate under power management subclause. | As in comment. | Revised –  Agree in principle with the commenter.  The negotiation procedure is described in 31.6.1 (WUR Mode Setup) as described in the sentence.  We clarify that Ack is required for the request/response and any other negotiation used for WUR mode setup.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 111. |
| 62 | Alfred Asterjadhi | 26.54 | 9.4.1.11 | I think we need both types for WUR action frames ([unprotected] WUR and protected WUR). Similar to what we have in 11ax for HE action frames. | As in comment. | Rejected –  Based on Table 9-54, the WUR Action frame is protected. In 11ax, when we have both types of action frame (protected vs unprotected), these two types of frames are used for different purposes. Since we do not define additional unprotected use for the WUR action frame, there is no need to add unprotected WUR Action frame. |
| 76 | Alfred Asterjadhi | 35.15 | 9.4.2.275 | Is it the current value or the most recent value? What if the broadcast WUR frame was sent a minute ago with value 3 and the current value is 4. Which one would it be? | As in comment. | Revised –  Agree in principle with the commenter. The counter field has similar functionality of Check Beacon field used by TIM broadcast. Based on the texts in Revmd 2.0, we have the following.  *The non-AP STA shall attempt to receive the next Beacon frame when it receives a Check Beacon field that*  *contains a value that is different from the previously received Check Beacon field.*  As a result, if an AP provides the counter field with the value that has not been trasnsmitted in a WUR broadcast frame as the previously received value for the WUR non-AP STA, then when the value is used later in a WUR broadcast frame, the WUR broadcast frame will be ignored.  TGba editor, please make changes as shown in doc 11-19/133r0 under all headings that include CID 76. |
| 1076 | Woojin Ahn | 59.01 | 31.7.3 | For a non-AP STA using both U-APSD and PSP, each of PS-poll and U-APSD trigger is used for retrieving BUs from different ACs. However, the non-AP STA may not know from which AC it should retrieve BUs, and in the worst case, STA may not retrieve any BUs after receiving a Wake-up frame unless it responds with an expected polling frame. A remedy to address this issue is necessary | Need more clarification how a WUR STA can choose one of the agreed PS operation in response to WUR Wake-up frame | Rejected –  We note that there exists a mode for STA to retrieve buffered BUs using both U-APSD and Ps-Poll as shown below by setting all ACs to be delivery-enabled. As a result, the same mechanism can be used, and there is no need for further complicated design.  *When the STA detects that the bit corresponding to its AID is 1 in the TIM, the STA shall issue a*  *PS-Poll frame, or a trigger frame if the STA is using U-APSD and all ACs are delivery-enabled, to*  *retrieve the buffered BU.* |

**Discussion:** *None.*

**Propose:** Revised for CID 476, 375, 376, 880, 1106, 118, 110, 111, 76 per discussion and editing instructions in 11-19/133r0.

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

(…existing texts…)**wake-up radio (WUR) primary channel:** The channel used by a WUR AP to transmit WUR Beacon frames.(#476)

(…existing texts…)

***TGba editor: Change 9.3.3.6 Association Request frame format as follows: (Track change on)***

* Association Request frame format

***Insert the following rows into Table 9-36 (Association Request frame body) maintaining row order:***

|  |  |  |
| --- | --- | --- |
| * Association Request frame body | | |
| Order | Information | Notes |
| <Last\_assigned+1> | WUR Capabilities | The WUR Capabilities element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+2> | WUR Mode | The WUR Mode element is optionally present when dot11WUROptionImplemented is true; otherwise it is not present.(#118) |

***TGba editor: Change 9.3.3.7 Association Response frame format as follows: (Track change on)***

* Association Response frame format

***Insert the following rows into Table 9-37 (Association Response frame body) maintaining row order:***

|  |  |  |
| --- | --- | --- |
| * Association Response frame body | | |
| Order | Information | Notes |
| <Last\_assigned+1> | WUR Capabilities | The WUR Capabilities element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+2> | WUR Operation | The WUR Operation element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+3> | WUR Mode | The WUR Mode element is present when dot11WUROptionImplemented is true, and the WUR Mode element is present in the Association Request frame that solicited this Association Response frame; otherwise it is not present. (#118) |

***TGba editor: Change 9.3.3.8 Reassociation Request frame format as follows: (Track change on)***

* Reassociation Request frame format

***Insert the following rows into Table 9-38 (Reassociation Request frame body) maintaining row order:***

|  |  |  |
| --- | --- | --- |
| * Reassociation Request frame body | | |
| Order | Information | Notes |
| <Last\_assigned+1> | WUR Capabilities | The WUR Capabilities element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+2> | WUR Mode | The WUR Mode element is optionally present when dot11WUROptionImplemented is true; otherwise it is not present.(#118) |

***TGba editor: Change 9.3.3.9 Reassociation Response frame format as follows: (Track change on)***

* Reassociation Response frame format

***Insert the following rows into Table 9-39 (Reassociation Response frame body) maintaining row order:***

|  |  |  |
| --- | --- | --- |
| * Reassociation Response frame body | | |
| Order | Information | Notes |
| <Last\_assigned+1> | WUR Capabilities | The WUR Capabilities element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+2> | WUR Operation | The WUR Operation element is present when dot11WUROptionImplemented is true; otherwise it is not present. |
| <Last\_assigned+3> | WUR Mode | The WUR Mode element is present when dot11WUROptionImplemented is true, and the WUR Mode element is present in the Reassociation Request frame that solicited this Reassociation Response frame; otherwise it is not present.(#118) |

***TGba editor: Change “WUR AP STA” to “WUR AP” throughout the spec*** (#118)

***TGba editor: Change 31.6 WUR power management procedure as follows: (Track change on)***

* WUR power management procedure
* General

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

A WUR non-AP STA is in WUR mode or WUR mode suspend while using WUR power management service provided by a WUR AP. (#117, #536)

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)

* WUR Mode Setup

To use the WUR power management service, a WUR non-AP STA uses the PCR component to exchange WUR Mode elements in WUR Mode Setup frames or (Re-)Association Request/Response frames (#118) with a WUR AP(#118). The settings for WUR mode setup are defined in Table 31-1 (WUR mode setup frame exchange - Request and Response) and Table 31-2 (WUR Mode Setup/Teardown frame transmission).

|  |  |  |  |
| --- | --- | --- | --- |
| * Settings for WUR mode setup frame exchange - Request and Response | | | |
| **Request frame: Action Type field of the WUR Mode element within a request frame transmitted from a WUR non-AP STA to a WUR AP STA**(#118) | **Response frame: Action Type field of the WUR Mode element within a response frame transmitted from a WUR AP STA to a WUR non-AP STA**(#118) | **Response frame: WUR Mode Response Status field of the WUR Mode element within a response frame transmitted from a WUR AP STA to a WUR non-AP STA**(#118) | **Status after the completion of the exchange** |
| Enter WUR Mode Request | Enter WUR Mode Response | Accept | The WUR non-AP STA enters WUR mode. |
| Enter WUR Mode Suspend Request | Enter WUR Mode Suspend Response | Accept | The WUR non-AP STA enters WUR mode suspend. |
| Enter WUR Mode Request | Enter WUR Mode Response | Denied | WUR power management service is not provided by the WUR AP to the WUR non-AP STA at this time. |
| Enter WUR Mode Suspend Request | Enter WUR Mode Suspend Response | Denied | WUR power management service is not provided by the WUR AP to the WUR non-AP STA at this time. |

NOTE—The definition of WUR mode and WUR mode suspend is described in 31.6.3 (WUR non-AP STA operation) and 31.6.4 (WUR AP operation).

|  |  |  |
| --- | --- | --- |
| * WUR Mode Setup/Teardown frame transmission | | |
| **Frame type carrying the WUR Mode element (and Action Type field value of the WUR Mode element)** (#118)  **transmitted from a WUR non-AP STA to a WUR AP** | **Frame type transmitted from a WUR AP to a WUR non-AP STA** | **Status after the completion of the exchange** |
| WUR Mode Setup frame (Action Type=Enter WUR Mode) |  | The WUR non-AP STA enters WUR mode from WUR mode suspend. |
| WUR Mode Setup frame (Action Type=Enter WUR Mode Suspend) |  | The WUR non-AP STA enters WUR mode suspend from WUR mode. |
| WUR Mode Teardown frame |  | The WUR non-AP STA tears down WUR power management service.(#Ed) |
|  | WUR Mode Teardown frame | The WUR AP tears down WUR power management service.(#Ed) |

(#634, #635, #1089, #1090, #1091)

A request frame in Table 31-1 is successfully transmitted from a WUR non-AP STA to a WUR AP if an Ack frame is transmitted from the WUR AP to the WUR non-AP STA for the request frame. (#111)

A response frame in Table 31-1 is successfully transmitted from a WUR AP to a WUR non-AP STA if an Ack frame is transmitted from the WUR non-AP STA to the WUR AP for the response frame. (#111)

If the WUR AP denies the WUR mode setup(#118), the WUR Mode Response Status field in the corresponding WUR Mode element shall be set to one of the values with meaning “Denied” shown in Table 9-318c (WUR Mode Response Status Definition).

After a WUR non-AP STA has negotiated WUR power management service with a WUR AP, the WUR non-AP STA may switch from WUR mode to WUR mode suspend or switch from WUR mode suspend to WUR mode by using the PCR component to initiate and complete a successful frame exchange, which includes a WUR Mode Setup frame with Action Type field of the carrying WUR Mode element set to “Enter WUR Mode Suspend” or “Enter WUR Mode” from the WUR non-AP STA and an Ack frame from the WUR AP as described in Table 31-2.(#118)

The Action Type field in the WUR Mode element of the WUR Mode Setup frame sent by the PCR component of the WUR non-AP STA in this frame exchange indicates the status that the STA shall adopt upon successful completion of the frame exchange.

After a WUR non-AP STA has negotiated WUR service with a WUR AP, the WUR AP may update the WUR parameters with the WUR non-AP STA in WUR mode, or WUR Mode Suspend by using the PCR component to initiate and complete a successful frame exchange, which includes an unsolicited WUR Mode Setup frame with the Action Type in WUR Mode element set to “Enter WUR Mode Response”, or “Enter WUR Mode Suspend Response”, from the WUR AP and an Ack frame from the WUR non-AP STA. The WUR non-AP STA that sent the ACK frame in response to the unsolicited WUR Mode Setup frame shall update the WUR parameters to the parameters included in the recieved WUR Mode Setup frame. The STA may tear down WUR operation if the STA doesn’t intend to use the parameters. After a WUR non-AP STA has negotiated WUR service with a WUR AP, the WUR AP may update the WUR parameters with the WUR non-AP STA in WUR mode, or WUR Mode Suspend by using the PCR component to initiate and complete a successful frame exchange, which includes an unsolicited WUR Mode Setup frame with the Action Type in WUR Mode element set to “Enter WUR Mode Response”, or “Enter WUR Mode Suspend Response”, from the WUR AP and an Ack frame from the WUR non-AP STA. The WUR non-AP STA that sent the ACK frame in response to the unsolicited WUR Mode Setup frame shall update the WUR parameters to the parameters included in the recieved WUR Mode Setup frame. The STA may tear down WUR operation if the STA doesn’t intend to use the parameters. After a WUR non-AP STA has negotiated WUR power management service with a WUR AP, the WUR AP may update the WUR parameters with the WUR non-AP STA in WUR mode or WUR mode suspend by using the PCR component to initiate and complete a successful frame exchange, which includes an unsolicited WUR Mode Setup frame with the Action Type in WUR Mode element set to “Enter WUR Mode Response” or “Enter WUR Mode Suspend Response” from the WUR AP and an Ack frame from the WUR non-AP STA. The WUR non-AP STA that sent the ACK frame in response to the unsolicited WUR Mode Setup frame shall update the WUR parameters to the parameters included in the received WUR Mode Setup frame.

The WUR non-AP STA may teardown WUR operation as described below if the WUR non-AP STA doesn’t intend to use the parameters.

After a WUR non-AP STA negotiates WUR power management service with a WUR AP, the WUR non-AP STA may tear down WUR power management service by using the PCR component to initiate and complete a successful frame exchange, which includes a WUR Mode Teardown frame from the WUR non-AP STA and an Ack frame from the WUR AP as described in Table 31-2.(#118).

After a WUR non-AP STA negotiates WUR power management service with a WUR AP, the WUR AP may tear down WUR power management service by using the PCR component to initiate and complete a successful frame exchange, which includes a WUR Mode Teardown frame from the WUR AP and an Ack frame from the WUR non-AP STA as described in Table 31-2.(#118).

***TGba editor: Change 9.6.32.1 WUR Action field as follows: (Track change on)***

* WUR Action field

Several Action frame formats are defined to support wake-up radio (WUR) functionalities.(#1106) A WUR Action field, in the octet field immediately after the Category field, differentiates the formats. The WUR Action field values associated with each frame format are defined in Table 9-517a (WUR Action field values).

|  |  |
| --- | --- |
| * WUR Action field values | |
| Value | Meaning |
| 0 | WUR Mode Setup |
| 1 | WUR Mode Teardown |
| 2-255 | Reserved |

***TGba editor: Change 9.6.32.2 WUR Mode Setup frame format as follows: (Track change on)***

* WUR Mode Setup frame format

The WUR Mode Setup frame is an Action frame of category WUR. The Action field of a WUR Mode Setup frame contains the information shown in Table 9-517b (WUR Mode Setup frame Action field format).

|  |  |
| --- | --- |
| * WUR Mode Setup frame Action field format | |
| Order | Information |
| 1 | Category |
| 2 | WUR Action |
| 3 | Dialog Token |
| 4 | WUR Mode element (see 9.4.2.273 (WUR Capabilities element)) |
| 5 | WUR Operation element (optional) (see 9.4.2.274 (WUR Operation element)) |

The Category field is defined in Table 9-54 (Category values).

The WUR Action field is set to 0 as defined in Table 9-517a (WUR Action field values).(#375)

The Dialog Token field is defined in 9.4.1.12 (Dialog Token field).

In a WUR Mode Setup frame with the Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend Request" or "Enter WUR Mode Request,” the Dialog Token field is set to a nonzero value chosen by the transmitting STA to identify the request/response transaction.(#880)

In a WUR Mode Setup frame with the Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend Response" or "Enter WUR Mode Response," the Dialog Token field is set to the value copied from the corresponding received WUR Mode Setup frame with the Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend Request" or "Enter WUR Mode Request.(#880)

In a WUR Mode Setup frame with the Action Type field of the carrying WUR Mode element set to "Enter WUR Mode Suspend" or "Enter WUR Mode,” the Dialog Token field is reserved.(#880)

The WUR Mode element field contains a WUR Mode element as defined in 9.4.2.273 (WUR Capabilities element).

The WUR Operation element field contains a WUR Operation element as defined in 9.4.2.274 (WUR Operation element).

* WUR Mode Teardown frame format

The WUR Mode Teardown frame is an Action frame of category WUR. The Action field of a WUR Mode Teardown frame contains the information shown in Table 9-517c (WUR Mode Teardown frame Action field format).

|  |  |
| --- | --- |
| * WUR Mode Teardown frame Action field format | |
| Order | Information |
| 1 | Category |
| 2 | WUR Action |

The Category field is defined in Table 9-54 (Category values).

The WUR Action field is set to 1 as defined in Table 9-517a (WUR Action field values).(#376)

***TGba editor: Change “starting point” to “start point” across the draft (#110)***

***TGba editor: Change 31.5 WUR duty cycle operation as follows: (Track change on)***

* WUR duty cycle operation

… (existing texts) …

|  |
| --- |
| (#110) |
| * WUR Duty Cycle |

The start point indicates the start time of an on duration. For an on duration, the start time of the next on duration is equal to the start time of the on duration plus the duty cycle period.(#110)

***TGba editor: Change 9.4.2.274 WUR Operation element as follows: (Track change on)***

9.4.2.274 WUR Operation element

(…existing texts…)

The Counter subfield indicates the current value of the Counter subfield included in the most recently transmitted(#76) broadcast WUR Wake-up frames.