IEEE P802.11
Wireless LANs

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| CR Disallowed Subchannels |
| Date: 2019-06-04 |
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Abstract

Proposed language to address two CIDs from LB 238 D4.0 relating to disallowed subchannels

The CIDS are 20106 and 21327 and 20903, 21325, 21326

Changes are referenced to TGax D4.3.

**REVISION NOTES:**

**R0**:

Initial

**R1**:

Added CID 20903

Update doc references

**R2**:

Added a note to 27.3.13 for non-HT DUP transmission preamble puncturing – this note creates a more explicit reference to existing text that describes how to puncture the L-STF, L-LTF, L-SIG for this PPDU

Update doc references

**R3**:

Change the reference in the added note to 27.3.13 to point to 27.3.7 which covers all HE PPDUs

Add changes to 27.3.7

Add changes to 27.3.10.8.3

Update doc references

**R4**:

Add “HE NDP PPDU” to the list of possible punctured PPDUs inside of the mathematical description section for 27.3.10.3 L-STF (Note that the Omega 20 MHz defined here is reused in the other preamble field equations)

Update doc references

**R5**:

Add CID 21325 and 21326

Add proposed changes for these two new CIDs within 26.7.2

Update doc references

**R6**:

Update to D4.3

Update doc references

**END OF REVISION NOTES**

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 TGax Draft. This introduction is not part of the adopted material.

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

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

**CIDs**

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| 20106 | Alfred Asterjadhi | 9.3.1.19 | 102.32 | The description of the Disallowed Subchannel Bitmap subfield seems to long. Suggest to compress the description a little bit. Also "is not disallowed" I am guessing can be replaced with "is allowed". | As in comment. | Reject – a careful reading of the description of the subfield indicates that the paragraph contains no more and no less than what is needed to provide a complete and accruate description of the subfield. As to the suggestion to use “allowed” in place of the phrase “is not disallowed”, this cannot easily be done, as there is a definition for disallowed, but there is not a complimentary definition of allowed. |
| 21327 | Robert Stacey | 26.11.7 | 410.11 | The INACTIVE\_SUBCHANNELS statement needs to be nomrative. | The parameter INACTIVE\_SUBCHANNELS may be present in the TXVECTOR of a non-HT duplicate PPDU that carries an HE NDP Announcement frame or of an HE sounding PPDU. The parameter INACTIVE\_SUBCHANNELS shall not be present otherwise. | Revise - TGax editor to make changes as shown in 11-19/1064r5 that are marked with CID 21327 which generally agree with the commenter’s suggestion to change the wording to be normative. |
| 20903 | Mark Rison | 26.7.2 | 358.12 | "value of 2047 for AID11 in a STA Info field of an HE NDPAnnouncement frame" is broken. In fact the whole para and next are wonky | At 358.6 change "An SU beamformer may solicit punctured feedback from an SU beamformee in an HE TB sounding sequence if the SU beamformee indicates support for punctured sounding by setting the Punctured Sounding Support subfield to 1. An SU beamformer shall indicate punctured subchannels in the NDP frames of an HE NDP sounding sequence by setting the appropriate bits of the Disallowed Subchannel Bitmap subfield of the STA Info field that includes the value of 2047 in the AID11 subfield within an HE NDP Announcement frame. An SU beamformer that includes a value of 2047 for AID11 in a STA Info field of an HE NDP Announcement frame shall place that STA Info field as the first STA Info field of the frame. An SU beamformer that indicates punctured subchannels in the NDP frames of an HE NDP sounding sequence shall set the TXVECTOR parameter INACTIVE\_SUBCHANNELS according to 27.11.7 (INACTIVE\_SUBCHANNELS)." to "An SU beamformer may solicit punctured feedback from an SU beamformee in an HE TB sounding sequence if the SU beamformee indicates support for punctured sounding by setting the Punctured Sounding Support subfield in the HE Capabilities elements it transmits to 1. An SU beamformer shall indicate punctured subchannels in the HE sounding NDP of an HE TB sounding sequence by setting the corresponding bits of the Disallowed Subchannel Bitmap subfield of the STA Info field with the AID11 subfield set to 2047 within the preceding HE NDP Announcement frame. An SU beamformer that includes a STA Info field with the AID11 subfield set to 2047 in an HE NDP Announcement frame shall place that STA Info field as the first STA Info field of the frame. An SU beamformer that indicates punctured subchannels in an HE sounding NDP shall set the TXVECTOR parameter INACTIVE\_SUBCHANNELS according to 27.11.7 (INACTIVE\_SUBCHANNELS)."Change the next para from "An SU beamformee that supports punctured sounding shall generate feedback corresponding to the subchannels indicated in the STA Info field with an AID11 value matching the eleven least significant bits of its AID value from within a received HE NDP Announcement frame, but excluding subcarriers that are disallowed according to the value of the Disallowed Subchannel Bitmap subfield of the same HE NDP Announcement frame." to "An SU beamformee that supports punctured sounding shall generate feedback corresponding to the subchannels indicated in the STA Info field addressed to it in an HE NDP Announcement frame, but excluding subcarriers that are disallowed according to any Disallowed Subchannel Bitmap subfield in that frame."In Table 9-321a change "Punctured Sounding as" to "punctured sounding as".At 362.5 change "preamble punctured sounding" to "punctured sounding".At 364.22 change "setting the Punctured Sounding Support subfield to 1" to "setting the Punctured Sounding Support subfield in the HE Capabilities elements it transmits to 1" | Revise - TGax editor to make changes as shown in 11-19/1064r5 that are marked with CID 20903 which generally agree with the commenter’s suggestion to rearrange the order of sentence clauses and use short references to previous subjects and objects and other changes suggested by the commenter except for a few that would conflict with several other modifications brought about by the resolution of several other comments. |
| 21325 | Robert Stacey | 26.7.2 | 357.38 | There is no description or definition of punctured sounding. | Add a description that captures how and why it would be used | Revise - TGax editor to make changes as shown in 11-19/1064r5 that are marked with CID 21325 which add some description of why punctured sounding would be used. For the description of the mechanism itself, the commenter should examine othe changes that have been made to subclause 26.7.2 sounding sequences and support due to other comments from LB238 |
| 21326 | Robert Stacey | 26.7.2 | 357.38 | The punctured sounding mechansim no descernable use. A STA is always able to transmit at the BSS channel width without puncuturing so why is sounding so special that it needs puncturing? | Add descriptive text to explain the value of the mechanism (puctured sounding) or remove it from the spec and complete the design in EHT | Revise - TGax editor to make changes as shown in 11-19/1064r5 that are marked with CID 21326 which add some description of why punctured sounding would be used. For the description of the mechanism itself, the commenter should examine othe changes that have been made to subclause 26.7.2 sounding sequences and support due to other comments from LB238 |

**26.7.2 Sounding sequences and support**

**Discussion:**

Regarding puncturing of L-STF, L-LTF, L-SIG in a non-HT DUP transmission

**For an HE PPDU:**

 **27.3.10.8.3 Common field**

*The pre-HE modulated fields (see Figure 27-23 (Timing boundaries for HE PPDU fields if midamble is not present)) are not transmitted in 20 MHz subchannels in which the preamble is punctured.*

This (i.e. above) is for an HE PPDU. I.e. while we do not have a formal equation for a punctured HE PPDU, we have this statement quoted above.

Now, for a NON\_HT PPDU:

D4.3 P620L3

**27.3.13 Non-HT duplicate transmission**

Equation 27-123 shows the puncturing of the NON\_HT PPDU DATA field.

I.e. we do not directly mention puncturing the preamble portion of a NON\_HT DUP PPDU

HOWEVER, in this same subclause, we do have this statement:

P620L14

*The L-STF and L-LTF fields shall be transmitted in the same way as in the HE transmission.*

We say " in the same way as in the HE transmission" while for the case of a punctured HE PPDU, we have the statement from 27.10.3.8.3 quoted further above, which tells us to puncture the "pre-HE fields". So this quoted line from 27.3.13 is effectively an implicit reference to 27.10.3.8.3 which tells the implementer to puncture the pre-HE fields.

We could consider adding another statement to this subclause to make the reference more direct:

*The L-STF, L-LTF and L-SIG fields are not transmitted in 20 MHz subchannels in which the preamble is punctured (see 27.10.3.8.3 (Common field)).*

We could even make that a note...

**Proposed Changes to TGax D4.3:**

***TGax editor: within subclause 26.11.7 INACTIVE\_SUBCHANNELS and RU\_ALLOCATION of TGax D4.3, change the following text:***

**26.11.7 INACTIVE\_SUBCHANNELS and RU\_ALLOCATION**

The indication of which subchannels are punctured in an HE sounding NDP or in an HE NDP Announce-ment that is carried in a non-HT Duplicate PPDU is conveyed from the MAC to the PHY through the TXVECTOR parameters INACTIVE\_SUBCHANNELS and RU\_ALLOCATION. The parameter INACTIVE\_SUBCHANNELS may be present in the TXVECTOR of a non-HT duplicate PPDU that carries an HE NDP Announcement frame or of an HE sounding PPDU. The parameter INACTIVE\_SUBCHANNELS shall not be present otherwise. **(#21327)** The setting of the RU\_ALLOCATION parameter for other PPDUs is specified in 26.5.2.3.3 (TXVECTOR parameters for HE TB PPDU response to Trigger frame), 26.5.2.3.4 (TXVECTOR parameters for HE TB PPDU response to TRS Control subfield) and 26.5.7.2 (STA behavior).

***TGax editor: within subclause 26.7.2 Sounding sequences and support of TGax D4.3, change the following text:***

**26.7.2 Sounding sequences and support**

An HE beamformer may solicit punctured SU feedback from an HE beamformee in an HE TB sounding sequence if the HE beamformee indicates support for punctured sounding by setting the Punctured Sounding Support subfield in the HE Capabilities elements it transmits to 1. An HE beamformer(#21320) shall indicate punctured subchannels in the HE sounding NDP(#21321) of an HE TB sounding sequence(#20576) by setting the appropriate bits of the Disallowed Subchannel Bitmap subfield of the STA Info field the AID11 subfield set to 2047 within thepreceding HE NDP Announcement frame. An SU beamformer that includes a STA Info field with the AID11 subfield set to 2047 in an HE NDP Announcement frame shall place that STA Info field as the first STA Info field of the frame. An SU beamformer that indicates punctured subchannels in an HE NDP Announcement frame(#21322) in an HE TB sounding sequence(#20576) shall set the TXVECTOR parameter INACTIVE\_- SUBCHANNELS of the non-HT duplicate PPDU carrying the HE NDP Announcement frame and the HE sounding NDP(#21323) as described in(#Ed) 26.11.7 (INACTIVE\_SUBCHANNELS and RU\_ALLOCATION)(# 21401). **(#20903)**

An SU beamformee that supports punctured sounding shall generate feedback corresponding to the subchannels indicated in the STA Info field addressed to it in an HE NDP Announcement frame, but excluding subcarriers that are disallowed according to the value of the Disallowed Subchannel Bitmap subfield in that frame. **(#20903)**

The determination on the part of the HE beamformer of whether to solicit full, partial or punctured feedback is beyond the scope of the standard, but the information used to make that determination might include knowledge of the presence or absence of interference on some tones of the operating bandwidth potentially rendering them at least temporarily unusable and the consideration of the impact of the overhead on system throughput of delivering full feedback versus partial or punctured feedback. **(#21325)(#21326)**

***TGax editor: within subclause 9.4.2.242.2 HE MAC Capabilities Information field, in Table 9-321a – Subfields of the HE MAC Capabilities Information field, change the “Definition” entry for the “Subfield” “Punctured Sounding Support” as shown:***

**9.4.2.242.2 HE MAC Capabilities Information field**

**Table 9-321a—Subfields of the HE MAC Capabilities Information field**

Indicates support for punctured sounding as described in 26.7 (HE sounding protocol). **(#20903)**

***TGax editor: within subclause 9.4.2.242.2 HE MAC Capabilities Information field, in Table 9-321a – Subfields of the HE MAC Capabilities Information field, change the “Definition” entry for the “Subfield” “Punctured Sounding Support” as shown:***

**26.7.3 Rules for HE sounding protocol sequences**

An HE beamformee that is a non-AP STA that transmits an HE Compressed Beamforming/CQI Report shall set the RU Start Index and RU End Index subfields of the HE MIMO Control field to indicate the range of tones for which compressed beamforming/CQI information is provided. If the HE NDP Announcement frame that solicited the feedback includes a Disallowed Subchannel Bitmap field with a non-zero value, then a beamformee that indicates support for punctured sounding by setting the Punctured Sounding Support subfield in the HE Capabilities elements it transmits to 1 shall include a Disallowed Subchannel Bitmap subfield in the solicited feedback with the same value as the Disallowed Subchannel Bitmap subfield of the HE NDP Announcement frame that solicited the feedback to indicate subcarriers for which feedback information is not provided from within the range of subcarriers indicated by the RU Start Index and RU End Index subfields. **(#20903)**

***TGax editor: within subclause 27.3.13 Non-HT duplicate transmission, modify the text as shown:***

**27.3.13 Non-HT duplicate transmission**

(#21572)The L-STF and L-LTF fields shall be transmitted in the same way as in the HE transmission. The L-SIG field shall be transmitted in the same way as in the HE transmission, with the following exceptions:

* The Rate and Length fields shall follow 17.3.4 (SIGNAL field)
* The four additional subcarriers at indices ±27 and ±28 are not modulated (no energy)

Note -- The L-STF, L-LTF and L-SIG fields are not transmitted in 20 MHz subchannels in which the preamble is punctured (see 27.3.7 (HE modulation and coding schemes)). **(#21327)**

***TGax editor: within subclause 27.3.7 HE modulation and coding schemes (HE-MCSs), add the following text to appear at the end of the subclause:***

**27.3.7 HE modulation and coding schemes (HE-MCSs)**

The pre-HE modulated fields (see Figure 27-23 (Timing boundaries for HE PPDU fields if midamble is not present)) are not transmitted in 20 MHz subchannels in which the preamble is punctured as is described in 27.3.10.3 (L-STF). **(#21327)**

***TGax editor: within subclause 27.3.10.3 L-STF, change the text as shown:***

**27.3.10.3 L-STF**

20MHz is a set of 20 MHz channels where pre-HE modulated fields are located. The set of 20 MHz channels contains one or more values in the range 0 to *N*20MHz – 1 for an HE TB PPDU, HE NDP PPDU or HE MU PPDU with preamble puncturing, and it contains all values in the range 0 to *N*20MHz – 1 for other HE PPDU formats. **(#21327)**

***TGax editor: within subclause 27.3.10.8.3 Common field, change the text as shown:***

**27.3.10.8.3 Common field**

The pre-HE modulated fields (see Figure 27-23 (Timing boundaries for HE PPDU fields if midamble is not present)) are not transmitted in 20 MHz subchannels in which the preamble is punctured (see 27.3.7 (HE modulation and coding schemes (HE-MCSs))). **(#21327)**

**End of proposed changes.**