### **IEEE P802.11 Wireless LANs**

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| Comment Resolutions on the Sync Field | | | | |
| Date: 2018-11-13 | | | | |
| Author(s): | | | | |
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**Abstract**

The document provides comment resolutions for comments received on the Sync Field, during the first WG letter ballot. The following is the list of CIDs: 164, 188, 197, 198, 302, 670, 671, 672, 673, 674, 675, 926, 927, 928, 929, 1023, 1054, 1214, 1215.

**Clause 32.2.4.6 Comments**

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 188 | 32.2.4.6 | 75.34 | Need to add per chain CSD to the generation of WUR SYNC and data | as in the comment | **Revise**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

**Discussion**

The Symbol Randomization and per-Antenna CSD is embedded in the Waveform Generation (Step c), and the Waveform Generation includes adding the GI, so it is necessary for the CSD to be within the Waveform Generation and not a subsequent set.

**32.2.4.6 Construction of the WUR-Sync for a single 20 MHz channel**

Construct the WUR-Sync filed for a single 20MHz channel defined in 32.2.8.3 (WUR SYNC field) as follows:

a) Set the WUR\_DATARATE from the WUR\_TXVECTOR.

b) Sync-bit sequence generation: Generate the Sync-bit sequence according to the WUR\_DATARATE as described in 32.2.8.3 (WUR SYNC field).

c) Waveform generation: Generate the MC-OOK waveform by using either On-WG or Off-WG according to the Sync-bit. Sync-bit duration TSync is 2 µs. Symbol randomization and per-transmit-chain CSD is applied within the waveform generation step.

e) Windowing: Apply windowing.

f) Analog and RF: Upconvert the resulting complex baseband waveform associated with each transmit chain to an RF signal according to the center frequency of the desired channel and transmit.

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1023 | 32.2.4.6 | 75.23 | "Construct the WUR-Sync filed ..." "filed" should be "field". | As in comment. | **Accept** |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1054 | 32.2.4.6 | 75.30 | In the following sentence, it is not clear if the On-WG corresponds to LDR On-WG or HDR On-WG: "Generate the MC-OOK waveform by using either On-WG or Off-WG according to the Sync-bit." Since the Sync bit duration is 2 usec, it can be explicitly mentioned here that the On-WG corresponds to HDR. Replace On-WG in the sentence with HDR On-WG. | As shown in the comment. | **Reject**  The sentence states that the 2 us On-WG/Off-WG is used for the Sync Field. Though this is the same duration as the HDR Data Field bits, it is not the “HDR On-WG”. |

**Clause 32.2.8.3.3 Comments**

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 164 | 32.2.8.3.3 | 83.12 | What is the waveform the sync field? How are the values of W convert to a time domain signal | Show a waveform with the values of W detailing the modulation | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 302 | 32.2.8.3.3 | 86.65 | The sentence "The OOK symbol modulates the OFDM symbol" is ambiguous. Also, there seems to be confusion here what the OOK symbol is. In this paragraph it seems to be an element of the vector W, whereas in Annex AB the OOK symbol is the vector of values that is Discrete Fourier- Transformed to form an OFDM symbol. | Replace by less ambiguous language. When the OOK symbol is one, the OFDM waveform is transmitted. When the OOK symbol is 0, no energy is transmitted. Also specify which OFDM symbol is meant (HDR ON and HDR OFF symbols). | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| 197 | 32.2.8.3.3 | 83.16 | It is not clear how the OOK symbol modulated the OFDM symbol. Either add equation or refer to the LDR/HDR data symbol waveform generation | as in the comment | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 671 | 32.2.8.3.3 | 83.05 | The text reads "The OOK signal is constructed by concatenating two copies of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4)." This is descriptive text. It should be normative, otherwise the sync field is not specified. | Change "is" to "shall be" in the text: "The MC-OOK signal shall be constructed by concatenating two copies of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4)." (See also my previous comment where it is suggested to change "OOK" to "MC-OOK") | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 672 | 32.2.8.3.3 | 83.16 | The text reads "The OOK symbol modulates the OFDM symbol". There is no support for this statement in the spec. | Remove the sentence | **Accept** |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 927 | 32.2.8.3.3 | 83.16 | "The OOK symbol modulates the OFDM symbol", not sure what information is this sentence trying to deliver? | Either delete the sentence or rephrase | **Revised**  The sentence has been replaced |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 670 | 32.2.8.3.3 | 83.04 | The text reads "For LDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The OOK signal is constructed by concatenating two copies of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4)." The term MC-OOK is used in the first sentence and OOK is used in the second. This is inconsistent. | Change "OOK" to "MC-OOK" in the text | **Revised**  The sentence was changed to refer to the Sync-bit sequence and so “OOK” is no longer applicable. |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 926 | 32.2.8.3.3 | 83.04 | "... as a multicarrier On-Off Keying (MC-OOK) signal ...", the acronym (MC-OOK) is already defined at the beginning of Section 32. | Directly use "MC-OOK" here. | **Revised**  The sentence was changed to refer to the Sync-bit sequence and so “OOK” is no longer applicable. |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1214 | 32.2.8.3.3 | 83.07 | W should be in bold/italic letter to indicate vector in Equation (32-4). | as in comment | **Accept**  TGba Editor to put “W” in italics |

**32.2.8.3.3 WUR-Sync field for Low Data Rate**

For LDR, the WUR-Sync field shall be (#671) constructed as a MC-OOK signal. The Sync-bit sequence(#670, #926) is constructed by concatenating two copies of the 32-bit sequence W, where each bit in the sequence is mapped to a MC-OOK symbol of duration 2 µs, and *W* is defined in Equation (32-4).

(32-4)

(#672)This Sync-bit sequence is used to construct the WUR-Sync field waveform as shown in Figure 32-4 (An Example of a WUR signal generator for the WUR-Sync field). (#164, #302, #197, #927)

**Clause 32.2.8.3.4 Comments**

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 198 | 32.2.8.3.4 | 83.33 | It is not clear how the OOK symbol modulated the OFDM symbol. Either add equation or refer to the LDR/HDR data symbol waveform generation | as in the comment | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 673 | 32.2.8.3.4 | 83.21 | The text reads "For HDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The OOK signal is constructed as the bit-wise complement of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4)." The term MC-OOK is used in the first sentence and OOK is used in the second. This is inconsistent. | Change "OOK" to"MC-OOK" in the text | **Revised**  The sentence was changed to refer to the Sync-bit sequence and so “OOK” is no longer applicable.  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 674 | 32.2.8.3.4 | 83.22 | The text reads "For HDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The OOK signal is constructed as the bit-wise complement of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4).". This is descriptive text. It should be normative, otherwise the sync field is not specified. | Change "is" to "shall be" in the text: "For HDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The MC-OOK signal shall be constructed as the bit-wise complement of the 32-bit sequence W, where each bit in the sequence has duration 2 ╬╝s, and W is defined in Equation (32-4)." (See also my previous comment where it is suggested to change "OOK" to "MC-OOK") | **Revised**  TGba Editor makes changes as shown in 802.11-18/1898r2 |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 675 | 32.2.8.3.4 | 83.32 | The text reads "The OOK symbol modulates the OFDM symbol". There is no support for this statement in the spec. | Remove the sentence | **Accept** |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 928 | 32.2.8.3.4 | 83.22 | "... as a multicarrier On-Off Keying (MC-OOK) signal ...", the acronym (MC-OOK) is already defined at the beginning of Section 32. | Directly use "MC-OOK" here. | **Revised**  The sentence was changed to refer to the Sync-bit sequence and so “OOK” is no longer applicable. |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 929 | 32.2.8.3.4 | 83.33 | "The OOK symbol modulates the OFDM symbol", not sure what information is this sentence trying to deliver? | Either delete the sentence or rephrase | **Accept** |

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| **CID** | **Clause** | **Page/Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1215 | 32.2.8.3.4 | 83.23 | W should be in bold/italic letter to indicate vector in Equation (32-5). | as in comment | **Revised**  TGba Editor to put “W” in italics |

* WUR-Sync field for High Data Rate

For HDR, the WUR-Sync field shall be (#674) constructed as a MC-OOK signal. The Sync-bit sequence (#673, #928) is constructed as the bit-wise complement of the 32-bit sequence *W*, where each bit in the sequence is mapped to a MC-OOK symbol of duration 2 µs, and W is defined in Equation (32-4). This bit-wise complement sequence is defined in Equation (32-5),





(#675, #929)This Sync-bit sequence is used to construct the WUR-Sync field waveform as shown in Figure 32-4 (An Example of a WUR signal generator for the WUR-Sync field). (#198)