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

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| CC36 CR for puncturing operation |
| Date: 2021-12-12 |
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**Abstract**

This submission proposes resolutions for the following 18 CIDs for TGbe CC36:

* 7880,5959,4181,7909,5555,6685,5556,7910,5206,7791,4167,7861,7862,4168,4169,5111,7364,7091

**Revisions:**

* Rev 0: Initial version of the document.

***TGbe editor: Please note Baseline is REVmd D5.0, 11ax D8.0, and 11be D1.3***

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| CID | Commenter | Clause | Page | Comment | Proposed Change | Resolution |
| 7880 | Yongho Seok | 35.2.1.2.2 | 243.40 | Trigger and CF-END frames can be also sent with the preamble puncturing. | Please allow to send other control frames with the preamble puncturing. | RevisedAgree with the commenter in principle. This has already been addressed in D1.3, which has generalized the rule and allowed puncturing for any non-HT duplicate PPDU or EHT PPDU.Tgbe editor, there is no further action needed on this CID. |
| 5959 | Liwen Chu | 35.2.1.2.2 | 243.42 | The control frames are not complete | Add PS Poll, BAR, NDPA | RevisedAgree with the commenter in principleThis has already been addressed in D1.3, which has generalized the rule and allowed puncturing for any non-HT duplicate PPDU or EHT PPDU.Tgbe editor, there is no further action needed on this CID. |
| 4181 | Alfred Asterjadhi | 35.2.1.2.2 | 243.42 | What if these frames are sent in another PPDU type? Can they be transmitted in any 20 MHz subchannel that is punctured? I would guess not. So please explicitly call out the rules for all types of PPDUs, what is allowed and what not. Similar consideration applies to other types of frames as well (i would guess this would not be limited only to this select group of control frames). | As in comment. | RevisedAgree with the commenter in principle. This has already been addressed in D1.3, which has generalized the rule and allowed puncturing for any non-HT duplicate PPDU or EHT PPDU.Tgbe editor, there is no further action needed on this CID. |
| 7909 | Youhan Kim | 35.2.1.2.2 | 243.42 | "When an EHT STA transmits an RTS, MU-RTS Trigger, or CTS frame in a non-HT duplicate PPDU, the STA shall not transmit on any 20 MHz subchannel that is punctured."Definition of 'puncturing' is that there is no transmission, so this sentence as-is does not provide any useful information.Is the sentence trying to say that when transmitting RTS/MU-RTS/CTS, then the 20 MHz subchannel(s) that are indicated to be punctured in the Beacon frame must be punctured?If so, it should be written as such.However, another question is why is it that only RTS/MU-RTS/CTS frames are called out here? E.g., are other frames allowed to transmit in 20 MHz subchannels which is supposed to be punctured? | Either delete this sentence which is currently provide no useful information, or clarify what it is trying to say. | RevisedAgree with the commenter in principle. This has already been addressed in D1.3, which has generalized the rule and allowed puncturing for any non-HT duplicate PPDU or EHT PPDU.Tgbe editor, there is no further action needed on this CID. |
| 5555 | JINYOUNG CHUN | 35.2.1.2.2 | 243.42 | STA shall not transmit on any 20MHz subchannel that is punctured when an EHT STA transmits any non-HT duplicate PPDU. So please delete the lists of frames. | Modify the text as follow:When an EHT STA transmits an RTS, MU-RTS Trigger, or CTS frame in a non-HT duplicate PPDU, the STA shall not transmit on any 20 MHz subchannel that is punctured. | RevisedAgree with the commenter in principleThis has already been addressed in D1.3, which has the following text: “An EHT STA shall not transmit on any 20 MHz subchannel that is punctured as indicated in the TXVECTOR parameter INACTIVE\_SUBCHANNELS”Tgbe editor, there is no further action needed on this CID. |
| 6685 | Robert Stacey | 35.2.1.2.2 | 243.42 | Is it the channel, subchannel or PPDU that is punctured? A channel might be punctured on a particular subchannel. A PPDU might be punctured on a particular subchannel. But the subchannel itself is not punctured as implied by "20 MHz subchannel that is punctured".In any case, puncturing is a PHY operation and should be defined in the PHY spec. The MAC spec needs rules on setting INACTIVE\_SUBCHANNELS and the PHY needs rules on how to transmit a PPDU based on the INACTIVE\_SUBCHANNELS setting.An appropriate MAC rule might be something like "If the AP says that the operating channel is punctured the the non-AP STA shall not transmit a PPDU with the INACTIVE\_SUBCHANNELS without a 0 in the appropriate place" (I.e. MAC behavior). | Rewrite this subclause so that it provides rules for the setting of INACTIVE\_SUBCHANNELS. Ensure that the PHY spec has rules for transmitting a PPDU based on the INACTIVE\_SUBCHANNELS setting. | RevisedAgree with the commenter in principleD1.3 has provided clarification in 35.2.1.2 to address this comment. It is the subchannel that gets punctured, which is similar to the baseline text in 11ax (e.g., "B0 indicates support for the reception of an 80 MHz preamble where the only punctured subchannel is the secondary 20 MHz channel").As suggested, clause 35.13.2 (Preamble puncturing operation) in D1.3 has provided rules for the setting of INACTIVE\_SUBCHANNELS and Table 36-1 has added rules for transmitting a PPDU based on the INACTIVE\_SUBCHANNELS settingTgbe editor, there is no further action needed on this CID. |
| 5556 | JINYOUNG CHUN | 35.2.1.2.2 | 243.46 | Why is the indication applied to only RTS, MU-RTS Trigger or CTS frame? Let's apply the indication to all non-HT duplicate PPDUs. | Modify the text as follow:The indication of which subchannels are punctured in an RTS, MU-RTS Trigger, or CTS frame that is carried in a non-HT duplicate PPDU is conveyed from the MAC to the PHY through the TXVECTOR parameter INACTIVE\_SUBCHANNELS (see Table 36-1 (TXVECTOR and RXVECTOR parameters)).The parameter INACTIVE\_SUBCHANNELS may be present in the TXVECTOR of a non-HT duplicate PPDU that carries an RTS, MU-RTS Trigger, or CTS frame. | RevisedAgree with the commenter in principle. This has already been addressed in D1.3, which has generalized the rule and allowed puncturing for any non-HT duplicate PPDU or EHT PPDU.Tgbe editor, there is no further action needed on this CID. |
| 7910 | Youhan Kim | 35.2.1.2.2 | 243.46 | Why are only RTS/MU-RTS/CTS frames called out in this paragraph?For example, the INACTIVE\_SUBCHANNELS TXVECTOR parameter in Table 36-1 states that the INACTIVE\_SUBCHANNELS TXVECTOR is always present when transmitting EHT MU and Non-HT duplicate PPDUs. | Change the paragraph such that the reader does not mistake that INACTIVE\_SUBCHANNELS is present only for RTS/MU-RTS/CTS.Also, the last sentence "... INACTIVE\_SUBCHANNELS may be present..." needs to be fixed to align with Table 36-1 (always present). | RevisedAgree with the commenter in principle. The individual frame types have been replaced with PPDU types in D1.3.In 11ax text, the presence of the INACTIVE\_SUBCHANNELS TXVECTOR parameter is optional, as this parameter is not needed for non-punctured transmissions. The text in D1.3 inherits the same rule.Tgbe editor, there is no further action needed on this CID. |
| 5206 | Huizhao Wang | 35.2.1.2.2 | 243.49 | The INACTIVE\_SUBCHANNELS field shall be in TxVector for non-HT Dup PPDU if the transmitter is an EHT STA | Change the "may" to "shall". | RejectedIn 11ax text, the presence of the INACTIVE\_SUBCHANNELS TXVECTOR parameter is optional, as this parameter is not needed for non-punctured transmissions. The text in D1.3 inherits the same rule.Tgbe editor, there is no further action needed on this CID. |
| 7791 | Yanjun Sun | 35.2.1.2.2 | 243.42 | If any punctured subchannel is indicated in beacons by an EHT AP, can the AP change what subchannel to puncture later in time? If so, please define signaling and procedures for the change. | As in comment | RevisedAgree with the commenter in principle. As an update of the puncturing pattern is carried in the EHT Operation Element in beacons, a non-AP STA can adopt the update pattern through the BSS parameter critical update procedure (see 35.3.9) in D1.3. Tgbe editor, there is no further action needed on this CID. |
| 4167 | Alfred Asterjadhi | 35.10.1 | 304.37 | What about in the other bands? A 6G AP only operates in the 6G band so this is a bit confusing as it implies that in other bands the 6G AP may do something else which is not true. And on a side note, in other bands (e.g., 5G) can another AP of an AP MLD announce these widths that are different from the other widths (for the 6 GHz AP affiliated to the same AP MLD? I would think so. Perhaps good to clarify (here or in the AP MLD behaviuor related subclauses. | As in comment. | RevisedAgree with the commenter in principle. Generalized the text so that the rules are applicable to other bands as well.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #4167 |
| 7861 | Yonggang Fang | 35.10.1 | 304.37 | Suggest to delete "6GHz non-EHT STAs" as the 6GHz EHT AP announces a BSS operating channel width no matter a "6GHz non-EHT STAs" exists or not. | See the comment | RevisedAgree with the commenter in principle. Deleted “to 6 GHz non-EHT STAs”.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #7861 |
| 7862 | Yonggang Fang | 35.10.1 | 304.37 | Please clarify "6 GHz EHT AP" means an EHT AP only operating on 6GHz band or an AP affiliated with AP MLD operating on 6GHz band? |   | RevisedText related to 6 GHz has been deleted based on resolution to #4167 above. Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #4167, same as above. |
| 4168 | Alfred Asterjadhi | 35.10.1 | 304.32 | I think we need a subclause for EHT BSS operation in other bands (2G4 and 5) and for the 5 GHz case maybe add that if EHT Operation element is there then 80+80 is not allowed, and probably the static puncturing case as well? | As in comment. | RevisedAgree with the commenter in principle. Disallowed 80+80 MHz operation at an EHT AP.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #4168 |
| 4169 | Alfred Asterjadhi | 35.10.1 | 304.34 | EHT BSS 6G operation subclause is too liimited in terms of description of normative behaviors. I think we need to add explicitly that the disallowed channels are those psecified by static puncturing field in EHT ops, and also what the expected behaviiors of the APs and STAs are. Use HE subclause as a reference. | As in comment. | RevisedAgree with the commenter in principle. Added reference to 35.14.3 (Preamble puncturing operation) which includes normative behavior on puncturing.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #4169 |
| 5111 | Geonjung Ko | 35.10.1 | 304.45 | The current restriction seems to restrict the freedom to select the primary channel. Therefore, primary channel selection can be prior to BSS operating channel width selection.For example, there are four 80 MHz channels (80-1, 80-2, 80-3 and 80-4) and 80-1 channel is disallowed. When the EHT AP intends to use 80-2 channel as the P80 channel and to use 80-2, 80-3 and 80-4 channels for EHT STAs, following the current restriction, the EHT AP should announce BSS operating channel width in the HE Operation element as 160 MHz (that covers 80-3 and 80-4 channels) which is the widest width. | Primary channel selection should be prior to BSS operating channel width selection.The restriction can be changed as below."The announced BSS operating channel width in the HE Operation element is the widest width ""including the primary channel"" without covering the disallowed 20 MHz channels." | RevisedAgree with the commenter in principle. Revised the text to ensure that the primary channel is considered.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #5111 |
| 7364 | Stephen McCann | 35.10.1 | 304.45 | The word "widest" is not useful. | Replace the term "widest" with "maximum" | RevisedAgree with the commenter in principle. Replace “widest” with “maximum”.Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #7364 |
| 7091 | Sigurd Schelstraete | 35.10.1 | 304.45 | Clarify "the widest width without covering the disallowed 20 MHz channels". Either an umabiguous definition or an example would help make this clearer | See comment | RevisedAgree with the commenter in principle. Replace “widest” with “maximum” and added reference to the Disabled Subchannel Bitmap field in the EHT Operation element .Tgbe editor please implement changes as shown in doc 11-21/1700r1 tagged as #7364, same as above |

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

**35.14 EHT BSS operation**

***TGbe editor: Please update the paragraphs in 35.14.2 and move them to 35.14.1 as follows:***

**35.14.1 Basic EHT BSS operation(#7913)**

An EHT AP shall not assign an AID value of 2007 to any STA.

**(#4167)**(#2852) An EHT AP may announce **(#7861)** a BSS operating

channel width that is different from the BSS operating channel width that it announces to non-AP

EHT STAs if the EHT BSS operating channel width includes at least one punctured 20 MHz subchannel and/or

if the announced EHT BSS operating channel width is not supported by an HE BSS.

**(#4167)**An EHT AP shall announce the BSS operating channel width in the HE Operation element with the

following restriction:

— The announced BSS operating channel width in the HE Operation element is the **(#7364)**maximum width **(#5111)** including the primary channel without covering any punctured 20 MHz subchannel indicated in the Disabled Subchannel Bitmap field in the EHT Operation element as defined in **35.14.3 (P**reamble puncturing operation**) (#4169)**.

The announced BSS operating channel width in HE Operation element is no more than the BSS operating

channel width in the EHT Operation element **(#4168)** and the corresponding BSS shall not operate as an 80+80 MHz BSS.