IEEE P802.11
Wireless LANs

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| Comment resolutions for Clause 3, Clause 4  |
| Date: 2019-7-1 |
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Abstract

This submission proposes resolutions for multiple comments related to TGba D3.0 with the following CIDs (20 CIDs):

3112, 3172, 3026, 3027, 3134, 3194, 3035, 3066, 3067, 3106, 3164, 3165, 3173, 3195, 3203, 3237, 3263, 3354, 3355, 3384

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: CID 3134 deferred

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

***Editing instructions formatted like this are intended to be copied into the TGba 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** | **Clause Number** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 3112 | Jeongki Kim | 3 | 21 | 60 | Is wake-up radio (WUR) channel used for sending only WUR Wake-up frames? How about vendor specific frame? If yes, add the vendor specific frame in the sentence | As in comment | Revised.Agree with the commenter. The WUR Vendor Specific frame is also added to the definition. The same change is also applied to Clause 29.2 P105L38. TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3112. |
| 3172 | Liwen Chu | 3 | 22 | 28 | With this definition, the next generation STA can't use WUR features. Change the definition to exclude the 11ah non-AP STA and other band non-AP STA if required. Or just mention the non-AP STA in 2.4/5/6GHz bands | As in comment. | Rejected.Response: It is well understood in 802.11 WG that when an amendment that comes after 802.11ba wants to use the 802.11ba, the next task group working on the amendment can modify the definition of WUR non-AP STA by including the STA being defined in the new amendment (e.g. EHT STA for 802.11be) so that it can use 802.11ba. Therefore future amendments can use 802.11ba. |
| 3026 | Dennis Sundman | 3.2 | 21 | 45 | This is not a definition. | Change the text to:"multicarrier on-off keying (MC-OOK) symbol: A MC-OOK symbol is either an MC-OOK On symbol where the multicarrier signal is present or an MC-OOK Off symbol where the multicarrier signal is not present." | Accepted. |
| 3027 | Dennis Sundman | 3.2 | 21 | 46 | The term multicarrier signal is not defined. | Add a definition for multicarrier signal. Proposed definition:"Multicarrier signal: A multicarrier signal is a signal of one or many OFDM symbols, where multiple subcarriers carry energy." | Revised.Agree with the commenter that a proper definition is needed for the term “multicarrier signal”. The proposed resolution is to use the following definition to make it more general instead of limiting to OFDM symbols as follows: “Multicarrier signal: A multicarrier signal is a signal that is constructed with multiple subcarriers that carry energy”TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3072. |
| 3134 | Joseph Levy | 3.2 | 21 | 61 | The wake-up radio (WUR) channel definition states that a WUR AP transmits WUR Wake-up frames to associated WUR non-AP Stations (STAs). There is no method of telling/assuring which devices will receive a transmitted frame, hence, the definition should not state that the frames are transmitted to associated WUR non-AP stations, simply that they are transmitted. Therefore, delete this statement. | Delete: "to associated WUR non-AP station stations (STA)" | Revised.Agree with the commenter. The cited text is deleted and added a phrase that a WUR non-AP STA listens for WUR Wake-up and Vendor Specific frames on the WUR channel. There is also another description on the WUR channel in Clause 29.2 P105L38 that needs the same change.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3134. |
| 3194 | Mark Hamilton | 3.2 | 22 | 34 | It appears that a 20MHz WUR frame is now a "WUR Basic PPDU" (per changes in 4.3.15a). The definition of "WUR PPDU" should be "WUR Basic PPDU" now, to match. | Insert "basic", to result in "wake-up radio (WUR) basic physical layer (PHY) protocol data unit (PPDU):" | Accepted. |
| 3035 | Gaurav Patwardhan | 4.3.15a | 25 | 38 | Rephrase WUR Discovery frame function description | Change to "The WUR Discovery frame supports the discovery of WUR APs by a WUR non-AP STA." | Revised.The sentence is rephrased as follows:” The WUR Discovery frame supports the discovery of WUR APs by a WUR non-AP STA at low power consumption.”TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3035. |
| 3066 | Graham Smith | 4.3.15a | 25 | 33 | "...and enables the WUR non-AP STAs to react to incoming traffic and critical update of BSS parameters with low latency." How come there is low latency? You need to wake up etc. as per any power save mechanism, so inevidibly there is a delay. I don't think you need to even go there at this point. Delete it. | Delete cited text | Revised.It is low latency in the sense that a non-AP STA doesn’t need to wait for a beacon (every 100 msec) to see if the bit location of the TIM element that is assigned to the non-AP STA is set or not to decide whether to transmit PS-Poll or not and also the non-AP STA doesn’t need to transmit trigger frames (e.g. QoS data or QoS Null-Data frame) periodically (e.g. every 100 msec) to check whether there is buffered data at the AP or not. Depending on the periodicity of the beacon frames or trigger frames, the worst case latency could be 100 msec whereas with WUR Wake-up frame the AP can indicate that there is buffered data instantly to the non-AP STA so that the non-AP STA can retrieve data from the AP, which may just take few msec.In order to avoid such misunderstanding, instead of using “low latency”, the proposed resolution is to rephrase the sentence as follows: “—The WUR Wake-up frame provides notification to one or more WUR non-AP STA(s) that a WUR AP has buffered data for the WUR non-AP STA(s), which enables the WUR non-AP STAs to remain in power save for longer periods of time when there is no data to receive and enables the WUR non-AP STAs to react promptly to incoming traffic and critical update of BSS parameters.”TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3066. |
| 3067 | Graham Smith | 4.3.15a | 25 | 25 | "...and the four types of WUR frames provide the following four functions". Unfortunately you have 5 bullets and 5 WUR frames. Only four functions though. | Replace cited phrase with " and the five types of WUR frames provide the following functions:" | Accepted. |
| 3106 | James Lepp | 4.3.15a | 26 | 41 | Move "Receive a protected WUR frame." to the mandatory main features section. This is needed for security of the system. | Move "Receive a protected WUR frame." to the mandatory main features section. | Rejected.Response: mandating the protected WUR frame may add burden to a STA that wants to support very simple and extremely low power consumption version of 802.11ba due to extra implementations and frame processing that the STA needs to do to support the protected WUR frame. The consensus of the task group was to have it as an optional so that a STA can make a choice whether to support the feature or not depending on its needs and use cases.  |
| 3164 | Lei Huang | 4.3.15a | 25 | 25 | with the addition of WUR Short Wake-up frame, it seems that the five types of WUR frames are supported. | change "four types of WUR frames" to "five types of WUR frames" | Accepted. |
| 3165 | Lei Huang | 4.3.15a | 26 | 19 | "NOTE --WUR FDMA PPDU on a 80 MHz channel applies to the 5 GHz band." is redundant since it has been mentioned in page 25 that the transmission of 80 MHz WUR FDMA PPDUs is defined in the 5 GHz band. | delete the note | Accepted. |
| 3173 | Liwen Chu | 4.3.15a | 25 | 25 | 5 bullets exist for 4 function? | remove the contradiction | Revised.Agree with the commenter.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3173. |
| 3195 | Mark Hamilton | 4.3.15a | 25 | 24 | The changes added in 4.3.15a for "WUR Basic PPDU" went too far. It is confusing to say that "A WUR Basic PPDU carries a WUR frame", when a WUR FDMA PPDU can also carry a WUR frame. | Change the text back to "A WUR PPDU carries a WUR frame", and similarly remove "Basic" in the next sentence. Add a sentence to the start of the next paragraph, "WUR PPDUs are either WUR Basic PPDUs or WUR FDMA PPDUs." | Accepted. |
| 3203 | Massinissa Lalam | 4.3.15a | 25 | 24 | "four types of WUR frames provide the following four functions". I'm counting 5 bullet points for four functions. Either state that there are 5 types of WUR frames for 4 functions, or integrate the short wake-up frame variant in the same bullet point as the wake-up frame | as in comment | Revised.Agree with the commenter.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3203. |
| 3237 | Peter Loc | 4.3.15a | 25 | 25 | Incorrect reference to the number of frame types. | There are 5 different types of WUR frames as defined in 9.10.3, not 4. Change this paragraph to "A WUR AP transmits a WUR Basic PPDU to a WUR non-AP STA or STAs. There are 5 different frame types, each provides one of the following functions:" | Revised.Agree with the commenter. The “four types” is changed to “five types”.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3237. |
| 3263 | Rojan Chitrakar | 4.3.15a | 25 | 24 | This section applies to WUR FDMA PPDU as well and should not be limited to WUR Basic PPDU. | Change to:A WUR Basic PPDU or a WUR FDMA PPDU carries a WUR frame. A WUR AP transmits a WUR Basic PPDU or a WUR FDMA PPDU to a WUR non-AP STA, and the four types of WUR frames provide the following four functions: | Revised.Agree with the commenter. The proposed resolution is to change “WUR Basic PPDU” to “WUR PPDU” and add a sentence “WUR PPDUs are either WUR Basic PPDUs or WUR FDMA PPDUs” after the paragraph.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3263. |
| 3354 | Xiaofei Wang | 4.3.15a | 25 | 24 | If the WUR basic PPDU can also be sent to multiple WUR non-AP STAs instead to just one one WUR non-AP STA, in case of beacon or wake up frames to one or more WUR non-AP STAs, the phrase "to a WUR non-AP STA" is not correct and should be change to "to WUR non-AP STAs". | As in comment | Revised.Agree with the commenter. The sentence is changed as follows: “A WUR AP transmits a WUR PPDU to a single WUR non-AP STA or multiple WUR non-AP STAs”TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3354. |
| 3355 | Xiaofei Wang | 4.3.15a | 25 | 25 | There are five type of frames listed under the heading "the four types of WUR frames provide the following four functions". | change four types to "five types"; not sure whether "four functions" should be changed to 'five functions" or not | Revised.Agree with the commenter. “four types” is changed to “five types” and “four functions” is changed to “functions”.TGba editor to make the changes shown in doc.: IEEE 802.11-19/1077r0 under all headings that include CID 3355. |
| 3384 | Yunsong Yang | 4.3.15a | 25 | 25 | L25 says 4 types of WUR frames. But there are five bullets below. | Change "four types" to "five types". | Accepted. |

**TGba Editor: *Change the subclauses below in TGba Draft 3.0 as follows: (#3027, 3112, 3134, 3194, 3195, 3263, 3354, 3067, 3164, 3237, 3355, 3384, 3173, 3203, 3066, 3035, 3195)***

**3. Definitions, acronyms, and abbreviations
3.2 Definitions specific to IEEE Std 802.11**

**TGba Editor: *Insert the following definition of multicarrier signal after the definition of multicarrier on-off keying (MC-OOK) symbol in TGba Draft 3.0 as follows: (#3027)***

**Multicarrier signal**: A multicarrier signal is a signal that is constructed with multiple subcarriers that carry energy (#3027)

**wake-up radio (WUR) channel:** A channel in which a WUR access point (AP) transmits WUR Wake-up frames and WUR Vendor Specific frames (#3112) and a WUR non-AP station (STA) listens for WUR Wake-up frames and WUR Vendor Specific frames. (#3134)

**wake-up radio (WUR) basic physical layer (PHY) protocol data unit (PPDU):** A PPDU transmitted with the TXVECTOR parameter FORMAT equal to WUR and TXVECTOR parameter CH\_BANDWIDTH equal to WUR\_CBW\_20 (#3194)

**4.3.15a Wake-up radio (WUR) AP and WUR non-AP STA**

A WUR (#3195, 3263) PPDU carries a WUR frame. A WUR AP transmits a WUR (#3195, 3263) PPDU to a single (#3354) WUR non-AP STA or multiple WUR non-AP STAs (#3354), and the five types of WUR frames provide the following functions: (#3067, 3164, 3237, 3355, 3384, 3173, 3203)

* The WUR Beacon frame helps maintaining timing synchronization between a WUR non-AP STA and a WUR AP that is transmitting the WUR Beacon frame and enables the WUR duty cycle operation.
* The WUR Wake-up frame provides notification to one or more WUR non-AP STA(s) that a WUR AP has buffered data for the WUR non-AP STA(s), which enables the WUR non-AP STAs to remain in power save for longer periods of time when there is no data to receive and enables the WUR non-AP STAs to react promptly to incoming traffic and critical update of BSS parameters.(#3066)
* The WUR Short Wake-up frame is a shortened version of the WUR Wake-up frame.
* The WUR Discovery frame supports the discovery of WUR APs by a WUR non-AP STA at low power consumption.(#3035)
* The WUR Vendor Specific frame supports vendor specific operations.(#2192, #2240, #2710, #2246, #2161, #2247, #2712, #2416, #2462, #2367)

WUR PPDUs are either WUR Basic PPDUs or WUR FDMA PPDUs. (#3195, 3263),

**29.2 WUR channel, WUR primary channel, and WUR discovery channel**

WUR channel is a channel in which a WUR AP transmits WUR Wake-up frames and WUR Vendor Specific frames (#3112) and a WUR non-AP station (STA) listens for WUR Wake-up frames and WUR Vendor Specific frames. (#3134).