IEEE P802.11
Wireless LANs

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|  Comment Resolution for Clause 31.2.2 |
| Date: 2020-09-01 |
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Abstract

This submission proposes comment resolution for CID 1021, 1022, 1224, 1225, 1227, 1422, 1423, 1486, 1487, 1494, 1754, 1789, 1790 (13 CIDs) related to Clause 31.2.2 in TGbd Draft 1.0

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial modification is applied
* Rev 2: Revised during the call with editorial changes (in green) and highlighted the discussion points (in blue)
* Rev 3: Text related to the MIB attribute for virtual CS in the OCB secondary channel is added (in grey)
* Rev 4: Revision based on discussion during TC held in Feb 9 and added the MIB variable in dot11StationConfigEntry (in pink)

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

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

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

**Discussion:**

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| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1021 | 38.06 |  | Medium is idle. Please clarify whether Physical CS, Virtual CS (PD. or ED), or both. | As in comment. | RevisedAgree in principle.The medium state of the OCB primary channel is determined by Physical CS and Virtual CS, and the medium state of the OCB secondary channel is done by Physical CS. The Virtual CS mechanism in the OCB secondary channel may be additionally applied.TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1022 | 38.24 |  | I am confused by all these exemptions (new rules) for EDCA contention. STA should perform PD plus NAV deferral in primary and ED in secondary. It is not clear to me what these extra rules are adding (besides increasing the likelyhood of collisions). | As in comment (up to line 42) | RevisedAgree in principle.The channel access method for 20 MHz transmission is not mixing the DCF and EDCA operation. The additional rule here is that the channel state determination is modified to sense two contiguous 10 MHz channels. The confusing wordings in the paragraph are modified to be aligned with current EDCA ruleTGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to editor: Same resolution is applied for CID 1022, CID 1227, CID 1486, CID 1790) |
| 1224 | 38.07 | 31.2.2 | To clarify the definition of a busy medium fpr 20 MHz transmission, we can add an explicit statement that he medium is busy unless both the primary and secondary channels are idle. | At the end of the first paragraph, append ", otherwise it determines that the 20 MHz medium is busy" | RevisedAgree in principleRevised text is added at the end of the first paragraph. TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1225 | 38.12 | 31.2.2 | Clause 31.2.2 mixes DCF and EDCA in several sentences. Those sentences invoke the backoff procedure for DCF (10.3.4.3) and AIFS. We should consistently invoke EDCA, or perhaps both EDCA and DCF as options. | In the second paragraph on page 38, in three places replace "10.3.4.3 (Backoff procedure for DCF)" with "10.22.2.2 (EDCA backoff procedure)". Alternatively, the wording can be changed to describe both DCF and EDCA procedures (i.e. DCF using 10.3.4.3 and DIFS, and EDCA using 10.22.2.2 and AIFS) | RevisedAgree in principle.The channel access rule is based on EDCA operation. Therefore, the backoff is invoked as defined in EDCA operation. The only change is that 'the medium is busy on the primary channel' is modified to 'the medium is busy on either the OCB primary channel or the OCB secondary channel.' The confusing words in this paragraph is modified to be alignedTGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to editor: Same resolution is applied for CID 1225, CID 1423, CID 1789) |
| 1227 | 38.33 | 31.2.2 | Clause 31.2.2 consistently says that the backoff counter is decremented one slot time after the AIFS/EIFS idle time. I believe that EDCA decrements the backoff counter at the expiration of AIFS/EIFS, not waiting for an additional slot time. This is important to avoid a countdown being deferred indefinitely when other STAs are ready to transmit at the expiration of AIFS/EIFS. | In the thrid paragraph on page 38, omit "plus aSlotTime" in three places | RevisedAgree in principle.The channel access rule is based on EDCA operation. The confusing wordings in 31.2.2 are modified to be aligned with current EDCA rule, which is defined based on the slot boundary. This paragraph is modified to be aligned with current EDCA ruleTGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to editor: Same resolution is applied for CID 1022, CID 1227, CID 1486, CID 1790) |
| 1422 | 38.01 | 31.2.2 | "An NGV STA transmitting a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDU shall contend forthe medium using EDCAF as defined in 10.2.3.2 (HCF contention based channel access (EDCA)) and 10.3(DCF) based on the medium sensing results of two contiguous 10 MHz channels, OCB primary channel andOCB secondary channel in an NGV 20 MHz channel. An NGV STA performing 20 MHz channel accessdetermines that the 20 MHz medium is idle only if both of OCB primary channel and OCB secondary chan-nel are sensed as idle." 1) it either uses EDCA or DCF, not both. 2) It's EDCA not EDCAF. 3) Grammar | Change to "For the purposes of transmission of a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDU, the medium is shall be considered idle only if both the OCB primary channel and OCB secondary channel are idle." | RevisedAgree in principle.The channel access rule is based on EDCA operation. The reference for channel access mechanism is modified to the corresponding EDCA chapters. The word ‘EDCAF’ is modified to ‘EDCA’.TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1423 | 38.09 | 31.2.2 | "If the medium of the OCB primary channel is determined to be busy and the medium of the OCB secondarychannel is determined to be idle, an NGV STA shall perform the random backoff procedure as described in10.3.4.3 (Backoff procedure for DCF) after the 20 MHz medium remains idle for a period for AIFS from theend of the immediately preceding medium-busy event. If the medium is determined to be busy in the OCBsecondary channel and the duration of channel busy is not known, an NGV STA performs the backoff proce-dure described in 10.3.4.3 (Backoff procedure for DCF) after the 20 MHz medium remains idle for a periodof EIFS (10.3.2.3.7 (EIFS)) from the end of the immediately preceding medium-busy event. If the mediumis determined to be busy in the OCB secondary channel and the duration of channel busy is known, an NGVSTA performs the random backoff procedure described in 10.3.4.3 (Backoff procedure for DCF) after the 20MHz medium remains idle for a period of AIFS from the end of the immediately preceding medium-busyevent." 1) This para suggests DCF is used, not EDCA. 2) The first and last sentence are basically saying the same thing | Change this para to just "An NGV STA shall use EDCA for medium access, except that i) if the medium is busy and the duration of busy medium cannot be determined, EIFS shall be used instead of AIFS if backoff is performed and ii) if the medium is busy on the OCB secondary channel and the duration of busy medium cannot be determined, the backoff counter shall only start to be decremented after EIFS rather than after AIFS of idle medium." and delete the following para | RevisedAgree in principle.The channel access rule is based on EDCA operation. These two paragraphs are changed to be clearer that it is based on the current rules in EDCA operationTGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to editor: Same resolution is applied for CID 1225, CID 1423, CID 1789) |
| 1486 | 38.24 | 31.2.2 | redundancy - the language of this paragraph has significant overlaps with language in previous paragraphs - the redundancy needs to be removed | rewrite the first three paragraphs of the subclause to remove the redundancy - perhaps change to a bulleted style for clarity | RevisedEach paragraph describes the rule for invoking the backoff and the operation during the backoff. This paragraph is modified to operation during the backoff. TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to editor: Same resolution is applied for CID 1022, CID 1227, CID 1486, CID 1790) |
| 1487 | 38.42 | 31.2.2 | better language choice - the baseline does not say "sensed busy", but rather, PHY-CCA.indication(BUSY) | change "sensed busy" to standard language as suggested | RevisedModified to 'the medium of the OCB secondary channel is busy' and adds the conditions to determine the medium status as busy.TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1494 | 37.37 | 31.2.2 | Scanning in the IEEE 802.11 standard generally refers to specific discovery procedures. This sounds more like channel access. | Change "Channel scanning" to "Channel sensing" | RevisedChanged to “Channel access”TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1754 | 38.1 | 31.2.2 | From the second paragraph in p.38, it can be understood that PIFS cannot be used for CCA in the OCB secondary channel, not like that for the ordinary secondary channel. (This is because of the special situation using OCB, I believe.) But reading the first paragraph in p.38, although it is excluding 11.15.9 (STA CCA sensing in a 20/40 MHz BSS), it is still not clear. A note is good to add that the OCB secondary channel does not follow 11.15.9. | As in comment. | RevisedAgree in principle.As it is not operated by PIFS sensing for channel expansion, a note is added to be clearer.TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>  |
| 1789 | 38.19 | 31.2.2 | Use of AIFS in deciding the backoff procedure is defined in 10.23.2.4, not in 10.3.4.3. So, I think we should refer to the sub-clause 10.23.2.4 instead of 10.3.4.3. | Change the text "... the random backoff procedure described in 10.3.4.3 (Backoff procedure for DCF)..." to "... the random backoff procedure described in 10.23.2.4 (Obtaining anEDCA TXOP)...". | RevisedAgree in principle.The corresponding text is changed to "...10.23.2.2 (EDCA backoff procedure)"TGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx>(Note to TGbd editor: Same resolution is applied for CID 1225, CID 1423, CID 1789) |
| 1790 | 38.21 | 31.2.2 | If we follow current backoff rule, the channel does not need to be idle for all AIFS value. Rather, the channel only needs to be idle for AIFSN x aSlotTime - aRxTxTurnaroundTime out of AIFS value, which implies that the channel does not necessarily idle during the SIFS right after channel becomes idle. | As shown in the comment. Apply the same logic to the description in the following paragraph too. | RevisedAgree in principle.The channel access rule is based on EDCA operation. The confusing wordings in 31.2.2 are modified to be aligned with current EDCA ruleTGbd editor: Incorporate the changes in <https://mentor.ieee.org/802.11/dcn/21/11-21-0070-04-00bd-d1-0-comment-resolution-for-clause-31-2-2.docx> (Note to TGbd editor: Same resolution is applied for CID 1022, CID 1227, CID 1486, CID 1790) |

**Propose:**

31.2.2 Channel ~~scanning~~access(#CID 1494) and transmission methods for 20 MHz OCB transmission

**TGbd Editor: *modify 31.2.2 as follows***

An NGV 20 MHz channel consists of two contiguous 10 MHz channels: the OCB primary channel and the OCB secondary channel.

The OCB primary channel is designated by the primary channel parameter of the radio environment vector in MA- UNITDATA.request primitive (see Clause 5.3.2 (Radio environment request vector)).

An NGV STA transmitting a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDUs shall contend for the medium using EDCA~~F~~(#CID 1422) as defined in 10.23.2 (HCF contention based channel access (EDCA)) and ~~10.3 (DCF)~~ 10.3.2 (Procedures common to the DCF and EDCAF) (#CID 1422) based on the medium sensing results of two contiguous 10 MHz channels, OCB primary channel and OCB secondary channel in an NGV 20 MHz channel. An NGV STA performing 20 MHz channel access determines that the 20 MHz medium is idle ~~only if both of OCB primary channel and OCB secondary channel are sensed idle.~~if all of the following conditions are met:

* The CS mechanism (see 10.3.2.1 (CS mechanism)) indicates that OCB primary channel is idle and
* The PHY-CCA.indication primitive indicates that OCB secondary channel ~~are sensed as~~is idle, and
* The virtual CS mechanism (see 10.3.2.1 (CS mechanism)) indicates that OCB secondary channel is idle, if *dot11VirtualCSonOCBSecondaryImplemented* is true.(#CID 1021).

Otherwise, the NGV STA performing 20 MHz channel access determines that the 20 MHz medium is busy. (#CID 1224)

NOTE—An NGV STA transmitting a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDU follows rules defined in sub-clause 31.2.2 (Channel access and transmission methods for 20 MHz OCB transmission) and does not follow rules defined in 11.15.9 (STA CCA sensing in a 20/40 MHz BSS) (#CID 1754)

If either the medium of the OCB primary channel or the OCB secondary channel is determined to be busy ~~and the medium of the OCB secondary channel is determined to be idle~~, an NGV STA shall ~~perform~~ invoke the random backoff procedure as described in ~~10.3.4.3 (Backoff procedure for DCF)~~ 10.23.2.2 (EDCA backoff procedure). ~~after the 20 MHz medium remains idle for a period of AIFS from the end of the immediately preceding medium-busy event. after the 20 MHz medium remains idle for a period of EIFS (10.3.2.3.7 (EIFS)) from the end of the immediately preceding medium-busy event. If the medium is determined to be busy in the OCB secondary channel and the duration of channel busy is known, an NGV STA performs the random backoff procedure described in 10.3.4.3 (Backoff procedure for DCF) after the 20 MHz medium remains idle for a period of AIFS from the end of the immediately preceding medium-busy event.~~ (#CID 1225, CID 1423, CID 1789)

~~When an NGV STA transmitting a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDUs performs the random backoff procedure, the NGV STA shall decrement a backoff counter once per interval of aSlotTime (a backoff slot) (see Clause 32.4.4 (NGV PHY)) while the medium sensing results of the two contiguous 10 MHz channels are determined to be idle. If the medium status of either OCB primary channel or OCB secondary channel is determined to be busy at any time during a backoff slot, then the backoff counter shall not be decremented for that slot. If the medium of the OCB primary channel is determined to be busy and the medium of the OCB secondary channel is determined to be idle, the backoff counter is next decremented after the 20 MHz medium has been determined to be idle for the duration of an AIFS plus aSlotTime. If the medium is determined to be busy in the OCB secondary channel and the duration of channel busy is not known, the backoff counter is next decremented after the 20 MHz medium has been determined to be idle for the duration of an EIFS plus aSlotTime. If the medium is determined to be busy in the OCB secondary channel and the duration of channel busy is known, the backoff counter is next decremented after the 20 MHz medium has been determined to be idle for the duration of an AIFS plus aSlotTime.~~

(#CID 1022, CID 1227, CID 1486, CID 1790) When the random backoff procedure is invoked, an NGV STA transmitting a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDU shall perform as described in 10.23.2.4 (Obtaining an EDCA TXOP), except that the definition of the slot boundaries. In this subclause, the slot boundaries are defined as follows:

1. Following AIFSN[AC] × aSlotTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after SIFS (not necessarily idle medium during the SIFS) after the last busy medium on the antenna that was the result of a reception of a frame with a correct FCS.
2. Following EIFS – DIFS + AIFSN[AC] × aSlotTime + aSIFSTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after the last indicated busy medium as determined by the physical CS mechanism that was the result of a non-S1G frame reception that has resulted in FCS error, or of a frame reception that has resulted in PHY-RXEND.indication (RXERROR) primitive where the value of RXERROR is not NoError.
3. When any other EDCAF at this STA transmitted a frame requiring immediate acknowledgment, the earlier of
	1. The end of the AckTimeout interval timed from the PHY-TXEND.confirm primitive, followed by AIFSN[AC] × aSlotTime + aSIFSTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel, and
	2. The end of the first AIFSN[AC] × aSlotTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after SIFS (not necessarily medium idle during the SIFS, the start of the SIFS implied by the length in the PHY header of the previous frame) when a PHY-RXEND.indication primitive occurs as specified in 10.3.2.11 (Acknowledgment procedure).
4. Following AIFSN[AC] × aSlotTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after SIFS (not necessarily medium idle during the SIFS) after the last busy medium on the antenna that was the result of a transmission of a frame for any EDCAF and which did not require an acknowledgment and after the expiration of the TXNAV timer if nonzero.
5. Following AIFSN[AC] × aSlotTime + aSIFSTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after the last indicated busy medium as indicated by the CS mechanism on the OCB primary channel that is not covered by a) to d).
6. Following EIFS – DIFS + AIFSN[AC] × aSlotTime + aSIFSTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after the last indicated busy medium as indicated by the CCA mechanism on the OCB secondary channel that is not covered by a) to d), when the duration of channel busy is not known.
7. Following AIFSN[AC] × aSlotTime + aSIFSTime – aRxTxTurnaroundTime of idle medium on the 20 MHz channel after the last indicated busy medium as indicated by the CS mechanism on the OCB secondary channel that is not covered by a) to d), when the duration of channel busy is known.
8. Following aSlotTime of idle medium on the 20 MHz channel, which occurs immediately after any of these conditions, a) to g), is met for the EDCAF.

If an NGV STA is unable to transmit a 20 MHz NGV PPDU or 20 MHz non-NGV duplicate PPDUs because the medium of the OCB secondary channel is ~~sensed~~ busy (#CID 1487) and the fallback enabled member of the radio environment request vector so allows, the STA may instead use the medium access procedure to transmit a 10 MHz PPDU on the OCB primary channel. The medium of the OCB secondary channel is busy if PHY-CCA.indication(BUSY, {secondary}) primitive occurs or the virtual CS indicates that the medium is busy on the OCB secondary channel, if *dot11VirtualCSonOCBSecondaryImplemented* is true. (#CID 1487)

 **Annex C**

 ASN.1 encoding of the MAC and PHY MIB

 **C.3 MIB Detail**

*Add the following MIB variables at the end of Dot11StationConfigEntry (the entries not shown are not*

*changed):*

Dot11StationConfigEntry::= SEQUENCE

 {

 …,

 dot11VirtualCSonOCBSecondaryImplemented TruthValue

 }

*Add the following MIB variable definition at the end of MIB variable definitions for the*

*dot11StationConfigEntry:*

dot11VirtualCSonOCBSecondaryImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

" This is a capability variable. Its value is determined by device capabilities. This attribute, when true, indicates that virtual CS operation in the OCB secondary channel is implemeted. "

::= { dot11StationConfigEntry xxx }