IEEE P802.11
Wireless LANs

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| CR for WUR frame format (part 1) |
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Abstract

This submission proposes resolutions for comments related to TGba D1.0 with the following CIDs (15 CIDs):

* 97, 398, 400, 496, 527, 617, 618, 722, 797, 798, 799, 1176, 1177, 1178, 1179

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Minor editorial changes
* Rev 2: Incorporated to Alfred’s suggestions
* Rev 3: Incorporated to Rojan’s suggestion regarding WUR scanning

***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 TGax 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** | **Comment** | **Proposed Change** | **Resolution** |
| 617 | Mark RISON | 49.39 | "Each identifier can be a transmit ID, which is obtained from the compressed BSSID, group ID, or a WUR ID." -- it is not clear whether this is saying that the transmit ID is obtained from the compressed BSSID, GID or WURID; or whether this is saying that the identifier can be one of a transmit ID (obtained from compressed BSSID), GID or WURID" | If the former, split into two sentences. If the latter, put the "which" subclause in parentheses | REVISEDAgree in principleHowever, the cited text is removed in D1.1No change is required for this comment |
| 400 | James Lepp | 49.44 | Already confused about the CRC here. Is it the CRC defined in 11ba, or the CRC defined in the base spec? |  | REJECTEDThe current text already clarifies that the CRC calculation follows the baseline spec with a reference. |
| 97 | Alfred Asterjadhi | 49.42 | The 12 bits of the OUI is missing here. Please add it. Also list the WUR frames that make use of each of the identifiers, or exclusions there in for the following subclauses. | As in comment. | REVISED Agree in principle with the comment.However, it is unnecessary to list all the use cases of the identifiers, as it is already defined clause 9. The proposed resolution is to add a reference to the subclause where the selection of the portion of the OUI is defined TGba editor to make the changes shown in 11-18/1873r2 under all headings that include CID 97. |
| 496 | Joseph Levy | 49.34 | There is no need to define the elements or fields of the WUR PPDU, as these are already defined in clause 9, clause 9 should be referenced here. A statement simply saying the format of the WUR PPDU is defined in 9.10 all that is necessary. Formats should not be specified more than once and should only be specified in clause 9. | Remove redundant WUR PPDU frame format information. | REVISED Disagree in principle with the comment.Clause 9 defines what the ID field contains. This subclause defines how the identifiers are computed by the AP and defines whether a frame is individually addressed, group addressed or broadcast depending on what identifier the frame contains.The proposed resolution is to clarify further these subclauses so that this is clear. TGba editor to make the changes shown in 11-18/1873r2 under all headings that include CID 496. |
| 398 | James Lepp | 49.53 | ""A WUR frame with transmit ID in the Address field is a broadcast WUR frame"". This statement is true, but it isn't useful. It isn't the value of the Transmit ID field that indicates the frame is a broadcast frame." | Explain what in a WUR Frame indicates the 12 bit address field contains a transmit ID. Does this only apply if WUR frame type = 0, or is there another case? This isn't described anywhere. | REVISEDDisagree in principle with the comment. The STA knows the identifier to which it is interested, which at a minimum are the transmit ID, and its WUR ID. These are either directly assigned by the AP to the STA or the STA derives from the compressed BSSID. The statement cited in the comment is useful as it helps the reader identify what a broadcast WUR frame is. Clause 9 does provide some details on the categorization for the WUR Wake Up frame but that does not apply to all the WUR frames, which is the case in this subclause.The proposed resolution is to further clarify that a broad cast WUR frame is defined by the transmitter ID in the ID field.TGba editor to make the changes shown in 11-18/1873r2 under all headings that include CID 398. |
| 527 | Lei Huang | 49.54 | WUR Discovery frame is a pre-association frame and also has transmit ID in the Address field. | Change "A WUR frame with transmit ID in the Address field is a broadcast WUR frame that is addressed to all the WUR STAs that are associated with the transmitting AP." to "A WUR Wake-up frame with transmit ID in the Address field is a broadcast WUR frame that is addressed to all the WUR STAs that are associated with the transmitting AP. A WUR Discovery frame with transmit ID in the Address field is a broadcast WUR frame that is addressed to all the WUR STAs that are not necessarily associated with the transmitting AP." | REVISED Agree in principle with the comment. Proposed resolution accounts for the suggested changes.TGba editor to make the changes shown in 11-18/1873r2 under all headings that include CID 527. |
| 618 | Mark RISON | 49.52 | "A WUR frame with transmit ID in the Address field is a broadcast WUR frame that is addressed to all the WUR STAs" -- this seems to be missing something" | Add "all-ones" before "transmit ID" | REJECTEDTransmitter ID is an identifier selected in such a way that it minimizes the probability that two WUR APs have the same transmitter ID value, and is obtained from the compressed BSSID (see 31.3.1). Specifying that the transmitter ID is all ones means that all WUR STAs associated with any WUR AP need to parse and decode all all-ones WUR frames in their surrounding, which leads to increased power consumption and reduced opportunities to correctly receive the WUR frames that are actually addressed to them. |
| 722 | Minyoung Park | 50.43 | The following sentence is not clear whether this applies to any WUR Wake-up frame: "A WUR AP that generates a WUR Wake-up frame that contains a Frame Body field with one or more STA Info fields shall order the STA Info fields so that the WUR IDs appear in increasing order. The AP shall not include the WUR ID of a WUR STA that does not support reception of VL WUR frames (see 9.4.2.274 (WUR Capabilities element))."Replace this paragraph as follows:"A WUR AP that generates a WUR Wake-up frame that contains a Frame Body field with one or more STA Info fields shall set the Address field to 0 and shall order the STA Info fields so that the WUR IDs appear in increasing order. The AP shall not include the WUR ID of a WUR STA that does not support reception of VL WUR frames (see 9.4.2.274 (WUR Capabilities element))." | As shown in the comment. | REVISEDAgree in principle with the comment.“A WUR Wake-up frame that contains a Frame Body field with one or more STA Info fields” is equivalent to a VL WUR Wake-up frame.In addition, the cited parahgraph describes the normative behavior of an WUR AP when it intends to generate a VL WUR Wake-up frame.The proposed resolution is to rephrase the text to specify “VL Wake-up frame”, and move the text to 31.7.2TGba editor to make the changes shown in 11-18/1873r2 under all headings that include CID 722. |
| 797 | Patrice Nezou | 49.57 | The transmit ID is built only from the 12 MSBs of the compressed BSSID. In a dense environment, some APs may have the same transmit ID. | Please define a procedure to detect the usage of the same Transmit ID by multiple APs or other mechanism to assign a unique transmit ID to each AP. | REJECTEDThe chance of having duplicated transmit ID is extremely low (~0.0002). In case of duplication, WUR STA still can check the validity of a received WUR frame using the hidden BSSID information preventing false wake-up.Moreover, changing the transmit ID requires all WUR STAs in WUR Mode to wake-up, also affects WUR identifier assignment.The proposed resolution is not to define additional procedure for this comment, considering the complexity and the limited. |
| 798 | Patrice Nezou | 49.57 | The transmit ID is built only from the 12 MSBs of the compressed BSSID. In a dense environment, some APs may have the same transmit ID. | Please define a procedure at the non-AP STA side to warn the AP that its transmit ID is already in use by another AP. | REJECTEDThe chance of having duplicated transmit ID is extremely low (~0.0002). In case of duplication, WUR STA still can check the validity of a received WUR frame using the hidden BSSID information preventing false wake-up.Moreover, changing the transmit ID requires all WUR STAs in WUR Mode to wake-up, also affects WUR identifier assignment.The proposed resolution is not to define additional procedure for this comment, considering the complexity and the limited usage. |
| 799 | Patrice Nezou | 50.3 | "WUR AP shall assign to each WUR STA a WUR ID that uniquely identifies the WUR STA within the BSS of the AP. The AP shall either select the WUR ID randomly from the identifier's space or calculate the WUR ID as AID + transmit ID, where the AID is the association identifier of the STA, the transmit ID is defined in 31.3.2 (Transmit ID) and the addition performed between the two identifiers is circular modulo 212."  The AID of a STA and the transmit ID of an AP are not unique. So there may be some overlappings that create collisions and wake up WUR STAs for nothing. | please define a procedure to reallocate a WUR ID to a WUR STA if some collisions are detected | REJECTEDAs the range of the identifier space is 0 to 4095, WUR ID collision is unavoidable. If we allow STAs to report collision and request reassignment, STAs might wake-up and report collision via PCR repeatedly that might dominate the power consumption of the STAs. Even with duplicated WUR ID, STA can still check the validity of a received WUR frame using the hidden BSSID information preventing false wake-up.The proposed resolution is not to define an additional procedure for this comment, considering the complexity and the limited usage. |
| 1176 | yujin noh | 50.25 | WUR frame and WUR PPDU are mixed in use. If needed, fix it to be consistent through the spec. | as in comment | REJECTEDWUR frame is a MAC layer frame without WUR-SYNC field. No change is required for this comment |
| 1177 | yujin noh | 50.22 | Clarify WID and WUR ID properly with when or how to use. Taking a look at the spec, currently WUR ID identifies the WUR STA while WID identifies WUR non-AP STA. Make sure whether it is intentional. In this way, WID is part of WUR ID or the same. If needed, WUR STA could be classified to WUR non-AP STA further in this subclause | as in comment | REVISEDAgree in principle with the comment.Already covered by the proposed resolution of CID 1073 and 1077 in 11-18/1847r1No change is required for this comment.  |
| 1178 | yujin noh | 50.22 | WUR AP and AP are minxed in use in 31.3.4. fix it to be consistent | as in comment | REVISEDAgree in principleAlready fixed in D1.1No change is required |
| 1179 | yujin noh | 50.22 | WUR STA and STA are minxed in use in 31.3.4. fix it to be consistent | as in comment | REVISEDAgree in principleAlready fixed in D1.1No change is required |

**Discussion: None**

* Setting the identifiers of WUR frames
* General

**TGba Editor: *make the following changes of this clause***

The ID field of WUR frames contains an identifier (ID) that is selected from the range 0 to 4095 (see 9.10.2.2 (ID field)). *(#496)* A WUR AP ensures that each identifier is either a transmitter ID (see 31.3.2 (Transmitter ID)) , group ID (see 31.3.3 (Group ID)), a WUR ID (see 31.3.4 (WUR ID)), or a portion of the OUI (see 9.10.3.4 (WUR Vendor Specific frame format)).*(#97)*

* Transmitter ID

**TGba Editor: *make the following changes of this clause***

A transmitter ID identifies the WUR AP transmitting the WUR frame. A WUR frame with transmitter ID in the ID field is defined as a broadcast WUR frame that is addressed to either all the WUR non-AP STAs that are associated with the transmitting WUR AP or to all the WUR non-AP STAs that are performing WUR scanning to discover the transmitting WUR AP. *(#398, 496, 527)*

* Group ID

**TGba Editor: *make the following changes of this clause***

A group ID identifies a group of one or more WUR non-AP STAs and is selected from a group ID space, which is a subset of consecutive values obtained from the identifier’s space. A WUR frame with group ID in the ID field is defined as a group addressed WUR frame that is addressed to all the WUR non-AP STAs identified by that group ID. *(#496)*

* WUR ID

**TGba Editor: *make the following changes of this clause***

A wake-up radio (WUR) ID identifies the WUR non-AP STA that is the intended recipient of the WUR frame. A WUR frame with a WUR ID in the ID field is defined as an individually addressed WUR frame that is addressed to the WUR non-AP STA identified by that WUR ID. *(#496)*

**TGba Editor: *delete the following paragraph of this clause***

 *(#722)*

* Wake-up Operation
* WUR AP Operation

**TGba Editor: *add the following paragraph after the note of the second paragraph in this clause***

A WUR AP that generates a VL WUR Wake-up frame with one or more STA Info fields shall order the STA Info fields in the Frame Body field so that the WUR IDs appear in increasing order. The WUR AP shall not include the WUR ID of a WUR non-AP STA that does not support reception of VL WUR frames. (see 9.4.2.273 (WUR Capabilities element)). *(#722)*