IEEE P802.11
Wireless LANs

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| CC50 CR on DRU in 38.3.2.1 - Group 1 |
| Date: 2025-04-10 |
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Abstract

This submission proposes resolutions for 34 CIDs in subclause 38.3.2.1 in P802.11bn D0.1:

296, 297, 442, 443, 444, 445, 566, 567, 568, 569, 926, 1021, 1118, 1582, 1755, 1756, 1757, 2172, 2173, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2561, 2562, 3509, 3510, 3511, 3512, 3514, 3516

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version

### CIDs: 296, 926, 1021, 2172

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 296 | 38.3.2.1 | 99.39 | The DRU section should have some introductory subsection introducing the main concepts, such as dsitribution BW, ... before those terms are used in the spec | See comment | **Revise**Agree with the comment. A definition for “distribution bandwidth” is included in subclause 3.2 Definitions specific to IEEE 802.11 TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#296). |
| 926 | 38.3.2.1 | 99.50 | This is first time to have distribution bandwidth in PHY section. Please define. | As in comment | **Revise**A definition for “distribution bandwidth” is included in subclause 3.2 Definitions specific to IEEE 802.11 TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#926). |
| 1021 | 38.3.2.1 | 99.50 | the term "distribution bandwidth" is not defined | Define "distribution bandwidth" | **Revise**A definition for “distribution bandwidth” is included in subclause 3.2 Definitions specific to IEEE 802.11 TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#1021). |
| 2172 | 38.3.2.1 | 99.50 | The terms DBW and Distribution Bandwidth are both used a lot throughout the text, should choose one and use it consistently | The abbreviation DBW is used in Chapter 9, should probably be defined in the abbreviation list and used throughout the text. | **Revise**DBW is defined in subclause 3.4 abbreviation and acronyms list. TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2172). |
| 2800 | 3.2 | 21.04 | Define "Distribution Bandwidth" and "Distributed Tune RU" (or better to use "Tune-distributed RU") | As in Comment | **Revise**A definition for “distribution bandwidth” is included in subclause 3.2 Definitions specific to IEEE 802.11 TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2800). |

***TGbn editor: please make the following change in clause 3, P23 in 11bn D0.2***

* Definitions specific to IEEE 802.11

***Insert the following definition (maintaining alphabetical order):***

**Option1:   Distribution bandwidth of a DRU:** Theminimum bandwidth of a channel in which all DRUs with the same number of tones and the same tone spacing as this DRU can be allocated.

**Option2:   Distribution bandwidth:** A 20, 40, 60, or 80 MHz channel width over which the subcarriers of a distributed-tone resource unit (DRU) are allocated.

**Option3:**   **Distribution bandwidth:** The width of a channel over which the subcarriers of one or more distributed-tone resource units (DRUs) are distributed.

* Abbreviations and acronyms

***Insert the following acronym definitions (maintaining alphabetical order):***

DBW distribution bandwidth(#2172)

DSO dynamic subband operation

MAPC multi-AP coordination

UHR ultra high reliability

### CIDs: 442, 443, 444, 566, 567, 1582, 2245, 2561, 2562, 1755, 1756, 1757, 3509

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 442 | 38.3.2.1 | 99.53 | While 60 MHz is stated as a distribution bandwidth, the allowed DRU sizes for 60 MHz are not listed. | List the allowed DRU sizes for DBW = 60 MHz. | **Revise**The allowed DRU sizes for DBW = 60 MHz are listed in Table 38-3.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#442). |
| 444 | 38.3.2.1 | 100.05 | Table 38-3 (Maximum number of DRUs for each distribution bandwidth) is missing an entry for DBW = 60 MHz. | Add entry for DBW = 60 MHz in Table 38-3 (Maximum number of DRUs for each distribution bandwidth) | **Accept** |
| 566 | 38.3.2.1 | 99.56 | Add a text regarding what kind of DRUs are used for 60 MHz DBW | See the comment. | **Revise**Text for the allowed DRU sizes for DBW = 60 MHz is added. TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#566). |
| 567 | 38.3.2.1 | 100.06 | Add the DBW60 case into table 38-3. | See the comment. | **Accept** |
| 1582 | 38.3.2.1 | 100.06 | The tone plan for DBW 60 was defined, so suggest to include the maximum number of DRUs for DBW 60 in Table 38.3. | See the comment. | **Accept** |
| 1757 | 38.3.2.1 | 100.06 | Missing the description of maximum number of DRUs on DBW60. | Please add the maximum number of DRUs on DBW60. | **Accept** |
| 2562 | 38.3.2.1 | 100.05 | Table 38-3 Mximumum number of DRUs for each dsitribution bandwidth is not clear. The maximum number of DRUs should be dependent on both a DRU distribution bandwidth and a PPDU bandwidth. In addition, the maximum number of DRUs related to DBW 60 is missing. | The titile of Table 38-3 may be modified as: Maximum number of DRUs for each distribution bandwidth in an 80 MHz subblock. Add the entries related to maximum number of DRUs related to DBW 60 to the table. | **Accept** |
| 2245 | 38.3.2.1 | 99.53 | In paragraph 4 of 38.3.2.1 "Tone plan for DRUs", DBW60 is defined for UHR TB PPDU, but DRU sizes are missing for 60 MHz distribution bandwidth. Please clarify. | As in comment | **Revise**Text for the allowed DRU sizes for DBW = 60 MHz is added. TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2245). |
| 2561 | 38.3.2.1 | 99.53 | Allowed DRU tone sizes to be used in 60 MHz distribution BW are missing. | Add text to describe what DRU tone sizes can be used in 60 Mhz distribution BW. | **Revise**Text for the allowed DRU sizes for DBW = 60 MHz is added.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2561). |
| 1755 | 38.3.2.1 | 99.54 | Missing "The" before "26-tone DRU" | Add "The" before "26-tone DRU". | **Accept** |
| 1756 | 38.3.2.1 | 99.55 | Missing "The" before "52-tone DRU" | Add "The" before "52-tone DRU". | **Accept** |
| 3509 | 38.3.2.1 | 99.59 | Table reference | defined in 38-3 --> defined in Table 38-3 | **Accept** |
| 443 | 38.3.2.1 | 100.01 | "A UHR UL TB PPDU using OFDMA transmission may carry a mixture of 26-, 52-, 106-, 242-, and 484-tone DRUs." This sentence is not correct if the PPDU bandwidth is 20 MHz since DRU sizes of 242-tone and 484-tone are not supported for DBW = 20 MHz. This sentence is not correct if the PPDU bandwidth is 40 MHz since DRU size of 484-tone is not supported for DBW = 40 MHz. This sentence is not correct if the PPDU bandwidth is 80 MHz since DRU size of 26-tone is not supported for DBW = 80 MHz and may not be supported for DBW = 60 MHz. | Change this sentence to " A UHR UL TB PPDU of a bandwidth 20 MHz using OFMDA transmission may carry a mixture of 26-, 52, 106-tone DRUs. A UHR UL TB PPDU of a bandwidth 40 MHz using OFMDA transmission may carry a mixture of 26-, 52-, 106-, 242- tone DRUs. A UHR UL TB PPDU of a bandwidth equal to or greater than 80 MHz using OFMDA transmission may carry a mixture of 26-, 52, 106-, 242-, 484-tone DRUs according to the puncturing pattern and the distribution bandwidth mode." | **Revise**The text is adopted with some editorial changes. TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#443). |

***TGbn editor: please make the following change in subclause 38.3.2.1, P107L53 in 11bn D0.2***

* Tone plan for DRUs

The UHR PHY subcarrier frequency spacing used in Distributed-tone RU (DRU) tone plan is identical to EHT PHY subcarrier frequency spacing defined in Clause 36 (Extreme High Efficiency (EHT) PHY specification).

The DRUs defined for UHR UL TB PPDU transmission are 26-tone DRU, 52-tone DRU, 106-tone DRU, 242-tone DRU, and 484-tone DRU.

Distribution bandwidth defined for UHR UL TB PPDU transmission are 20 MHz, 40 MHz, 60 MHz and 80 MHz.

The 26-tone DRU, 52-tone DRU, and 106-tone DRU are used in 20 MHz distribution bandwidth. The(#1755) 26-tone DRU, 52-tone DRU, 106-tone DRU, and 242-tone DRU are used in 40 MHz distribution bandwidth. The 52-tone DRU, 106-tone DRU, and 242-tone DRU are used in 60 MHz distribution bandwidth(#442, #566, #2561, #2245). The(#1756) 52-tone DRU, 106-tone DRU, 242-tone DRU, and 484-tone DRU are used in 80 MHz distribution bandwidth.

The maximum number of DRUs for 20 MHz, 40 MHz, 60 MHz(#566, #2561), and 80 MHz distribution bandwidths is defined in Table(#3509) 38-3 (Maximum number of DRUs for each distribution bandwidth in an 80 MHz subblock(#2562)).

A UHR UL TB PPDU of a 20 MHz bandwidth using OFMDA transmission may carry a mixture of 26-, 52- and 106-tone DRUs. A UHR UL TB PPDU of a 40 MHz bandwidth using OFMDA transmission may carry a mixture of 26-, 52-, 106- and 242- tone DRUs. A UHR UL TB PPDU of a bandwidth equal to or greater than 80 MHz using OFMDA transmission may carry a mixture of 26-, 52-, 106-, 242- and 484-tone DRUs according to the puncturing pattern and the distribution bandwidth mode.

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|  | * Maximum number of DRUs for each distribution bandwidth in an 80 MHz subblock(#2562)
 |
| DRU Type | DBW 20 | DBW 40 | DBW 60(#444, #567, #1582, #1757, #2562) | DBW 80 |
| 26-tone DRU | 9 | 18 | N/A | N/A |
| 52-tone DRU | 4 | 8 | 12 | 16 |
| 106-tone DRU | 2 | 4 | 6 | 8 |
| 242-tone DRU | N/A | 2 | 3 | 4 |
| 484-tone DRU | N/A | N/A | N/A | 2 |

### CIDs: 297, 445, 1118, 2246

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 297 | 38.3.2.1 | 100.21 | This paragraph is a left-over of an early motion on DRUs. It's inclusion in the amendment does not add much value. | Delete paragraph | **Accept** |
| 445 | 38.3.2.1 | 100.23 | While 60 MHz is stated as a distribution bandwidth, it is not stated whether 26-tone DRUs will be used as building blocks for DBW = 60 MHz. | Change "DRU tone plans on distribution bandwidth 20 MHz and 40 MHz are designed by using 26-tone DRUs asbasic building blocks, (80MHz TBD), the hierarchical tone structure as regular RUs (RRUs) is preserved forDRU." to "DRU tone plans on distribution bandwidth 20 MHz and 40 MHz are designed by using 26-tone DRUs asbasic building blocks, (60MHz and 80MHz TBD), the hierarchical tone structure as regular RUs (RRUs) is preserved forDRU." | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#445). |
| 1118 | 38.3.2.1 | 100.23 | In the 80MHz, 26 tone DRU is not defined. So, the minimum size of DRU is 52 tones. | Add the description of DBW80 that it is based on the 52-tone DRU. | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#1118). |
| 2246 | 38.3.2.1 | 100.23 | "DRU tone plans on distribution bandwidth 20 MHz and 40 MHz are designed by using 26-tone DRUs as basic building blocks, (80MHz TBD), the hierarchical tone structure as regular RUs (RRUs) is preserved for DRU." Please remove (80MHz TBD), or clarify why it is needed here since 26-tone DRU is not supported in 80 MHz DBW. | As in comment | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2246). |

 (#297, #445)

### CIDs: 2247

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2247 | 38.3.2.1 | 100.39 | Change "Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 80 MHz UHR TB PPDU)." to "Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with DBW 80 MHz). The DRU tones in Table 38-6 are defined for DBW80 MHz. An 80 MHz UHR TB PPDU can also use 20+20+40 or 40+20+20 DBW modes besides 80 MHz DBW. Same comments apply to 106-tone DRU and 242 tone DRU. | As in comment | **Revise**The change is reflected to all occurrences in addition to the table captionTGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2247). |

A 52-tone DRU consists of 48 data subcarriers and 4 pilot subcarriers. The positions of the pilots for the 52-tone DRU are defined in Table 38-39 (Pilot indices for a 52-tone DRU transmission). The locations of the 52-tone DRUs are fixed as defined in Table 38-4 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 20 MHz UHR TB PPDU), Table 38-5 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 40 MHz UHR TB PPDU), and Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with 80 MHz DBW(#2247)).

A 52-tone DRU consists of tones of two corresponding 26-tone DRUs. For example, 52-tone DRU1 consists of tones of 26-tone DRU1 and 26-tone DRU2 in the same distribution bandwidth.

A 106-tone DRU consists of 102 data subcarriers and 4 pilot subcarriers. The positions of the pilots for the 106-tone DRU are defined in Table 38-40 (Pilot indices for a 106-tone DRU transmission). The locations of the 106-tone DRUs are fixed as defined in Table 38-4 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 20 MHz UHR TB PPDU), Table 38-5 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 40 MHz UHR TB PPDU), and Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with 80 MHz DBW(#2247)).

A 106-tone DRU consists of tones of two corresponding 52-tone DRUs and two extra tones. For example, 106-tone DRU1 consists of tones of 52-tone DRU1, 52-tone DRU2, and two extra tones in the same distribution bandwidth.

A 242-tone DRU consists of 234 data subcarriers and 8 pilot subcarriers. The positions of the pilots for the 242-tone DRU are defined in Table 38-41 (Pilot indices for a 242-tone DRU transmission). The locations of the 242-tone DRUs are fixed as defined in Table 38-5 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in a 40 MHz UHR TB PPDU), and Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with 80 MHz DBW(#2247)).

A 242-tone DRU consists of tones of two corresponding 106-tone DRUs, one 26-tone DRUs, and four extra tones. For example, 242-tone DRU1 consists of tones of 106-tone DRU1, 106-tone DRU2, 26-tone DRU5, and four extra tones in the same distribution bandwidth.

A 484-tone DRU consists of 468 data subcarriers and 16 pilot subcarriers. The positions of the pilots for the 484-tone DRU are defined in Table 38-42 (Pilot indices for a 484-tone DRU transmission). The locations of the 484-tone DRUs are fixed as defined in Table 38-6 (Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with 80 MHz DBW(#2247)).

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* Data and pilot subcarrier indices for Distributed-tone RUs (DRU) in an 80 MHz UHR TB PPDU with 80 MHz DBW((#2247)



### CIDs: 568, 569, 2173, 2248, 2249,2250, 2251, 3510, 3511

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 568 | 38.3.2.1 | 100.42 | In DBW80, there is no 26 DRU. | Add "for DBW20 and DBW40" at the end of the text "A 52-tone DRU consists of tones of two corresponding 26-tone DRUs" | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#568). |
| 569 | 38.3.2.1 | 101.01 | In DBW80, there is no 26 DRU. | Add "for DBW40" at the end of the text "A 242-tone DRU consists of tones of two corresponding 106-tone DRUs, one 26-tone DRUs, and four extra tones" and delete "s" in "26-tone DRUs".Also, add the text "A 242-tone DRU consists of tones of two corresponding 106-tone DRUs and thirty extra tones for DBW80. For example, 242-tone DRU1 consists of tones of 106-tone DRU1, 106-tone DRU2, and thirty extra tones in the same distribution bandwidth." | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#569). |
| 2173 | 38.3.2.1 | 100.42 | The term 'corresponding' is not suitable here. | Either remove the term 'corresponding' or replace it with 'adjacent' (probably reflects a different meaning that the original intention). Same comment for Line 54 (106-tone DRU), Line 1 on page 101 (242-tone DRU) and Line 12 on page 101 (484-tone DRU). | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#2173). |
| 2248 | 38.3.2.1 | 100.42 | "A 52-tone DRU consists of tones of two corresponding 26-tone DRUs. For example, 52-tone DRU1 consists of tones of 26-tone DRU1 and and 26-tone DRU2 in the same distribution bandwidth." This sentence is only true for DBW 20 MHz and 40 MHz. Suggest to remove this sentence here since it is obvious from 26 tone and 52 tone DRU indices shown in Table 38-4 and 38-5. | As in comment | **Accept** |
| 2249 | 38.3.2.1 | 100.54 | "A 106-tone DRU consists of tones of two corresponding 52-tone DRUs and two extra tones. For example,106-tone DRU1 consists of tones of 52-tone DRU1, 52-tone DRU2, and two extra tones in the same distribution bandwidth." All these sentence is redundant, it is obvious from the tone indices defined in Table 38-4, 38-5 and 38-6. In 11ax, 11be spec, regular RU tone indices definition, we don't have those texts since it is obvious from the tables, and we don't see the need to add it in 11bn. | As in comment | **Accept** |
| 2250 | 38.3.2.1 | 101.01 | "A 242-tone DRU consists of tones of two corresponding 106-tone DRUs, one 26-tone DRUs, and four extra tones. For example, 242-tone DRU1 consists of tones of 106-tone DRU1, 106-tone DRU2, 26-tone DRU5,and four extra tones in the same distribution bandwidth." This is only true for DBW 40MHz, not for DBW 80 MHz. Suggest to remove the sentence since it is obvious from Table 38-5. | As in comment | **Accept** |
| 2251 | 38.3.2.1 | 101.12 | Please remove "A 484-tone DRU consists of tones of two corresponding 242-tone DRUs. For example, 484-tone DRU1 consists of tones of 242-tone DRU1 and 242-tone DRU2 in the same distribution bandwidth." since it is obvious from Table 38-6. | As in comment | **Accept** |
| 3510 | 38.3.2.1 | 100.42 | This is not true for 80MHz distribution BW that has no 26-tone DRU defined | A 52-tone DRU in a 20MHz or 40MHz distribution BW consists of ... | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#3510). |
| 3511 | 38.3.2.1 | 101.01 | For 80MHz distribution BW a 242-tone DRU covers 2 106-tone DRU's but no 26-tone RU | A 242-tone DRU in a 40MHz distribution BW consists of ... | **Revise**The paragraph is deleted.TGbn editor: please incorporate changes shown in 11-25/0656r0 below under the tag (#3511). |

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### CIDs: 3512, 3514, 3516

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 3512 | 38.3.2.1 | 101.16 | Avoid line break in negative numbers between sign and number to improve readability |   | **Accept** |
| 3514 | 38.3.2.1 | 102.04 | Avoid line break in negative numbers between sign and number to improve readability |   | **Accept** |
| 3516 | 38.3.2.1 | 103.15 | Avoid line break in negative numbers between sign and number to improve readability |  | **Accept** |