IEEE P802.11  
Wireless LANs

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| Comment Resolution for Coexistence Assessment Document (CAD) | | | | |
| Date: 2021-04-26 | | | | |
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Abstract

This submission proposes resolutions for comments received on Coexistence Assessment Document (CAD) . The following is the list of 40 CIDs:

* 1175, 1176, 1177, 1178, 1519, 1695~1729

Revisions:

r0: initial discussion on the comments and resolutions

r1: changes based on discussions in the teleconference

r2: editorial change and remove “licensed” before 5.9 GHz. Add reference link to the updated CA document in the resolutions.

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1724 | Title | 1 | 802.19 comment from James Lansford on CA document: The document should be titled "Coexistence Assessment Document" not Coexistence Assurance. IEEE 802 changed the naming convention some time back. | Change title to "Coexistence Assessment Document" | Accepted |
| 1725 | 1 | 1 | 802.19 comment from James Lansford on CA document: While it appears that submitting a CAD in parallel with a LB is allowed (according to James Gilb) it is not the usual practice; it does not allow feedback to the drafting process except by voting "no" on the LB and sending it back to the TG. | Have TGbd ask for WG approval of CAD before running Letter Ballot | Accepted |
| 1519 | 1.2.1.a | 1.22 | The CSD requirement for Broad Market Potential is not met since the US FCC has Approved a Report and Order to select a C-V2X technology for use in ITS applications =Nov 18, 2020 https://www.fcc.gov/document/fcc-modernizes-59-ghz-band-improve-wi-fi-and-automotive-safety | Redraft the CSD Broad Market Potential clause to address the applications after US FCC Action. | Rejected  The CSD “Broad Market Potential” is described based on entire global V2X market analysis. There is still global market potentials without FCC allowance. NO current action is needed to change the CSD. . |
| 1696 | 1 | 2.3 | 802.19 comment from Benjamin Rolfe on CA document: The correct format for reference to 802.11: IEEE Std 802.xx (e.g. IEEE Std 802.11bd) | Insert "Std" (with no period) after IEEE. | Accepted |
| 1710 | 1 | 2.7 | 802.19 comment from Billy Verso on CA document: OCB is not defined | Expand acronym OCB for this first use | Accepted |
| 1695 | 1 | 2.9 | 802.19 comment from Benjamin Rolfe on CA document: Define OCB at first use | See comment. | Accepted |
| 1175 | 2 | 2 | CAD: This document doesn't address operation of 802.11bd in the unlicensed band (U-NII-4) the FCC is scheduled to approve on November 18. Section 4 states that "While 802.11bd devices are intended to operate in the ITS band under ITS regulations, it is also possible for 802.11bd to operate outside of the ITS band" but does not elaborate beyond that statement for the 5.9GHz band. There has been discussion in numerous places about operation of DSRC in the unlicensed U-NII-4 band for certain use cases, and the Car to Car Communications Consortium (C2C-CC) even asked 802.11bd to consider operation in the unlicensed band. See https://mentor.ieee.org/802.11/dcn/20/11-20-1012-01-00bd-on-802-11bd-mandatory-features-input-from-the-car-2-car-communications-consortium.pptx . Since this R&O would also eliminate DSRC in approximately two years (whether based on 802.11p or 802.11bd), operation in the unlicensed 5.9GHz band in the United States is perhaps the only way 802.11bd could be deployed, unless the FCC allocates new spectrum for ITS. | Add U-NI-4 to reflect new spectrun allocation in the US (5850-5895MHz). | Revised  802.11bd defines new PHY modes (NGV PPDU) to provide better coexistence with 10 MHz 11p PPDU operating 5.9 GHz.  As 11bd draft 1.0 is ready, the group prefers not to add new PHY/MAC modes.  As OCB operation does not limit the use of other PHY format in any unlicensed bands, e.g. VHT/HE PPDU. V2X use of OCB operation in unlicensed bands is already allowed in 802.11-2020.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1697 | 2 | 2.17 | 802.19 comment from Benjamin Rolfe on CA document: Question: Is there overlap with the current DMG channel plan? The text rather plainly says that the existing 60 GHz channel plan is unchanged. But in the next section (3) you suggest 802.11bd operates in an licensed 60 GHz band, while the existing DMG operates in an unlicensed 60 GHz band.  Assume the reader of the CAD is seeking information on coexistence. A really basic bit of information is the frequency range in which the system operates. Provide the specifics of bands used. If you gave, for example, the band start and stop frequencies, it would leave little room for to wonder as to whether there is overlap with other 802 wireless systems operating in the licensed exempt 60 GHz bands (which include 802.11 DMG and two 802.15.3 PHYs, one of which is used quite a bit). | Specify the frequency range of the bands in which 802.11bd may operate. A good presentation is to proivide a table with band identifier, start and end frequencies. | Revised  The ITS application using 60 GHz band in Europe is license exempt. Modified the text to clarify that 11bd OCB operation on 60 GHz band is unlicensed. Add reference to Annex E in 802.11-2020 for the definition of 60 GHz band.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1711 | 3 | 2.17 | 802.19 comment from Billy Verso on CA document: Difficult to refer to these opening "hanging" paragraphs | Introduce sub-clause heading to cover the first two paragraphs in clause 3 | Revised  Removed the two paragraphs.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1712 | 3 | 2.17 | 802.19 comment from Billy Verso on CA document: Saying "coexistence is assured through both regulation and 802.11 technologies." is not really true since 802.11 techniques do not necessarily ensure coexistence, i.e. there are cases of 802.11 radios causing interference and coexistence issues for other radios in various operating bands. | change "coexistence is assured through both regulation and 802.11 technologies." to "coexistence is assured via licensed use regulations." (assuming this does in fact ensure coexistence). | Rejected  Both regulation and 802.11 technoloies are required to assure coexistence in ITS bands.  In ITS bands, regulation assures only licensed devices can operate within the band, and certain operating BW and band sharing rules are applied. E.g. 11p 20MHz operating device should not be allowed to work with 11p 10MHz devices in the same channel.  The coexistence among licensed 11bd devices and licensed legacy devices and other non-802.11 devices are provided through CSMA/CA technology and CCA rules. |
| 1713 | 3 | 2.19 | 802.19 comment from Billy Verso on CA document: Saying "coexistence is assured through both regulation and 802.11 technologies." is not really true since 802.11 techniques do not necessarily ensure coexistence. | change "coexistence is assured through both regulation and 802.11 technologies." to "coexistence is assured via licensed use regulations." (assuming this does in fact ensure coexistence). | Rejected  Same comment as CID 1712.  Both regulation and 802.11 technologies are required to assure coexistence in ITS bands.  In ITS bands, regulation assures only licensed devices can operate within the band, and certain operating BW and band sharing rules are applied. E.g. 11p 20MHz operating device should not be allowed to work with 11p 10MHz devices in the same channel.  The coexistence among licensed 11bd devices and licensed legacy devices and other non-802.11 devices are provided through CSMA/CA technology and CCA rules. |
| 1721 | 2 | 2 | 802.19 comment from Stephen Palm on CA document: Band labeling unclear between clause 2 and 3 | Harmonize | Revised  Reword the description of “Band of Operation” with references and add new section 3 and 4 to specify other non-802.11 operation in the same bands.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1722 | 3.1 | 2 | 802.19 comment from Stephen Palm on CA document: Unclear that non-802.11 systems would use CCA | Clarify | Rejected  CSMA/CA with CCA rules is used by 802.11bd to cosexit with non-802.11 OFDM signals, similarly as other 802.11 amendments. |
| 1723 | 3.3 | 2 | 802.19 comment from Stephen Palm on CA document: OCB undefined | Define | Revised  Added OCB definition in the the last Section 9 (Definitions).  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1698 | 3 | 2.20 | 802.19 comment from Benjamin Rolfe on CA document: While operating in a band exclusively allocated for 802.11 reduces other sources of interference, it does not assure coexistence. When all devices operating in the bad are controlled and managed so as to coordinate access among all devices, then you can come close (but still, not guarantee). However if there is possibility of any non-coordinated transmissions, there will be potential for interference from overlapping, uncoordinated 802.11 networks. If you believe that there is no possibility of non-coordinated transmissions, so stated and explain why this is achievable. If not, remove the statement of assurance which is not accurate.  It may be accurate to say use of dedicated spectrum greatly reduces the likelihood of interference. It may be true that regulations limit potential for such interference. It may even be true that regulations provide a means with dealing with such interference. The reader would know if any of these things impact coexistence from this descirption.  Later the CAD notes that 11bd can be used in other, shared, bands. That means the benefit of dedicated spectrum is not assure | Remove "assures". Replace with statements that are correct. Include discussion of the factors noted in the comment that affect coexistence. See details in the comment and consider other features of the standard that can be used to enhance coexistence in dedicated bands. Also discuss the implications of NOT having complete coordination of all devices using the band. If you really believe that such coordination is "assured", explain how this is achieved. | Revised.  Agree that no technology can “assure” coexistence. Change the word “assure” to “provide” in corresponding places.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1699 | 3 | 2.20 | 802.19 comment from Benjamin Rolfe on CA document: It is also unfortunate that you missed a really important, and effective, means of coexistence provided by the DMG PHYs: the "D" (directionality). This greatly (as in vastly) reduces the interference footprint from a transmission, and can greatly increase effective use of the spectrum. While you may think that DMG is directional because that's the only way to make it work over a distance greater than a few inches (because pretty much it is), the coexistence benefits are really substantial.  This applies to clause 4 also. | Describe the coexistence characteristics of DMG including the reduced interference footprint of a directed beam as well as the benefits to receivers. | Revised  The directional transission is the technology defined in DMG. 11bd does not introduce any new PHY technology for DMG. Modify the wording to refer to 11ad technogies for coexistence.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1700 | 3 | 2.20 | 802.19 comment from Benjamin Rolfe on CA document: Another really powerful coexistence mechanism of 60 GHz devices is nature. Without focusing the transmit energy as does DMG, natural attenuation in air reduces the potential to interfere. So much so that non-directional 802.15.3e based systems achieve channel reuse with very little physical separation (less than 1/3m). With DMG, impact outside of the beam is likewise rapidly attenuated. This is an actual, very effective, coexistence mechanism (and why proximity communications systems use 60 GHz). This too is worth describing.  This applies to clause 4 also. | Add description of the coexisetnce implications of the propagation characterists of the 60 GHz band. Discuss the obvious benefits of using the band when coexistence is critical (such as anytime the air is shared). | Rejected  The propagation property itself does not provide coexistence. Faster attenuation will also require STAs to stay closer and the coexistence issue is not mitigated. |
| 1727 | 3 | 2.20 | 802.19 comment from James Lansford on CA document: Current text is "When working on the 60 GHz ITS band, all 802.11 devices operate as licensed devices, hence coexistence is assured through both regulation and 802.11 technologies." While the EU has an ITS allocation defined in the 60GHz band, the US and many other countries do not have a licensed band for ITS in 60GHz. Hence, operation of 802.11bd in the 60GHz band in the US and many other countries will be as unlicensed devices, in particular under the ISM band rules (47 CFR ┬º 15.255) in the United States. | Add text to describe the ITS band defined in Europe, and change text to mention that the 60GHz spectrum in the US (and many other countries) is unlicensed. | Revised  In Europe, 60 GHz regulation for ITS application is license exempt under short range device (SRD) rules. Modifed the CAD to clarify that 11bd 60 GHz operation is unlicensed.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1714 | 3.1 | 2.22 | 802.19 comment from Billy Verso on CA document: If there are non 802.11 systems licensed in these same bands, that would seem to contradict the statement, in the opening hanging paragraphs of clause 3, that 802.11 technologies assure coexistence. | Resolve the contradiction, if still present. | Revised  Replace the word “assure” to “provide”.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1715 | 3.1 | 2.23 | 802.19 comment from Billy Verso on CA document: Is the correct term CSMA-CA, i.e. CCA plus the whole algorithm of collision avoidance with back-off periods etc. | Correct terminology for clarity. | Revised  Change the coexistence mechanism to carrier sense multiple access with collision Avoidance (CSMA/CA).  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1716 | 3.1 | 2.24 | 802.19 comment from Billy Verso on CA document: Was there analysis of the non-802.11 radios using the same band i.e. to assess the coexistence properties of the CCA / CSMA-CA algorithms operating together | State what analysis has been done, and include it or reference to it as appropriate. | Revised  Add Section 6 for coexistence analysis with non-802.11 systems.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1701 | 3.1 | 2.28 | 802.19 comment from Benjamin Rolfe on CA document: "clear channel assessment" (aka CCA) is not a coexistence mechanism. It isn't even a channel access mechanism. It may (or may not) be a part of an 802.11 channel access mechanism. IIn some cases CCA may be the "listen" step when CSMA-CA is used as a "listen before talk" channel access mechanism. Sometimes CCA does not involve any listening in 802.11. With our without listening, CCA alone t accomplishes nothing other than a time small delay prior to transmission. While such a delay may prevent a 100% Tx duty cycle, which is good for coexistence, CCA is really only useful when used as part of 802.11 CSMA-CA. It is simply incorrect to say that CCA is the primary ANYTHING in 802.11.  CSMA-CA may be, in some circumstances, be used as a coexistence mechanism. This is not assured nor even safe to assum. The most common CCA method used in 802.11 channel access (CSMA-CA), as is noted elsewhere in this CAD, is primarily detection of an 802.11 preamble, which secondary use of energy detection after transission has commenced. As an option, energy detection alone may be used for CCA. When using preamble detection, obviously only devices generating an 802.11 preamble are detected. In some situations, CCA with pure ED may provide detection of non-802.11 systems, or it may not, depending upon how the CCA parameters, such as the threshold and duration of detection, are selected. Depending upon how ED configuration parameters are set, pure ED may also prevent the 802.11 device from transmitting in a noisy but not too noisy to be useful channel.  Note: This must be fixed. This mistake has been repeated in every 802.11 CAD for as long as I can remember and is fundamentally wrong, so basically wrong as to give the impression to readers, especially those outside of 802.11, that no serious thought has gone into preparation of the CAD nor to coexistence. This group has put some effort into consideration of coexistence, both with legacy 802.11p and other systems. That effort should be reflected in the CAD. Please, break the cycle of abuse now! | Delete "CCA" and replace with a technically correct desciption. Describe at least some of the vast number of channel acecss mechanisms correctly, focusing on those that provide coexistence with non-802.11 systems, which includes but is not limited to CSMA-CA using CCA with energy detection. Describe how energy detect threshold and detection duration affect coexistence (lower threshold improves probability of detecting other systems, as does longer duration, but both also increase probability of mistaking noise in the channel for another transmitter). | Revised  Replace CCA with CSMA/CA.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1702 | 3.1 | 2.1 | 802.19 comment from Benjamin Rolfe on CA document: 802.11 CSMA contains many controls that can be varied to affect performance. For example, when using CCA with energy detection, the detection threshold and sampling duration are defined in most cases by MIB variables (IEEE Std P802.11-revD). Per the current standard, there is no defined ED threshold or duration for the 5.9 band. Does 802.11bd define these parameters? If so, that might be a coexistence mechanism for detecting non-802.11 systems. Many other channel access parameters affect the coexistence impact (both ways) of the 802.11 device. There are channel access schemes in 802.11 in which CCA is not performed at all. Choosing when to use which and how to configure the many control variables greatly impacts coexistence performance (both ways).  Providing a description of how this works would be very useful for people intending to achieve acceptable performance in the presence of non-coordinated systems. As we later admit this possibility, it's worth at least pointing the user in the right direction. | Provide a description of how CSMA works to enhance coexistence (limits effective duty cycle, may sense other devices and defer, etc). Explain how configuration of CSMA (and other channel access mechanisms) can be used to achieve acceptable performance in the presence of non-coordinated systems. Include recommendations on how to configure CSMA-CA when this is intended as a coexistence mechanism, e.g. appropriate ED threshold and duration, CSMA persistence parameters, and so on. | Revised  Add Section 6 for coexistence analysis with non-802.11 systems. Basically, the same CSMA/CA mechanism is defined in 802.11bd for coexistence. There is no new analysis needed.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1176 | 3 | 2 | CAD: Current text is "When working on the 60 GHz ITS band, all 802.11 devices operate as licensed devices, hence coexistence is assured through both regulation and 802.11 technologies." While the EU has an ITS allocation defined in the 60GHz band, the US and many other countries do not have a licensed band for ITS in 60GHz. Hence, operation of 802.11bd in the 60GHz band in the US and many other countries will be as unlicensed devices, in particular under the ISM band rules (47 CFR ┬º 15.255) in the United States. | Add text to clarify that in the US, there is no 60GHz ITS band and that 802.11bd would operate as an unlicensed device. | Revised  Duplicated comment as CID1727.  In Europe, 60 GHz regulation for ITS application is license exempt under short range device (SRD) rules. Modifed the CAD to clarify that 11bd 60 GHz operation is unlicensed.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1728 | 3.2 | 2.40 | 802.19 comment from James Lansford on CA document: 802.11bd only coexists with 10MHz 802.11p but the band should be the ITS band as defined by the FCC, since the 5.9GHz band isn't just for ITS going forward. (and I'll note that 802.11p does coexist with 10MHz 802.11a, but there are no deployed 802.11a devices in the 5GHz band that implement 10MHz channels...there is 802.11j in 4990-5000MHz that is 10MHz wide, but that doesn't apply here) The 5.9GHz band in the future will also include HT 20MHz PPDUs. | Need to add text to describe coexistence with the other 802.11 standards family. | Rejected  11bd NGV PHY only defines new NGV PPDU to better coexist with 11p 10MHz in 5.9 GHz band.  New 11bd PPDU formats that provides PHY-level coexistence with other unlicensed usage of 5.9 GHz band is not the scope of 11bd. |
| 1703 | 3.3.1 | 3.8 | 802.19 comment from Benjamin Rolfe on CA document: Extending the communication range via repetition does not necessarily extend the interference footprint of the device, as assumed. It will have impacts on interference footprint and vulnerability. Repetition increases the duration of the PPDU which increases the potential both to cause interference or contention, as well as the potential to be the victim of interference from another 802.11 device any other non-coordinated system. Thus there is both impact TO and impact FROM legacy devices and any other energy that might be found in the band.  From a quick look, the increase range is achieved only if both transmitting and receiving device are aware of and using the repetition and DCM diversity gain. So the actual area of impact on legacy devices may not increase at all. This feature will allow improved coexistence by allowing turning down power and turning up computational gain which can reduce the interference footprint. This can benefit both 802.11bd devices, legacy 802.11p devices, other legacy 802.11 and non-802.11 devices when operated in other than the dedicated band as suggested in this CAD. | Delete first and second paragraph and replace with an accurate description of the effect of these features on spheer of influence, 802.11bd devices, legacy 802.11 devices and non-802.11 device. Include discussion of the coexistence benefits of these features (such as ability to use lower radiated power), as well as the consequences, positive and negative, of longer PPDU duration. | Revised  As NON\_NGV\_10 repetition transmission is used for broadcast packets. Repetition is simply to improve the broadcast range and reliability. Power control is not the goal for broadcast services.  The number of repetition is controlled by upper layer to mitigate the impact of long transmission duration. Add the decription of this impact.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1177 | 3.3.2 | 3 | CAD: It should be noted that in the 10MHz mode, the 802.11p tone spacing is 156.25kHz and in the 20MHz mode, the 802.11p tone spacing is 312.5kHz. In 802.11bd, all tones are spaced at 156.25kHz whether 10 or 20MHz bandwidth is used. Also, the 20MHz PPDU in 802.11bd does not have the same preambles as the 20MHz PPDU in 802.11p. Hence, the 20MHz bandwidth mode in 802.11bd is incompatible with the 20MHz mode in 802.11p. | Add text to clarify that the 20MHz modes in 802.11bd do not conexist with the 20MHz channels in 802.11p. | Revised.  802.11bd 20 MHz PPDU can coexist with 802.11p 20MHz PPDU using -65dBm ED threshold CCA rule. Add a sentence to clarify that.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1717 | 3.3.2 | 3.12 | 802.19 comment from Billy Verso on CA document: In a number of places (five places?) it says "edge tones at +/-" followed by a number but no units are quoted, are these MHz? | Add appropriate units in all (5) places | Revised  The places that the commenter is referring to does not have a unit. It is the tone indices. Add the “tone indices” to clarify.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1729 | 3.3.2 | 3.12 | 802.19 comment from James Lansford on CA document: It should be noted that in the 10MHz mode, the 802.11p tone spacing is 156.25kHz and in the 20MHz mode, the 802.11p tone spacing is 312.5kHz. In 802.11bd, all tones are spaced at 156.25kHz whether 10 or 20MHz bandwidth is used. Also, the 20MHz PPDU in 802.11bd does not have the same preambles as the 20MHz PPDU in 802.11p. Hence, the 20MHz bandwidth mode in 802.11bd is incompatible with the 20MHz mode in 802.11p. | Describe how 802.11bd 20MHz modes will coexist and be compatible with 20MHz modes in 802.11p. | Revised  Similar comment as CID 1177  802.11bd 20 MHz PPDU can coexist with 802.11p 20MHz PPDU using -65dBm ED threshold CCA rule. Add a sentence to clarify that.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1704 | 3.3.2 | 3.16 | 802.19 comment from Benjamin Rolfe on CA document: First paragraph: Finish the story. The reduced out of band emissions will have a positive effect on coexistence with other systems: this is a good thing, so brag about it a little. It also can improve receiver resistance to interferring sources as it enables tighter matching of RX filters which can help reject unwanted signals. While this seems obvious to some of us, it is worth stating. | Add description of the benefits of improved out of band emissions and improved spectral mask requirements. | Revised  Add text to describe the benefits of “new 20MHz C2 mask”: improve adjacent channel operation.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1718 | 3.3.2 | 3.20 | 802.19 comment from Billy Verso on CA document: There seems to be an inconsistency with "(C2)" being written after mention of the 20 MHz transmit mask and "C [1]" being written after mention of the 10 MHz transmit mask. Also not clear what these are referring to. Why is C2 in parentheses and C not? If the [1] refers to the clause 5 reference say "in [1]" to clarify. | Correct and/or reference as necessary to clarify, or maybe just delete these terms. | Revised  Clarify C2 transmit mask is for 20 MHz power class C and 10MHz transmit mask is for 10 MHz power class C.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1719 | 3.3.3 | 3.25 | 802.19 comment from Billy Verso on CA document: What does NON\_NGV or NGV mean? It would be good to expand the acronym. | Expand acronym. | Revised  Add acronym definition in Section 9.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1705 | 3.3.2 | 3.30 | 802.19 comment from Benjamin Rolfe on CA document: Last paragraph: The new mask is definitely better for coexistence, but "assure" is not correct. | Change "assure" to "enable" to avoid broken promises :-). | Revised  Change “assure” to “provide”  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1720 | 4 | 3.33 | 802.19 comment from Billy Verso on CA document: It is a very open statement to say "it is possible for 802.11bd to operate outside of the ITS band". Without being specific on the frequency bands how can the coexistence assessment be considered adequate. | State the frequency bands outside of ITS bands where 802.11bd may operate, and consider the coexistence impact in all such applicable bands. | Revised  Clarifies that 802.11bd only operates in unlicensed or license exempt 60 GHz band.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1706 | 3.3.3 | 3.34 | 802.19 comment from Benjamin Rolfe on CA document: "Guarantees" is a dangerous word to use. "Provides" or "enables" are better word choices. | Change "guarantees" to "provides". | Agreed |
| 1726 | 4 | 3.50 | 802.19 comment from James Lansford on CA document: This document doesn't address operation of 802.11bd in the unlicensed band (U-NII-4) the FCC is scheduled to approve on November 18. Section 4 states that "While 802.11bd devices are intended to operate in the ITS band under ITS regulations, it is also possible for 802.11bd to operate outside of the ITS band" but does not elaborate beyond that statement for the 5.9GHz band. Again, there has been discussion in numerous places about operation of DSRC in the unlicensed U-NII-4 band for certain use cases, and the Car to Car Communications Consortium (C2C-CC) even asked 802.11bd to consider operation in the unlicensed band. See https://mentor.ieee.org/802.11/dcn/20/11-20-1012-01-00bd-on-802-11bd-mandatory-features-input-from-the-car-2-car-communications-consortium.pptx . Since this proposed R&O would also eliminate DSRC in the next two years (whether based on 802.11p or 802.11bd), operation in the unlicensed 5.9GHz band in the United States is perhaps the only way 802.11bd could be deployed, unless the FCC allocates new spectrum for ITS. | Add text to describe how 802.11bd will coexist with other 802.11 standards operating in a 20MHz bandwidth in unlicensed bands (e.g., 802.11a/n/ac/ax/be) | Revised  Duplicate comment as CID1175  802.11bd defines new PHY modes (NGV PPDU) to provide better coexistence with 10 MHz 11p PPDU operating 5.9 GHz.  As 11bd draft 1.0 is ready, the group prefers not to add new PHY/MAC modes.  As OCB operation does not limit the use of other PHY format in any unlicensed bands, e.g. VHT/HE PPDU. V2X use of OCB operation in unlicensed bands is already allowed in 802.11-2020.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1707 | 4.1 | 4.3 | 802.19 comment from Benjamin Rolfe on CA document: This contains no information relevant to Coexistence with Non-802.11 systems. First this repeats the mistake about CCA as a coexistence mechanism where perhaps CSMA-CA is intended (CCA by itself is irrelevant - see details in comment on Clause 3.1). This is wrong another way: the CCA rule referenced (20.5.4.2.2) is about detecting the start of a valid DMG OFDM mode or DMG SC mode transmission, which is not likely to be generated by a non-802.11 system. | Delete the paragraph and replace it with a paragraph that describes Coexistence with Non-802.11 systems (of which there may be a lot). | Revised  Add Section 5 (Mechanisms supporting Coexistence with non-802.11 systems) and Section 6 (Coexistence analysis: non 802.11 systems).  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1178 | 4.2 | 4 | CAD: There is no preamble defined that is interoperable with any of the 802.11 PHY standards since 802.11a; without a 20MHz 802.11n/ac/ax/be preamble to enable preamble detection, only Energy Detection is possible. This limits the ability of NGV to operate in unlicensed band with minimal interference from other 802.11 devices. | Add text to describe how the 802.11bd PPDU for 20MHz operation in unlicensed 5GHz bands can coexist with other 802.11 PPDU using preamble detection. | Revised  802.11bd defines new PHY modes (NGV PPDU) only in 5.9 GHz for better coexistence with 10 MHz 11p PPDU. 11bd does not define operation in other unlicensed 5GHz band.  Update the CAD to describe 11bd only provides PHY-level coexistence with 10 MHz 11p PPDU in 5.9 GHz. Energy Detection (ED) level CCA is used for other PPDU formats.  As OCB operation does not limit the use of other PHY format in any unlicensed bands, e.g. VHT/HE PPDU. V2X use of OCB operation in unlicensed bands should already be allowed in 802.11-2020.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1708 | 4.3 | 4.7 | 802.19 comment from Benjamin Rolfe on CA document: Sharing the PPDU format enables interoperation, but how exactly does that impact coexistence (hint: it can in a positive way). This section is titled "Coexistence with 802.11 systems" but contains no information on coexistence.  A common PPDU format doe not "guarantee coexistence" so that's wrong. Also, using "guarentee" in such context is wrong (see the frontmatter of 802.11).  Perhaps what is meant meant is that this provides compatibility with, and/or interoperability with, legacy devices? That at least might be a true statement. This seems like a useful feature, but what is the contribution to coexistence? For example, does it enable coordinating channel access among new and legacy devices using one of the plethora of mechanisms provided in 802.11 to achieve such coordination? That would actually be a positive strategy to improve coexistence with other 802.11 devices.  Frontmatter of 802.11: "IEEE Standards do not guarantee or ensure safety, security, health, or environmental protection, or ensure against interference with or from other devices or networks." | Replace content-free paragraph with:  802.11bd devices operating in the 60 GHz frequency band use the PPDU format[s] of the [DMG OFDM and/or DMG SC] which enables information exchange between 802.11bd and legacy DMG devices. This allows coordinating chanel access among 802.11bd and legacy DMG [OFDM and/or SC] devices using the [list relevant coordination and channel access mechanisms] to provide effective sharing of the channel(s). | Revised  Add a new section 7 (Mechanisms supporting Coexistence with legacy 802.11 systems), and change “guarantees” to other appropriate words.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |
| 1709 | 4 | 3.42 | 802.19 comment from Benjamin Rolfe on CA document: This clause SHOULD be a pretty significant part of this CAD, as one would expect a lot more diversity in spectrum uses outside of the ITS bands. But it is essentially content free, with no discussion at all of coexistence. | Provide a description of bands other than ITS in which 11bd devices may operate, and include an assessment of the coexistence impacts to and from other systems, both 802.11 legacy systems and non-802.11 systems. | Revised  Add new section 3, 4, 5, 6, 7 to streamline the description of the coexistence with 802.11 legacy and non-802.11 systems.  Please refer to the changes in the following updated CA document:  <https://mentor.ieee.org/802.11/dcn/20/11-20-1564-05-00bd-tgbd-coexistence-assessment-document.docx> |