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Wireless LANs

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Abstract

This document contains suggested changes to Draft IEEE P802.11bn\_D0.2 for the Non-Primary Channel Access (NPCA) feature, based on some comments collected in CC50. Specifically, this document defines a frame exchange procedure used for STAs to enable/disable the NPCA operation and/or update the parameters related to NPCA.

Related CIDs in CC50: 246, 435, 785, 913, 914, 1209, 1215, 1507, 1553, 2139, 2140, 2144, 3408

# 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 |  |
| 2 |  |
| 3 |  |
| 4 |  |
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# 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 0.2 within this document are based on CIDs obtained through CC50.

## DISCUSSION:

1. Most comments are focus on the following points:
   1. Define a frame exchange to explicitly indicate the NPCA enablement/disablement for AP/non-AP STA.
   2. The name “NPCA STA” is refered to a STA that supports NPCA rather than a STA that has enabled NPCA. Suggest to differentiate the NPCA support and the NPCA enablement.
   3. Keep align with some definitions in DPS.
2. To address these CIDs, we made the following changes:
   1. Define that an NPCA STA is a STA that has enabled NPCA operation. Moreover, a new MIB is introduced to define the STA that supports NPCA operation.
   2. Extract the NPCA Operation Information field of the UHR Operation Information element as a independent field in 9.4.1, as what the DPS subclause did.
   3. Add a new NPCA parameter present bitmap subfield into the NPCA Operation Information field. This is due to difference between AP and non-AP STA. Specifically, the NPCA Primary Channel field and the NPCA minimum Duration Threshold field are not used by non-AP STA. Further, an NPCA AP may want to change to a new NPCA Primary Channel while the other parameters like NPCA minimum Duration Threshold remains unchanged, then it would be more efficient with such a present bitmap subfield in the NPCA Operation Information field.
   4. Define a UHR OM Notification frame, which is used to indicate the NPCA enablement/disablement, and/or to update the parameters related to NPCA operation (for either AP or non-AP STA).
   5. Define the behavior for AP and non-AP STA to announce their enablement/disablement, respectively. All these announcement are divide into several cases as follows.
      1. For AP to announce the NPCA enablement, there are two cases,
         1. The AP previously disabled the NPCA operation, and now it intends to enable NPCA.
         2. The AP has previously enabled the NPCA operation, and a non-AP STA is trying to probe/associate with this AP.
      2. For non-AP STA to announce the NPCA enablement, there are also two cases,
         1. the non-AP STA, that has previously disabled NPCA operation, has associated with an NPCA AP, and now it intends to enable the NPCA operation.
         2. the non-AP STA is trying to probe/associate with an NPCA AP, and intends to announce its NPCA enablement.
      3. For the STAs to announce the NPCA disablement, it is similar to bullets i and ii above.
      4. The newly defined UHR OM Notification frame is used for the cases like i-1 or ii-1, and the previously defined UHR Operation Information element is still used for the cased like i-2 or ii-2.
   6. The newly defined UHR OM Notification frame can be also used for NPCA parameters update.
   7. The whole NPCA clause is split into several subclauses.

## Open Issues:

1. It is TBD whether to use the UHR OM Notification frame as defined in this PDT for both initiator and responder side, or to use a separately defined NPCA request frame and NPCA response frame.
2. The detailed UHR OM Notification frame format is TBD. There are possibilities that the UHR OM Notification frame are also used for other UHR features.
3. The response rule to the UHR OM Notification frame is TBD. Do we need a STATUS\_CODE in the response frame?

## CID LIST:

NOTES:

a) Some CIDs are shaded gray, this typically means that someone else has volunteered to provide a resolution for the CID.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter name** | **Subclause. page** | **Page.**  **line** | **Comment** | **Proposed change** | **Proposed resolution** |
| 246 | Yuxin LU | 37.10 | 78.22 | It is not clear in which container a non-AP NPCA STA announce its NPCA enablement/disablement and further, parameters with update | Suggest to describe the container, such as via Action frame to dynamically enable and disable NPCA, or update parameters |  |
| 435 | Shuang Fan | 37.10 | 78.17 | It's not clear about the definition of NPCA AP.The current text in line 23 mentions 'An NPCA AP that has an operating bandwidth less than TBD (but either 80 or 160 MHz) shall not enable NPCA operation', this imply an AP with bandwidth less than TBD shall not support NPCA opeation and shall not set NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1 | Change the sentence 'An AP that supports NPCA operation is called an NPCA AP' to 'An AP with bandwidth larger than TBD (either 80 or 160 MHz) that supports NPCA operation is called an NPCA AP, and an NPCA AP shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1' |  |
| 785 | Seongho Byeon | 37.10 | 78.17 | We need to define NPCA AP's capability setting. For example, we can change the first parapraph as below (note that NPCA STA can be either NPCA AP or NPCA non-AP STA as it means): "A STA that supports NPCA operation is called an NPCA STA. An NPCA STA shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1. An AP that supports NPCA operation is called an NPCA AP. A non-AP NPCA STA may enable the NPCA mode only if it is associated with an NPCA AP. It is TBD how the non-AP STA enables NPCA mode." | As in comment. |  |
| 913 | Mikael Lorgeoux | 9.4.2.1 | 59.18 | The enablement/disablement of NPCA mode and the presence of the NPCA Operation Information field are 2 different things. It seems tricky to manage both using the single bit "NPCA Operation Information Present" bit. As example, an AP may send its NPCA Operation Information field during association and may wish to enable the NPCA mode later during operation. | Suggest to manage only the presence of the NPCA Operation Information field with the "NPCA Operation Information Present" bit.  Suggest to have a dedicated "NPCA mode" bit in the "UHR Operation Parameter field" and/or in a (TBD) OM Notification frame |  |
| 914 | Mikael Lorgeoux | 37.10 | 78.21 | The procedure and signaling to enable/disable the NPCA mode between a NPCA AP and a non-AP NPCA STA is not defined | Specify the NPCA enablement and disablement procedure and signaling. |  |
| 1209 | Morteza Mehrnoush | 37. 10 | 78.21 | Similar to other feature the STA should be able to enable/disable the NPCA. | Resolve TBD for enablement/disablement by defining the frame exchange and signaling. |  |
| 1215 | Morteza Mehrnoush | 37. 10 | 78.36 | For non-AP STA, management frame (UHR OMN frame) for enablement/disablement should be used to carry the NPCA switching and switch back delay | Address the TBD based on the comment |  |
| 1507 | Dongju Cha | 37.10 | 78.20 | How to enable/disable the NPCA operation need to be defined on non-AP STA side | 1. Which frame to use  - E.g., non-AP NPCA STA can its NPCA mode in request/notification frame along w/ NPCA related parameters (NPCA Switching Delay, NPCA Switching Back Delay, etc) 2. Condition of non-AP NPCA STA to enable its operation of NPCA need to be defined  - E.g., non-AP NPCA STA can enable only if NPCA AP enables NPCA mode |  |
| 1553 | yajun CHENG | 37.10 | 78.29 | According to the description in the above two paragraphs, the fact that an AP that supports NPCA operation does not mean the AP has NPCA mode enabled. Therefore, we should add normative text to describe how an NPCA AP enables NPCA mode. | Please add normative text to describe how an NPCA AP enables NPCA mode. |  |
| 2139 | Vishnu Ratnam | 37.10 | 78.21 | The spec needs to define the mechanism for a non-AP STA to enable/disable NPCA operation or update its NPCA parameters. | The commentor will bring a contribution to resolve the issue. |  |
| 2140 | Vishnu Ratnam | 37.10 | 78.27 | The spec needs to define the mechanism for an AP to enable/disable NPCA operation or update its NPCA parameters. | The commentor will bring a contribution to resolve the issue. |  |
| 2144 | Vishnu Ratnam | 37.10 | 78.47 | Suggest to change the name of "NPCA Operation Information Present" field to "NPCA Enabled" field. This is also consistent with the other fields in the UHR Capabilities element. | As in comment. |  |
| 2676 | Xiaofei Wang | 37.10. | 37.28 | inconsistence in definition for DPS AP and NCPA AP. A DPS AP needs to have DPS enabled to be called a DPS AP, however, an NPCA AP only needs to support NPCA capabilities, and do not need to have NPCA enabled. It is better to be consistent in definitions. | as in comment |  |
| 3408 | Gaurang Naik | 37.10 | 78.20 | Define a procedure for the NPCA AP to enable/disable the NPCA mode. When the AP transitions from the NPCA disabled to the NPCA enabled mode, the non-AP STA can start switching the NPCA primary channel to perform NPCA operations. Similarly, when the AP transitions from the NPCA disabled to the NPCA enabled mode, the non-AP STA must not switch to the NPCA primary channel. The UHR AP must provide sufficient time to the non-AP STA to react to necessary changes so that it can operate efficiently. | As in comment. |  |

# Text to be adopted begins here:

***Insert the folloing new subclause at the end of subclause 9.6:***

**9.6.aa1 Protected UHR Action frame details**

**9.6.aa1.1 Protected UHR Action field**

A Protected UHR Action field, in the octet immediately after the Category field, differentiates the Protected UHR Action frame formats. The Protected UHR Action field values associated with each frame format within the UHR category are defined in Table 9-aa (Protected UHR Action field values).

Table 9-aa1 Protected UHR Action field values

|  |  |  |
| --- | --- | --- |
| **Value** | **Meaning** | **Time priority** |
| 0 | UHR Operating Mode Notification | No |
|  |  |  |

**9.6.aa1.2 UHR Operating Mode Notification frame format**

A UHR Operating Mode Notification frame is used to indicate that the transmitting UHR STA is changing one or more of its operation mode. The Action field of the UHR Operating Mode Notification frame contains the information shown in Table 9-aa2 (UHR Operating Mode Notification frame Action field format).

Table 9-aa2 UHR Operating Mode Notification frame Action field format

|  |  |
| --- | --- |
| **Order** | **Information** |
| 1 | Category |
| 2 | Protected UHR Action |
| 3 | Dialog Token |
| 4 | NPCA Operation Information field |
|  |  |

***Insert the folloing new subclause at the end of subclause 9.4.1:***

**9.4.1.aa1 NPCA Operation Information field**

The NPCA Operation Information field is defined in Figure 9-aa1 (NPCA Operation Information field format)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 B7 | B8 B15 | B16 Bx | Bx+1 Bx+6 | Bx+7 Bx+12 |
|  | NPCA Enabled | NPCA Parameter Present Bitmap | NPCA Primary Channel | NPCA Minimum Duration Threshold | NPCA Switching Delay | NPCA Switch Back Delay |
| Bits: | 1 | 7 | 0 or 8 | 0 or TBD | 0 or 6 | 0 or 6 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Bx+13 Bx+20 | Bx+21 Bx+22 | Bx+23 |
|  | NPCA Disabled Subchannel Bitmap | Initial NPCA QSRC | TXOP-based NPCA |
| Bits: | 0 or 8 | 0 or 2 | 0 or 1 |

**Figure 9-aa1 NPCA Operation Information field format**

The NPCA Enabled field is set to 1 to indicate that NPCA operation is enabled at the STA transmitting this field, and set to 0 otherwise.

The format of NPCA Parameter Present Bitmap subfield is defined in Figure 9-aa2 (NPCA Parameter Present Bitmap subfield format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
|  | NPCA primary channel present | NPCA Minimum Duration Threshold present | NPCA Switching delay present | NPCA switch back delay present | NPCA Disabled Subchannel Bitmap present | Initial NPCA QSRC present | TXOP-based NPCA present |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 9-aa2 NPCA Parameter Present Bitmap subfield format**

***Move the following paragraphs from subclause 9.4.2.aa1 in D0.2 to subclause 9.4.1.aa1.***

***Change the following paragraphs as follows:***

**9.4.2.aa1 UHR Operation Element**

The NPCA Operation Information Present field indicates whether the NPCA Operation Information field is present in the UHR Operation Information field. The NPCA Operation Information Present field is set to 1 to indicate that the NPCA Operation Information field is present in the UHR Operation Information field, and set to 0 otherwise.

The format of the NPCA Operation Information field is defined in Figure 9-aa1 (NPCA Operation Information field format)in subclause 9.4.1.aa1.



### 37.10 Non-primary channel access (NPCA)

**37.10.1 General**

Non-Primary channel access is a mechanism for a STA to access the wireless medium while the primary channel is determined as busy for a period. A STA that has dot11NPCAOptionImplemented equal to true supports NPCA operation shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1.

**37.10.2 Discovery of an NPCA STA**

A STA that has enabled NPCA operation is called an NPCA STA. An AP that has enabled NPCA operation is called an NPCA AP.

A non-AP NPCA STA may enable the NPCA mode only if it is associated with an NPCA AP.

An NPCA AP that has an operating bandwidth less than TBD (but either 80 or 160 MHz) shall not enable NPCA operation. An AP of a multiple BSSID set which enables NPCA operation shall indicate the same NPCA primary channel as all of the other APs of the same multiple BSSID set which have enabled NPCA operation.

**37.10.2.1 AP behavior**

When an AP intends to enable the NPCA operation, the following rules apply:

1. If the AP is currently operating with NPCA operation disabled, the AP shall transmit a UHR Operating Mode Notification frame, in which:
   1. the NPCA Enabled field of the NPCA Operation Information field shall be set to 1, and
   2. each bit of the NPCA parameter present Bitmap fields shall be set to 1, and all the fields following the NPCA parameter present Bitmap fields shall be set to the corresponding values it should be, respectively.
2. If an NPCA AP is transmitting a Probe Response or a (Re)Association Response, the NPCA AP shall set the NPCA Operation Information Present field of the UHR Operation Parameters field in the UHR Operation element to 1, and announce all the corresponding NPCA parameters in the NPCA Operation Information field in the response frame it transmits.

When an AP intends to disable the NPCA operation, the following rules apply:

1. If the AP is currently operating with NPCA operation enabled, the AP shall transmit a UHR Operating Mode Notification frame, in which:
2. the NPCA Enabled field of the NPCA Operation Information field shall be set to 0, and
3. each bit of the NPCA parameter present Bitmap field shall be set to 0, and
4. the following fields (NPCA primary channel field, NPCA Minimum Duration Threshold field, NPCA Switching delay field, NPCA switch back delay field) are not present.
5. If an AP that has disabled NPCA operation is transmitting a Probe Response or a (Re)Association Response, the AP shall set the NPCA Operation Information Present field of the UHR Operation Parameters field in the UHR Operation element it transmits to 0.

When an NPCA AP receives a UHR Operating Mode Notification frame from its associated non-AP STA, the NPCA AP shall responds with a TBD frame.

**37.10.2.2 Non-AP STA behavior**

When a non-AP NPCA STA intends to enable the NPCA operation, the following rules apply:

1. If the non-AP STA has already associated with an NPCA AP, the non-AP STA shall transmit a UHR Operating Mode Notification frame, in which:
   1. the NPCA Enabled field of the NPCA Operation Information field shall be set to 1, and
   2. the B1 and B2 of the NPCA parameter present bitmap field shall be set to 0, the NPCA primary channel field, NPCA Minimum Duration Threshold field are not present, and
   3. the B3 and B4 of the NPCA parameter present bitmap field shall be set to 1, the NPCA Switching delay field and NPCA switch back delay field are present and shall be set to its corresponding value.
2. If the non-AP STA is transmitting a Probe Request frame or a (Re)Association Request frame to an NPCA AP, the non-AP STA shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 1 in the Probe Request frame or the (Re)Association Request frame it transmits.

When a non-AP NPCA STA intends to enable the NPCA operation, the following rules apply:

1. If the STA is a non-AP STA that is already associated with an NPCA AP, the non-AP STA shall transmit a UHR Operating Mode Notification frame, in which:
   1. the NPCA Enabled field of the NPCA Operation Information field shall be set to 1, and
   2. each bit of the NPCA parameter present Bitmap field shall be set to 0, and the following fields (NPCA primary channel field, NPCA Minimum Duration Threshold field, NPCA Switching delay field, NPCA switch back delay field) are not present.
2. If the non-AP STA is transmitting a Probe Request frame or a (Re)Association Request frame to an NPCA AP, the non-AP STA shall set the NPCA Supported field of the UHR MAC Capabilities Information field of the UHR Capabilities element to 0 in the Probe Request frame or the (Re)Association Request frame it transmits.

When a non-AP NPCA STA receives a UHR Operating Mode Notification frame from an AP that it associated with, in which the AP indicates that it intends to enable the NPCA operation, the non-AP NPCA STA shall responds with a UHR Operating Mode Notification frame, indicating whether the non-AP NPCA STA is going to enable the NPCA Operation.

When a non-AP NPCA STA receives a UHR Operating Mode Notification frame from an AP that it associated with, in which the AP indicates that it intends to disable the NPCA operation, the non-AP NPCA STA shall responds with a TBD frame.

**37.10.2 NPCA operation parameters**

An NPCA AP that has enabled NPCA operation shall include the NPCA Operation Information field in its UHR Operation element of (Re)Association Response and Probe Response frames that it transmits:

* + - * and indicate its NPCA switching delay and NPCA switch back delay and Init\_QSRC\_NPCA respectively in the NPCA Switching Delay field, NPCA Switch Back Delay field and Initial NPCA QSRC field. **(#1060) (#1223)**
      * and enable PPDU-based only NPCA operation by setting the TXOP-based NPCA field to 0 or enable both PPDU-based and TXOP-based NPCA operation by setting the TXOP-based NPCA field to 1. **(#3593)**

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

* + - * The NPCA Disabled subchannel Bitmap shall satisfy the following requirements:
        1. The puncturing pattern indicated by the NPCA Disabled Subchannel Bitmap 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)**
        2. A 20 MHz subchannel indicated as punctured in the Disabled Subchannel Bitmap of the EHT Operation element (if any) is also indicated as punctured in the NPCA Disabled Subchannel Bitmap. **(#2372)**

A non-AP NPCA STA that supports NPCA operation shall indicate its NPCA switching delay and NPCA switch back delay respectively in the NPCA Switching Delay field and NPCA Switch Back Delay fields of the UHR Operating Mode Notification frames that it transmits.

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 NPCA non-AP STA. An NPCA STA follows 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, and
      * 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 (dot11NPCAMUEDCATable) 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, regardless of the parameter values in dot11NPCAMUEDCATable. **(#786) (#1809) (#1820)**

When an NPCA STA intends to update the parameters related to NPCA operation, the NPCA STA shall transmit a UHR Operating Mode Notification frame, in which:

a) The NPCA Enabled field of the NPCA Operation Parameter field shall be set to 1, and

b) The bits of the NPCA parameter present bitmap field shall be set to 1, if the corresponding parameter field is to be updated, and shall be set to 0 otherwise.

**37.10.3 NPCA switch conditions**

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 Operation Information Present 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 Operation Information Present 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 Operation Information Present field corresponding to the BSS of which it is a member is equal to 1 and either condition 1) or 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. the PPDU is classified by the STA as an inter-BSS PPDU following the procedure definedin 26.2.2 (Intra-BSS and inter-BSS PPDU classification).
   2. 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 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
      1. whether the RXVECTOR parameter TXOP\_DURATION of the PPDU is considered for this comparison and whether it is indicated by the AP is TBD
   3. the 20/40/80/160 MHz channel occupied by the PPDU is identified by the STA, based on the Bandwidth field in the PHY preamble of the PPDU and the channel allocations in the corresponding band, and the channel occupied by the PPDU does not overlap with the NPCA primary channel
   4. TBD conditions
2. the STA received a PPDU containing a Control frame and a PPDU containing an initial response frame of a Control frame exchange on the BSS primary channel and all of the following conditions apply:
   1. the received PPDU(s) are classified by the STA as inter-BSS PPDU(s) following the procedure defined in 26.2.2 (Intra-BSS and inter-BSS PPDU classification)
   2. b. 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
      1. Whether the RXVECTOR parameter TXOP\_DURATION of the received PPDU(s) are considered for this comparison is TBD
   3. the 20/40/80/160 MHz channel occupied by the received PPDU(s), identified by the STA 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), does not overlap with the NPCA primary channel
      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
   4. TBD conditions

**37.10.4 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 an meeting condition 1) above, 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, where NPCA HE switch time is defined as follows:
   1. TBD
2. If the STA switches from the BSS primary channel to the NPCA primary channel based on meeting condition 2) above, 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, where NPCA NHT switch time is defined as follows:
   1. TBD
3. 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.
4. Once the STA becomes ready to transmit on the NPCA primary channel, 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: M126
   1. Each time that the STA switches to the NPCA primary channel, it shall initialize CW\_NPCA[AC] to TBD value and randomly choose a new initial value between 0 and CW\_NPCA[AC] for the backoff counter (BO\_NPCA[AC]).
   2. QSRC\_NPCA[AC] shall be set to 0.
   3. If the STA is a non-AP STA and the associated AP has disabled the use of untriggered UL transmissions on the NPCA primary channel for that STA, then the STA shall not initiate a TXOP on the NPCA primary channel.

NOTE—The baseline EDCA procedure is followed on the BSS primary channel. The values of CW\_NPCA[AC] and BO\_NPCA[AC] are discarded by the NPCA STA when it switches back to the BSS primary channel.

1. The STA shall not initiate a transmission on the NPCA primary channel to another STA until that STA's NPCA switching delay time has elapsed since the NPCA HE switch time if switching due to condition 1) above or NPCA NHT switch time if switching due to condition 2) above
2. The STA shall begin all frame exchanges on the NPCA primary channel with an NPCA initial Control frame 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. Details on the NPCA ICF are TBD
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. The Trigger frame shall include an explicit indication that it is being transmitted on the NPCA primary channel. Signaling details TBD.
4. 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 the inter-BSS traffic that 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
   5. 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 of the EHT Operation element.

# Text to be adopted ends here.

**References:**