IEEE P802.11
Wireless LANs

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| Comment Resolutions on WUR Capability element |
| Date: 2019-05-13 |
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Abstract

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

* 16 CIDs: 2115, 2138, 2157, 2165, 2259, 2443, 2444, 2507, 2596, 2658, 2718, 2719, 2720, 2721, 2787, 2800

R0: Original text

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.***

# Capability Element

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 2115 | 41.47 | 9.4.2.290 | 802.11ba will complete after 802.11ax. 802.11ax will introduce the 6 GHz band. Why doesn't 802.11ba mention 6 GHz? | Add 6 GHz | Rejected. IEEE 802.11ba is independent TG from IEEE 802.11ax.Regulation for 6 GHz band is not yet finalized. Also, based on the TGba functional requirement document (11-17/39r2), TGba shall define operations for 2.4 GHz and 5 GHz bands, not 6 GHz. 6 GHz band for WUR may be considered later amendment. |
| 2138 | 41.59 | 9.4.2.290 | We have two PHY rates today, and might have more in the future. Suggest to add a Supported WUR Rates field to the WUR Capabilities element. | Add a Supported WUR Rates field to the WUR Capabilities Element. Field is a bitmap of 8 bit length. First bit indicates support for 62.5, second bit indicates support for 250, third to final bits are all reserved for future use. | Rejected.We don’t have any agreement on adding more PHY rates. It does not seem necessary to prepare in advance for adding PHY rates. |
| 2157 | 41.59 | 9.4.2.290 | Bit 12 of the WUR capabilities Information Field isn't used anywhere. Need to clarify in 30.8.1 that this capability bit is used by the AP. | There is a sentence in 30.8.1, but it should be made more clear by expanding it to the following to actually explain the AP uses the received capability bit in its decision. "A WUR AP shall not send a WUR Wake-up frame to associated WUR non-AP STA(s) with data rate that is not supported by the WUR non-AP STA(s) as indicated in the WUR Capabilities Information Field (see 9.1.2.290)." | Revised.Agreed in priciple.That sentence is revised to be more clear.TGba editor please make the changes as shown in 11-19/0741r4 |
| 2165 | 43.36 | 9.4.2.290 | Although the 11ba functional requirement doesn't mention 6GHz band, the current 11ba can be operated in 6GHz without any big spec changes. It just need a 6GHz support indication in WUR Capability element. There might exist 6GHz only AP or 6 GHz only STA in near future. For them, 11ba should be supported in 6GHz. | Use 1 bit in Supported Bands field for indicating the 6GHz band support | Rejected. Regulation for 6 GHz band is not yet finalized. Also, based on the TGba functional requirement document (11-17/39r2), TGba shall define operations for 2.4 GHz and 5 GHz bands, not 6 GHz. 6 GHz band for WUR may be considered later amendment. |
| 2259 | 41.25 | 9.4.2.290 | It is a bit strange to say a certain field is transmitted by a WUR AP. | P41L25: change "If the Supported Bands field is transmitted by a WUR AP" to "If the WUR Capabilities element is transmitted by a WUR AP"P41L29: change "If the Supported Bands field is transmitted by a WUR non-AP STA" to "If the WUR Capabilities element is transmitted by a WUR non-AP STA" | Accepted. |
| 2443 | 43.06 | 9.4.2.290 | The support of the transmission of 20 MHz WUR PPDU at HDR for WUR AP should be optional and therefore there needs to be a signaling for that. The 20 MHz WUR PPDU with HDR Support field should be used for indicating the capability to transmit 20MHz WUR PPDU at HDR. | In the definition box, delete "the reception of". Change the encoding box as follows:"For a WUR non-AP STA:- Set to 1 to indicate support for the reception of20 MHz WUR PPDU with HDR. Set to 0otherwiseFor a WUR AP:- Set to 1 to indicate support for the transmission of 20 MHz WUR PPDU with HDR. Set to 0otherwise" | Rejected.Transmission of 20 MHz WUR PPDU at HDR for WUR AP is mandatory. (see 4.3.15a (Wake-up radio (WUR) STA)) |
| 2444 | 43.13 | 9.4.2.290 | The WUR FDMA support is optional for the WUR AP as well. Therefore, there needs to be a way to indicate whether the WUR AP supports WUR FDMA or not. A WUR non-AP STA should support the WUR FDMA channel switching capability if it supports the WUR FDMA, therefore the field doesn't need to specify for the channel switching capability but should be used to indicate the WUR FDMA support capability. | Change Subfield box "WUR FDMA Channel Switching Support" to "WUR FDMA Support".Change the definition box as follows: "Indicates whether the WUR FDMA is supported or not (see 30.10 (WUR FDMA operation)).Change the encoding box as follows:"For a WUR non-AP STA:-- Set to 0 if the WUR FDMA is not supported.-- Set to 1 if the WUR FDMA is supported" | Revised.Agreed in priciple.Subfield name and definition are changed as suggested. Encoding has been modified with consistency with other subfields. “For a WUR non-AP STA” is deleted, because definition covers both STA and AP side.TGba editor please make the changes as shown in 11-19/0741r4 |
| 2507 | 41.38 | 9.4.2.290 | Has there been any discussion to extend the operation of WUR to 6 GHz band? | Add 6 GHz band to the list. | Rejected.Regulation for 6 GHz band is not yet finalized. Also, based on the TGba functional requirement document (11-17/39r2), TGba shall define operations for 2.4 GHz and 5 GHz bands, not 6 GHz. 6 GHz band operation for WUR may be considered later amendment. |
| 2596 | 41.30 | 9.4.2.290 | "WUR operating channel" is not defined | Change "WUR Operating channel" to "WUR channels". | Accepted. |
| 2658 |  | 9.4.2.290 | The scope of the project in the PAR says "The WUR is a companion radio to the primary connectivity radio and meets the same range requirement as the primary connectivity radio." If the band of the WUR operation can be different from the band where the WUR non-AP STA exchanges non-WUR PPDUs with the WUR AP, how can the above requirement be achieved? This question relates to the usage of the Supported Bands field. I can understand if one of the WUR operating band is the same with where the WUR non-AP STA exchanges non-WUR PPDUs and if the Supported Bands field informs the WUR operating bands other than that. | Justify the usage of the Supported Bands field. | Rejected.If a WUR AP wants to have same range between PCR and WUR, it may use same band for PCR and WUR. However, band selection is implementation issue. How to use the Supported Bands field does not seem to need to be described more.  |
| 2718 | 42.11 | 9.4.2.290 | Without the mention of PCR, it is really rather unclear what transition from the doze state to the awake state means. There is no clear definition of doze state in RevMD, but imply it cannot transmit or receive frames. It is unclear whether that will include WUR PPDUs. Doze state needs to be clearly redefined if PCR is removed. | Either clear define what a doze state is; or revert to the two components designs with revisions to address the concerns raised before | Revised.Subclause 11.2.1 General in RevMD describes Doze/Awake state. So the reference is added.  TGba editor please make the changes as shown in 11-19/0741r4 |
| 2719 | 42.47 | 9.4.2.290 | For a WUR AP, if it supports VL frames, does it also need to support one group ID? And will need to assign the one group ID for VL frames? | please clarify whether AP supporting VL frame should support one group ID and if so, please revise the support field indication accordingly. | Revised.Description for value 0 for the AP side is modified to clarify. TGba editor please make the changes as shown in 11-19/0741r4 |
| 2720 | 43.18 | 9.4.2.290 | Would WUR wake up frames be transmitted on multiple WUR channels for a particular WUR STA? If not, then "in different WUR channels from the WUR primary channel" should be changed to "in a different WUR channel from the WUR primary channel". | as in comment. | Revised.The definition of WUR FDMA Support subfield has been changed. The sentence has been modified as simply as possible and commented part has been deleted.  |
| 2721 | 43.14 | 9.4.2.290 | The rest of the table seems to discuss the value of "1" first and then "0". It should be reversed for this row. | as in comment. | Revised.Agreed in priciple.Encoding has been modified with consistency with other subfields.TGba editor please make the changes as shown in 11-19/0741r4 |
| 2787 | 41.30 | 9.4.2.290 | "...If the Supported Bands field is transmitted by a WUR non-AP STA, then the Supported Bands field indicates the supported bands for the WUR operating channel. The format of the Supported Bands field is shown in Figure 9-772b ( Supported Bands field format)."For the WUR operation in 6 GHz, please add 6 GHz to the Supported Bands field. | As in comment. | Rejected.Regulation for 6 GHz band is not yet finalized. Also, based on the TGba functional requirement document (11-17/39r2), TGba shall define operations for 2.4 GHz and 5 GHz bands, not 6 GHz.6 GHz band for WUR may be considered later amendment. |
| 2800 | 41.25 | 9.4.2.290 | The word "If" makes the sentence on L25 sounds like that the AP can choose not to transmit the Supported Bands field at all. "When" would be better to avoid mis-interpretation. | Change both "If" on L25 and L28 to "When". And delete both "then" on L25 and L28. | Accepted. |

**9.4.2.290 WUR Capabilities element**

**TGba Editor: Modify the 3rd and 4th paragraphs as follows [2259, 2596, 2800]:**

When the WUR Capabilities element is transmitted by a WUR AP, the Supported Bands field is reserved.

When the WUR Capabilities element is transmitted by a WUR non-AP STA, the Supported Bands field indicates the supported bands for the WUR channels. The format of the Supported Bands field is shown in Figure 9-772b ( Supported Bands field format).

**TGba Editor: Modify of Figure 9-772c as follows [2444]:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 | B9 B10 | B11 | B12 | B13 | B14 B15 |
|  | Transition Delay | VL WUR Frame Support | WUR Group IDs Support | Protected WUR Frame Support | 20 MHz WUR PPDU with HDR Support | WUR FDMA Support | Reserved |
| Bits: | 8 | 1 | 2 | 1 | 1 | 1 | 2 |

**Figure 9-772c—WUR Capabilities Information field format**

**TGba Editor: Modify of Table 9-318f as follows [2444, 2718, 2719, 2721]:**

**Table 9-318f—Subfields of the WUR Capabilities Information field**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Transition Delay | Indicates the maximumtime that the non-AP STA requires to transition from the doze state to awake state. (see 11.2.1 (General)). | The indicated value is equal to 256\*(value of the field plus 1) μs. Reserved for a WUR AP. |
| VL WUR Frame Support | Indicates support for VL WUR frame. | For a WUR non-AP STA:* Set to 1 to indicate support for the receeption of VL WUR frame. Set to 0 otherwise.

For a WUR AP* Set to 1 to indicate support for the transmission of VL WUR frame. Set to 0 otherwise.
 |
| WUR Group IDs Support | Indicates Group IDs support. | For a WUR non-AP STA:* Set to 0 to indicate no support for WUR group IDs if the VL WUR Frame Support subfield is 0 and to indicate support for single WUR group ID when the VL WUR Frame Support subfield is 1.
* Set to 1 to indicate support for up to 16 WUR group IDs.
* Set to 2 to indicate support for up to 32 WUR group IDs.
* Set to 3 to indicate support for up to 64 WUR group IDs.

For a WUR AP:* Set to 0 to indicate no support for WUR group IDs if the VL WUR Frame Support subfield is 0 and to indicate support for single WUR group ID when the VL WUR Frame Support subfield is 1.
* Set to 1 to indicate support for WUR group IDs
 |
| Protected WUR Frame Support | Indicate support for protected WUR frame. | For a WUR non-AP STA:* Set to 1 to indicate support for the reception of protected WUR frame. Set to 0 otherwise.

For a WUR AP:* Set to 1 to indicate support for the transmission of protected WUR frames. Set to 0 otherwise.
 |
| 20 MHz WUR PPDU with HDR Support | Indicate support for the reception of 20 MHz WUR PPDU with HDR. | Set to 1 to indicate support for the reception of 20 MHz WUR PPDU with HDR. Set to 0 otherwise. Reserved for a WUR AP. |
| WUR FDMA Support | Indicates whether the WUR FDMA is supported or not (see 30.10 (WUR FDMA operation)). | For a WUR non-AP STA:* .
* Set to 1 if the WUR FDMA channel switching capability is supported. Set to 0 otherwise.

For a WUR AP:* Set to 1 if the transmission of WUR FDMA PPDU is supported. Set to 0 otherwise.
 |

30.7 WUR power management procedure

**30.7.2 WUR mode setup**

**TGba Editor: Modify of 10th paragraph as follows [2444]:**

A WUR non-AP STA may indicate in the WUR Mode element its recommendation on which WUR channel to assign for itself if the WUR FDMA Support subfield in the WUR Capabilities element sent by the WUR non-AP STA is set to 1; otherwise, the WUR non-AP STA shall not recommend a WUR channel. The WUR non-AP STA may indicate in the WUR Mode element its recommendation on which data rate (LDR or HDR) to use for individually or group addressed WUR wake-up frames transmitted to the WUR non-AP STA if the 20MHz WUR PPDU with HDR Support subfield in the WUR Capabilities ele­ment sent by the WUR non-AP STA is set to 1; otherwise, the WUR non-AP STA shall not recommend a WUR data rate. The WUR non-AP STA should avoid repeatedly renegotiating WUR power management with the same recommended WUR parameters in the WUR Mode element for the remainder of the associa­tion if the WUR AP doesn’t use the recommended value(s) from the WUR non-AP STA.

30.8 Wake-up Operation

**30.8.1 General**

**TGba Editor: Modify the 3rd and 4th paragraph as follows [2157]:**

A WUR AP shall not send a WUR Wake-up frame with HDR to associated WUR non-AP STA(s) that does not support HDR, as indicated by the 20 MHz WUR PPDU with HDR Support subfield in the WUR Capabilities element sent by the WUR non-AP STA(s).

30.10 WUR FDMA operation

**TGba Editor: Modify the 1st , 2nd, 3rd and 4th paragraphs as follows [2444]:**

A WUR non-AP STA whose dot11WURFDMAChannelSwitchImplemented is false shall set the WUR FDMA Support subfield of the WUR Capabilities Information field of the WUR Capabilities element to 0.

A WUR non-AP STA whose dot11WURFDMAChannelSwitchImplemented is true shall set the WUR FDMA Support subfield of the WUR Capabilities Information field of the WUR Capabilities element that it transmits to 1.

If a WUR AP receives from a WUR non-AP STA a WUR Capabilities element of which the WUR FDMA Support subfield of the WUR Capabilities Information field is equal to 0, the WUR AP shall set the WUR Channel Offset subfield of the WUR Parameters field of the WUR Mode element to 0.

If a WUR AP receives from a WUR non-AP STA a WUR Capabilities element of which the WUR FDMA subfield of the WUR Capabilities Information field is equal to 1, the WUR AP may set the WUR Channel Offset subfield of the WUR Parameters field of the WUR Mode element that it transmits to a nonzero value as defined in Table 9-321d (Subfields of WUR Parameters field from WUR AP), subject to the following constraints:

—The negotiated WUR duty cycle schedule does not overlap with the TWBTTs at which the WUR AP schedules transmission of WUR Beacon frames, except for the case when the value indicated in the On Duration subfield of the WUR Parameters field in the WUR Mode element received from the WUR non-AP STA is equal to the value indicated in the Duty Cycle Period subfield

—The WUR AP shall not transmit in the WUR secondary channel and WUR secondary 40 MHz channel any WUR frame addressed to the WUR non-AP STA for aPPDUMaxTime defined in Table 31-12 (WUR PPDU Time and Length Characteristics) from the TWBTTs.