IEEE P802.11
Wireless LANs

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| CR for 11be D1.0 Spectral Mask |
| Date: 2020-07-13 |
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Abstract

This submission proposes text changes of TGbe Draft 1.0 for CIDs:

4639

4955

4956

5020

5021

5097

6094

6148

6149

6444

6816

6817

6837

7257

7258

7259

7260

7261

7262

7315

7743

8142

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: editorial updates
* Rev 2: suggest to generalize the definition of preamble puncturing to TB PPDU.
* Rev 3: updated based on comments received online

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 1.01. 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.***

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 4639 | 36.3.19.2.1 | 517.57 | 1) No Disable Subchannel Bitmap defined elsewhere in the spec; 2) This para has the 802.11 arch back to front, and leads to circular logic. What should happen: Step 1) PHY declares its optional capabilities via one or more MIB variables. PHY must support all requirements implied by asserting each such MIB variable (or not assert it) (typically the PHY does this at digital design time or during factory cal/in-service cal for analog). Step 2) MLME reads the PHY's capabilities. Step 3) MLME advertises its capabilities and associates with a BSS, where the BSS behavior might be defined/constrained by Opertions elements; and at the same time the MLME configures the PHY to align with the STA's advertised capabilities element and the BSS' operations element. In this light, an EHT STA need to support the PHY requirements associated with \*all\* mandatory puncturing patterns, and \*any\* optional-but-supported puncturing patterns that an AP \*could\* advertise in its operations element. Not just what one AP happens to transmit today. | 1) Define Disable Subchannel Bitmap in the HE Operaitons element; and 2) try "For preamble puncturing in an EHT MU PPDU, the signal leakage from the occupied subchannels to the punctured subchannels shall follow the restrictions as described below for each puncturing pattern that can be expressed by the U-SIG. For preamble puncturing in an EHT TB PPDU, the signal leakage from the occupied subchannels to the punctured subchannels shall follow the restrictions as described below for each puncturing pattern that can be expressed by the Disable Subchannel Bitmap field in the EHT Operations element (see 35.12.x (Preamble puncturing operation)." | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 4639. |
| 4955 | 36.3.19.1.2 | 521.37 | Refering to the example in Figure 36-73, is there evidence that ~-22dBr in the punctured channel will meet 6 GHz regulatory requirements to not interfere with an incumbent occupying the punctured channel? If not, a warning must be added that this feature shall only be used when other non-primary occupants are in the punctured channel. We can't have this feature causing regulatory violations and risk the industry losing access to the band. | as in comment | Rejected –no text changes are needed. Commenter was asking/concerning about the current requirements defined in IEEE. The current requirements in IEEE for punctured mask follow closely on regulatory reqruiements already. IEEE spec also mentioned requirements are subject to local regulatory rules: “NOTE 1—In the presence of additional regulatory restrictions, the device has to meet both the regulatory requirements and the mask defined in this subclause.” |
| 4956 | 36.3.19.1.2 | 521.37 | Refering to the example in Figure 36-73, is there evidence that ~-22dBr in the punctured channel will meet 5 GHz DFS regulatory requirements to not interfere with a radar occupying the punctured channel? If not, a warning must be added that this feature shall only be used when other non-primary occupants are in the punctured channel. We can't have this feature causing regulatory violations and risk the industry losing access to the band | as in comment | Rejected –no text changes are needed. Commenter was asking/concerning about the current requirements defined in IEEE. The current requirements in IEEE for punctured mask follow closely on regulatory reqruiements already. IEEE spec also mentioned requirements are subject to local regulatory rules: “NOTE 1—In the presence of additional regulatory restrictions, the device has to meet both the regulatory requirements and the mask defined in this subclause.” |
| 5020 | 36.3.19.1.1 | 514.03 | The text "greater than 19.5Hz" looks redundant. Delete it. | See the comment. | Accepted-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 5020. |
| 5021 | 36.3.19.1.1 | 514.37 | Add a space, i.e., "decibels domain". | See the comment. | Accepted |
| 5097 | 36.3.19.1.2 | 518.06 | is/are is not aligned with and/or in the same sentence | change to are/is | Accepted |
| 6094 | 36.3.19.1.2 | 519.38 | Preamble puncture: if 2 or more bands are punctured at the edge of the band it is not clear in we should apply Case 1 or Case 2. The sentence at the beginning of case 2 is not clear, it says "edge" but then it is applied to the middle of the band and figure 36-72 includes "middle" |   | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 6094. |
| 6148 | 36.3.19.1.3 Additional restrictions of preamble puncturing for non-HT duplicate PPDU | 523.42 | There is a large space in Line 42. | delete the space | Accepted |
| 6149 | 36.3.19.1.2 Additional restrictions for puncturing in EHT PPDU | 523.15 | No unit in the upper right figure | Add "Freq [MHz]" there | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 6149. |
| 6444 | 36.3.19 | 517.61 | Update a section number for "Preamble puncturing operation". | As in comment | Revised-Resolved in CID 4639 |
| 6816 | 36.3.19.1.2 | 0.00 | better to add "Measurements shall be made using a 100 kHz resolution bandwidth and a 7.5 kHz video bandwidth" as 36.3.19.1.1 |   | Accepted-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 6816. |
| 6817 | 36.3.19.1.3 | 0.00 | better to add "Measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth" as 17.3.9.3 |   | Accepted-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 6817. |
| 6837 | 36.3.19.1.3 | 525.21 | Fig 36-79 top left drawing corresponds to 320MHz wrongly titled as 80MHz. Please chanhe the description of top left drawing to "320MHz spectral mask without preamble puncture" | As in Comment | Accepted-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 6837. |
| 7257 | 36.3.19.1.2 | 517.55 | The term "subchannel puncturing" is not found elsewhere in the document. What is the meaning? Why can't the term preamble puncturing be used? | Clarify | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 7257. |
| 7258 | 36.3.19.1.2 | 517.60 | Change "In EHT MU PPDU, puncturing pattern" to "In EHT MU PPDU, the puncturing pattern" | See comment (2 occurences) | Revised-Resolved in CID 4639 |
| 7259 | 36.3.19.1.2 | 517.60 | Change "is based on U-SIG" to "is contained in U-SIG". | See comment | Revised-Resolved in CID 4639 |
| 7260 | 36.3.19.1.2 | 517.61 | Add section 35.12.x or remove reference to it. | See comment | Revised-Resolved in CID 4639 |
| 7261 | 36.3.19.1.2 | 519.43 | Change "Depends on the ..." to "Depending on the ..." | See comment | Accepted |
| 7262 | 36.3.19.1.2 | 520.22 | "in the middle of the EHT PPDU" is bad choice of words. A PPDU exists in the time domain, so "the middle" can be misinterpreted. Even in the frequency domain, this figure applies to all non-edge locations, which is also not accurately captured by "in the middle". | Improve wording. Simlar comment for Figure 36-74. | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 7262. |
| 7315 | 36.3.19.1.3 | 523.42 | Empty spaces before "-20 dBr" | Remove empty spaces | Accepted |
| 7743 | 36.3.19.1 | 513.09 | PSD floor was discussed in dcn 923 but not reflected in spec | as commented | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 7743. |
| 8142 | 36.3.19.1.3 | 523.38 | In EHT PPDU, puncturing pattern is based on U-SIG or the Disable Subchannel Bitmap in the EHT Operations elements. Add the puncturing pattern to be applied to non-HT duplicated transmission | as in comment | Revised-TGbe editor please refer to the changes in DCN 1159r3 under heading that include CID 8142. |

**Proposed changes for CID 4639, 7257, 8142:**

***Discussions:*** *11be subclause 36.3.12.11(EHT preamble of preamble punctured EHT MU PPDU) limits the scope of preamble puncturing to MU PPDU. Suggest generalizing the definition to cover TB PPDU, such that no need to create another definition of “subchannel puncturing”. The definition can also be leveraged by unused tone EVM.*

*For example, 36.3.12.11 can be changed to “Preamble punctured PPDU” The preamble puncturing in TB PPDU can be clarified as “the unmodulated frequency resources in TB PPDU may be due to unallocated RU/MRU, preamble puncturing or CCA busy. The unmodulated subchannels due to preamble puncturing is determined by the Disabled Subchannel bitmap field in the EHT operation element”*

*To the TGbe Editor: change the P.L. 539.57 as following:*

For preamble puncturing in EHT MU PPDU, ~~and for subchannel puncturing in~~ EHT TB PPDU and non-HT duplicated PPDU, the signal leakage from the occupied subchannels to the punctured subchannels shall follow the restrictions as described below subject to the puncturing pattern in EHT MU PPDU, ~~and~~ EHT TB PPDU and non-HT duplicated PPDU, respectively. The puncturing pattern in an EHT MU PPDU is indicated by the Punctured Channel Information in U-SIG. The puncturing pattern in an EHT TB PPDU and non-HT duplicated PPDU is determined by the Disabled Subchannel Bitmap field in the EHT Operation element defined in 9.4.2.295a (EHT Operation element).

~~In EHT MU PPDU, puncturing pattern is based on U-SIG. In EHT TB PPDU, puncturing pattern is based on the Disable Subchannel Bitmap field in the EHT Operation element as described in 35.12.x (Preamble puncturing operation).~~

**Proposed changes for CID 6094:**

*To the TGbe Editor: change the P.L. 539.57 as following:*

When there are two or more contiguous 20 MHz subchannels are punctured in a PPDU and the punctured subchannels are not at the edge of the PPDU, the subchannel edge mask as defined in Figure 36-72…

**Proposed changes for CID 6149:**

*To the TGbe Editor: Replace* ***Figure 36-75—Example for the construction of the overall interim spectral mask for 80 MHz EHT PPDU with the second lowest 20 MHz subchannel punctured*** *with the figure below.*



**Proposed changes for CID 6816:**

*To the TGbe Editor: add the paragraph below at the end of 36.3.19.1.2*

Measurements shall be made using a 100 kHz resolution bandwidth and a 7.5 kHz video bandwidth.

**Proposed changes for CID 6817:**

*To the TGbe Editor: add the paragraph below at the end of 36.3.19.1.3*

Measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth.

*To the TGbe Editor: change the paragraph below in P.L. 539.51 as below*

Measurements shall be made using a 100 kHz resolution bandwidth and a 7.5 kHz video bandwidth for EHT PPDU.

Measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth for non-HT duplicate PPDU.

**Proposed changes for CID 6837:**

*To the TGbe Editor: Replace* **Figure 36-79—Example for the construction of the overall interim spectral mask for 320 MHz non-HT duplicated transmission with the lowest 40 MHz subchannel punctured** *with the figure below.*



**Proposed changes for CID 7262:**

*To the TGbe Editor: change the title of figure 36-72 and figure 36-74 respectivly as below:*

Figure 36-72—Preamble puncture mask for preamble puncturing in the ~~middle of the~~ EHT PPDU when the bandwidth of the punctured subchannel is equal to or greater than 40 MHzand the punctured subchannel is not at the edge of the PPDU bandwidth.

Figure 36-74—Preamble puncture mask for preamble puncturing in the ~~middle of the~~ EHT PPDU when the bandwidth of the punctured subchannel is equal to 20 MHzand the punctured subchannel is not at the edge of the PPDU bandwidth.

**Figure 36-77—Preamble puncture mask for preamble puncturing in the non-HT duplicate PPDU when the bandwidth of the punctured subchannel is equal to or greater than 40 MHz** and the punctured subchannel is not at the edge of the PPDU bandwidth

**Figure 36-78—Preamble puncture mask for preamble puncturing in the non-HT duplicate PPDU when the bandwidth of the punctured subchannel is equal to 20 MHz** and the punctured subchannel is not at the edge of the PPDU bandwidth

**Proposed changes for CID 7743, 5020:**

To TGbe editor: make the following changes

Change P.L. 535.30 as below

The transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –53 dBm/MHz at any frequency offset in the 2.4GHz band. The transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –39 dBm/MHz at any frequency offset in the 5GHz and 6GHz band. Figure 36-64 (Example transmit spectral mask for a 20 MHz mask PPDU) shows an example of the resulting overall spectral mask when the –40 dBr spectrum level is above –53 dBm/MHz in the 2.4GHz or when the –40 dBr spectrum level is above –39 dBm/MHz in the 5GHz and 6GHz band.

Change P.L. 536.1 as below

The transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –56 dBm/MHz at any frequency offset ~~greater than 19.5 MHz~~ in the 2.4 GHz band. The transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –39 dBm/MHz at any frequency offset in the 5 GHz and 6GHz band. Figure 36-65 (Example transmit spectral mask for a 40 MHz mask PPDU) shows an example of the resulting overall spectral mask when the –40 dBr spectrum level is above –56 dBm/MHz in the 2.4 GHz or when the –40 dBr spectrum level is above –39 dBm/MHz in the 5GHz and 6GHz band.

Change P.L. 536.38 as below

The transmit spectrum shall not exceed the maximum of the interim transmit spectrum mask and -39 dBm/MHz at any frequency offset. Figure 36-66 (Example transmit spectral mask for an 80 MHz mask PPDU) shows an example of the resulting overall spectral mask when the –40 dBr spectrum level is above –39 dBm/MHz

For an 80 MHz mask PPDU of EHT format, if the preamble puncturing is applied, the interim spectral mask is
subject to the mask defined in…

Change P.L. 537.35 as below

The transmit spectrum shall not exceed the maximum of the interim transmit spectrum mask and -39 dBm/MHz at any frequency offset. Figure 36-67 (Example transmit spectral mask for a 160 MHz mask PPDU) shows an example of the resulting overall spectral mask when the –40 dBr spectrum level is above –39 dBm/MHz.

For a 160 MHz mask PPDU of EHT format, if the preamble puncturing is applied, the interim spectral mask is
subject to the mask defined in…

Change P.L. 538.36 as below

The transmit spectrum shall not exceed the maximum of the interim transmit spectrum mask and -39 dBm/MHz at any frequency offset. Figure 36-68 (Example transmit spectral mask for a 320 MHz mask PPDU) shows hows an example of the resulting overall spectral mask when the –40 dBr spectrum level is above –39 dBm/MHz.

For a 320 MHz mask PPDU of EHT format, if the preamble puncturing is applied, the interim spectral mask is
subject to the interim mask defined in…