IEEE P802.11
Wireless LANs

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| [CR for CID 1081, 2255 and 2990] |
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Abstract

This submission proposes resolutions for follwing 3 CIDs: 1081, 2255 and 2990

Revisions:

* Rev 0: Initial version of the document.
* Rev 1 :Editorial change
* Rev 2: updated as to apply the received comments for 1081 and add the definition of non-OFDMA UL MU-MIMO

## CID 1081

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1081 | 29.01 | 3 | There are several definitions in clause 3.1 & 3.2 which need to be updated to include EHT/EHT PPDU. For example, definition of "non-high-throughput (non-HT)", "20 MHz mask physical layer (PHY) protocol data unit (PPDU)", "bandwidth signaling transmitter address (TA)" etc | As in comment | Revised. Agree to commentor. Some definitions need to be updated to include the EHT/EHT PPDU. TGbe Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/21/11-21-0292-02-00be-the-comment-resolution-for-CID-1081-2255-2990.docx. |

***TGbe editor: please add the following definitions into clasue 3.1***

*Change the following definitions*

**non-high-throughput (non-HT):** A modifier meaning not high throughput (HT), notvery high throughput (VHT) ~~and~~, not high efficiency (HE), and not extremely high throughput (EHT). (#1081)

***TGbe editor: please add the following definitions into clasue 3.2***

*Change the following definitions*

**20 MHz mask physical layer (PHY) protocol data unit (PPDU):** One of the following PPDUs:

* A Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) PPDU transmitted using the 20 MHz transmit spectral mask defined in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification).
* A Clause 18 (Extended Rate PHY (ERP) specification) orthogonal frequency division multiplexing (OFDM) PPDU transmitted using the transmit spectral mask defined in Clause 18 (Extended Rate PHY (ERP) specification).
* A high throughput (HT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW20 and the CH\_OFFSET parameter equal to CH\_OFF\_20 transmitted using the 20 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).
* A very high throughput (VHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW20 transmitted using the 20 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) PPDU transmitted by a VHT STA using the 20 MHz(11md) transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* An HT PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW20 and the CH\_OFFSET parameter equal to CH\_OFF\_20 transmitted by a VHT STA using the 20 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A high efficiency (HE) PPDU with TXVECTOR parameter CH\_BANDWIDTH equal to CBW20 transmitted using the 20 MHz transmit spectral mask defined in Clause 27 (High Efficiency (HE) PHY specification).
* A Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) PPDU transmitted by an HE STA using the 20 MHz transmit spectral mask defined in Clause 27 (High Efficiency (HE) PHY specification).

i) An extremely high throughput (EHT) PPDU with TXVECTOR parameter CH\_BANDWIDTH equal to CBW20 transmitted using the 20 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).

**20 MHz physical layer (PHY) protocol data unit (PPDU):** A Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM -applications) PPDU, a Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) PPDU (when using 20 MHz channel spacing), a Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY -specification) PPDU, a Clause 18 (Extended Rate PHY (ERP) specification) orthogonal frequency division multiplexing (OFDM) PPDU, a Clause 19 (High Throughput (HT) PHY specification) 20 MHz high throughput (HT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW20, ~~or~~  aClause 21 (Very High Throughput (VHT) PHY specification(11ac)) 20 MHz very high throughput (VHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW20, ~~or~~ a Clause 27 (High Efficiency (HE) PHY specification) 20 MHz high efficiency (HE) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW20, or a Clause 36 (Extremely High Throughput (EHT) PHY specification) 20MHz extremely high throughput (EHT) PPDU with TXVECTOR parameter CH\_BANDWIDTH equal to CBW20.

**40 MHz mask physical layer (PHY) protocol data unit (PPDU):** One of the following PPDUs:

* A 40 MHz high throughput (HT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW40) transmitted using the 40 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).
* A 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to NON\_HT\_CBW40) transmitted by a non-very high throughput (non-VHT) STA using the 40 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).
* A 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40) transmitted by a very high throughput (VHT) STA using the 40 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 20 MHz HT PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW20 and the CH\_OFFSET parameter equal to either CH\_OFF\_20U or CH\_OFF\_20L transmitted using the 40 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).
* A 20 MHz VHT PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW20 transmitted using the 40 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 40 MHz VHT PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW40 transmitted using the 40 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 40 MHz HT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW40) transmitted by a VHT STA using the 40 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 20 MHz non-HT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW20) transmitted using the 40 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).
* A 20 MHz non-HT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW20) transmitted by a VHT STA using the 40 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 40 MHz high efficiency (HE) PPDU with TXVECTOR parameter CH\_BANDWIDTH equal to CBW40 transmitted using the 40 MHz transmit spectral mask defined in Clause 27 (High Efficiency (HE) PHY specification).
* A 40 MHz VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40) transmitted by an HE STA using the 40 MHz transmit spectral mask defined in Clause 21 (Very high throughput (VHT) PHY specification).
* A 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40) transmitted by an HE STA using the 40 MHz transmit spectral mask defined in Clause 19 (High Throughput (HT) PHY specification).

m) A 40 MHz extremely high throughput (EHT) PPDU with TXVECTOR parameter CH\_BANDWIDTH equal to CBW40 transmitted using the 40 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).

**40 MHz physical layer (PHY) protocol data unit (PPDU):** A 40 MHz high throughput (HT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW40), ~~or~~ a 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to NON\_HT\_CBW40 or TXVECTOR parameter CH\_BANDWIDTH equal to CBW40), ~~or~~ a 40 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40), ~~or~~ a Clause 27 (High Efficiency (HE) PHY specification) 40 MHz high efficiency (HE) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW40, or a Clause 36 (Extremely High Throughput (EHT) PHY specification) 40 MHz extremely high throughput (EHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW40.

**80 MHz mask physical layer (PHY) protocol data unit (PPDU):** One of the following PPDUs:

* An 80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) transmitted using the 80 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).

b) An 80 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) transmitted using the 80 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).

c) A 20 MHz non-HT, high throughput (HT), or VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW20) transmitted using the 80 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).

d) A 40 MHz non-HT duplicate, HT, or VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40) transmitted using the 80 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).

e) An 80 MHz high efficiency (HE) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) transmitted using the 80 MHz transmit spectral mask defined in Clause 27 (High Efficiency (HE) PHY specification).

f) An 80 MHz extremely high throughput (EHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) transmitted using the 80 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).

**80 MHz physical layer (PHY) protocol data unit (PPDU):** A Clause 21 (Very High Throughput (VHT) PHY specification) 80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) ~~or~~, a Clause 21 (Very High Throughput (VHT) PHY specification) 80 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80), ~~or~~ a Clause 27 (High Efficiency (HE) PHY specification) 80 MHz high efficiency (HE) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW80, or a Clause 36 ( Extremely High Throughput (EHT) PHY specification) 80 MHz extremely high throughput (EHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW80.

**160 MHz mask physical layer (PHY) protocol data unit (PPDU):** One of the following PPDUs:

* A 160 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) transmitted using the 160 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 160 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) transmitted using the 160 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 20 MHz non-HT, high throughput (HT), or VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW20) transmitted using the 160 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 40 MHz non-HT duplicate, HT, or VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW40) transmitted using the 160 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* An 80 MHz non-HT duplicate or VHT PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW80) transmitted using the 160 MHz transmit spectral mask defined in Clause 21 (Very High Throughput (VHT) PHY specification).
* A 160 MHz high efficiency (HE) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) transmitted using the 160 MHz transmit spectral mask defined in Clause 27 (High Efficiency (HE) PHY specification).
* A 160 MHz extremely high throughput (EHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) transmitted using the 160 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).

**160 MHz physical layer (PHY) protocol data unit (PPDU):** A Clause 21 (Very High Throughput (VHT) PHY specification) 160 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) ~~or~~, a Clause 21 (Very High Throughput (VHT) PHY specification) 160 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160), ~~or~~ a Clause 27 (High Efficiency (HE) PHY specification) 160 MHz high efficiency (HE) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW160, or a Clause 36 ( Extremely High Throughput (EHT) PHY specification) 160 MHz extremely high throughput (EHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW160.

**320 MHz mask physical layer (PHY) protocol data unit (PPDU):** One of the following PPDUs:

* A 320 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW320) transmitted using the 320 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).
* A 320 MHz extremely high throughput (EHT) PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW160) transmitted using the 320 MHz transmit spectral mask defined in Clause 36 (Extremely High Throughput (EHT) PHY specification).

**320 MHz physical layer (PHY) protocol data unit (PPDU):** A Clause 36 (Extremely High Throughput (EHT) PHY specification) 320 MHz non-high throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH\_BANDWIDTH equal to CBW320) or a Clause 36 (Extremely High Throughput (EHT) PHY specification) 320 MHz extremely high throughput (EHT) PPDU with the TXVECTOR parameter CH\_BANDWIDTH equal to CBW320.

**bandwidth signaling transmitter address (TA):** A TA that is used by a very high throughput (VHT) station (STA), a high efficiency (HE) STA, or an extremely high throughput (EHT) STA to indicate the presence of additional signaling related to the bandwidth to be used in a subsequent transmission in an enhanced distributed channel access (EDCA) transmission opportunity (TXOP). It is the IEEE medium access control (MAC) individual address of the transmitting STA but with the Individual/Group bit set to 1.

**multi-user (MU) physical layer (PHY) protocol data unit (PPDU):** A PPDU that carries one or more PHY service data units (PSDUs) for one or more stations (STAs) using the downlink multi-user multiple input, multiple output (DL-MU-MIMO) technique, orthogonal frequency division multiple access (DL OFDMA) technique, or a combination of the two techniques, or that carries a PSDU for an AP and is in a high efficiency (HE) MU PPDU format or an extremely high throughput (EHT) MU PPDU format.(#24320)

**20 MHz-only non-access-point (non-AP) extremely high throughput station (EHT STA):** A non-AP EHT STA that indicates in the Supported Channel Width Set subfield in the EHT PHY Capabilities Information field in(#Ed) the EHT Capabilities element that it supports only 20 MHz channel width for the frequency band in which it is operating.

**20 MHz operating non-access-point (non-AP) extremely high throughput station (EHT STA):** A non-AP EHT STA that is operating in 20 MHz channel width mode, such as a 20 MHz-only non-AP EHT STA or an EHT STA that has reduced its operating channel width to 20 MHz using operating mode indication (OMI).

**80 MHz operating non-access-point (non-AP) extremely high throughput station (EHT STA):** A non-AP EHT STA that is operating in 80 MHz channel width mode, such as a non-AP STA (excluding the 20 MHz-only non-AP EHT STA) which is not capable of 160 MHz operation or a non-AP STA that has reduced its operating channel width to 80 MHz using operating mode indication (OMI).

**160 MHz operating non-access-point (non-AP) extremely high throughput station (EHT STA):** A non-AP EHT STA that is operating in 160 MHz channel width mode, such as a non-AP STA (excluding the 20 MHz-only non-AP EHT STA) which is not capable of 320 MHz operation or a non-AP STA that has reduced its operating channel width to 160 MHz using operating mode indication (OMI).

**downlink (DL) extremely high throughput (EHT) multi-user (MU) physical layer (PHY) protocol data unit (PPDU):** An EHT MU PPDU transmitted by an access point (AP). This PPDU carries one or more physical layer (PHY) service data units (PSDUs) for one or more users.

**extremely high throughput (EHT) basic service set (BSS):** A BSS in which the transmitted Beacon frame includes an EHT Operation element.

**extremely high throughput (EHT) beacon:** A Beacon frame transmitted in an extremely high throughput (EHT) single user (SU) physical layer (PHY) protocol data unit (PPDU).

**extremely high throughput (EHT) beamformee:** An HE station (STA) that receives an EHT physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix.

**extremely high throughput (EHT) beamformer:** An HE station (STA) that transmits an EHT physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

**extremely high throughput (EHT) modulation and coding scheme (EHT-MCS):** A specification of the EHT physical layer (PHY) parameters that consists of modulation order ((#24155)BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM) and forward error correction (FEC) coding rate ((#24155)1/2, 2/3, 3/4, 5/6) and that is used in an EHT PHY protocol data unit (PPDU).

**extremely high throughput (EHT) multi-user (MU) physical layer protocol data unit (PPDU):** A PPDU transmitted with EHT MU PPDU format.

**extremely high throughput (EHT) physical layer (PHY) protocol data unit (PPDU):** A Clause 36 PPDU that is not a Clause 27 PPDU.

**extremely high throughput (EHT) trigger-based (TB) physical layer (PHY) protocol data unit (PPDU):** A PPDU transmitted with EHT TB PPDU format. This PPDU carries a single physical layer service data unit (PSDU).

**non-orthogonal frequency division multiple access (non-OFDMA) extremely high throughput (EHT) physical layer (PHY) protocol data unit (PPDU):** An EHT PPDU which consists of a single RU or a single MRU.

**orthogonal frequency division multiple access (OFDMA) extremely high throughput (EHT) physical layer (PHY) protocol data unit (PPDU):** An EHT PPDU which consists of more than one RU or MRU. Each of them is allocated to a different STA.

**non-orthogonal frequency division mulitiple access (non-OFDMA) UL MU-MIMO** : a transmission where there are no other RUs/MRUs scheduled other than the one doing UL MU-MIMO.

(#1081)

## CID 2255, 2990

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2255 | 159.27 | 36.1.4 | Note sure it makes sense nowadays to carry forward the HT-greenfield format support | Remove HT-greenfield format support | RejectedIn 11ax and revmd include the green-field. For backword compatibility, it needs to be included in 11be. |
| 2990 | 159.22 | 36.1.4 | Non-HT duplicate format is defined in Claide 36 (36.3.14). | Please correct reference. | Revised. Since Non-HT duplicate transmission is defined in clause 36.3.14, we can refer to it to clarifyTGbe Editor: incorporate the following changes in https://mentor.ieee.org/802.11/dcn/21/11-21-0292-01-00be-the-comment-resolution-for-CID-1081-2255-2990.docx. |

Propose :

***TGbe editor: please modify the P159L22 in the suclause 36.1.4 as follows***

**……**

The FORMAT parameter determines the overall structure of the PPDU and can take on one of the following values:

—Non-HT format (NON\_HT), based on Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) or Clause 18 (Extended Rate PHY (ERP) specification), and including non-HT duplicate format based on Clause 36.3.14. (#2990)

—HT-mixed format (HT\_MF) as specified in Clause 19 (High Throughput (HT) PHY specification).

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**References:**

**[1] 802.11ax D8.0**

**[2] 802.11be D0.3**