IEEE P802.11  
Wireless LANs

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| D0.1 CID resolutions for Section 38.1 | | | | |
| Date: 2025-03-21 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Eugene Baik | Qualcomm |  |  | eugeneb@qti.qualcomm.com |
| Bin Tian | Qualcomm |  |  | btian@qti.qualcomm.com |
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Abstract

This submission contains proposed comment resolutions to comments pertaining to Clause 38.1 in P802.11bn D0.1. The proposed text edits as part of the resolutions will be with respect to Draft 0.1.

The submission provides resolutions to the following CIDs

2728

3728

2038

2231

288

289

456

1070

1071

1102

1368

2039

2040

2232

2550

2729

3291

3529

290

2041

2233

2551

2552

3292

615

2042

2703

2730

2731

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: CID numbers in-lined with proposed text changes
* Rev 2: Document version reference mistake correction

# Part 1 – (Page 87 of D0.1)

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2728 | 38.1.1 | 87.11 | "Clause" | Clause 38 | Accepted |
| 3728 | 38.1.1 | 87.11 | Clause number missing | Change "Clause (" to "Clause 38 (" | Revised.  Duplicate of accepted CID 2728 and resolved through proposed change of that resolution. |
| 2038 | 38.1.1 | 87.12 | "Clause" should be "Clause 38". | As in comment | Revised.  Duplicate of accepted CID 2728 and resolved through proposed change of that resolution. |
| 2231 | 38.1.1 | 87.12 | "In addition to the requirements in Clause (Ultra high reliability (UHR) PHY specification)", missing 38 after Clause.. | As in comment | Revised.  Duplicate of accepted CID 2728 and resolved through proposed change of that resolution. |

# Part 2 – (Page 87 of D0.1)

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 288 | 38.1.1 | 87.50 | Grammar - Change " new four MCS values" to "four new MCS values" | See comment | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 289 | 38.1.1 | 87.51 | Change TBDx to their agreed values | See comment | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 456 | 38.1.1 | 87.51 | please update MCS index based on Motion#195 | please update MCS index based on Motion#195 | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 1070 | 38.1.1 | 87.50 | "the UHR PHY defines new four MCS" | Change to "the UHR PHY defines four new MCS" | Revised.  Duplicate of CID 288 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 1071 | 38.1.1 | 87.51 | TBD1 to TBD4 should be replaced by MCS 17, MCS19, MCS20, and MCS23 | TBD1 to TBD4 should be replaced by MCS 17, MCS19, MCS20, and MCS23 | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 1102 | 38.1.1 | 87.51 | Replace TBD 1, TBD2, TBD3, TBD4 to MCS17, MCS19, MCS20, MCS23 based on the passed motion 195 | As the comment. | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 1368 | 38.1.1 | 87.50 | change "new four" to "four new" | see comment | Revised.  Duplicate of CID 288 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 1615 | 38.1.1 | 87.87 | Remove TBDs regarding new MCS entries | as in comment | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2039 | 38.1.1 | 87.49 | "convolutional" should be "BCC" which is offciially defined in the spec. | As in comment | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2040 | 38.1.1 | 87.51 | All "TBD"s are actually defined, specifically MCS TBD1 for QPSK with 2/3 code rate, MCS TBD2 for 16-QAM with 2/3 code rate, MCS TBD3 for 16-QAM with 5/6 code rate and MCS TBD4 for 256-QAM with 2/3 code rate. | Change to "specifically MCS 17 for QPSK with 2/3 coding rate, MCS 19 for 16-QAM with 2/3 coding rate, MCS 20 for 16-QAM with 5/6 coding rate and MCS 23 for 256-QAM with 2/3 coding rate." | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2232 | 38.1.1 | 87.51 | "specifically MCS TBD1 for QPSK with 2/3 code rate, MCS TBD2 for 16-QAM with 2/3 code rate, MCS TBD3 for 16-QAM with 5/6 code rate and MCS TBD4 for 256-QAM with 2/3 code rate." Replace TBDs with new MCS values pasaed in PHY motion 195 | As in comment | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2550 | 38.1.1 | 87.51 | Update TBD MCS indices based on passed motion on new MCS indices | as in the comment | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2729 | 38.1.1 | 87.50 | "new four" | four new | Revised.  Duplicate of CID 288 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 3291 | 38.1.1 | 87.51 | Replace "TBD1" to "TBD4" by 17 19 20 23. | as in comment | Revised.  Duplicate of CID 289 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 3529 | 38.1.1 | 87.50 | new four | new four -> four new | Revised.  Duplicate of CID 288 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 290 | 38.1.1 | 87.54 | "a new longer LDPC codeword size of 2x1944 bits that may be used alongside the prior defined LDPC codeword sizes". What does "be used alongside" mean? | Change to "in addition to existing LDPC codeword sizes" | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution |
| 2041 | 38.1.1 | 87.54 | "longer LDPC codeword size of 2x1944" is not accurate in syntax. with "larger LDPC codeword size of 3888". | Change "longer LDPC codeword size" to "larger LDPC condword size" | Revised.  Agree with comment, sentence should be rewritten to accurately reflect new LDPC definition. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution |
| 2233 | 38.1.1 | 87.54 | Please change "a new longer LDPC codeword size of 2x1944" to "a new LDPC codword size of 3888". "2x1944" is not used in the longer LDPC codeword length definition. | As in comment | Revised.  Agree with comment, duplicate CID 2041 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution |

# Part 3 – (Page 87 of D0.1)

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2551 | 38.1.1 | 87.57 | Add a clarification that UEQM is defined for multi-stream MIMO communications. | Change to "The UHR PHY provides support for Unequal Modulation for MIMO transmissions with more than one spatial streams" | Revised.  Agree with comment, sentence should be rewritten. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution |
| 2552 | 38.1.1 | 87.58 | Add a sentence to describe the benefits and usecases for UEQM | Change to "This new feature is designed to improve the PHY rate for imbalanced per-stream SNR in MIMO channels and can be used alongside ..." | Revised.  Agree with comment, sentence should be rewritten. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution |
| 3292 | 38.1.1 | 87.57 | Change "provides support" to "supports" | as in comment. Similar for other paragraphs in this subclause. | Rejected.  Either “provides support for” or “supports” convey the same meaning, and there is precedent using “provides support”, as it is used in other Clause introduction sections (e.g. EHT) |

# Part 4 – (Page 87 of D0.1)

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 615 | 38.1.1 | 87.63 | "distributed RUs" should be "Distributed-tone RUs" | As in comment | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2042 | 38.1.1 | 87.63 | DRU is defined as "Disbributed-tone RU"distribute RUs" with "distributed-tone RUs". | Replace "distributed RUs (DRU)" with "Distributed-tone RU (DRU)". | Revised.  Agree with comment, duplicate of CID 615 resolution. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2703 | 38.1.1 | 87.63 | "Distributed RUs which use a separate OFDM tone plan and distribution mapping" is not a clear despcription of the DRU that doesn't highlight the main DRU idea | "Suggest to change the text to ""UHR PHY defines a new tone plan for distributed RUs | Revised.  Agree with comment to re-write sentence. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2730 | 38.1.1 | 87.62 | "and RUs and MRUs" | RUs and MRUs | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |
| 2731 | 38.1.1 | 87.64 | "a separate OFDM tone plan" | separate OFDM tone plans | Revised.  Agree with comment. Instruction to editor: see Proposed Text Changes of 11/25-0509r2 for text changes of resolution. |

# Proposed Text Changes

Under MS Word, view “All Markup” to view the detailed text additions, removals, edits. CID numbers in “[ ]” are in-lined with corresponding text changes.

**38 Ultra high reliability (UHR) PHY specification**

**38.1 Introduction**

**38.1.1 Introduction to the UHR PHY**

Clause 38 (Ultra high reliability (UHR) PHY specification) specifies the PHY entity for an ultra high reliability (UHR) orthogonal frequency division multiplexing (OFDM) system. In addition to the requirements in Clause 38 (Ultra high reliability (UHR) PHY specification) [#2728, 3728, 2038, 2231], a UHR STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory requirements of Clause 36 (Extremely high throughput (EHT) PHY specification), Clause 27 (High Efficiency (HE) PHY specification), Clause 21 (Very High Throughput (VHT) PHY specification), Clause 19 (High Throughput (HT) PHY specification), and Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification).

For 2.4 GHz band operation, the UHR PHY is based on the EHT PHY defined in Clause 36 (Extremely high throughput (EHT) PHY specification), which is further based on the HE PHY defined in Clause 27 (High Efficiency (HE) PHY specification), the HT PHY defined in Clause 19 (High Throughput (HT) PHY specification), and the OFDM PHY defined in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) and Clause 18 (Extended Rate PHY (ERP) specification).

For 5 GHz band operation, the UHR PHY is based on the EHT PHY defined in Clause 36 (Extremely high throughput (EHT) PHY specification), which is further based on the HE PHY defined in Clause 27 (High Efficiency (HE) PHY specification), the VHT PHY defined in Clause 21 (Very High Throughput (VHT) PHY specification), the HT PHY defined in Clause 19 (High Throughput (HT) PHY specification), and the OFDM PHY defined in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification)

For 6 GHz band operation, the UHR PHY is based on the EHT PHY defined in Clause 36 (Extremely high throughput (EHT) PHY specification), which is further based on the HE PHY defined in Clause 27 (High Efficiency (HE) PHY specification), and the OFDM PHY defined in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification).

The UHR PHY continues support for DL OFDMA, UL OFDMA, DL MU-MIMO, and UL MU-MIMO as defined in the EHT PHY. Preamble puncturing as defined in the EHT PHY continues to be supported for the UHR MU PPDU, for both OFDMA and non-OFDMA.

The UHR PHY continues support for modulation of data subcarriers using the EHT MCS set, which comprises BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, and 4096-QAM modulation orders and FEC coding (BCC [#2039]and LDPC) with code rates of 1/2, 2/3, 3/4, and 5/6. Additionally, the UHR PHY defines four new [#288, 1070, 1368, 2729, 3529] MCS values for new combinations of existing modulation orders and coding rates, specifically MCS 17 for QPSK with 2/3 code rate, MCS 19 for 16-QAM with 2/3 code rate, MCS 20 for 16-QAM with 5/6 code rate and MCS 23 [#289, 456, 1071, 1102, 1615, 2040, 2232, 2550, 3291] for 256-QAM with 2/3 code rate. The UHR PHY introduces support for a new larger [#2041] LDPC codeword size of 3888 [#2233] bits that may be used in addition to the existing [#290] LDPC codeword sizes specified in the EHT PHY.

The UHR PHY provides support for unequal modulation in beamformed multistream MIMO [#2551], in which different spatial streams within a PPDU can use different modulation orders. This new feature is designed to improve data rates in MIMO channels where imbalances in per-stream SNR exist and [#2552] can be used alongside the existing method of equal modulation transmit beamforming, as defined in the EHT PHY.

The UHR PHY continues support for the OFDM symbol numerology, tone plans, RUs [#2730], and MRUs specified for the EHT PHY as defined in Clause 36. Additionally, the UHR PHY defines distributed-tone [#615, 2042] RUs (DRUs), which use separate OFDM tone plans [#2731] where the RU occupies non-consecutive distributed physical subcarriers, that are [#2703] designed to provide power and range benefits for STAs operating in frequency bands with power spectrum density limits. DRUs are specifically for use only with uplink UHR TB PPDUs.