IEEE P802.11  
Wireless LANs

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| CR for Puncturing Mask | | | | |
| Date: 2020-03-10 | | | | |
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Abstract

This submission proposes text changes of TGax Draft 6.0 for CID 24032,24103,24148,24265

Revisions:

* Rev 0: Initial version of the document.

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.***

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| **CID** | **Clause** | **P/L** | **Comment** | **Proposed change** | **Resolution** |
| 24032 | 27.3.19.1 | 649.00 | The following comment is submitted on behalf of Reza Hedayat:    The 11ax coexistence assurance document identifies the higher OOBE that 11ax preamble-puncture causes as follows: "With respect to coexistence, the spectral "holes" created by preamble puncturing are not protected by a TX spectral mask. The TX spectral mask only applies to the entire 80 or 160 MHz channel bandwidth. Therefore other systems in these sub-channels could see higher out-of-band emissions than that experienced by two neighboring systems where the out-of-band transmissions by each system are restricted by a TX spectral mask."  The higher OOBE identified above could cause additional interference to legacy 802.11 devices (and even 11ax devices) and to other technologies that operate in 2.4GHz, 5GHz and 6GHz unlicensed spectrum. The additional interference depend on the number of punctured channels and on average it is from about 5 dB to 10 dB for one and two punctured channels (but it could be as high as 20 dB). Enhancing the 11ax punctured masks would enhance coexistence with legacy 802.11 devices which 802.11 WG has long rooted for.  Motivated by fair coexistence with other technologies and particularly 802.11ac, 3GPP NR-Unlicensed technology (that is designed to operate in 5 and 6GHz) has recently decided on a tighter spectral mask for the punctured transmission. The agreed spectral mask are: -23dBr for single-punctured, -25dBr for two-punctured and -28dBr for the cases where the punctured channel are at the edge. These emission mask levels would be followed worldwide. Note that the European regulatory body, ETSI BRAN, has recently converged to agree on the same emission mask levels for punctured transmission. | It is proposed for 11ax punctured transmission to follow the following emission mask: -23dBr for single-puncture channel, and -25dBr for two-puncture channels (for Fig 27-52), and -28dBr for the cases where the punctured channels are at the edge (Fig 27-53). | Rejected  - |
| 24103 | 27.3.19.1 | 647.60 | Transmit spectral mask for 80MHz and 160MHz in figures 27-49 and 27-50 provide too much out of band emissions for use in UNII-4 band. Add a feature to lower the out of band emissions when operating at the edge of a band. | Add a feature to allow puncturing subchannels at the edge of 80 and 160 MHz DL and UL transmissions when the BSS is operating in a channel at the edge of a band that has tight regulatory requirements for OOBE. There will be a small loss in efficiency, but a huge gain in out of channel interference. | Reject. |
| 24148 | 27.3.19.1 | 647.60 | In case of 20 MHz puncturing, why isn't the 20 MHz spectrum emission mask used on the punctured subchannel instead of having a -20dBr hard limit on the whole punctured subchannels? | As in comment | Rejected |
| 24265 | 27.3.19.1 | 649 | On behalf of Reza: The transmit specral masks for the punctured preamble cases are not aligned with those of 3gpp and ETSI - the 802.11 WG should take a look at the masks proposed by the other groups. | Consider whether 802.11 and other standards groups should have similar punctured masks. | Rejected |

**Discussions**

**All the comments request 11ax defines the same puncturing mask as in ETSI. The reason to reject include the following:**

* IEEE spec defines minimum requirement for interoperability test, any devices are still subject to the regional regulatory requirements.
* Different region has different requirements, IEEE spec does not need to reflect the difference. Accommodate the reqruieemnts from different regulator will make the spec bulcky and not elegant.
* Some example not aligned with the regulatory include (but not limited to):
  + LO leakage in IEEE: max(P – 32, –20). Tighter than ETSI.
  + Bandedge leakage. In the bandedge, regulator has even more stringent requirements than the mask defined in IEEE;
  + The roll of region of punctured mask in ETSI is 1MHz but IEEE defines 0.5MHz.
  + ETSI requires DL/UL follow the same punctured mask. TB PPDU in 11ax only follows unused tone EVM.
* Time wise, 11ax cannot fully synch with ETSI. 11ax is finalizing the draft but ETSI has not reach the final aggrement on punctured Mask.