IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CC36 CR on EHT PHY Introduction-20MHz device related CIDS | | | | |
| Date: 2022-02-xx | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Kanke Wu | Qualcomm Inc |  |  | kankew@qti.qualcomm.com |
| Bin Tian | Qualcomm Inc |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes resolutions for the following 14 comments from CC36 in P802.11be D1.0:

6930, 7115, 4978, 4979, 4524, 4980,5523, 5521, 5522 , 4895, 5714, 7321, 7322, 7977

This proposed text changes in this document are based on TGbe Draft 1.4

Revisions:

* Rev 0: Initial version of the document.

***.***

# CID 6930, 7115

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolutions** |
| 6930 | 36.1.1 | 316.1 | Add support for 20 MHz only non AP EHT STA to operate in 6 GHz band | Replace lines 1 to 20 of page 316 as follows:  A 20 MHz-only non-AP EHT STA may support the following:  -- (#2679)Reception of 40 MHz EHT sounding NDP in 2.4 GHz, 5 GHz and 6 GHz bands.  -- (#2679)Reception of 80 MHz and 160 MHz EHT sounding NDP in 5 GHz and 6 GHz bands.  --Reception of 242-tone RU in the primary 20 MHz channel within 40 MHz, 80 MHz, and 160 MHz  PPDU(#1272) widths in the 5 GHz and 6 GHz bands.  --26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6  (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel within 40 MHz  channel width in the 2.4 GHz band if the 20 MHz-only non-AP EHT STA supports the EHT subchannel selective transmission operation described in 35.6.1 (EHT subchannel selective transmission).  --26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6  (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel within 40 MHz,  80 MHz, and 160 MHz PPDU(#1272) widths in the 5 GHz and 6 GHz bands if the 20 MHz-only non-AP EHT STA supports the EHT subchannel selective transmission operation described in 35.6.1 (EHT subchannel selective transmission). | Revised  In current spec draft 20MHz only non-AP STA HE and 20MHz operating non-AP EHT can operate in 6GHz band while the 20MHz only non-AP EHT STA is not allowed. The intention when this decision was made is to promote 6GHz band for wide bandwidth high throughput applications. However, there are indeed some use cases like IOT in which it is beneficial to allow 20MHz only EHT STA in 6GHz band so we suggest to add this support. This also helps to harmonize the support requirements of 20Mhz operating EHT STA and 20MHz only EHT STA.  Instruction to the editors:  Please make the changes as given in 21/1220r1 |
| 7115 | 36.1.1 | 316.21 | Suggest to add a note: "20 MHz-only non-AP EHT STA are not allowed in 6 GHz" | See comment | Revised  In current spec draft 20MHz only non-AP STA HE and 20MHz operating non-AP EHT can operate in 6GHz band while the 20MHz only non-AP EHT STA is not allowed. The intention when this decision was made is to promote 6GHz band for wide bandwidth high throughput applications. However, there are indeed some use cases like IOT in which it is beneficial to allow 20MHz only EHT STA in 6GHz band so we suggest to add this support. This also helps to harmonize the support requirements of 20Mhz operating EHT STA and 20MHz only EHT STA.  Instruction to the editors:  The same change as for CID 6930 |

**Discussions:**

In the current document, 20 MHz Only non-AP STAs are not allowed to operate in the 6 GHz band, while 20 MHz Operating non-AP STAs may operate in the 6 GHz band. The requirements for 20 MHz Only non-AP STAs and 20 MHz Operating non-AP STAs are aligned elsewhere.

Based on the definition given in subclause 3, 20 MHz Only non-AP STAs are a subset of 20 MHz Operating non-AP STAs. We propose to enable 20 MHz Only non-AP operating in the 6 GHz band and align the requirement with 20 MHz Operating non-AP STAs.

Text

Description automatically generated with medium confidence

**Proposed text changes in D1.4:**

**In the section of “9.4.2.313.4 Supported EHT-MCS And NSS Set field” make the indicated changes**

**P203**

**Table 9-401I – Subfields of the Supported EHT-MCS And NSS Set field(#4972)(#4516)**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| EHT-MCS Map (20  MHz-Only Non-AP STA)  (#5872) | For a 20 MHz-only non-AP STA(#5872), indicates the maximum number of spatial streams supported for reception and the maximum number of spatial streams that the STA can transmit, for each MCS value in a PPDU with a bandwidth of 20 MHz, 40 MHz, 80 MHz, 160 MHz, or 320 MHz with the following additional restrictions:   * Support for the reception of 1024-QAM in a 40 MHz, 80 MHz, 160 MHz, or 320 MHz EHT DL OFDMA is indicated jointly with the Rx 1024-QAM In Wider Bandwidth DL OFDMA Support subfield. * Support for the reception of 4096-QAM in a 40 MHz, 80 MHz,160 MHz, or 320 MHz EHT DL OFDMA is indicated jointly with the RX 4096-QAM In Wider Bandwidth DL OFDMA Support subfield. | The format and encoding of this subfield are defined in (#7048)Figure 9-1002aa (EHT-MCS Map (20 MHz-Only Non-AP STA) subfield and Basic EHT-MCS and NSS Set field format(#5872)) and the associated description.  In 5 GHz and 6 GHz, if B1, B2, and B3 of the Sup-ported Channel Width Set field in the HE PHY Capabilities Information field are all 0, then this field is present; otherwise, it is not present.  In 2.4 GHz, if B0 of the Supported Channel Width Set field in the HE PHY Capabilities Information field is 0, then this field is pres-ent; otherwise, it is not present. |

**In the section of “35.11.3 CENTER\_FREQUENCY\_SEGMENT” make the indicated changes**

**P440L57-P441L7**

A 20 MHz operating non-AP EHT STA shall issue a PHY-CONFIG.request primitive with the CENTER\_FREQUENCY\_SEGMENT parameter in the PHYCONFIG\_VECTOR set to the center frequency of the primary 20 MHz channel except when the 20 MHz operating non-AP EHT STA sets dot11HESubchannelSelectiveTransmissionImplemented equal to true in which case the 20 MHz operating non-AP EHT STA may issue a PHY-CONFIG.request primitive with the CENTER\_FREQUENCY\_SEGMENT parameter in the PHYCONFIG\_VECTOR set to the center frequency of any 20 MHz channel within the BSS bandwidth of 40 MHz, 80 MHz or 160 MHz by following the procedure in 26.8.7 (HE subchannel selective transmission). The 20 MHz operating non-AP EHT STA may also issue a PHY-CONFIG.request primitive with the CENTER\_FREQUENCY\_SEGMENT parameter in the PHYCONFIG\_VECTOR set to the center frequency of any 20 MHz channel within the primary 160 MHz when the BSS bandwidth is 320 MHz by following the procedure in 26.8.7 (HE subchannel selective transmission).

**In the section of “35.15.1 Basic EHT BSS operation” make the indicated changes**

**P447**

**Table 35-6 – Indication of supported channel widths by an EHT STA**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating Band | Maximum supported channel width | Supported Channel Width Set subfield in the HT Capabilities element | Supported Channel Width Set and the Extended NSS BW Support subfields in the VHT Capabilities element (See Table 9-311) | Supported Channel Width Set subfield in the HE Capabilities element | Support For 320 MHz in 6 GHz subfield in the EHT Capabilities element |
| 2.4 GHz | 20 MHz | 0 | N/A | Set B0 to 0 | 0 |
| 2.4 GHz | 40 MHz | 1 | N/A | Set B0 to 1 | 0 |
| 5 GHz | 20 MHz (See NOTE) | 0 | Set to indicate support for up to 80 MHz | Set B1 to 0, B2 to 0, B3 to 0 | 0 |
| 5 GHz | 80 MHz | 1 | Set to indicate support for up to 80 MHz | Set B1 to 1, B2 to 0, B3 to 0 | 0 |
| 5 GHz | 160 MHz | 1 | Set to indicate support for up to 160 or 80+80 MHz | Set B1 to 1, B2 to 1 | 0 |
| 6 GHz | 20 MHz (See NOTE) | N/A | N/A | Set B1 to 0, B2 to 0, B3 to 0 | 0 |
| 6 GHz | 80 MHz | N/A | N/A | Set B1 to 1, B2 to 0, B3 to 0 | 0 |
| 6 GHz | 160 MHz | N/A | N/A | Set B1 to 1, B2 to 1 | 0 |
| 6 GHz | 320 MHz | N/A | N/A | Set B1 to 1, B2 to 1 | 1 |
| NOTE – This corresponds to the 20 MHz-only non-AP EHT STA. An EHT AP does not use this setting. | | | | | |

**In the section of “36.1.1 Introduction to the EHT PHY” make the indicated changes**

**Starting from P461 L45**

A 20 MHz operating non-AP EHT STA shall support the following:

—26-, 52-, and 106-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) in the primary 20 MHz channel within 40 MHz PPDU in the 2.4 GHz band, and 40 MHz, 80 MHz, and 160 MHz PPDU(#1272) in the 5 GHz and 6 GHz bands, and 320 MHz PPDU in the 6 GHz band.

A 20 MHz operating non-AP EHT STA may support the following:

—(#2679)Reception of 40 MHz EHT sounding NDP (#7363)in the 2.4 GHz,5 GHz, and 6 GHz bands.

—(#2679)Reception of 80 MHz and 160 MHz EHT sounding NDP (#7361)in the 5 GHz and 6 GHz bands.

—Reception of 242-tone RU in the primary 20 MHz channel within 40 MHz PPDU in the 2.4 GHz band, and 40 MHz, 80 MHz, and 160 MHz PPDU(#1272) in the 5 GHz and 6 GHz bands, and 320 MHz PPDU in the 6 GHz band.

—26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel except the primary 20 MHz within 40 MHz channel width in the 2.4 GHz band if the 20 MHz operating non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7 (HE subchannel selective transmission)

—26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel except the primary 20 MHz within 40 MHz, 80 MHz, and 160 MHz PPDU(#1272) widths in the 5 GHz and 6 GHz bands if the 20 MHz operating non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7(HE subchannel selective transmission).

—26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel except the primary 20 MHz within the primary 160 MHz when the BSS bandwidth is 320 MHz in the 6 GHz band if the 20 MHz operating non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7(HE subchannel selective transmission).

if the non-AP STA is a 20 MHz-only non-AP STA that

**In the section of “36.3.2.5 20 MHz operating non-AP EHT STAs” make the indicated changes**

**P515L12-48**

(#2359)(#3095)(#2781)A 20 MHz operating non-AP EHT STA shall support (#4537)the transmission and reception of 26-tone RU, 52-tone RU, 106-tone RU, and 52+26-tone MRU in locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) within its operating channel for a 40 MHz, 80 MHz, 160 MHz, and 320 MHz OFDMA EHT PPDU. A 20 MHz operating non-AP EHT STA may support (#4537)the reception of 242-tone RU within its operating channel for a 40 MHz, 80 MHz, 160 MHz, and 320 MHz OFDMA EHT PPDU (see 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276))). (#3165)An EHT AP with an operating channel width greater than 20 MHz shall be able to allocate an RU (see 36.3.2.1 (Subcarriers and resource allocation in EHT PPDUs(#4636))) or MRU (see 36.3.2.2 (Subcarriers and resource allocation for multiple RUs)) on a 20 MHz channel within the BSS bandwidth in a 40 MHz, 80 MHz, 160 MHz, or 320 MHz (#4537)OFDMA EHT PPDU to a 20 MHz operating non-AP EHT STA depending on the AP’s operating channel width. The AP’s operating channel (#7164)width is the same as the BSS channel width. When an EHT AP assigns an RU or MRU to a 20 MHz operating non-AP EHT STA, the EHT AP shall follow the restrictions for 20 MHz operation in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276))(#4537).

(#4633)NOTE 3—As defined in 35.11.3 (CENTER\_FREQUENCY\_SEGMENT(#4633)), a 20 MHz operating non-AP EHT STA operates in the primary 20 MHz channel except when the 20 MHz operating non-AP EHT STA sets dot11HESubchannelSelectiveTransmissionImplemented equal to true(#7165) in which case the 20 MHz operating non-AP EHT STA might operate in any 20 MHz channel within the BSS bandwidth of (#5525)40 MHz, 80 MHz or 160 MHz. The 20 MHz operating non-AP EHT STA might also operate in any 20 MHz channel within the primary 160 MHz when the BSS bandwidth is 320 MHz.

# CID 4978, 4979

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 4978 | 36.1.1 | 315.61 | 20 MHz-only non-AP EHT STA shall also support those RUs and MRUs in the primary 20 MHz channel within 40 MHz PPDU in the 2.4 GHz band. Need to specify it. | See the comment | REVISED.  Agree with the commentator. The requirement for 40MHz in 2.4GHz is missing in the description. The updated text for this section above already corrected this issue.  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 4979 | 36.1.1 | 316.26 | 20 MHz operating non-AP EHT STA shall also support those RUs and MRUs in the primary 20 MHz channel within 40 MHz PPDU in the 2.4 GHz band. Need to specify it. | See the comment. | REVISED.  Agree with the commentator. The requirement for 40MHz in 2.4GHz is missing in the description. The updated text for this section above already corrected this issue.  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |

# CID 4524, 4980, 5523

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 4524 | 36.1.1 | 316.39 | Non primary channel operation is also "may" supported for 20Mhz operation STA. Add the two bulltets in L8-L20 in P316 after L39 or combine with the 20Mhz only STA "may" paragraph. | as in the comment. | REVISED.  Agree with the commenter. The requirement for 20 MHz operating non-AP EHT STA is aligned in the proposed new text.  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 4980 | 36.1.1 | 316.39 | Similar to 20 MHz-only non-AP EHT STA, by SST operation, 20 MHz operating non-AP EHT STA may also support 26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 in any 20 MHz channel within 40 MHz PPDU in 2.4 GHz, 5 GHz and 6 GHz, within 80 MHz and 160 MHz PPDU in 5 GHz and 6 GHz and within 320 MHz PPDU in 6 GHz. | Add the description. | REVISED.  Agree with the commenter. The requirement for 20 MHz operating non-AP EHT STA is aligned in the proposed new text.  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 5523 | 36.1.1 | 316.39 | There is no description on the operation of a 20 MHz operating non-AP EHT STA in any 20 MHz channel by following the procedure in 26.8.7 (HE subchannel selective transmission) while in the same condition the operation of a 20 MHz-only non-AP EHT STA is written down in 36.1.1 (Introduction to the EHT PHY). Though the related text on the operation is defined in 36.3.2.5 (20 MHz operating non-AP EHT STAs), it might be misleading if there is only desription regarding 20 MHz-only non-AP EHT STA in the PHY introduction part which is important section to show the summary of EHT PHY. | Suggest to add following text,  "-- 26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation) in any 20 MHz channel within 40 MHz channel width in the 2.4 GHz band if the 20 MHz operating non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7 (HE subchannel selective transmission).  -- 26-, 52-, 106-, and 242-tone RU sizes and 52+26-tone MRU size on locations allowed in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation(#3276)) in any 20 MHz channel within 40 MHz, 80 MHz, and 160 MHz PPDU widths in the 5 GHz and 6 GHz band or the primary 160 MHz when the BSS bandwidth is 320 MHz in the 6 GHz if the 20 MHz operating non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7 (HE subchannel selective transmission)." | REVISED.  Agree with the commenter. The requirement for 20 MHz operating non-AP EHT STA is aligned in the proposed new text.  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |

# CID 5521, 5522 , 4895, 5714, 7321, 7322, 7977

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 5521 | 36.1.1 | 316.11 | The sentence "if the 20 MHz-only non-AP EHT STA supports the EHT subchannel selective transmission operation described in 35.6.1 (EHT subchannel selective transmission)." should be "if the 20 MHz-only non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7 (HE subchannel selective transmission)" | As in comment | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 5522 | 36.1.1 | 316.17 | The sentence "if the 20 MHz-only non-AP EHT STA supports the EHT subchannel selective transmission operation described in 35.6.1 (EHT subchannel selective transmission)" should be "if the 20 MHz-only non-AP EHT STA supports the HE subchannel selective transmission operation described in 26.8.7 (HE subchannel selective transmission)" | As in comment | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 4895 | 36.1.1 | 316.18 | Add the subclause for EHT subchannel selective transmission in 35 clauses of 11be spec and add the description for EHT SST. | As in comment | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 5714 | 36.1.1 | 316.12 | "EHT subchannel selective transmission operation" is not defined in the current spec. Use HE subchannel selective transmission operation as described in 26.8.7 or define EHT subchannel selective transmission operation in clause 35. | Change "EHT subchannel selective transmission operation..." to "HE subchannel selective transmission operation described in 26.8.7." Or define EHT subchannel selective transmission operation in Clause 35 | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 7321 | 36.1.1 | 316.12 | Provide spec text for 35.6.1 (EHT subchannel selective transmission) and adjust numbering of subclause and reference there after. | as in comment | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 7322 | 36.1.1 | 316.22 | The "Editor's Note: There is no sublcause 35.6.1 in the draft amendment." should read "Editor's Note: There is no sublcause 35.X.1 (EHT subchannel selective transmission) in the draft amendment." as ther is already a subclause 35.6.1 addressing a different topic | as in comment | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |
| 7977 | 36.1.1 | 316.11 | Reference to incorrect subclause. | At P316L11 and L18, change  "EHT subchannel selective transmission operation described in 35.6.1."  to  "subchannel selective transmission operation described in 26.8.7."  And delete the Editor's Note at P316L22. | REVISED.  Agree with the commenter. The proposed change is implemented as part of the proposed change for CIDs 6930, 7115  Instructions to the editor: No further changes are needed for this CID after implementing the proposed changes for CIDs 6930, 7115 |