IEEE P802.11  
Wireless LANs

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| **TGba D1.0 Comment Resolutions for 32.2.9 WUR-Data Field** |
| **Date:** 2018-11-12 |
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Abstract

This submission proposes resolutions for comments of TGba D1.0 with the following CIDs:

* 165, 196, 199, 213, 265, 266, 267, ~~676~~, 677, 751

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGba D1.0 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 165, 677, 265, 196, 213, 199, 266, 267, 751*

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 165 | 32.2.9.2 | 84.26 | "The other coefficients are selected from BPSK, QPSK, 16-QAM, 64-QAM, or 256-QAM."- what does this mean? Any value can be chose? Coefficients of what? In what modulation formula they appear | If the intent is that carriers outside the -6..6 band may be modulated by random coefficient with the quoted modulation types. Otherwise giant spurious signals may be generated | Revised-  Agree in principle with the commenter. Delete paragraph in 84.22 ~ 84.28 and refer to section 32.2.7, 32.2.3.1 and 32.2.3.2 for waveform generation.  TGba editor to make the changes shown in 11-18/1862r1. |
| 677 | 32.2.9.2 | 84.26 | The text reads "The other coefficients are selected from BPSK, QPSK,16-QAM, 64-QAM, or 256-QAM" It is unclear what is the purpose of the word "other", I believe it is a typo | Remove the word "other". Change the sentence to " The coefficients are selected from BPSK, QPSK, 16-QAM, 64-QAM, or 256-QAM" | Revised-  Agree in principle with the commenter. Delete paragraph in 84.22 ~ 84.28 and refer to section 32.2.7, 32.2.3.1 and 32.2.3.2 for waveform generation.  TGba editor to make the changes shown in 11-18/1862r1. |
| 265 | 32.2.9.2 | 84.27 | 1024 QAM was adopted as an optional feature in 11ax, and thus, WUR can also consider supporting it. | Change the sentence as follows:  "The other coefficients are selected from BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, or 1024-QAM." | Rejected-  The baseline is 11ac. We don’t have to use 1024-QAM which is complicated. |
| 196 | 32.2.9.2 | 84.14 | Remove " The MC-OOK symbol corresponding to each input bit for WUR-LDR ... SymHDROff and SymLDROn denote OFF and ON symbols with 2 ╬╝s duration for WUR HDR, respectively.". since Table 32-8 and 32-9 already maps the information to the codebits. Here the text only needs to discuss how to map the coded bits to waveform | as in the comment | Revised-  Delete the corresponding sentences and the tables. But, add the definition of “SymLDROn”, “SymLDROff”, “SymHDROn”, and “SymHDROff” because those terms are used in the spec.  TGba editor to make the changes shown in 11-18/1862r1. |
| 213 | 32.2.9.2 | 84.00 | We should be consistent with SymHDROn and SymHDROff | Replace the table entries "[SymHDROn, SymHDRoff]" with "[SymHDROn, SymHDROff]" and "[SymHDROff, SymHDRon]" with "[SymHDROff, SymHDROn]" | Revised-  Agree in principle with the commenter. Delete Table 32-10 and 32-11 because those tables are duplicated. Table 32-8 and 32-9 already map the information to the encoded bits.  TGba editor to make the changes shown in 11-18/1862r1. |
| 199 | 32.2.9.2 | 84.50 | It is not clear how the SymLDROn or SymHDR is generated. Need to either add equation or refer ot other sections. | as in the comment | Revised-  Agree in principle with the commenter. Delete paragraph in 84.22 ~ 84.28 and refer to section 32.2.7, 32.2.3.1 and 32.2.3.2 for waveform generation.  TGba editor to make the changes shown in 11-18/1862r1. |
| 266 | 32.2.9.2 | 84.28 | Detailed procedure regarding how to construct SymLDRon and SymHDRon is missing. | Describe the detailed procedure to construct SymLDRon and SymHDRon. | Revised-  Agree in principle with the commenter. Delete paragraph in 84.22 ~ 84.28 and refer to section 32.2.7, 32.2.3.1 and 32.2.3.2 for waveform generation.  TGba editor to make the changes shown in 11-18/1862r1. |
| 267 | 32.2.9.2 | 84.51 | There is no description for the WUR-Data field in a FDMA transmission. | Describe the detailed procedure to construct WUR-Data field for a FDMA transmission. | Revised-  Agree in principle with the commenter. Refer to Section 32.2.3.3 to describe how to generate waveform for a FDMA transmission.  TGba editor to make the changes shown in 11-18/1862r1. |
| 751 | 32.2.9.2 | 84.23 | "can be" is not a normative text in the following sentence: "SymLDROn, SymLDROff, SymHDROn, SymHDROff symbols can be constructed by populating contiguous 13 subcarriers. "  Please replace "can be" with "is" in the sentence. | As shown in the comment. | Revised-  Agree in principle with the commenter. Delete paragraph in 84.22 ~ 84.28 and refer to section 32.2.7, 32.2.3.1 and 32.2.3.2 for waveform generation.  TGba editor to make the changes shown in 11-18/1862r1. |

*TGba Editor: Please make the following changes (in red) in 32.2.9.2 WUR-Data field for Low Data Rate and High Data Rate of D1.0:*

**32.2.9.2 WUR-Data field for Low Data Rate and High Data Rate**

The WUR-Data field shall be encoded by Manchester-based encoding. Encoded bits corresponding to each input bit are shown in Table 32-8 (Manchester-based encoded bits for WUR LDR) and Table 32-9 (Man­chester-based encoded bits for WUR HDR) for WUR LDR and WUR HDR, respectively.

**32-8 – Manchester-based encoded bits for WUR LDR**

|  |  |
| --- | --- |
| **Input bit** | **Encoded bits** |
| 0 | 1010 |
| 1 | 0101 |

**32-9 – Manchester-based encoded bits for WUR HDR**

|  |  |
| --- | --- |
| **Input bit** | **Encoded bits** |
| 0 | 10 |
| 1 | 01 |

The encoded binary data shall be modulated using MC-OOK, i.e., encoded bits 0 and 1 shall be represented by OFF and ON symbols, respectively. The duration of the MC-OOK symbol corresponding to each encoded bit is dependent on WUR data rate: 4 μs for WUR LDR and 2 μs for WUR HDR. ~~The MC-OOK symbol corresponding to each input bit for WUR-LDR is shown in Table 32-10 (MC-OOK symbols for WUR LDR). SymLDROff and SymLDROn denote OFF and ON symbols with 4 μs duration for WUR LDR, respectively. The MC-OOK modulated symbol corresponding to each input bit for WUR HDR is shown in Table 32-11 (MC-OOK symbols for WUR HDR). SymHDROff and SymLDROn denote OFF and ON symbols with 2 μs duration for WUR HDR, respectively.~~For WUR LDR, 4us MC-OOK OFF and ON symbols are denoted as SymLDROff and SymLDROn, respectively. For WUR HDR, 2us MC-OOK OFF and ON symbols are denoted as SymHDROff and SymHDROn, respectively.(#196)

~~SymLDROn, SymLDROff, SymHDROn, SymHDROff symbols can be constructed by populating contigu­ous 13 subcarriers. When a single 20 MHz WUR channel is used for transmission of WUR PPDU, the OOK waveform of WUR PPDU is generated by using contiguous 13 subcarriers with a subcarrier spacing of 312.5 kHz and the center subcarrier being null. The other coefficients are selected from BPSK, QPSK, 16-QAM, 64-QAM, or 256-QAM. Indices for contiguous 13 subcarriers are from -6 to 6.~~ When a single 20 MHz WUR channel is used for transmission of WUR PPDU, SymHDROn and SymLDROn are described in Section 32.2.7 (Mathematical description of signals). The generation of SymHDROn and SymLDROn is described in Section 32.2.3.1 (WUR-PPDU waveform generation for Sync field and high rate Data field) and Section 32.2.3.2 (WUR-PPDU waveform generation for low rate Data field), respectively. (#165)(#677)(#199)(#266)(#751)

For a FDMA transmission, the MC-OOK waveform generation is described in Section 32.2.3.3 (WUR-PPDU Data field waveform generation for the FDMA transmission).(#267)

**~~32-10 – MC-OOK symbols for WUR LDR~~**(#196)(#213)

|  |  |
| --- | --- |
| **~~Input bit~~** | **~~MC-OOK modulated symbol~~** |
| ~~0~~ | ~~[SymLDROn, SymLDROff, SymLDROn, SymLDROff]~~ |
| ~~1~~ | ~~[SymLDROff, SymLDROn, SymLDROff, SymLDROn]~~ |

**~~32-11 – MC-OOK symbols for WUR HDR~~**(#196)(#213)

|  |  |
| --- | --- |
| **~~Input bit~~** | **~~MC-OOK modulated symbol~~** |
| ~~0~~ | ~~[SymHDROn, SymHDRoff]~~ |
| ~~1~~ | ~~[SymHDROff, SymHDRon]~~ |

#### *CID 676*

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 676 | 32.2.9.2 | 84.11 | The text reads "The encoded binary data shall be modulated using MC-OOK". This sentence contains normative text stating that MC-OOK shall be used. However the current version of the draft does not define MC-OOK. Hence, normative text defining MC-OOK ought to be provided. | Change the text in page 78, lines 63 to 65 to "For the WUR Sync ON symbols and WUR Data MC-OOK ON symbols (SymLDROn and SymHDROn), the baseband signal shall be as specified in Equation (32-2)" | Revised-  Agree in principle with the commenter. In the corresponding sentence, change “can be” to “shall be”.  TGba editor to make the changes shown in 11-18/1862r1. |

*TGba Editor: Please make the following changes (in red) in 78.63 of D1.0:*

For the WUR Sync ON symbols and WUR Data MC-OOK ON symbols (SymLDROn and SymHDROn), the baseband signal ~~can be~~shall be(#676) obtained by taking the Inverse Discrete Fourier Transform (IDFT) as described below.