IEEE P802.11
Wireless LANs

|  |
| --- |
| PDT CR MAC NPCA CC50 |
| Date: 2025-06-30 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Matthew Fischer | Broadcom | 250 Innovation Drive San Jose CA 95134 | +1 650 796 9206 | Matthew.fischer@gmail.com |
| Laurent Cariou | Intel |  |  | Laurent.cariou@intel.com |
| Gaurang Naik | Qualcomm |  |  | gnaik@qti.qualcomm.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This document contains suggested changes to Draft IEEE P802.11bn\_D0.3 for the Non Primary Channel Access (NPCA) feature.

Proposal to resolve the following CIDs:

171 176 421 422 453 454 455 786 787 790 833 836 837 1052 1053 1055 1056 1057 1058 1059 1060 1063 1210 1211 1214 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1227 1236 1509 1510 1511 1512 1513 1514 1515 1554 1722 1741 1795 1808 1809 1820 1825 1855 1877 1878 1882 1890 1891 2076 2138 2145 2146 2147 2148 2149 2358 2359 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2401 2431 2432 2433 2434 2435 2649 2678 2679 2680 2688 3037 3038 3039 3040 3043 3044 3045 3046 3047 3048 3049 3050 3051 3052 3053 3054 3055 3056 3139 3142 3188 3389 3390 3409 3411 3412 3413 3414 3415 3416 3417 3421 3593 3594 3596 3597 3712 3714

# Revision information

The following is a summary of the important changes that occurred within each revision of this document:

|  |  |
| --- | --- |
| **Revision** | **Major changes** |
| 0 | Initial revision |
| 1 | Editorial:* Fix the meeting month indication in the upper left corner of the document header
* Assign resolutions to numerous additional CIDs based on changes that were made for other CIDs in revision 0, i.e. many CIDs highlight similar issues and initial changes were initially typically referenced to only a single CID – revision 1 attempts to resolve comments that appear to have been addressed by the changes proposed in revision 0, i.e. many CIDs that did not have resolutions in revision 0 now have a resolution in revision 1, but no new changes to the draft text are created by the addition of those new CID resolutions
* Deleted CIDs 997 – 1019 – these CIDs had an incorrect clause number which made them appear to belong to NPCA, but they are actually DPS comments

Technical:* Add rule that Beacons shall not be transmitted on the NPCA channel, 171, 1855, 836, 837
* Remove resolution of CID 1881, it was incorrect
* Various additional CID resolutions are added, each affecting some technical language by creating some modification from revision 0, but not creating any significant functional or behavioural changes, e.g. these changes are largely providing clarifying details to existing technical language
 |
| 2 | Technical changes:* Modified the time window for arrival of the third PPDU to account for the non (MU)RTS case. (MU)RTS case uses NAVTimeout, non-(MU)RTS needs to use the DUR field value from the first PPDU control frame.
* Modified the bandwidth determination language to account for cases when the BW is only determined at the time of the receipt of the third PPDU
* When determining NPCA\_TIMER value, use the largest, not smallest value of the several candidate variables
* When determining NPCA\_TIMER value, subtract “the largest of the switch back delays of the STA and its peers”
* Add two reset conditions for NPCA\_TXOP\_CONTROL\_FRAME\_REM\_DUR to avoid using a leftover value from a previous reception
* Adjust the value of NPCA\_TXOP\_CONTROL\_FRAME\_REM\_DUR to account for the possible ICR and the PHY-RXSTART.indication delay of the third PPDU
* Added co-hosted BSS language (requiring same NPCA primary channel for all BSS in the set)
* Removed CFP language from ICF/ICR requirement for NPCA TXOPs

Editorial changes:* Added “PPDU-based” and “TXOP-based” in the phrase that immediately precedes the description of the conditions that must be true in order to perform NPCA, so as to clarify the meaning of these terms which are already used elsewhere in the text
* Added a few subclause headings to break up the NPCA section
* NPCA BW restrictions – made the language more PPDU specific
* Changed capitalization on one instance of control frame
 |
| 3 | Editorial changes:* Remove unresolved CIDs, add CID list in the abstract
 |
| 4 | Technical changes:* Added “partially received PPDU” in the sub condition of 2) that is used to determine if the exchange is an OBSS TXOP

Editorial changes:* Changed PPDU-based to PHY Header-based
* Changed TXOP-based to MAC Header-based
* Separated some phrases into additional subbullets for clarity within 2) a)
 |
| 5 | Technical changes:* None

Editorial changes:* Added a phrase to the NOTE regarding TBTT occurrence during NPCA, where the phrase is copied from the relevant motion
* Changed one instance of DUR field to Duration/ID field
* Change NPCA\_TXOP\_REM\_DUR to NPCA\_PHY\_TXOP\_REM\_DUR
* Change NPCA\_TXOP\_CONTROL\_FRAME\_REM\_DUR to NPCA\_CFRAME\_TXOP\_REM\_DUR
 |
| 6 | Technical changes:* Change NPCA Disabled subchannel bitmap from 8 to 16 bits
* Removed “inter-BSS” from “third inter-BSS PPDU” in the NPCA transmission rules section, the requirement for inter-BSS determination already exists in condition 2) in the switching section
* Remove “init CW[AC] to CWmin[AC] – this is redundant, as the very next line has another initialization for CW[AC] (which in fact, is slightly different, and more correct)
* Added “but not an MU-RTS” to the DUO case for ICF to be used during NPCA

Editorial changes:* Changed the name of subclause 37.10.2 from NPCA mode starting conditions to Switching to the NPCA channel
* Changed a couple of characters from existing in the D0.3 to new to the draft (i.e. corrected a change tracking error)
* Changed a reference to “condition 2) above” to condition 2) of 37.10.2, because the condition is now found in a new, different subclause due to a previous revision’s change that broke this section into several subclauses, added a similar fix to a reference to MU EDCA parameters
* Added a reference to MU EDCA protocol rules
* Delete a redundant “that”
* Change heading name 37.10.3
 |
| 7 | Technical changes:* Added NPCA parameters that must be the same for the collocated/Multi BSS cases – i.e. NPCA minimum duration, etc
* Changed the requirement of condition 2 to be more specific, instead of “all or part of” a three PPDU sequence, changed to at least the first PPDU and the PHY header of the third PPDU
* Transmission rules 6) b), the non-AP STA ICF shall be a BSRP NTB Trigger, not may
* For ICF TX by non-AP STA, add the exception for TX to Mobile AP in DPS mode
* Added a TBD for when it is ok to use ELR during NPCA
* Modified NPCA Start Timeout value with enumeration of cases
* Added UHR Link Reconfiguration frame to the frames that should carry UHR Op IE
* Extend the same NPCA parameters requirement to the Multi BSSID case
* Slight modification to the determination of the value of NPCA\_CFRAME\_TXOP\_REM\_DUR – change equal to set (really editorial) but then also adding a time point when this variable value asssignement occurs (the technical part)
* Conditions 1) and 2) for switching to NPCA had an overlap, which is fixed by moving the main starting condition for 2) to become 2) a) and then adding a new condition in condition 1) which is that condition 2) a) is not true *(i.e. condition 1 should only be checked if there was no ICF detected, as described in 2) a) )*
* Added a resolution for CID 787 (reject)
* For CID 790, add a new line with a CID tag that says that a STA shall not transmit a response to a trigger that does not have the NPC Primary Indication equal to 1.
* Changed reference draft from D0.2 to D0.3, (cannot change heading numbering due to editing problems), with a few minor editorial edits as a result
* Add a sentence that says that if no NPCA Disabled Subchannel Bitmap is present, then no subchannels are punctured for NPCA
* Removed dot11NPCAMUEDCATable, as it is the same as dot11MUEDCATable
* Condition 1) d) – added “if present” behind the RU\_ALLOCATION parameter

Editorial changes:* Changed “contained in a non-AP MLD” to “affiliated with a non-AP MLD”, which matches accepted terminology
* Added a time value of an OFDM symbol
* Changed duration of OFDM symbol to the more formal TSYM
* Added CID 2435
* Changed resolution doc references to r7
* Simplified the language of conditions 1) b) i) and 1) b) ii)
* Add another reference to an internal subclause due to the addition of subclause headings
* MU EDCA language – deleted a redundant phrase at the very end of this section
* Change NPCA Operation Information Present to NPCA Enabled
* Wording modification regarding untriggered UL
 |
| 8 | Technical changes:* Add a new paragraph in 37.10 that says that the AP must assign the NPCA pch to lie within the sec 80 of a 160 BSS or sec 160 of a 320 BSS
* Created a definition for the Initial NPCA QSRC field
* Removed the text that says that an AP indicates its NPCA parameter values in the associated fields as this is implicit in the requirement to send these fields
* Disabled Subchannel bitmap – when there is no NPCA disabled bitmap, the operation needs to match the baseline disabled bitmap operation, added a reference to 35.15.2
* In the second NPCA switching condition, removed the redundant requirement that the OBSS PPDUs do not overlap the NPCA primary channel (made redundant by the new phrase at the beginning of this paragraph)
* Transmission rules 4) a) iv), cleaned up language that assigns QSRC[AC] to Init\_QSRC\_NPCA and remove default value statement.
* Transmission rules, removed the “except when other conditions” regarding ELR PPDU, etc
* Replaced TBD with (Re)Assoc REQ and UHR Link Recon for non-AP advertisement case

Editorial changes:* 37.10.2 Switching – condition 2) a) split the bullet into two pieces to make it more readable – all lettered bullet conditions beneath item 2) must be true, so the logical flow is still
* 37.10.2 Switching– this entire heading is new material, so it should be in underline
* Changed names of PHY Header based and MAC Header based to PHYLEN and MOPLEN (i.e. MAC or PHY = MOP) and removed the names for the two NPCA entry conditions – they are just condition 1) and condition 2) now, since the two conditions are almost never referenced, the names are not needed
* Re-ordered conditions 1) a) and 1) b), now require only that condition 2) is not true, vs condition 2) a)
* Condition 2) d) modified language to remove “partially received PPDU” while maintaining the same technical requirement
* Global change of NPCA Operation Information to NPCA Operation Parameters
* Removed redundant “that supports NPCA operation”
* Add “field” as needed to instances of NPCA Disabled Bitmap
* 37.10.3 NPCA TX rules – bullet b) reworded a bit and changed the indentation to clarify
* Removed 16-bit from bitmap field description, a lot of other editorial changes based on Mark Rison’s comments, including “derived from the received PPDU” vs “of the received PPDU”
* Quite a few CIDs removed from the abstract and table
 |
| 9 |  |
| 10 |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| 99 | * You wish
 |
| 100 | Oh oh. |
|  |  |

# Introduction

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 TGbe Draft. The abstract, revision information, introduction, explanation of the proposed changes, discussion and references sections are not part of the adopted material.

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

## Explanation of the proposed changes:

The proposed changes to the 802.11 TGbn draft 0.3 within this document are based on CIDs obtained through CC50.

## DISCUSSION:

## Open Issues:

## CID LIST:

NOTES:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 171 | Jay Yang | 37.10 | 78.17 | The group addressed frame and Beacon frame delivery in NPCA is missing, please clarify it. e.g."The beacon frame and group addressed frame should not be delivered on NPCA channel, and the group addressed frame should be buffered and delivered after DTIM Beacon" | as the comments | Revised – TGbn editor to make changes marked with CID 171 found in 11-25-0936r8 which add a prohibition against sending the Beacon on the NPCA channel. |
| 176 | Ke Zhong | 37.10 | 79.45 | The description "based on an meeting condition" is not correct and does not align with the description "based on meeting condition" in the following paragraph. | Replace "an meeting condition" with "meeting condition" to align the description in the following paragraph.That is, delete "an" in "an meeting condition".Or, we can align the description in the two paragraphs as "based on the meeting condition 1)" and "based on the meeting condition 2)". | Revised – TGbn editor to make changes marked with CID 176 found in 11-25-0936r8 which follow the first of the commenter’s recommendations. |
| 421 | Shuang Fan | 37.10 | 79.08 | It's not clear about the definition of 'channel allocations in the corresponding band'. | Clarify the definition of 'channel allocations' | Revised – TGbn editor to make changes marked with CID 421 found in 11-25-0936r8 which address the issue of clarifying the meaning of channel allocations related to NPCA operation. |
| 422 | Shuang Fan | 37.10 | 79.32 | In case of MU-RTS/CTS control frame exchange sequence, the bandwidth singaling TA is not used, and there will be no valid CH\_BANDWIDTH\_IN\_NON\_HT in the scrambling sequence and RXVECTOR, please add a new bullet or note to clarify how to determin the bandwidth of Mu-RTS/CTS | A simple way to determine the bandwidth of MU-RTS/CTS frame is by using status of per 20 MHz CCA of the received MU-RTS/CTS frame. | Reject – the suggested method is simple, but it is unreliable. The group feels that it is unacceptable to base a channel reuse operation on such an unreliable mechanism. |
| 453 | Mahmoud Kamel | 37.10 | 79.46 | NPCA HE switch time parameter is not defined and the abbreviation HE is not spelled out making the term ambiguous. | Define the term NPCA HE switch time and spell out the HE abbreviation. | Revised – TGbn editor to make changes marked with CID 453 found in 11-25-0936r8 which define NPCA HE switch time. Also see CID 3593. |
| 454 | Mahmoud Kamel | 37.10 | 79.55 | NPCA NHT switch time parameter is not defined and the abbreviation NHT is not spelled out making the term ambiguous. | Define the term NPCA NHT switch time and spell out the NHT abbreviation. | Revised – TGbn editor to make changes marked with CID 454 found in 11-25-0936r8 which define NPCA NHT switch time. Also see CID 3593. |
| 455 | Mahmoud Kamel | 37.10 | 78.54 | In NPCA operation, condition 1 only applies to HE/EHT/UHR PPDUs. What about the scenario where the OBSS AP is HT or VHT. A transmission of such AP may take place on the BSS PCH of the NPCA AP and provides a good opportunity to exploit NPCA in such scenario. | Include a condition for the scenario when the OBSS AP is HT or VHT. | Reject – the opportunity is not so good. The mechanism requires that the OBSS PPDU be identifiable as an OBSS PPDU, but the HT format and VHT format do not provide very definitive information within the PHY header to determine this, whereas HE, etc formats provide an explicit BSS COLOR value in the PHY header. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 786 | Seongho Byeon | 37.10 | 78.41 | The use of the MU EDCA parameter is TBD, but a detailed description of how to use or apply it to the non-AP NPCA STA(s) is required. | Need to describe how to use MU EDCA parameter, not to allow untriggered UL transmission of NPCA non-AP STA(s). | Revised – TGbn editor to make changes marked with CID 786 found in 11-25-0936r8 which define MU EDCA operation for preventing non triggered UL during NPCA. |
| 787 | Seongho Byeon | 37.10 | 80.22 | [Bullet 5)] It is required to describe the case where an NPCA AP transmits ICF soliciting ICRs from multiple NPCA STAs. For example:When an NPCA AP transmits an ICF soliciting ICRs from multiple non-AP STAs (e.g., a Trigger frame including multiple non-overlapping User Info fields), the AP can transmit the ICF after the longest delay has expired among the non-AP STAs receiving the User Info field. | As in comment. | Reject – no change needed. The language already covers this case. I.e. there can be multiple second STAs. |
| 790 | Seongho Byeon | 37.10 | 80.27 | [Bullet 6)] When a STA performing NPCA receives an ICF that is not explicitly indicated to be on the NPCA primary channel but sent by its associated AP, it is necessary to describe what action to take. For example, "When an NPCA STA receives an ICF sent by the AP, not including explicit indication that it is being transmitted on the NPCA primary channel, it shall terminate NPCA operation." | As in comment. | Revised – TGbn editor to make changes marked with CID 790 found in 11-25-0936r8 which address the issue of an explicit indication of a frame being transmitted on the NPCA primary channel. See also CID 3643 |
| 833 | Oren Kedem | 37.10. | 78.17 | Upon reception of OBSS PPDU on P20, NPCA STA switches to NP20 and start performing backoff procedure.While in backoff, NPCA STA may receive PPDUs on NP20 and should maintain NAV accordingly.PPDU received on NP20 may classified as Inter (other OBSS) or Intra (other NPCA STA from same BSS) as in P20.NAV setting rules on NP20 should be the same as on P20 with the exception that NP20 Inter/Intra NAV Timer is reset also upon switch from P20 to NP20 | Text should include below normative:NPCA STA shall maintain two NAVs on NPCA Primary Channel: an intra-BSS NAV and a basic NAV. The intra and Basic NAV shall be reset upon switch to NPCA Primary Channel and be updated as defined in 26.2.4 (Updating two NAVs). | Revised – TGbn editor to make changes marked with CID 833 found in 11-25-0936r8 which address the issue of the state of the intra-BSS NAV when determining whether to switch to NPCA operation. |
| 836 | Oren Kedem | 37.10. | 78.17 | STA should not forword Group Addressed frame when on NPCAnon-primary ? | Please provide rule to exclude group frames when on NPCA | Revised – TGbn editor to make changes marked with CID 836 found in 11-25-0936r8 which add a prohibition against sending the Beacon on the NPCA channel. See also CID 171. |
| 837 | Oren Kedem | 37.10. | 78.17 | AP should not transmit Group Addressed frame when on NPCAnon-primary ? | Please provide rule to exclude group frames when on NPCA | Revised – TGbn editor to make changes marked with CID 836 found in 11-25-0936r8 which add a prohibition against sending the Beacon on the NPCA channel. See also CID 171. |
| 1052 | Matthew Fischer | 37.10. | 78.23 | NPCA operation should be allowed for BSS BW down to 80 MHz. | Change "operating bandwidth less than TBD (but either 80 or 160 MHz) shall not enable NPCA operation." to "operating bandwidth less than 80 MHz shall not enable NPCA operation." | Revised – TGbn editor to make changes marked with CID 1052 found in 11-25-0936r8 which address the issue of minimum BSS BW for NPCA operation. |
| 1053 | Matthew Fischer | 37.10. | 78.32 | Reduce overhead of the pseudo static indication of NPCA mode. | Change "and NPCA Switch Back Delay field of the TBD frames." to "and NPCA Switch Back Delay field of Association Response frames." Also, add a new bit to the UHR Capabilities element called NPCA\_Supported. This bit should appear in Beacons and Probe responses. Add language here to indicate that an NPCA AP sets this bit. An AP would normally just indicate the support in the Beacon and keep the NPCA parameters out of the beacon, only sending them in the Association Response and in the Beacon only if they are going to change - but they shouldn't ever change. | Revised – TGbn editor to make changes marked with CID 1053 found in 11-25-0936r8 which address the issue of signaling of NPCA operation parameters. |
| 1055 | Matthew Fischer | 37.10. | 78.41 | NPCA untriggered prohibited mode should be all or none for non-AP STAs. | Change "Whether the mode is for all associated non-APs or per non-AP is TBD." to "The AP may enable this mode for all associated non-AP NPCA STAs or for individually identified non-AP NPCA STAs." Delete the line "Whether MU EDCA parameters mechanism is used for this or not is TBD." | Revised – TGbn editor to make changes marked with CID 1055 found in 11-25-0936r8 which address the issue of setting a restriction on the use of NPCA untriggered mode and MU EDCA parameters to determine the mode. |
| 1056 | Matthew Fischer | 37.10. | 78.59 | Specify the determination of the remainder of the PPDU duration | Change "the duration of the PPDU, (determined by the MAC in a manner TBD, but necessarily involving some of the parameters of the RXVECTOR associated with the received PPDU) or the duration of the PPDU" to "1) The value of the MAC variable NPCA\_TXOP\_REM\_DUR is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to the BSS of which it is a member, where NPCA\_TXOP\_REM\_DUR is equal to:a) The value in usec, of the remaining duration of the PPDU, determined by the MAC at the time of the receipt of the PHY-RXSTART.indication associated with the received PPDU, by subtracting the time elapsed between the reception of the PHY-CCA.indication(BUSY) and PHY-RXSTART.indication primitives associated with the received PPDU from the value of RXTIME of the received PPDU and adding the value of the TXOP\_DURATION parameter of the RXVECTOR of the PPDU, if not UNSPECIFIED" and delete the following text: "whether the RXVECTOR parameter TXOP\_DURATION of the PPDU is considered for this comparison and whether it is indicated by the AP is TBD" | Revised – TGbn editor to make changes marked with CID 1056 found in 11-25-0936r8 which address the issue of determining the endpoint of the NPCA operation based on PPDU reception. |
| 1057 | Matthew Fischer | 37.10. | 79.20 | Specify the determination of the TXOP | Replace "the TXOP duration, determined from the Duration field of the received frame(s), is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its BSS" with "The value of the MAC variable NPCA\_TXOP\_REM\_DUR is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its BSS, where NPCA\_TXOP\_REM\_DUR is equal to:a) the value in usec, from the Duration field of the received frame(s), or, if no Duration field is correctly received, and a value other than UNSPECIFIED is present in the TXOP\_DURATION parameter of the RXVECTOR of any of the received frames, the remaining duration of the PPDU containing the initial response frame, determined by the MAC at the time of the receipt of the PHY-RXSTART.indication of that PPDU by subtracting the time elapsed between the reception of the PHY-CCA.indication(BUSY) and PHY-RXSTART.indication primitives associated with the received PPDU from the value of RXTIME associated with the received PPDU, plus the value of the TXOP\_DURATION parameter of the RXVECTOR of the associated PPDU, otherwise, 0" and delete the sentence: "Whether the RXVECTOR parameter TXOP\_DURATION of the received PPDU(s) are considered for this comparison is TBD" | Revised – TGbn editor to make changes marked with CID 1057 found in 11-25-0936r8 which address the issue of determining the endpoint of the NPCA operation based on TXOP information reception. |
| 1058 | Matthew Fischer | 37.10. | 79.53 | Define NPCA HE switch time | Change "TBD" to "NPCA HE switch time is the point in time that is 24 usec after the receipt of the PHY-RXSTART.indication associated with the received PPDU from condition 1) above" | Revised – TGbn editor to make changes marked with CID 1058 found in 11-25-0936r8 which address the issue of NPCA switch time. See also CID 1554. |
| 1059 | Matthew Fischer | 37.10. | 79.62 | Define NPCA NHT switch time | Change "TBD" to "NPCA NHT switch time is the point in time that is 4 usec after the PHY-RXEND.indication associated with the initial response frame from condition 2) above"Delete item 5) because with this change, it is no longer relevant. | Revised – TGbn editor to make changes marked with CID 1059 found in 11-25-0936r8 which address the issue of NPCA switch time. See also CID 1741. |
| 1060 | Matthew Fischer | 37.10. | 80.05 | There is a TBD that needs to be replaced with a technical specification of behavior. | Replace item 4), including all subbullets with: "2) The NPCA STA performs the backoff procedure on the NPCA primary channel following the rules defined in 10.23.2.2 (EDCA backoff procedure), except that:a) The STA shall maintain QSCR[AC] and CW[AC] MAC variables for the NPCA primary channel that are distinct from and unrelated to the QSRC[AC] and CW[AC] MAC variables used by the EDCA backoff procedure on the primary channel of the BSSb) An NPCA STA may initiate a TXOP on the NPCA primary channel after the NPCA\_HE or NPCA\_NHT switch time, as appropriate, provided that the backoff procedure has completed3) At each NPCA HE switch time or NPCA NHT switch time, as appropriate, the STA shall initiate countdown of the MAC variable NPCA\_TXOP\_REM\_DUR in units of 1 usec" | Revised – TGbn editor to make changes marked with CID 1060 found in 11-25-0936r8 which address the issue of the differentation of the backoff operations on NPCA primary channel vs the backoff on the normal channel of the BSS. |
| 1063 | Matthew Fischer | 37.10. | 80.31 | Fix the TBD | Replace the item 6) "a) Details on the NPCA ICF are TBD", with two new items at the level of 6) to read as follows:7) For TXOPs initiated by an AP, the initial Control frame shall be a non-HT BSRP or MU-RTS except when the target non-AP STA(s) are operating in the DUO mode, in which case, the ICF shall conform to the rules found in 37.11.2 (Dynamic Unavailability Operation (DUO) mode)8) For TXOPs initiated by a non-AP STA, the initial Control frame may be a non-HT BSRP or a BSRP that conforms to the rules for ICF found in 37.11.2 (Dynamic Unavailability Operation (DUO) mode) | Revised – TGbn editor to make changes marked with CID 1063 found in 11-25-0936r8 which address the issue of the initial control frame requirement for TXOPs within NPCA operation. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1210 | Morteza Mehrnoush | 37. 10 | 78.23 | Resolve the TBD by fixing this to BW less than 80MHz shall not enable NPCA operation | As in comment | Revised – TGbn editor to make changes marked with CID 1210 found in 11-25-0936r8 which address the issue of minimum BSS BW for NPCA operation. See also CID 1052. |
| 1211 | Morteza Mehrnoush | 37. 10 | 78.32 | NPCA Switching and switch back delay of the AP should be carried in the UHR Operation element; management frames which carries these needs to be defined, e.g. beacon and probe response and association response. | Define the signaling for indicating the NPCA Switching and switch back delay of the AP |  |
| 1214 | Morteza Mehrnoush | 37. 10 | 78.41 | Regarding "Whether the mode is for all associated non-Aps or per non-AP is TBD". TBD needs to be resolved. To be fair to all the STAs, this mode must be enabled/disabled for all non-AP STAs. Also applying same mode to all STAs simplifies the signaling. | Address the TBD based on the comment | Revised – TGbn editor to make changes marked with CID 1214 found in 11-25-0936r8 which address the issue of triggered UL only NPCA operation. See also CID 786. |
| 1216 | Morteza Mehrnoush | 37. 10 | 78.59 | To resolve TBD in 1b: TBD is for PPDU duration itself so duration value should be derived from the L-SIG length field. | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1216 found in 11-25-0936r8 which address the issue of the determination of NPCA TXOP duration. See also CID 1056. |
| 1217 | Morteza Mehrnoush | 37. 10 | 79.04 | To resolve TBD in 1b.i: resolve the TBD by allowing the TXOP\_DURATION in addition to PPDU duration value | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1217 found in 11-25-0936r8 which address the issue of the determination of NPCA TXOP duration based on TXOP based NPCA invocation. |
| 1218 | Morteza Mehrnoush | 37. 10 | 79.24 | To resolve TBD in 2b.i: Duration field in control frames are sufficient to derive the usable duration for NPCA. So remove this TBD/bullet | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1218 found in 11-25-0936r8 which address the issue of the determination of NPCA TXOP duration based on TXOP based NPCA invocation. |
| 1219 | Morteza Mehrnoush | 37. 10 | 79.40 | Remove the TBD conditions on 2d to simplify the protocol | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1219 found in 11-25-0936r8 which removes a TBD. |
| 1220 | Morteza Mehrnoush | 37. 10 | 79.53 | The NPCA HE switch time needs to be defined. For this case, the switch time should be after the BSS color, TXOP\_DURATION, and BW information is determined | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1220 found in 11-25-0936r8. |
| 1221 | Morteza Mehrnoush | 37. 10 | 79.62 | The NPCA HHT switch time needs to be defined. For this case, the switch time should be after the NPCA STA determines the inter-BSS classification, TXOP\_DURATION, and BW information from the ICF/ICR, and made sure the TXOP is not terminated. | Address the TBD as in comment | Revised – TGbn editor to make changes marked with CID 1221 found in 11-25-0936r8. |
| 1222 | Morteza Mehrnoush | 37. 10 | 80.10 | It is expected that the exponential BO to be used on NPCA primary channel similar to BSS primary channel with the same value. We don't need the exceptions for the NPCA primary channel a and b. Lets say several STAs switched to NPCA primary channel and start accessing the channel by sending the ICF (additionally there could be OBSS on NPCA primary channel), then this results in a lot of collision without exponential BO to help resolve this excessive ICF failures. | Remove the exceptions a and b so that NPCA | Revised – TGbn editor to make changes marked with CID 1222 found in 11-25-0936r8. |
| 1223 | Morteza Mehrnoush | 37. 10 | 80.11 | Is CW\_NPCA[AC] value the same as CW\_min[AC] to be used on NPCA primary channel? If yes, does the exponential backoff will be used on the NPCA channel? | Please clarify what is CW\_NPCA and BO\_NPCA. Also define the exponential BO on NPCA primary channel similar to BSS primary channel; in that regard QSRC\_NPCA needs to be re-thought and clarify the behavior for it. | Revised – TGbn editor to make changes marked with CID 1223 found in 11-25-0936r8 which address the issue of the differentation of the backoff operations on NPCA primary channel vs the backoff on the normal channel of the BSS. |
| 1224 | Morteza Mehrnoush | 37. 10 | 80.18 | What happens to the CW and BO on the BSS primary channel, after the STA returns to the BSS primary channel? Does it resume from the values prior to switching to NPCA primary channel? | Please clarify CW and BO on BSS primary channel as in comment | Revised – TGbn editor to make changes marked with CID 1224 found in 11-25-0936r8 which address the issue of NPCA switch time. See also CID 1061. |
| 1225 | Morteza Mehrnoush | 37. 10 | 80.31 | Resolve the TBD by listing the ICF/ICRs to be used in NPCA. Also the interaction of NPCA with other features like DPS, DUO, etc which may require a different ICF/ICRs needs to be defined. | As in comment | Revised – TGbn editor to make changes marked with CID 1225 found in 11-25-0936r8 regarding the ICF for NPCA. |
| 1227 | Morteza Mehrnoush | 37. 10 | 80.49 | Remove this TBD. Dynamic puncturing in general is not adopted yet so prefer to remove the requirement for NPCA | As in comment | Revised – TGbn editor to make changes marked with CID 1227 found in 11-25-0936r8 regarding puncturing in NPCA. |
| 1236 | Morteza Mehrnoush | 37. 10 | 79.08 | "the channel allocations in the corresponding band" is not clear. Does it mean that NPCA STA know the OBSS channel allocation? If yes, how? | Please clarify the statement mentioned in the comment, and define the procedure how the NPCA STA can get such a information | Revised – TGbn editor to make changes marked with CID 1236 found in 11-25-0936r8 regarding determining channel allocation in NPCA. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1509 | Dongju Cha | 37.10 | 78.34 | change "announce" to "indicate" | As in comment | Accept |
| 1510 | Dongju Cha | 37.10 | 78.30 | change "respectively" to " , respectively" | As in comment | Revised – TGbn editor to make changes marked with CID 1510 found in 11-25-0936r8 due to resolution of other CIDs the text is deleted. |
| 1511 | Dongju Cha | 37.10 | 78.40 | change "non-APs or per non-AP" to "non-AP NPCA STAs or per non-AP NPCA STA" | As in comment | Revised – TGbn editor to make changes marked with CID 1511 found in 11-25-0936r8 due to resolution of other CIDs the text is deleted. |
| 1512 | Dongju Cha | 37.10 | 78.41 | How to enable/disable the untriggered UL transmission on the NPCA primary channel need to be defined. | We can define some mechanisms as follows.1. Non-AP NPCA STA can indicate whether it prefers the Triggered-based UL transmission on NPCA primary channel when it enables the operation of NPCA2. When NPCA AP enables Triggered-based UL transmission, it applies the rule (Triggered-based UL TX) to non-AP NPCA STAs that indicated it requires the Triggered-based UL transmission | Revised – TGbn editor to make changes marked with CID 1512 found in 11-25-0936r8 which define MU EDCA operation for preventing non triggered UL during NPCA. See also CID 786. |
| 1513 | Dongju Cha | 37.10 | 79.13 | Regarding NPCA triggering condition: other than "Received Control frame and initial response frame of Control frame exchange (e.g., received RTS + CTS) on the BSS primary channel", "Received Control frame and frame followed by initial response frame of Control frame but do not receive the initial response frame of Control frame (e.g., received RTS + Data, but do not received CTS)" also need to be defined as triggering condition. | As in comment | Revised – TGbn editor to make changes marked with CID 1513 found in 11-25-0936r8 which address the issue of determining when to switch to NPCA operation based on control frame reception. |
| 1514 | Dongju Cha | 37.10 | 80.08 | Remove M126 | As in comment | Accept |
| 1515 | Dongju Cha | 37.10 | 80.31 | TBD should be resolved | Considering the fact that NPCA STAs can be triggered due to different OBSS activity which leads to having different NPCA Duration, NPCA Duration of AP needs to be included in NPCA ICF and NPCA ICR, respectively in case of DL tx and UL tx | Revised – TGbn editor to make changes marked with CID 1515 found in 11-25-0936r8 which address the issue of NPCA ICF. |
| 1554 | yajun CHENG | 37.10 | 80.52 | In order to guarantee reliable transmission on the BSS primary channel, especially when non-AP STAs and AP have different switching capabilities (different switch back delays), it is necessary to standardize how and when STAs initial the switching from the NPCA Primary channel to the BSS Primary channel. | Specify the start time for STAs to switch from the NPCA Primary channel back to the BSS Primary channel. | Revised – TGbn editor to make changes marked with CID 1554 found in 11-25-0936r8 which address the issue of NPCA switch time. |
| 1722 | Gaius Wee | 37.10 | 78.34 | The meaning of "announce ... in the ...fields" may be unclear | Replace "announce" with "indicate". Or "announce by indicating" | Revised – TGbn editor to make changes marked with CID 1722 found in 11-25-0936r8. |
| 1741 | Kosuke Aio | 37.10 | 79.56 | No definition of "NPCA NHT switch" | Please add the definition. | Revised – TGbn editor to make changes marked with CID 1741 found in 11-25-0936r8 that define NPCA NHT switch time. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1795 | Junichi Iwatani | 37.10 | 78.50 | Procedures for an NPCA STA to return from an NPCA primary channel to the BSS primary channel should be clarified. | As in comment. | Revised – TGbn editor to make changes marked with CID 1058 found in 11-25-0936r8 which address the issue of NPCA switch time. See also CID 1554. |
| 1808 | Patrice Nezou | 37.10 | 80.01 | Please solve TBD in the section related to the EDCA parameters to ensure fairness between NPCA and non-NPCA capable STAs for the contention window management | Please precise the CW management when switching from primary to NPCA channel, when switching back to the primary channel and during the NPCA period. | Revised – TGbn editor to make changes marked with CID 1808 found in 11-25-0936r8 that provide behavior rules for backoff procedure related to NPCA. See also CID 1224. |
| 1809 | Patrice Nezou | 37.10 | 80.01 | There is no requirement for the management of the MU EDCA parameetrs during the NPCA procedure. Please clarify to ensure fairness among all STAs associated to the BSS. | Please precise the management of the MU EDCA parameters (especially MU EDCA timer) when switching from primary to NPCA channel, when switching back to the primary channel and during the NPCA period. | Revised – TGbn editor to make changes marked with CID 1809 found in 11-25-0936r8 which address the issue of MU EDCA parameters during NPCA operation. |
| 1820 | Juseong Moon | 37.10 | 80.03 | The use of the MU EDCA timer during NPCA operation is not defined. The operation of the MU EDCA timer during NPCA operation needs to be specified. | Please add the following text:(Current)The STA shall use the same EDCA parameter set, MU EDCA parameter set, and EPCS EDCA parameter set values for operation on the NPCA primary channel as it uses on the BSS primary channel.(Added)\*\*The STA shall use a common MU EDCA Timer per its EDCAFs for the Primary channel and the NPCA Primary channel\*\* | Revised – TGbn editor to make changes marked with CID 1820 found in 11-25-0936r8 which address the issue of determining the status of MU EDCA parameters during NPCA operation. |
| 1825 | Juseong Moon | 37.10 | 79.20 | Because the duration field value in the ICR frame during the ICF-ICR frame exchange may be shorter than the threshold, the TXOP duration used for comparison with the NPCA Minimum Duration Threshold when switching to the NPCA Primary channel should be determined by the Initial Response Frame. | Please modify the text as the following:the TXOP duration, determined from the Duration field of the \*\*initial response frame\*\*, is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its BSS | Revised – TGbn editor to make changes marked with CID 1825 found in 11-25-0936r8 which address the issue of determining when to switch to NPCA operation based on control frame reception. |
| 1855 | Yusuke Tanaka | 37.10 | 79.42 | The frames transmitted by the NPCA operation seem to be mainly Data frames and Control frames, but if there are no restrictions, inappropriate frames (such as Beacon frames) may be transmitted. | Specify the conditions for frames that can be transmitted in the NPCA operation. | Revised – TGbn editor to make changes marked with CID 1855 found in 11-25-0936r8 which add a prohibition against sending the Beacon on the NPCA channel. See also CID 171. |
| 1877 | Sanghyun Kim | 37.10 | 78.60 | The NPCA operation has been agreed to be performed during the time when the primary channel is known to be busy (Motion 11). Therefore, the NPCA STA should performs NPCA operation based on the remaining OBSS TXOP from the moment it detects OBSS activity.In other words, the value compared to the NPCA minimum duration threshold should be the sum of the remaining inter-BSS PPDU length and the remaining OBSS TXOP duration after the PPDU ends. | Please change the condition 1) b. as follows and delete i) in that condition.the duration of the (remaining) PPDU plus the value of the RXVECTOR parameter TXOP\_DURATION of the PPDU, is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to the BSS of which it is a member | Revised – TGbn editor to make changes marked with CID 1877 found in 11-25-0936r8 which address the issue of determining the endpoint of the NPCA operation based on OBSS TXOP duration information. |
| 1878 | Sanghyun Kim | 37.10 | 78.15 | It is unclear how an NPCA STA set its basic NAV timer for the BSS primary channel.NPCA STA shall set the basic NAV before initiating a switch to the NPCA primary channel. | Please provide NAV setting rules for the NPCA STA | Reject – the baseline provides the rules for setting NAV. The NPCA operation subclause does not propose to change these rules. |
| 1879 | Sanghyun Kim | 37.10 | 80.22 | It is unclear how a STA that has completed backoff procedure defer its Tx initiation considering the NPCA switching delay of a recipient STA. | Please provide a channel access mechanism for a NPCA STAs to defer Tx initiation considering the NPCA switching delay. | Reject – the requested rules exist already in D0.1 at P80L22. |
| 1882 | Sanghyun Kim | 37.10 | 78.54 | If the BSS color of a received inter-BSS PPDU is the same as the STA's BSS color (i.e., in the case of a BSS collision), the STA identifies the PPDU as an inter-BSS PPDU after decoding the frame included in the PPDU. In this situation, it is unclear whether the STA should switch to the NPCA primary channel. | Either restrict NPCA operation to cases where an inter-BSS PPDU is identified using the BSS color or provide a mechanism for switching after decoding the frame included in the HE/EHT/UHR PPDU. | Reject – rules for avoiding switching to NPCA based on MyBSS PPDU exist already in D0.1 P78L56 and P79L17 |
| 1890 | Sanghyun Kim | 37.10 | 79.47 | It is unclear what time point 'NPCA HE switch time' refers to. | Please provide additional details to clarify the time point indicated by 'NPCA HE switch time' | Revised – TGbn editor to make changes marked with CID 1890 found in 11-25-0936r8 that provide behavior rules for backoff procedure related to NPCA. See also CID 3593. |
| 1891 | Sanghyun Kim | 37.10 | 79.55 | It is unclear what time point 'NPCA NHT switch time' refers to. | Please provide additional details to clarify the time point indicated by 'NPCA NHT switch time' | Revised – TGbn editor to make changes marked with CID 1891 found in 11-25-0936r8 that provide behavior rules for backoff procedure related to NPCA. See also CID 3593. |
| 2076 | Liangxiao Xin | 37.10 | 80.23 | Does the "STA" mean "the STA" or "another STA"? | please clarify | Reject – the third instance of STA includes the qualifier “that” which in common usage is an explicit indication that the 3rd instance of STA refers to the immediately preceding instance of STA. |
| 2138 | Vishnu Ratnam | 37.10 | 78.21 | The current text reads: "only if it is associated with an NPCA AP.". Suggest to replace with "only if it is associated with an NPCA AP that has enabled NPCA operation." | As in comment. | Revised – TGbn editor to make changes marked with CID 2138 found in 11-25-0936r8 that provide behavior rules for backoff procedure related to NPCA. |
| 2145 | Vishnu Ratnam | 37.10 | 78.63 | The spec should clarify how the value in the NPCA Minimum Duration Threshold field is applied to the case of HE+ PPDUs. | For HE+ PPDUs since the switch is performed after receiving the PHY header, the TXOP\_DURATION-PHY\_HEADER\_DURATION should be larger than NPCA Minimum Duration Threshold. | Revised – TGbn editor to make changes marked with CID 2145 found in 11-25-0936r8 which address the issue of determining the value of the NPCA operation minimum duration. |
| 2146 | Vishnu Ratnam | 37.10 | 79.11 | The spec should clarify the additional conditions to be met to perform the NPCA switch. | As in comment. | Revised – TGbn editor to make changes marked with CID 2146 found in 11-25-0936r8 which address the issue of determining the start of the NPCA operation. |
| 2147 | Vishnu Ratnam | 37.10 | 79.20 | For sub-bullet b of bullet 2, we have the text "the TXOP duration, determined from the Duration field of the received frame(s), is greaterthan the ...". Suggest to replace with "the TXOP duration, determined from the Duration field of the received initial response frame, is greaterthan the ..." | As in comment. | Revised – TGbn editor to make changes marked with CID 2146 found in 11-25-0936r8 which address the issue of determining the duration of the NPCA operation. |
| 2148 | Vishnu Ratnam | 37.10 | 79.40 | The spec should clarify the additional conditions to be met to perform the NPCA switch. | As in comment. | Revised – TGbn editor to make changes marked with CID 2148 found in 11-25-0936r8 which clarifies the additional conditions for initiation of NPCA operation. |
| 2149 | Vishnu Ratnam | 37.10 | 79.45 | For bullet 1, we have the text: " NPCA primary channel based on anmeeting condition 1) above,". Delete "an". | As in comment. | Accept |
| 2358 | Ahmadreza Hedayat | 37.10. | 78.23 | Resolve the TBD in "an opertaing bandwidth less than TBD". | As in comment | Revised – TGbn editor to make changes marked with CID 2358 found in 11-25-0936r8 which clarifies the minimum BSS BW for initiation of NPCA operation. See also CID 1210. |
| 2359 | Ahmadreza Hedayat | 37.10. | 78.32 | Resolve the TBD frames that carry the NPCA Switching (Back) Delay fields for an AP. | As in comment | Revised – TGbn editor to make changes marked with CID 2359 found in 11-25-0936r8 which clarifies the frames used to carry NPCA parameters. |
| 2361 | Ahmadreza Hedayat | 37.10. | 78.41 | Resolve the TBD in "Whether the mode is for all associated non-APs or per non-AP is TBD." | As in comment | Revised – TGbn editor to make changes marked with CID 2361 found in 11-25-0936r8 which clarifies the scope of the UL triggered limitation of NPCA operation. |
| 2362 | Ahmadreza Hedayat | 37.10. | 78.41 | Resolve the TBD in "Whether MU EDCA parameters mechanism is used for this or not is TBD." | As in comment | Revised – TGbn editor to make changes marked with CID 2362 found in 11-25-0936r8 which address the issue of the use of MU EDCA parameters during NPCA operation. |
| 2363 | Ahmadreza Hedayat | 37.10. | 78.59 | Not clear why there is a TBD for obtaining the PPDU duration field. Resolve the TBD. | As in comment | Revised – TGbn editor to make changes marked with CID 2363 found in 11-25-0936r8 which address the issue of the use of determination of the duration of STA dwell time on NPCA primary channel. |
| 2364 | Ahmadreza Hedayat | 37.10. | 79.05 | It's unclear what "whether it is indicated by the AP is TBD" refers to. The "TXOP\_DURATION of the PPDU" should be used in the calculation. | As in comment | Revised – TGbn editor to make changes marked with CID 2364 found in 11-25-0936r8 which address the issue of the use of determination of the duration of STA dwell time on NPCA primary channel. |
| 2365 | Ahmadreza Hedayat | 37.10. | 79.11 | Resolve or remove the "TBD conditions" |   | Revised – TGbn editor to make changes marked with CID 2365 found in 11-25-0936r8 which address the issue of some NPCA operation TBD language. |
| 2366 | Ahmadreza Hedayat | 37.10. | 79.24 | The "TXOP\_DURATION of the PPDU" should be used in the calculation. Resolve the TBD. | As in comment | Revised – TGbn editor to make changes marked with CID 2366 found in 11-25-0936r8 which address the determination of the duration of the NPCA operation. |
| 2367 | Ahmadreza Hedayat | 37.10. | 79.40 | Resolve or remove the "TBD conditions" | As in comment | Revised – TGbn editor to make changes marked with CID 2367 found in 11-25-0936r8 which address the issue of TBD values in the NPCA operation description. |
| 2368 | Ahmadreza Hedayat | 37.10. | 79.46 | based on an meeting condition 1) -> based onmeeting condition 1) | As in comment | Accept |
| 2369 | Ahmadreza Hedayat | 37.10. | 79.53 | Define "NPCA HE switch time" and "NPCA NHT switch time". Resolve the TBDs. | As in comment | Revised – TGbn editor to make changes marked with CID 2369 found in 11-25-0936r8. |
| 2370 | Ahmadreza Hedayat | 37.10. | 80.10 | For 10.23.2.2, min/max values for the NPCA CWs need to be specified. | As in comment | Revised – TGbn editor to make changes marked with CID 2370 found in 11-25-0936r8. |
| 2371 | Ahmadreza Hedayat | 37.10. | 80.31 | Resolve the TBD for the ICF transmitted on the NPCA primary channel | As in comment | Revised – TGbn editor to make changes marked with CID 2371 found in 11-25-0936r8. See also CID 1063. |
| 2372 | Ahmadreza Hedayat | 37.10. | 80.49 | It's not clear why additional puncturing is discussed here: "It is TBD whether a frame that solicits a response other than TB PPDUs can puncture 20MHz subchannels not indicated as punctured in the Disabled Subchannel Bitmap field ofthe EHT Operation element.". Suggest to resolve the TBD here by removing this bullet. | As in comment | Revised – TGbn editor to make changes marked with CID 2372 found in 11-25-0936r8 which address the issue of punctured subchannels in NPCA. |
| 2401 | Yuki Fujimori | 37.10 | 80.07 | Remove the motion number "M126". | As in the comment. | Accept |
| 2431 | Thomas Handte | 37.10 | 78.40 | typo: in which untriggered UL transmissions on the NPCAprimary channel by NPCA non-AP STAs IS not permitted | in which untriggered UL transmissions on the NPCAprimary channel by NPCA non-AP STAs ARE not permitted | Revised – TGbn editor to make changes marked with CID 2431 found in 11-25-0936r8. |
| 2432 | Thomas Handte | 37.10 | 78.41 | "non-APs" should be "non-AP STAs" | Change to "non-AP STAs" (twice) | Revised – TGbn editor to make changes marked with CID 2432 found in 11-25-0936r8. |
| 2433 | Thomas Handte | 37.10 | 78.54 | Condition 1) includes two cases: STA received a PPDU and STA received a PHY-RXSTART.indication of a HE/EHT/UHR PPDU. For the first case, it is not clear, at which point in time this case applies. For example, is it the CCA indication, EARLYSIG indication, the RXSTART indication or RXEND indication? | Clarify at which point in time the "received a PPDU" case applies. Otherwise, it causes a huge uncertainty about when a STA switches to NPCA primary channel. | Revised – TGbn editor to make changes marked with CID 2433 found in 11-25-0936r8. See also CID 1056, 1057. |
| 2434 | Thomas Handte | 37.10 | 78.54 | Condition 1) includes the case that STA received a PPDU. We should exclude HE/EHT/UHR PPDU, because it is already covered by the second case of condition 1). Also seeing condition 2) we may need to say that condition 2) is not applicable. Also, Condition 1) is applicable to an RTS for example. However at least a CTS response should be awaited for being sure about a TXOP being truly initiated on primary channel (that's why there is condition 2). | Change first case to "the STA received a non-HE, non-EHT, non-UHR PPDU, a PPDU for which condition 2) is not fulfilled, or a PPDU that is not an RTS" | Revised – TGbn editor to make changes marked with CID 2434 found in 11-25-0936r8. See also CID 1056, 1057. |
| 2435 | Thomas Handte | 37.10 | 80.22 | Two STAs may switch to the NPCA primary channel because different switching conditions are fulfilled which needs to be reflected in the switching times. | A submission proposing a solution will be provided | Revised – TGbn editor to make changes marked with CID 2435 found in 11-25-0936r8. |
| 2649 | Ying Wang | 37.10 | 79.13 | It is not clear whether "a Control frame" and the later "a Control frame exchange" are referring to the same thing or not in "the STA received a PPDU containing a Control frame and a PPDU containing an initialresponse frame of a Control frame exchange on the BSS primary channel and..." If not, it doesn't make sense to use "and" to connect the two PPDUs. | Change to "the STA received a PPDU containing a Control frame and a PPDU containing an initialresponse frame to the Control frame on the BSS primary channel..."? | Revised – TGbn editor to make changes marked with CID 2649 found in 11-25-0936r8. |
| 2678 | Xiaofei Wang | 37.10. | 79.14 | Is the response frame not the response frame of the received control frame? If so, the text needs to make it clear to avoid confusion | change "a Control frame" to "the control frame" | Revised – TGbn editor to make changes marked with CID 2678 found in 11-25-0936r8. |
| 2679 | Xiaofei Wang | 37.10. | 79.17 | Since it is assumed that two PPDUs are received in line 13, the PPDU(s) should be changed to PPDUs. | as in comment | Revised – TGbn editor to make changes marked with CID 2679 found in 11-25-0936r8. |
| 2680 | Xiaofei Wang | 37.10. | 79.45 | "an" is not correct and should be removed | as in comment | Accept |
| 2688 | Ying Wang | 37.10 | 80.09 | Unnecessary motion number showing up before item a. of "4) Once the STA ..." | Remove "M126" | Accept |
| 3037 | Mark RISON | 37.10 | 78.19 | "A non-AP NPCA STA may enable the NPCA mode only if it is associated with an NPCA AP." ambiguous | Change to "A non-AP NPCA STA shall not enable the NPCA mode unless it is associated with an NPCA AP." | Revised – TGbn editor to make changes marked with CID 3037 found in 11-25-0936r8. |
| 3038 | Mark RISON | 37.10 | 78.24 | "which" should be "that". Also next line | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3038 found in 11-25-0936r8. |
| 3039 | Mark RISON | 37.10 | 78.30 | " and indicate its NPCA switching delay and NPCA switch back delay respectively in the NPCA Switching Delay field and NPCA Switch Back Delay field of the TBD frames" duplicates Clause 9. Similarly in para at line 34 | Delete the cited text | Revised – TGbn editor to make changes marked with CID 3039 found in 11-25-0936r8. |
| 3040 | Mark RISON | 37.10 | 78.34 | "A non-AP STA that supports NPCA operation" -- isn't this "An NPCA non-AP STA"? | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3040 found in 11-25-0936r8. |
| 3043 | Mark RISON | 37.10 | 78.59 | "the duration of the PPDU, (determined by the MAC in a manner TBD, but necessarilyinvolving some of the parameters of the RXVECTOR associated with the received PPDU) or the duration of the PPDU plus the value of the RXVECTOR parameter TXOP\_DURATION of the PPDU, is greater than" -- the RXVECTOR param TXOP\_DURATION will never be negative so the first condition is covered by the second | Delete "the duration of the PPDU, (determined by the MAC in a manner TBD, but necessarilyinvolving some of the parameters of the RXVECTOR associated with the received PPDU) or" and the comma before "is greater" | Revised – TGbn editor to make changes marked with CID 3043 found in 11-25-0936r8. |
| 3044 | Mark RISON | 37.10 | 79.06 | ", based onthe Bandwidth field" -- not all PPDU formats have a Bandwidth field | As it says in the comment | Reject – in the case when a PPDU format does not include a Bandwidth field, the outcome of the item should resolve to a logical value of FALSE, thereby not meeting the earlier condition that all of the items in the list must be TRUE. |
| 3045 | Mark RISON | 37.10 | 79.06 | " the 20/40/80/160 MHz channel occupied by the PPDU is" -- what if the PPDU occupies some other width, e.g. 320 MHz? Also line 26 | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3045 found in 11-25-0936r8. |
| 3046 | Mark RISON | 37.10 | 79.06 | " the 20/40/80/160 MHz channel occupied by the PPDU is identified by the STA, based onthe Bandwidth field in the PHY preamble of the PPDU and the channel allocations in the corresponding band" unclear -- identified as what? | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3046 found in 11-25-0936r8. |
| 3047 | Mark RISON | 37.10 | 79.13 | "an initialresponse frame of a Control frame exchange" not clear. What is a Control frame exchange, and what constitutes a response within it? | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3047 found in 11-25-0936r8. |
| 3048 | Mark RISON | 37.10 | 79.13 | "the STA received a PPDU containing a Control frame and a PPDU containing an initialresponse frame of a Control frame exchange" -- so it has to receive two PPDUs? What if anything can be between these two PPDUs? | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3048 found in 11-25-0936r8. |
| 3049 | Mark RISON | 37.10 | 79.13 | "the received PPDU(s)" -- but the text above seems to require exactly two PPDUs | Delete all the "(s)"s in 2) | Revised – TGbn editor to make changes marked with CID 3049 found in 11-25-0936r8. |
| 3050 | Mark RISON | 37.10 | 79.32 | It is not clear what i) and ii) are. Are they additional conditions? Do they both have to be met? Actually, first one looks like an additional condition but second one looks like a NOTE | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3050 found in 11-25-0936r8. |
| 3051 | Mark RISON | 37.10 | 79.45 | "on an meeting condition 1) " spurious "an " | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3051 found in 11-25-0936r8. |
| 3052 | Mark RISON | 37.10 | 0.00 | I see no point in defining separate "NPCA HE switch time" and "NPCA NHT switch time". Just define a single "NPCA switch time", and explain how it is set for 1) and for 2) | As it says in the comment | Reject – the switch time is different because for the HE case, only the PPDU PHY header is received before the switch occurs, while for the NHT case, the entire PPDU is received before the switch occurs. These are necessarily very distinct switching times. |
| 3053 | Mark RISON | 37.10 | 80.08 | Spurious "M126" | Delete the cited text | Accept |
| 3054 | Mark RISON | 37.10 | 80.11 | "CW\_NPCA[AC]" etc. are not defined | As it says in the comment | Revised – TGbn editor to make changes marked with CID 3054 found in 11-25-0936r8. |
| 3055 | Mark RISON | 37.10 | 80.22 | "The STA shall not initiate a transmission on the NPCA primary channel to another STA" -- you can't transmit to anything but another STA | Change "to another STA until that STA's NPCA" to "until the peer STA's NPCA" | Revised – TGbn editor to make changes marked with CID 3055 found in 11-25-0936r8. |
| 3056 | Mark RISON | 37.10 | 80.27 | "NPCA initial Control frame" -- no such frame | Delete "NPCA" | Revised – TGbn editor to make changes marked with CID 3056 found in 11-25-0936r8. |
| 3139 | Jeongki Kim | 37.10 | 78.55 | Need to clarify the NPCA STA's operation based on receiving Inter-BSS ELR PPDU | Define the procedure of NPCA STA that switches to NPCA primary channel after receiving inter-BSS ELR PPDU. | Revised – TGbn editor to make changes marked with CID 3139 found in 11-25-0936r8 which address the issue of the use of ELR frames during NPCA operation. |
| 3142 | Jeongki Kim | 37.10 | 78.53 | In "the STA received a PPDU and/or received a PHY-RXSTART.indication primitive for an HE/EHT/UHR PPDU on the BSS primary channel", "and/or" implies "STA may not receive "a PHY-RXSTART.indication for HE/EHT/UHR PPDU". Does this mean STA can switch to NPCA primary channel on receiving other types PPDUs (HT/VHT PPDU)? Then, please define the detailed switching operation of NPCA STA for HT/VHT PPDU. | Describe the detailed NPCA switching operation of NPCA STA that receives Inter-BSS HT/VHT PPDU. | Reject – the cases are already accounted for. The commenter has misread the cited text. The line begins with “the STA received a PPDU” – this means that any PPDU format could have been received, including the HT/VHT formats mentioned by the commenter. Later conditions already include rules that account for this possibility. |
| 3188 | Yunbo Li | 37.10 | 79.01 | a STA may perform PPDU based NPCA or TXOP based NPCA, we need two separate NPCA Minimum Duration Thresholds to capature them. | as in comment. | Reject – there is no discernible technical need for two minimum duration thresholds. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3389 | Zhenpeng Shi | 37.10 | 78.52 | The related motion (motion 144) has a note saying other conditions TBD, but TBD conditions are not mentioned here. Other conditions have been discussed in many proposals, for example, pre-HE PPDU, OBSS SP, etc. | Add "3) TBD conditions" for an NPCA STA to switch to the NPCA primary channel for NPCA operation. | Revised – TGbn editor to make changes marked with CID 3389 found in 11-25-0936r8 which address the issue of some TBD language in the NPCA operation description. |
| 3390 | Zhenpeng Shi | 37.10 | 79.05 | It is not clear what does "it" mean in "whether it is indicated by the AP is TBD". It seems that "it" means whether TXOP\_DURATION should be considered or not, but it can also be interpreted as other meanings as a part of condition 1b, e.g.,"it" means that the duration of PPDU is greater than the NPCA Minimum Duration Threshold. | Clarify the meaning of "it" in "whether it is indicated by the AP is TBD". | Revised – TGbn editor to make changes marked with CID 3390 found in 11-25-0936r8. |
| 3409 | Gaurang Naik | 37.10 | 78.30 | The AP must also provide the values of the NPCA primary channel and the NPCA minimum duration threshold. To keep it clean, suggest to say "shall include \*and indicate its NPCA parameters in\* the NPCA Operation Information field and remove references to specific parameters. | As in comment. | Revised – TGbn editor to make changes marked with CID 3409 found in 11-25-0936r8. |
| 3411 | Gaurang Naik | 37.10 | 78.15 | Motion #11 specifies that "A BSS shall only have a single Non-Primary Channel Access (NPCA) primary channel". This hasn't been called out in the spec. Add this statement in the spec. | Add "A BSS shall only have a single Non-Primary Channel Access (NPCA) primary channel" in 37.10. | Reject – the NPCA Operation Information field format already contains a single field to specify NPCA primary channel, making it impossible to advertise more than one such channel, therefore, an explicit prohibition against multiple NPCA primary channels is unnecessary. |
| 3412 | Gaurang Naik | 37.10 | 78.44 | Rather than coupling the AP and STA behaviors to values of a field, better to say that the behavior relies on whether the AP has enabled the mode or not. | Say "A non-AP NPCA STA shall not switch to the NPCA primary channel for NPCA operation if \*associated AP has disabled the NPCA mode\*. An NPCA AP shall not switch to the NPCA primary channel for NPCA operation if \*it has disabled the NPCA mode\*. | Reject – if the behavior is dependent on the AP enabling the mode, then there must be text that specifies how the non-AP STA determines whether the AP has enabled the mode or not. That is what the existing text does. |
| 3413 | Gaurang Naik | 37.10 | 78.50 | Rather than coupling the STA's behavior to a value of a field, better to say that the behavior relies on whether the AP has enabled the mode or not. | Say "An NPCA STA may switch to the NPCA primary channel for NPCA operation if the \*AP\* corresponding to the BSS of which \*the STA\* is a member \*has enabled the NPCA mode\* and either condition 1) or 2) is met:" | Reject – if the behavior is dependent on the AP enabling the mode, then there must be text that specifies how the non-AP STA determines whether the AP has enabled the mode or not. That is what the existing text does. |
| 3414 | Gaurang Naik | 37.10 | 79.02 | Clarify that \*it\* is the \*NPCA STA\* | As in comment. | Revised – TGbn editor to make changes marked with CID 3414 found in 11-25-0936r8. |
| 3415 | Gaurang Naik | 37.10 | 79.24 | In the Control frame based switch, Duration of the TXOP is obtained from the duration field of the soliciting Control frame. TXOP\_DURATION in the initial Response frame points to the same duration. So, this statement seems unnecessary. | Delete the statement. | Revised – TGbn editor to make changes marked with CID 3415 found in 11-25-0936r8. |
| 3416 | Gaurang Naik | 37.10 | 79.36 | Clarify that in such cases (i.e., when CTS is received without receiving the eliciting RTS or MU-RTS Trigger frame) the NPCA STA doesn't switch to the NPCA primary channel. | As in comment. | Revised – TGbn editor to make changes marked with CID 3416 found in 11-25-0936r8. |
| 3417 | Gaurang Naik | 37.10 | 80.36 | Address this TBD. Clarify where in the Trigger frame this indication is carried. | As in comment. | Revised – TGbn editor to make changes marked with CID 3417 found in 11-25-0936r8. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Cmtr name** | **Subc. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3421 | Qing Xia | 37.10 Non-primary channel access (NPCA) | 80.08 | Suggest to delete "M126" | same as comment | Accept |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Cmtr name** | **Sclse. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3593 | kaiying Lu | 37.10. | 78.23 | In some scenarios, some BSS frequently uses the strategy to reserve long TXOP duration (e.g.TXOP limit) and then truncate the TXOP, or to extend the TXOP by frame exchanges. If NPCA operation is based on TXOP duration of the detected OBSS activity on the primary channel under those scenarios mentioned above, blindness issues on the primary channel due to NPCA operation will become worse. OBSS PPDU length based NPCA operation should be able to enabled by an NPCA AP. | Commenter will propose OBSS-PPDU length based NPCA parameters to solve the issue. | Revised – TGbn editor to make changes marked with CID 3593 found in 11-25-0936r8 which address the issue of the use of PPDU length information in determining when to use NPCA operation. |
| 3594 | kaiying Lu | 37.10. | 78.40 | Clarify whether it is for all associated non-APs or per non-APs that the mode of operation in which untriggered UL transmissions on the NPCA is not permitted | as in comment. | Revised – TGbn editor to make changes marked with CID 3594 found in 11-25-0936r8. |
| 3596 | kaiying Lu | 37.10. | 80.16 | The STA shall be allowed to use MU EDCA parameters mechanism when an NPCA AP enables a mode to disallow untriggered UL transmission on the NPCA primary channel for that STA. | Clarify the rules as in comment. | Revised – TGbn editor to make changes marked with CID 3596 found in 11-25-0936r8 which address the issue of the use of MU EDCA parameters during NPCA operation. |
| 3597 | kaiying Lu | 37.10 | 80.24 | Clarify what "that STA" refers to. If it refers to "another STA", clarify how a STA know whether the "another STA" is switching due to condition 1) or 2)? | as in comment. | Revised – TGbn editor to make changes marked with CID 3597 found in 11-25-0936r8. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Sbclse. page** | **Page.****line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3712 | Li-Hsiang Sun | 37.10 | 78.54 | " the STA received a PPDU and/or received a PHY-RXSTART.indication primitive for an HE/EHT/UHR PPDU on the BSS primary channel ..." Should also cover future generation PPDU with a U-SIG | as in comment | Reject – authors of future amendments will revise this text if and when that revision is needed. |
| 3714 | Li-Hsiang Sun | 37.10 | 79.20 | If DUO, remaining TXOP duration for control frame and non-HT responding frame may be different | if the remaining TXOP duration after responding frame is different for control and initial response frame, use the smaller one to compare with NPCA Minimum Duration Threshold | Revised – TGbn editor to make changes marked with CID 3714 found in 11-25-0936r8. |

# Text to be adopted begins here:

***TGbn editor: Please make the following changes to 802.11bn draft D0.3:***

**9.4.2.aa1 UHR Operation Element**

***TGbn editor: Modify Figure 9-aa3 – NPCA Operation Parameters field format, by adding a new field called “NPCA Disabled Subchannel Bitmap” to the figure with a width of 16 bits.* (#2372)**

***TGbn editor: Modify Figure 9-aa3 – NPCA Operation Parameters field format, by adding a new field called “Initial NPCA QSRC” to the figure with a width of 2 bits.* (#1060) (#1223)**

***TGbn editor: Modify Figure 9-aa3 – NPCA Operation Parameters field format, by adding a new field called “MOPLEN NPCA” to the figure with a width of 1 bit.* (#3593)**

***TGbn editor: Modify the text as shown:***

The NPCA Switch Back Delay field indicates the time needed by an NPCA STA to switch from the NPCA primary channel to the BSS primary channel in units of 4 μs.

The NPCA Disabled Subchannel Bitmap field is a bitmap where the lowest numbered bit corresponds to the 20 MHz subchannel that lies within the BSS bandwidth and is the lowest in frequency of the set of all 20 MHz subchannels within the BSS bandwidth. Each successive bit in the bitmap corresponds to the next higher frequency 20 MHz subchannel. A bit in the bitmap that lies within the BSS bandwidth is set to 1 to indicate that the corresponding 20 MHz subchannel is punctured and is set to 0 to indicate that the corresponding 20 MHz subchannel is not punctured. A bit in the bitmap that falls outside of the BSS bandwidth is reserved. **(#2372)**

The MOPLEN NPCA field indicates which conditions can be used to initiate an NPCA operation. A value of 1 in this field indicates that both PHYLEN NPCA operation and MOPLEN NPCA operation are permitted in the BSS. A value of 0 in this field indicates that only PHYLEN NPCA operation is allowed in the BSS. **(#3593)**

The Initial NPCA QSRC field indicates the value that is used to initialize the EDCAF QSRC[AC] variables when an NPCA STA in the BSS switches to NPCA operation. **(#1060) (#1223)**

***TGbn editor: Insert a new subclause into 802.11bn draft D0.1:***

**10.22.3.2.2 EDCA backoff procedure**

***Modify the text as follows:***

k) If explicitly indicated, such as in 37.10 (Non-primary channel access (NPCA)). **(#1060) (#1223)**

If the backoff procedure is invoked for reason k) above, CW[AC] and QSRC[AC] shall be set according to the descriptions found in 37.10 (Non-primary channel access (NPCA)). **(#1060) (#1223)**

* Non-primary channel access (NPCA)

A STA that supports NPCA operation is called an NPCA STA. An AP that supports NPCA operation is called an NPCA AP. A non-AP NPCA STA shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1. A non-AP NPCA STA shall not **(#3037)** enable the NPCA mode unless **(#3037)** it is associated with an NPCA AP that has enabled NPCA operation. **(#2138)**

An NPCA AP that has an operating bandwidth less than 80 MHz shall not enable NPCA operation. An AP of a multiple BSSID set that **(#3038)** enables NPCA operation shall indicate the same NPCA primary channel, same NPCA minimum duration, same NPCA switching delay and same NPCA switch back delay as all of the other APs of the same multiple BSSID set that**(#3038)** have enabled NPCA operation.An AP of a co-hosted BSS that enables NPCA operation shall indicate the same NPCA primary channel, same NPCA minimum duration, same NPCA switching delay and same NPCA switch back delay as all of the other APs of the same co-hosted BSSs that have enabled NPCA operation. **(#1052) (#1210) (#2358)**

An NPCA AP that has enabled NPCA operation shall include the NPCA Operation Parameters field in its UHR Operation element of (Re)Association Response, UHR Link Reconfiguration and Probe Response frames that it transmits. **(#1053) (#1510) (#2359) (#3039) (#3409)**

An AP enables PHYLEN NPCA operation by setting the MOPLEN NPCA field to 0 and enables both PHYLEN NPCA and MOPLEN NPCA operation by setting the MOPLEN NPCA field to 1. **(#3593)**

An NPCA AP may advertise an NPCA Disabled Subchannel Bitmap field in the NPCA Operation Parameters field that indicates the subchannels that are punctured when an NPCA STA operates on the NPCA primary channel: (#2372)

* The NPCA Disabled Subchannel Bitmap field value shall satisfy the following requirements:
	+ The puncturing pattern indicated by the value of the NPCA Disabled Subchannel Bitmap field is a valid non-OFDMA puncturing pattern as defined in 36.3.12.11.3 (Preamble puncturing for EHT MU PPDUs in a non-OFDMA transmission) (#2372)
	+ A 20 MHz subchannel indicated as punctured in the Disabled Subchannel Bitmap field of the EHT Operation element (if any) is also indicated as punctured in the NPCA Disabled Subchannel Bitmap field.
* If no NPCA Disabled Subchannel Bitmap field is present in the NPCA Operation Parameters field transmitted by the AP that the STA is affiliated with, then the subchannels are punctured during NPCA operation as indicated in 35.15.2 (Preamble puncturing operation). (#2372)

An NPCA AP shall indicate a value in the NPCA Primary Channel field of transmitted NPCA Operation Parameters fields that corresponds to a channel that is located within the secondary 80 MHz of the BSS operating channel if the BSS is a 160 MHz BSS and that corresponds to a channel that is located within the secondary 160 MHz of the BSS operating channel if the BSS is a 320 MHz BSS. **(#1052) (#2358)**

A non-AP NPCA (#3040)STA shall indicate (#**1509**) (#**1722**) its NPCA switching delay and NPCA switch back delay respectively in the NPCA Switching Delay field and NPCA Switch Back Delay fields of (Re)Association Request and UHR Link Reconfiguration frames. **(#1053)**

**37.10.1 MU EDCA interaction with NPCA**

If an NPCA AP that has enabled NPCA operation advertises MU EDCA parameters in the Beacon frames that it transmits, the MU EDCA protocol (see 26.2.7 (EDCA operation using MU EDCA parameters)) shall apply jointly on both BSS primary channel and NPCA primary channel for a non-AP NPCA STA. An NPCA STA shall follow the MU EDCA procedure in 26.2.7 (EDCA operation using MU EDCA parameters). In addition, an NPCA STA shall: (#786) (#1055) (#1809) (#1820) (#2362) (#3596) (#1214) (#1511) (#1512) (#2361) (#2431) (#2432) (#3594)

* Maintain a single MU EDCA timer that is shared across the BSS primary channel and the NPCA primary channel
* Transition from using EDCA parameters to using MU EDCA parameters (and vice-versa) at the same time on both the BSS primary channel and the NPCA primary channel based on conditions described in 26.2.7 (EDCA operation using MU EDCA parameters) that occur on either the BSS primary channel or the NPCA primary channel, and (#786) (#1809) (#1820)
* Use the same MU EDCA parameters on the NPCA primary channel as are used on the BSS primary channel (dot11MUEDCATable) except that AIFSN[AC] shall be set to 0 for all ACs whenever the STA is operating on the NPCA primary channel. (#786) (#1809) (#1820)

**37.10.2 Switching to the NPCA channel**

A non-AP NPCA STA shall not switch to the NPCA primary channel for NPCA operation if the value of the most recently received NPCA Enabled field from its associated AP is equal to 0. An NPCA AP shall not switch to the NPCA primary channel for NPCA operation if the value of its most recently transmitted NPCA Enabled field is equal to 0.

An NPCA STA may switch to the NPCA primary channel for NPCA operation if the value of the most recently received or transmitted NPCA Enabled field corresponding to the BSS of which it is a member is equal to 1 and either condition 1) or condition 2) is met:

1. the STA received a PPDU and/or received a PHY-RXSTART.indication primitive for an HE/EHT/UHR PPDU on the BSS primary channel and all of the following conditions are true:
	1. Condition 2) is not true
	2. The PPDU is classified by the STA as in inter-BSS PPDU following the procedure defined in 26.2.2 (Intra-BSS and inter-BSS PPDU classification).
	3. At least one of the following conditions is true:
		1. The value of the MAC variable NPCA\_PPDU\_REM\_DUR derived from the received PPDU **(#1056) (#2146) (#3593)** is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to the BSS of which the STA is a member **(#1056) (#2146) (#3593) (#1056) (#2146) (#1216) (#2363) (#2364) (#2433) (#2434) (#3043) (#3414)**
		2. If the NPCA AP corresponding to the BSS of which the STA is a member has enabled MOPLEN NPCA in addition to PHYLEN NPCA and the value of the MAC variable NPCA\_PHY\_TXOP\_REM\_DUR derived from the received PPDU is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to the BSS of which the STA is a member **(#1057) (#1217) (#1825) (#1877) (#2146) (#3593) (#2433) (#2434) (#3414)**
	4. **(#1057) (#1217) (#2146) (#3390) (#3415)**The bandwidth of the PPDU is determined by the STA to be 20, 40, 80 or 160 MHz, **(#3045) (#3046)**based on the Bandwidth field in the PHY preamble of the PPDU and the channel allocations in the corresponding band indicated in the RXVECTOR parameter RU\_ALLOCATION of the PHY-RXSTART.indication associated with the PPDU, if present **(#421)**, and the channel occupied by the PPDU does not overlap with the NPCA primary channel **(#1236)**
	5. The STA’s intra-BSS NAV is zero **(#2365)**
2. All of the following conditions are true:
	1. A sequence of three PPDUs, separated by aSIFSTime, is identified on the BSS primary channel, comprising an initial Control frame, an initial response frame and a third PPDU following the initial response frame
	2. The STA received at least the first PPDU containing the initial Control frame and the PHY-RXSTART.indication and/or the PHY-RXEARLYSIG.indication of the third PPDU  **(#1513) (#2649) (#2678) (#2679) (#3047) (#3048) (#3416)**
	3. An indication that a valid TXOP was obtained on the BSS primary channel, as verified by the receipt of a PHY-RXEARLYSIG.indication or PHYRXSTART.indication primitive corresponding to the third PPDU that occurs during a time window that:
		1. has a duration that is equal to NPCA\_START\_TIMEOUT which is (2 x aSIFSTime) + (2 x aSlotTime) + aRxPHYStartDelay + ICR\_Timeout, where ICR\_Timeout is equal to:
			1. The length (in usec) of the expected CTS if the initial Control frame is an RTS or an MU-RTS Trigger frame
			2. The value of the UL Length field of the Common Info field of the BSRP Trigger frame if the initial Control frame is a BSRP Trigger frame
		2. begins when the MAC receives a PHY-RXEND.indication primitive corresponding to the first PPDU  **(#2146) (#2433) (#2649)**
	4. At least one of the three PPDUs in the sequence of PPDUs is classified by the STA as an inter-BSS PPDU following the procedure defined in 26.2.2 (Intra-BSS and inter-BSS PPDU classification) **(#1056) (#2146) (#3593) (#3049)**
	5. At least one of the following conditions is true:
		1. ither: NPCA STA is not operating on the NPCA pS PPDU following the procedure defined in 26.2.2 (Intra-BSS and inter-BSS PPDU cThe NPCA AP has enabled PHYLEN NPCA only and the value of the MAC variable NPCA\_PPDU\_REM\_DUR derived from the received third PPDU of the sequence of PPDUs is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its BSS **(#1056) (#2146) (#3593) (#3050)**
		2. If the NPCA AP has enabled MOPLEN NPCA in addition to PHYLEN NPCA and the value of the MAC variable NPCA\_CFRAME\_TXOP\_REM\_DUR derived from the received first PPDU (containing the initial Control frame of the control frame exchange) of the sequence of PPDUs is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its associated BSS **(#1056) (#2146) (#3593)**
	6. **(#1057) (#1217) (#1218) (#2146)**The largest bandwidth of the three PPDU(s) is determined by the STA to be less than or equal to one half of the BSS operating bandwith as determined based on the channel allocations in the corresponding band and the PPDU bandwidth that is signaled in the received PPDU(s) or obtained from the RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT of the received PPDU(s).**(#3045) (#3046) (#3016)**
		1. if the Control frame is an RTS frame in a non-HT (duplicate) PPDU, then it includes a bandwidth signaling TA and the signaled PPDU bandwidth is 20 MHz, 40 MHz, 80 MHz, or 160 MHz
		2. identification of the channel occupied by a received CTS frame in a non-HT (duplicate) PPDU is determined by examining the RTS frame or the MU-RTS frame that elicited the CTS response
	7. the STA’s intra-BSS NAV is zero **(#833) (#2148)**

 **(#1219) (#2365) (#3389) (#2148)**

When a PHY-CCA.indication(BUSY) primitive corresponding to the start of the reception of a PPDU is indicated at an NPCA STA while operating on the BSS primary channel, the values of the MAC variables NPCA\_PPDU\_REM\_DUR, NPCA\_PHY\_TXOP\_REM\_DUR and NPCA\_TIMER are all set to 0. When a PHY-CCA.indication(BUSY) corresponding to the start of the reception of a PPDU containing an initial Control frame is indicated at an NPCA STA while operating on the BSS primary channel, the MAC variable NPCA\_CFRAME\_TXOP\_REM\_DUR is set to 0. **(#1057) (#1217) (#1218) (#2147)**

The MAC variable NPCA\_PPDU\_REM\_DUR derived from a received PPDU is equal to the value in usec, of the remaining duration of the received PPDU, determined by the MAC at the time of the receipt of the PHY-RXSTART.indication primitive associated with the received PPDU, by subtracting the time elapsed between the reception of the PHY-CCA.indication(BUSY) and PHY-RXSTART.indication primitives associated with the received PPDU from the value of RXTIME of the received PPDU. **(#1056)**

The MAC variable NPCA\_PHY\_TXOP\_REM\_DUR derived from a received PPDU is equal to:

* 0, if the RXVECTOR parameter TXOP\_DURATION is UNSPECIFIED
* Otherwise, it is equal to the value in usec, of the remaining duration of the PPDU, determined by the MAC at the time of the receipt of the PHY-RXSTART.indication primitive associated with the received PPDU, by subtracting the time elapsed between the reception of the PHY-CCA.indication(BUSY) and PHY-RXSTART.indication primitives associated with the received PPDU from the value of RXTIME corresponding to the received PPDU, **(#1057) (#1217) (#2145)** plus the value of the TXOP\_DURATION parameter of the RXVECTOR of the PPDU. **(#1057) (#1217) (#2366) (#2433)**

The MAC variable NPCA\_CFRAME\_TXOP\_REM\_DUR derived from a received PPDU is set to the value in the Duration/ID field of the Control frame in the received PPDU at the receipt of the PHY-RXEND.indication primitive of the PPDU that contained the frame. The value of NPCA\_CFRAME\_TXOP\_REM\_DUR is reduced by the amount of time elapsed between the PHY-RXEND.indication primitive of the Control frame from which the value of NPCA\_CFRAME\_TXOP\_REM\_DUR was determined and the PHY-RXSTART.indication primitive of the third PPDU of the frame exchange sequence identified in condition 2) above at the time of the receipt of the PHY-RXSTART.indication primitive of the third PPDU. **(#1057) (#1217) (#1218) (#2147) (#2433)**

**37.10.3 NPCA transmission rules**

When an NPCA STA switches to the NPCA primary channel for NPCA operation, then the following rules apply:

1. If the STA switches from the BSS primary channel to the NPCA primary channel based on meeting **(#3593) (#2149) (#2368) (#2680) (#3051)**condition 1) of 37.10.2 (Switching to the NPCA channel), the STA shall initiate the switch at the NPCA HE switch time and it shall be ready to transmit and receive frames (subject to its capabilities and operating mode) on the NPCA primary channel no later than the value of its most recently indicated NPCA switching delay after the NPCA HE switch time. The NPCA HE switch time is the point in time immediately after the reception of the HE-SIG-A/U-SIG field of the received PPDU from condition 1) above. **(#3593) (#453) (#1220) (#1554) (#1058) (#1890) (#2369)**
2. If the STA switches from the BSS primary channel to the NPCA primary channel based on meeting condition 2) of 37.10.2 (Switching to the NPCA channel), the STA shall initiate the switch at the NPCA NHT switch time and it shall be ready to transmit and receive frames addressed to it (subject to its capabilities and operating mode) on the NPCA primary channel no later than the value of its most recently indicated NPCA switching delay after the NPCA NHT switch time. The NPCA NHT switch time is equal to the point in time that is 3 x TSYM (as defined in Table 17-5 – Timing related parameters, in the column labeled “Value (20 MHz channel spacing)”) after the reception of the L-SIG field of the third PPDU of the received sequence of PPDUs from condition 2) above **(#3593) (#454) (#1221) (#1741) (#1059) (#1891) (#2435) (#2369)**
3. The STA shall use the same EDCA parameter set and EPCS EDCA parameter set values for operation on the NPCA primary channel as it uses on the BSS primary channel. See 37.10.1 (MU EDCA interaction with NPCA) for MU EDCA parameters. (#**786**)
4. At each NPCA HE switch time or NPCA NHT switch time, as appropriate, if the STA is an AP or if the STA is a non-AP STA and transmission of frames that are not a response to a Trigger frame is not disabled by the MU EDCA protocol (See 26.2.7 (EDCA operation using MU EDCA parameters)), the STA may initiate a TXOP on the NPCA primary channel by following the rules defined in 10.23.2.2 (EDCA backoff procedure) and 10.23.2.4 (Obtaining an EDCA TXOP) with the following exceptions: (#**786**) **(#1514) (#1808) (#2401) (#3053)**
	1. **(#3054)**Each time that the STA switches to the NPCA primary channel, the STA shall **(#1060) (#1223) (#1222)**
		1. If condition 1) from 37.10.2 (NPCA mode starting conditions) is met, set NPCA\_CFRAME\_TXOP\_REM\_DUR to 0.
		2. Set NPCA\_TIMER to the largest non-zero value of the variables NPCA\_PPDU\_REM\_DUR, NPCA\_PHY\_TXOP\_REM\_DUR and NPCA\_CFRAME\_TXOP\_REM\_DUR, minus the largest of the switch back delays of the STA and its peers. **(#1060) (#1223) (#1057) (#1217) (#1218) (#2147) (#3714)**
		3. Store the existing values of the variables QSRC[AC], CW[AC] and the backoff counter for each EDCAF **(#1060) (#1223)**
		4. Set QSRC[AC] for each AC to the value of the Initial NPCA QSRC field of the NPCA Operation Parameters received from its associated NPCA AP. **(#1060) (#1223)** (#**786**) (#**2370**) **(#3054)**
		5. initialize variables CW[AC] to 2Init\_QSRC\_NPCA × (CWmin[AC] + 1) – 1 **(#1060) (#1223)** (#**786**) (#**1808**) **(#3054)**
		6. invoke the backoff procedure even if the medium for the NPCA primary channel is not busy. **(#1060) (#1223)** (#**786**) (#**1808**)
		7. initiate countdown of the MAC variable NPCA\_TIMER in units of 1 usec (#**786**)

 (#**786**)

1. A first STA shall not initiate a transmission on the NPCA primary channel to a second (#**3055**)STA until the second STA's NPCA switching delay time has elapsed since the NPCA HE switch time at the first STA if the first STA is switching due to condition 1) above or since the NPCA NHT switch time at the first STA if the first STA is switching due to condition 2) above (#**3597**)
2. The STA shall begin all frame exchanges on the NPCA primary channel with an (#**3056**) ICF using non-HT PPDU or non-HT duplicate PPDU format using a rate of 6 Mb/s, 12 Mb/s, or 24 Mb/s.
	1. For TXOPs initiated by an AP, the initial Control frame (ICF) shall be a BSRP Trigger frame or an MU-RTS Trigger frame except when at least one of the target non-AP STA(s) is operating in the DUO mode, in which case, the ICF may be a BSRP Trigger frame or a BSRP NTB Trigger frame but not an MU-RTS. In addition: **(#1063) (#1225) (#1515) (#2371)**
		1. The ICF shall conform to the rules in 37.11.2 (Dynamic Unavailability Operation (DUO) mode) if at least one of the target non-AP STA(s) is operating in DUO mode. **(#1063) (#2371)**
		2. The ICF shall conform to the rules in 37.13 (Enhanced multi-link single-radio (EMLSR) operation for a UHR non-AP MLD) if at least one of the target non-AP STA(s) is affiliated with a non-AP MLD that is operating in EMLSR mode. **(#1063) (#2371)**
		3. The ICF shall conform to the rules in 37.9.1 (Dynamic power save (DPS) operation) if at least one of the target non-AP STA(s) is operating in DPS mode. **(#1063) (#2371)**
	2. For TXOPs initiated by a non-AP STA, if the intended recipient STA is not a mobile AP operating in the DPS mode, the initial Control frame shall be a BSRP NTB Trigger frame and the ICF shall conform to the rules for ICF found in 37.11.2 (Dynamic Unavailability Operation (DUO) mode) if the non-AP STA is operating in the DUO mode. **(#1063) (#2371)**
	3. For TXOPs initiated by a non-AP STA, if the intended recipient STA is not a Mobile AP operating in the DPS mode, the ICF shall conform to the rules found in 37.9.1 (Dynamic power save (DPS) operation). **(#1063) (#2371)**
3. An NPCA AP that transmits a Trigger frame on the NPCA primary channel shall indicate RU index values that use the NPCA primary channel as the reference primary channel. **(#790)** **(#3417)**
4. An NPCA STA that transmits a Trigger frame on the NPCA primary channel shall set the NPCA Primary Indication field to 1 in the Special User Info field. **(#790)** **(#3417)**
5. The 20 MHz channels occupied by PPDUs transmitted by the STA shall meet all of the following conditions:
	1. include at least the NPCA primary channel
	2. all be within the BSS bandwidth
	3. not include any of the channels occupied by either the PPDU of condition 1) of 37.10.2 (Switching to the NPCA channel) or by the third PPDU of condition 2) of 37.10.2 (Switching to the NPCA channel) , whichever caused the STA to switch from the BSS primary channel to the NPCA primary channel
	4. not include channels that are indicated as punctured in the Disabled Subchannel Bitmap field in the EHT Operation element or in the NPCA Disabled Subchannel Bitmap field in the UHR Operation element with the following rules: **(#2372)**
		1. (#**1227**)if the associated NPCA AP advertises an NPCA Disabled Subchannel Bitmap field, the STA shall follow the rules in 35.15.2 (Preamble puncturing operation) except that instead of the Disabled Subchannel Bitmap field it shall use the most recently exchanged NPCA Disabled Subchannel Bitmap field. (#2372)
		2. If the AP does not transmit an NPCA Disabled Subchannel Bitmap field, a UHR NPCA STA shall follow the rules in 35.15.2 (Preamble puncturing operation). (#2372)
6. The STA shall not transmit a response to a Trigger frame if the trigger frame does not contain 1 in the NPCA Primary Indication field of the Special User Info field. **(#790)**
7. UHR ELR PPDUs, HE ER SU PPDUs, EHT MCS14/15 shall not be transmitted on the NPCA primary channel. (#**3139**)
8. Dynamic Subband Operation (see 37.19 (Dynamic Subband Operation)) shall not be used on the NPCA primary channel. (#**3139**)
9. If TBTT for the BSS occurs while an NPCA AP is operating on the NPCA primary channel, the scheduling of the transmission of the Beacon frame and following group addressed frames shall be deferred until immediately after the AP switches back to the BSS primary channel (#**171**) (#**1855**) (#**836**) (#**837**)
	1. NOTE – The AP and associated STAs are not required to switch back to the BSS primary channel at TBTT. The group addressed frames will be buffered and delivered immediately following the next DTIM Beacon, unless explicitly specified otherwise. (#**171**)

**37.10.3 Switching back from the NPCA channel**

1. When the STA switches back to the BSS primary channel, it shall: **(#1060) (#1223) (#1061) (#1224)** (#**1808**)
	1. replace the current values of the variables QSRC[AC], CW[AC] and the backoff counter for each EDCAF with the values that it stored when it switched to the NPCA primary channel **(#1060) (#1223) (#1061)** (#**1808**)
	2. resume the backoff procedure **(#1060) (#1223) (#1061)** (#**1808**)

NOTE – exponential backoff applies on the NPCA primary channel when there are failed transmissions. **(#1060) (#1223)**

# Text to be adopted ends here.

**References:**

1. xxxx