IEEE P802.11
Wireless LANs

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| LB 266 CIDs on Coexistence Assurance document |
| Date: 2022-09-08 |
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Abstract

This document proposes resolutions for the following CIDs:

CIDs 11142, 11143, 11144, 11145, 11146, 1147, 11148, 11149, 11150.

These particular CIDs are on the Coexistence Assurance document accompanying the 802.11be amendment, not on the Amendment itself.

# Introduction

The 802.19 WG voted on the 802.11be CA document [1], with Ballot closing on June 30th, 2022.

The results of the vote were 26Y/2N/0A, meaning the document was approved. Nine comments were received in 802.19 and were submitted by the 802.19 WG chair as LB 266 CIDs 11142, 11143, 11144, 11145, 11146, 1147, 11148, 11149, 11150.

For some reason, the CIDS as recorded in LB266 are missing Clause and page/line numbers. Also, the column “proposed change” appears to be missing from these CIDs.

The 802.19 WG chair provided the list of comments as originally submitted in 802.19, which do contain the missing information. The resolutions in this document are based on this more complete record of CIDs, where the LB266 CID number are added for reference.

# CIDs

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| **Index** | **LB266 CID**  | **Page**  | **Subclause** | **Line No** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 1 | 11142 | 4 | 7 | 38 | The line saying that UWB devices are "required by regulation to accept all interferers" is not helpful. This applies to all unlicenced spectrum users; regulation gives 11be and other unlicenced radios no protection either. The sentence adds little to the coexistence assessment. | Delete this sentence. | AcceptChange implemented in 802.11-21/0706r6. |
| 2 | 11143 | 4 | 7 | 43 | The statement "CSMA/CA is used to provide coexistence in the 5 GHz and 6 GHz bands...." does not address UWB coexistence. I calculate it will not detect UWB transmissions unless the devices are really close, like a small few inches away, so it will not help coexistence with UWB devices in the 6GHz band. On the other hand, an 11be transmitter, even at moderate TX powers, will be likely to disrupt UWB reception hundreds of metres distant. While there is probably nothing that can be done about this, I think it should be acknowledged and documented as a coexistence issue in this coexistence assessment document. | Add a statement: "Note -- This CSMA/CA mechanism is not effective as a coexistence mechanism with IEEE 802.15 UWB radios since the UWB signals will typically be below the CSMA detection threshold." | AcceptChange implemented in 802.11-21/0706r6. |
| 3 | 11144 | 5 | 7 | 5 | In the second bullet under "standard power operation", the term "height" is used: "transmit power as a function of AP location, height and the knownlocation of licensed services in the area." Since transmit power restrictionsneed to be determined, a more precise definition of "height" is suggested.See proposed change below. | Modify the term "height" to be Height Above Average Terrain (HAAT)or Height Above Ground Level (AGL). These two terms are very different. Iwould suggest AGL since there is no computation required and we are dealingwith short range communications. | Revised Agree in principle with commenter. For reference: WFA's AFC interface specification specifically uses the term "height above ground level (AGL)".Changed “height” to height above ground level (AGL) in 802.11-21/0706r6  |
| 4 | 11145 | 4 | 7 | 36 | The sentence should be updated to remove "expected' as rules are already in place.The reference to "rules" should be to the regulations instead of the R&OEither replace the reference to the FCC 6 GHz R&O or add reference to the actual rules:https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15#subpart-Ebut when referencing "regulations" use reference to subpart E. | Update reference for "rules" to the regulations (link in comment)and update references section accordingly. | RevisedAgree in principle.Following changes were made in 802.11-21/0706r6:* Replace "is expected to" with "shall"
* Replace reference [5] with: "[5] FCC Rules Part 15, subpart E (Unlicensed National Information Infrastructure Devices), https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15#subpart-E"
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| 5 | 11146 | 5 | 7 |  | Regarding "P802.11be will implement the mechanisms needed to communicate the transmit power restrictions to the P802.11be devices"Some more detail on how this will work would be great. A reference to the appropriate clauses in the draft is probably enough and it would be really helpful. | See comment | RevisedAP uses TPE (Transmit Power Envelope) element in Beacon, Probe Response, … to communicate allowed power and/or PSD levels to the non-AP STA. Added clarification language to make this more explicit.Change implemented in 802.11-21/0706r6. |
| 6 | 11147 | 5 | 9.1 |  | Provide just a little more information on the mask so it is more clear what the out of channel / out of band leakage can be. The worst case the channels at the band edges, so noting the mask value at the band edge (including guard) would be helpful.This is good because under many operating conditions (e.g. less than full TX power) the mask will place out of band power well below the regulatory limit (-27 dBm) which is a significant improvement in coexistence footprint for systems occupying adjacent bands. | Add calculation of the power values at the band edge based on the out of channel mask applied to the channel closest to the band edge considering guard provided by the channel plan. | RejectedNo changes needed.The main purpose of the PSD masks specified in 802.11 appears to be towards coexistence in the same band, not to enforce OOB requirements.It's my understanding that the -27 dBm OOB limit is actually a more stringent requirement that the 802.11 mask. In that case, adding the OOB power limit indirectly imposed by these masks will not add much to assuring coexistence. |
| 7 | 11148 | 6 | 9.2 |  | "These spectral masks provide protection for other users in parts of the spectrum that are not used by the EHT transmission."Not really "protection" but reduces the interference footprint. "protection" is a loaded word ;-).Also it is not clear how the new PSD mask does this. As I understand it (which may be wrong but is what is said above) the holes come from unused subchannels.That could mean that in the active subchannels more power can be used to achieve he same PSD as if all subchannels are used (carry energy). Is the "new mask" taking advantage of this?That would be good to clarify. | Change to remove "protection" and clarify how the new mask reduce impact. | RevisedReplaced "provide protection for" with "reduce the interference towards".Note that the 802.11 mask definitions are relative (in dBr relative to the in-band power level), so the standard makes no statement on whether the PSD can be increased in parts of the band when other parts do not carry energy. As such, it can not be said that the 802.11 standard makes any recommendation on this issue.Change implemented in 802.11-21/0706r6. |
| 8 | 11149 | 6 | 9.3 |  | "From an interference point of view, this is no different from concurrent multi-channel operation where independent networks"This is not true. MLO is a coordinated use of multiple channels. This is very different from concurrent use of the channels by independent networks in which TX times are random(ish) with respect to other independent networksMLO. If the intent is to rely on analysis done previously then provide a reference. That 'it is commonly done" doesn't provide any insights into how it impacts coexistence.Intuitively MLO could be rather severe impact if used to monopolize the entire band. However my understanding is MLO as proposed in 11be has mechanisms to keep that from happening, which would be worth mentioning.This deserves some analysis. | Delete the incorrect assertion.Provide a summary of mechanisms in 11be that prevent MLO from annihilating the band | Reject.MLO operation is not coordinated on the PHY level. The different links still perform independent Clear Channel Assesment, contention etc. Especially in STR mode, this makes the behavior essentially equivalent to two channels operating independently. In NSTR mode, this is still largely true, but with transmissions possibly coordinating their respective end times.  |
| 9 | 11150 | 5 | 8 | 26 | This clause identifies some mechanisms (sort of) but no coexistence analysis. That clause appears to be missing. The reference (from 2013) is not really sufficient as much has changed in 802.11 since 2013. Features like MLO could significantly change the coexistence characteristics with uncoordinated 802.11 systems. Some new features introduced into the standard (both PHY and MAC) which will improve the coexistence characteristics which are worth pointing out. Building on the referenced work is OK but some updates are needed. | Add a coexistence analysis clause that explores how the new features impact coexistence. | Revised.As indicated by the title, this cause specifically deals with Coexistence with legacy 802.11 systems ("legacy" in the widest sense of the word, i.e.: any generation that precedes 802.11be).Broad coexistence between various generations of 802.11 is achieved by all 802.11 generations sharing the same format for the legacy part of the preamble, such that pending transmissions are able to properly defer to transmissions that gain access to the medium earlier. That approach has been used since 802.11n and has not changed.While some newer 802.11 generations may have specified other mechanism to be used under particular conditions (e.g. spatial reuse), these will not be generally applicable since older generations do not implement them. The only mechanism that covers all legacy variants is still the shared format of the legacy preamble.Added "legacy" to preamble to clarify that only this part of the preamble is common. Also emphasized that this approach is identical to the one used in 802.11n, 802.11ac, 802.11ax.Change implemented in 802.11-21/0706r6. |

# References

[1] TGbe Coexistence Assessment Document, 802.11-21/0706r5, <https://mentor.ieee.org/802.11/dcn/21/11-21-0706-05-00be-tgbe-coexistence-assessment-document.docx>