IEEE P802.11  
Wireless LANs

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| Comment resolutions for miscellenious comments - part 1 | | | | |
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Abstract

This submission proposes resolutions for multiple comments related to TGba D2.0 with the following CIDs ( 22 CIDs):

* 2010, 2038, 2571, 2113, 2198
* , 2228, 2229, 2264, 2374
* 2392, 2511, 2572, 2614, 2615
* 2616, 2617, 2644, 2645, 2653
* 2778, 2798

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Modified based on Rojan’s feedback

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.***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2010 | Albert Petrick | Annex B | 119 | 28 | Missing PICS entry for 11ax HE 2.4 GHz and 5 GHz operation in the \*CFOFDM row, Status column of the B.4.3 IUT configuration table | ADD PICS CFHE2G4: and CFHE5G: Reference 802.11ax D4.0 | Rejected.  In 802.11ax D4.1, the CFOFDM row, Status column of the B.4.3 IUT configuration table only shows the following: “O.2  CFHT5G:M  CFTVHT:M  CFHE:M” and cannot find CFHE2G4 or CFHE5G. |
| 2038 | Alfred Asterjadhi | 30.1 | 63 | 20 | Sentence can be improved... "A WUR AP that transmits a WUR PPDU shall include a WUR frame in the WUR Data field of the PPDU"... | As in comment. | Revised.  Agree in principle. Since the intention of the sentence is to carry a WUR frame in the WUR PPDU, the sentence is now changed to “A WUR AP that transmits a WUR PPDU shall include a WUR frame in the WUR PPDU as defined in 31.2.2 (WUR PPDU format).”  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2038. |
| 2571 | Robert Stacey | 30.1 | 63 | 20 | WUR PPDU formating is done by the PHY. The MAC controls the PHYs behavior through the PHY SAP. If there is requirement on how the WUR Data field is generated then it belongs in the PHY clause. | Delete this statement. If necessary add a statement to the PHY clause to the effect that the WUR Data field contains the octets sent to the PHY by the MAC in the PHY-DATA.request primitive. | Revised.  Agree in principle. Since the intention of the sentence is to carry a WUR frame in the WUR PPDU and not the formatting of the WUR PPDU, the sentence is now changed to “A WUR AP that transmits a WUR PPDU shall include a WUR frame in the WUR PPDU as defined in 31.2.2 (WUR PPDU format).”  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2571. |
| 2113 | Guido Hiertz | 31.3.2 | 115 | 9 | This is the only occurence of aCCAMinTime. This value is neither defined nor explained anywhere else. Also, there seems to be no use of this value. | Delete aCCAMinTime from the standard. | Revised.  aCCAMinTime is typo. This should be aCCAMidTime for the WUR FDMA PPDU transmission same as the 40 and 80 MHz PPDU transmission in VHT or HE. The correct text can be found in doc:11-18/1163r4.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2113. |
| 2198 | Joseph Levy | 10.2.1 | 61 | 25 | In Figure 10-1 states that DCF is used for Contention services, basis for PCF, HCF and MCF. PCF has been removed from the 802.11REVmdD2.0 specification and should not appear in this list. Please use the correct version of Figure 10-1 and modify appropriately | Modify the current 802.11REVmdD2.0 figure. | Revised.  Agree with the commenter. The figure 10-1 in D2.0 was generated based on 802.11ax D3.3, which included PCF in the figure. 802.11ax D4.1 also has the same error.  Instruction to the TGba editor: remove the word “PCF” and change the sentence in the figure 10-1 as follows: “Used for Contention Services, basis for HCF and MCF” |
|  |  |  |  |  |  |  |  |
| 2228 | Joseph Levy |  |  |  | Annex G provides frame exchange sequences, since WUR mode is negotiated via a frame exchange sequence these frame exchange sequences should be included in Annex G - which is normative. Please provide the frame sequences for WUR in Annex G. | Provide text for Annex G detailing the WUR frame exchange sequences. | Rejected.  WUR mode setup is based on regular management frame exchanges and the management frame exchanges are already covered by the existing frame exchange sequences defind in Annex G. Annex G does not define specific frame exchanges (i.e. Annex G doesn’t define every individual management frame exchange defined in the baseline standard). Therefore, there is no new frame exchange sequence to define for TGba.  I also do not see the need to have Annex G since normative behaviors of packet exchanges are already defined in MAC clauses. In worst case, there could be conflicting definitions in two places in the standard. |
| 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.  The WUR mode and the WUR mode setup procedure is clearly defined in subclause 30.7.2.  Regarding the PS mode and the WUR mode, in P72L52 of D2.0, Note 3 clearly explains that “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. A WUR non-AP STA can be in the awake state or the doze state when the WUR non-AP STA is in WUR mode or WUR mode suspend.”  How to support multi-band is implementation issue and this is out of scope of TGba. |
| 2264 | Lei Wang | 30.11 | 81 | 53 | There seems multiple radio channels that are in use in a WUR-capable AP/STA, including: main data radio channel, WUR primary channel for WUR Beacon frame, WUR discovery channel for WUR discovery frame, WUR Wake-Up channel for WUR Wake-up frame. And those channels can be different from each other. Would suggest to clearly specify those important aspects in the PHY introduction section.  In addition, Can WUR frames be transmitted on a totally different bands from the main data radio? For example, 5GHz band for the main data radio, 2.4GHz band for WUR PHY? | Please clearly specify which band/channel is used to transmit WUR frames in the PHY introduction section, i.e., 31.1, similar to all other PHY specifications in 802.11 spec. | Revised.  Agree in principle. Although the definitions of the WUR channel, WUR primary channel, and WUR discovery channel are in Clause 3.2, it is sometimes difficult to understand the relationship between them. To help readers to understand better, a new subclause is inserted after 30.1 because the details of the channels are defined in clause 30.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2264. |
| 2374 | Mark Hamilton | 31.2.2 | 87 | 3 | WUR PPDU can be a WUR FDMA PPDU, too. (The "WUR PPDU" term appears to be inclusive.) These sentences needs to be clarified slightly. | Change "The WUR PPDU format is defined for the 20 MHz channel bandwidth. Figure 31-1 WUR PPDU format shows the WUR PPDU format." to "The WUR PPDU format for the 20 MHz channel bandwidth is defined in Figure 31-1." | Rejected.  The commenter’s understanding is not correct. The WUR PPDU is defined for the 20 MHz channel bandwidth and does not include the WUR FDMA PPDU. The WUR FDMA PPDU consists of two or more WUR PPDUs over 40 or 80 MHz channel bandwidth. |
| 2392 | Mark Hamilton | 30.1 | 63 | 17 | Clause 30 needs to be clear that this is additive to the other MAC clauses. Use a style simlar to what's in 11ax's introduction in clause 26, but make sure to include that a WUR MAC always includes clause 10, clause 11 and clause 12, and may optionally include clause 26. | As in comment, to replace the sentence on line 17. | Revised.  Agree in principle. The sentence has been replaced with a paragraph similar to the style used in 802.11ax D4.1 P299L11.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2392. |
| 2511 | Osama Aboulmagd | 61.00 | 40 | 10.2.1 | Figure 10-1...The WUR PHY seems to be out of place since it is not an independent PHY that is acting alone. Need to find a better place for the WUR PHY that reflects its use and its place in the total architecture. It is probably better to consult with the ARCH SC. | as in comment | Rejected.  Similar to the HE PHY, the WUR PHY is capable of transmitting and receiving PPDUs that are compliant with the mandatory requirements of the Clause 17 (OFDM PHY specification). Please see Clause 31.1 Introduction (P83L7) in D2.1. Therefore, the WUR PHY is in the right place. |
| 2572 | Robert Stacey | 30.1 | 63 | 28 | "intends" is imprecise and implies free will - something only concious beings have. It is imprecise because a device may intend to transmit now but change its mind later and not do the transmission. In the near future, when AI becomes prevalent, we may apply the word "intends" but for now avoid this word. | Change to "Before a WUR AP transmits a WUR frame it shall contend for the medium..." | Accepted.  Response to the commenter: There are many occurances of “intends” in REVmd D2.1 and 802.11ax D4.1. The baseline spec should also remove the word “intend” until AI becomes prevalent. |
| 2614 | Rui Cao | 32.2.4 | 89 | 2 | The term "WUR-based encoder" does not seem to be meaningful. | Change to "WUR waveform encoder." throughout the spec text. | Rejected.  The WUR-based encoder is a name that the group chose for the encoding procedure defined in Clause 31 WUR PHY Specification, which is mapping 0 to 1010 for LDR or 10 for HDR and 1 to 0101 for LDR or 01 for HDR. Since the encoder is “based” on the WUR PHY, WUR-based seems to have the right meaning. |
| 2615 | Rui Cao | 32.2.4 | 89 | 5 | "Figure 31-4 An Example of a WUR signal generator for the WUR-Sync field, Figure 31-5 An Example of a WUR signal generator for the WUR-Data field, and 31.2.4.1 WUR PPDU waveform generation for WUR-Sync field and high data rate WUR-Data field through 31.2.4.4 Symbol Randomizer and Per-antenna Cyclic Shift show an example of transmitter block diagram for the WUR-Sync field and the WUR-Data field." This long sentence does not read well. Need to be rephrased. | Change to "An example of transmitter block diagram for the WUR-Sync field and the WUR-Data field is shown in Figure 31-4 An Example of a WUR signal generator for the WUR-Sync field, Figure 31-5 An Example of a WUR signal generator for the WUR-Data field." | Revised.  The sentence is changed in D2.1 to “Figure 31-4 (An example of a WUR signal generator for the WUR-Sync field), Figure 31-5 (An example of a WUR signal generator for the WUR-Data field(#2665)), and 31.2.4.1 (WUR PPDU waveform generation for WUR-Sync field and high data rate WUR-Data field) through 31.2.4.4 (Symbol Randomizer and Perantenna Cyclic Shift) show an example of transmitter block diagram for the WUR-Sync field and the WURData field.”, which reads much better.  TGba editor does not need to make any additional changes. The changes are already reflected in D2.1. |
| 2616 | Rui Cao | 32.2.4 | 89 | 10 | "The waveform generation for L-STF, L-LTF, and L-SIG fields is described in 21.3.3 (Transmitter block diagram)." How about BPSK-Mark? | Add BPSK-Mark transmitter block diagram. May refer to LSIG block diagram in Sec. 32.3.3. | Revised.  Agree in principle. The following sentence “The waveform generation for the BPSK-Mark field is same as the waveform generation for the L-SIG field” is added to P97L10 in D2.1.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2616. |
| 2617 | Rui Cao | 32.2.4.4 | 92 | 49 | "One of the bits on the LFSR is converted to an integer m, with a value of either plus or minus one ...", the phrase of "One of the bits" is not clear. | Change to "The seventh bit of LFSR state is converted to an integer m, with a value of either plus or minus one ... ", | Accepted. |
| 2644 | Stephan Sand | B.4.36.2 | 123 | 30 | Reference to 31.1 for item WURP2.1 in Table B.4.36.2 correct? | Check if reference is 31.1 or 31.2.2 and needs modification | Revised.  The reference to 31.1 is correct since the reference is pointing to the sentence “A WUR AP shall support the following features:  — A WUR PPDU with 20 MHz channel width, low data rate, and single stream.” However, adding a reference to 31.2.2 WUR PPDU format will also help readers to understand the WUR PPDU format.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2644. |
| 2645 | Stephan Sand | B.4.36.2 | 123 | 38 | Reference to 31.1 for item WURP3 in Table B.4.36.2 correct? | Check if reference is 31.1 or 31.2.3 and needs modification | Revised.  Response to the comment: The reference to 31.1 is correct since the reference is pointing to the sentence “A WUR AP may support the following features:  — FDMA transmissions for 40 MHz and 80 MHz contiguous channel widths.  — FDMA transmission with subchannel puncturing for 80 MHz.” However, adding a reference to 31.2.3 WUR FDMA PPDU format will also help readers to understand the WUR FDMA PPDU format.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2645. |
| 2653 | Sudhir Srinivasa | 32.2.4 | 89 | 9 | Missing BPSK-Mark description | Need to add the waveform generation of the BPSK-Mark symbol. | Revised.  Agree in principle. The following sentence “The waveform generation for the BPSK-Mark field is same as the waveform generation for the L-SIG field” is added to P97L10 in D2.1.  TGba editor to make the changes shown in doc.: IEEE 802.11-19/0643r2 under all headings that include CID 2653. |
| 2778 | Yongho Seok | 31.2 | 86 | 41 | Regarding CID 1154, The resolution is "REJECTED (MAC: 2019-01-20 07:03:32Z) - TGba is unable to reach consensus on a resolution". The reject reason is wrong because the group hasn't discussed this comment. Please resolve CID 1154 again. | As in comment. | Rejected.  This is invalid comment since the comment should be on 802.11ba D2.0 and not on 802.11ba D1.0 since the previous letter ballot on D1.0 failed.  Response to the commenter: CID 1154 from the previous letter ballot reads: “What is a mandatory requirement of the WUR PPDU transmission?  The spec describes too many implementation dependent issues.  Please clearly specify the requirement with "shall" sentence.  And, remove other implementation dependent texts.”  The WUR transmit specification is defined in subclause 31.2.12 WUR transmit specification with “shall” sentences. |
| 2798 | Yunsong Yang | 6.5.4 | 33 | 65 | WUR has unique PHY operational parameters, therefore, should affect 6.5.4 PLME-CHARACTERISTICS.confirm. | Amend 6.5.4 by adding WUR PHY operational parameters in the cited primitive. | Rejected.  802.11ba D2.1 only has the following parameters defined in 31.3.2: aCCAMidTime, aPPDUMaxTime, aPSDUMaxLength, and aRxPHYStartDelay. The four parameters are already included in PLME-CHARACTERISTICS.confirm in 6.5.4.2. Therefore, there is no need to amend 6.5.4. |

**TGba Editor: *Change the subclauses below in TGba Draft 2.1 as follows:***

**30. Wake-Up Radio (WUR) MAC specification  
30.1 Introduction**

(#2392)

A WUR STA supports the MAC and MLME functions defined in Clause 30 in addition to the MAC functions defined in Clause 10, the MLME functions defined in Clause 11, the security functions defined in Clause 12, and the HE MAC functions defined in Clause 26 if a WUR STA is an HE STA except when the functions in Clause 30 supersede the functions in Clause 10, Clause 11, Clause 12 or Clause 26. (#2392)

**TGba Editor: *Change the following sentence in TGba Draft 2.1 P69L20 as follows:***

A WUR AP that transmits a WUR PPDU shall include a WUR frame in the WUR PPDU as defined in 31.2.2 (WUR PPDU format). (#2038, 2571)

**TGba Editor: *Insert the following subclause after 30.1 in TGba Draft 2.1 P69L23 as follows: (#2264)***

**30.1a WUR channel, WUR primary channel, and WUR discovery channel**

WUR channel is a channel in which a WUR AP transmits WUR Wake-up frames to an associated WUR non-AP STA.

WUR primary channel is a channel in which a WUR AP transmits WUR Beacon frames (see 30.5.2 WUR Beacon generation). The WUR primary channel is indicated in the WUR Operating Class and the WUR Channel subfields in the WUR Operation element contained in a Beacon, Association Response, Reassociation Response, or Probe Response frame transmitted by the WUR AP.

When the WUR FDMA Channel Switching Support subfield of the WUR Capabilities Information field of the WUR Capabilities element is set to 0, the WUR channel is equal to the WUR primary channel. Otherwise, the WUR channel may be different from the WUR primary channel (see 30.10 WUR FDMA operation).

WUR discovery channel is a channel in which a WUR AP transmits WUR Discovery frames. The WUR discovery channel may be indicated in a WUR Discovery element in Beacon and Probe Response frames (see 30.11 WUR Discovery operation). WUR discovery channel may be different from the WUR channel and the WUR primary channel.

NOTE—WUR primary channel can be different from the primary channel of the BSS.

**30.2 Channel access**

**TGba Editor: *Change the following sentence in TGba Draft 2.1 P63L28 as follows: (#2572)***

Before a WUR AP transmits a WUR frame, the WUR AP shall contend for the medium as defined in 10.24.2 (HCF contention based channel access (EDCA)) and 10.3.2 (Procedures common to the DCF and EDCAF) except that:

* Table of time and length characteristics

**TGba Editor: *Change the following table in TGba Draft 2.1 P122L9 as follows:***

|  |  |
| --- | --- |
| * WUR PPDU Time and Length Characteristics | |
| Characteristics | Value |
| aCCAMidTime (#2113) | 25 µs |
| aPPDUMaxTime | 2968 µs |
| aPSDUMaxLength | 22 octets (see NOTE 1) |
| aRxPHYStartDelay | 88 µs (see NOTE 2) |
| NOTE 1—This is the maximum length in octets for a WUR PPDU with LDR.  NOTE 2—This value arises from the time to the end of the WUR-Sync field with HDR. | |

**31.2.4 Transmitter block diagram**

**TGba Editor: *Change the following table in TGba Draft 2.1 P97L9 as follows:***

Figure 31-4 (An example of a WUR signal generator for the WUR-Sync field), Figure 31-5 (An example of a WUR signal generator for the WUR-Data field(#2665)), and 31.2.4.1 (WUR PPDU waveform generation for WUR-Sync field and high data rate WUR-Data field) through 31.2.4.4 (Symbol Randomizer and Perantenna Cyclic Shift) show an example of transmitter block diagram for the WUR-Sync field and the WURData field. The actual waveform generation of theses fields is implementation dependent. The waveform generation for L-STF, L-LTF, and L-SIG fields is described in 21.3.3 (Transmitter block diagram). The waveform generation for the BPSK-Mark field is same as the waveform generation for the L-SIG field.(#2616)

**Annex B**

**TGba Editor: *Change the following table in TGba Draft 2.1 as follows:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * WUR PHY features | | | | |
| Item | Protocol capability | References | Status | Support |
|  | Are the following PHY protocol features supported? |  |  |  |
| WURP1 | PHY operating modes |  |  |  |
| WURP1.1 | Operation according to Clause 17  (Orthogonal frequency division multiplexing (OFDM) PHY specification) | 31.1 (Introduction) | CFWUR:M | Yes  No  N/A  |
| WURP2 | WUR PPDU format |  |  |  |
| WURP2.1 | WUR PPDU with 20 MHz channel width, LDR, and single stream | 31.1 (Introduction), 31.2.2 (WUR PPDU format) (#2644) | CFWUR:M | Yes  No  N/A  |
| WURP2.2 | WUR preamble | 31.2.9 (WUR preamble) | CFWUR:M | Yes  No  N/A  |
| WURP2.3 | WUR-Data field | 31.2.10 (WUR-Data field) | CFWUR:M | Yes  No  N/A  |
| WURP3 | WUR FDMA PPDU | 31.1 (Introduction), 31.2.3 (WUR FDMA PPDU format) (#2645) | CFWUR:O | Yes  No  N/A  |
| WURP4 | WUR encoding for the Data field | 31.2.10.2 (WUR-Data field for low data rate and high data rate) | CFWUR:M | Yes  No  N/A  |