IEEE P802.11
Wireless LANs

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| CC50 NPCA CR for CIDs 1817, 1818, 1819, 1821, 1830, 1822, 1823, 1824, 1831 |
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Abstract

This submission proposes comment resolution for the following CIDs submitted to CC50.

1817, 1818, 1819, 1821, 1830, 1822, 1823, 1824, 1831

## Revision History

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| --- | --- |
| **Revision** |  |
| 0 | Initial submission |
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## Comments

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1817 | Juseong Moon | 37.10 | 80.22 | When an AP uses MU operation(both UL and DL) in NPCA primary channel, the AP of the BSS shall consider the longest switching delay time among the allocated STAs by the AP. Therefore, a rule for the MU operation shall be addedde. | Please add the following text:In case where the STA transmits a DL MU PPDU or a Trigger frame that triggers UL MU PPDU(s) after switching to the NPCA primary channel, the STA shall not initiate a transmission on the NPCA primary channel to another STA(s) until the longest NPCA switching delay time among the other STA(s) has elapsed, either from the NPCA HE switch time for switching due to condition 1) above, or from the NPCA NHT switch time for switching due to condition 2) above. | Revised.Agree in principle.Instructions for TGbn Editor: Please make changes tagged with #1817 in this document. |
| 1818 | Juseong Moon | 37.10 | 79.36 | The bandwidth of the CTS frame may be narrower than that of the RTS. A rule modification is required to account for this situation. | As in comment | Rejected.The issue pointed out by this comment has been resolved in the current CR document of Matthew Fischer et al. (11-25/0936r11).  |
| 1819 | Juseong Moon | 37.10 | 80.52 | When an NPCA STA receives a frame from another OBSS in the NPCA Primary channel and can determine the OBSS's transmission duration (e.g., NAV), there is no defined operation for transitioning back to the Primary channel based on the remaining NAV duration. | Please add the following text:The NPCA STA shall switch back to the primary channel, if remaining time is smaller than the NPCA Minimum Duration Threshold, where the remaining time is defined as the following: a. When the NPCA STA receives an inter-BSS PPDU on its NPCA Primary channel, the remaining time is between the transmission end time of the received inter-BSS PPDU and the known transmission end time of its Primary channel. b. When the NPCA STA detects the medium as busy, the remaining time is between the time, which the medium is detected as idle, and the known transmission end time of its Primary channel. | Rejected.The operation which this comment is pointing out can be performed with implementation specific method. |
| 1821 | Juseong Moon | 37.10 | 79.42 | The operational procedure of EMLSR after switching to the NPCA Primary channel is not defined. | Please clarify it. | Revised.Agree in principle.Instructions for TGbn Editor: Please make changes tagged with #1821 in this document. |
| 1822 | Juseong Moon | 37.10 | 79.42 | Considerations for cases where an NPCA STA is operating on the NPCA Primary channel while an R-TWT SP is ongoing are insufficient. | Please define a rule to address the comment. | Revised.Agree in principle.Instructions for TGbn Editor: Please make changes tagged with #1822 in this document. |
| 1823 | Juseong Moon | 37.10 | 79.44 | The method for NAV management in the NPCA Primary channel is missing. Since Basic NAV is set based on control frame exchange in the Primary channel, if this NAV is used as is, transmission in the NPCA Primary channel is not possible. | The rule should be modified to ensure that the Basic NAV of the Primary channel does not affect transmissions in the NPCA Primary channel. For example, when a STA switches to the NPCA Primary channel, the STA shall reset the Basic NAV. | Revised.Agree in principle.Instructions for TGbn Editor: Please make changes tagged with #1823 in this document. |
| 1824 | Juseong Moon | 37.10 | 78.52 | An NPCA STA of BSS may only hear an OBSS's TF but fail to receive the TB PPDU due to a hidden node situation. In this case, even though the STA sets the Basic NAV, but NPCA operation is not possible per the current D0.1. Allowing NPCA operation in this case can improve performance. | Please define a rule to address the comment. | Revised.Agree in principle.Instructions for TGbn Editor: Please make changes tagged with #1824 in this document. |
| 1831 | Gwangho Lee | 37.10 | 79.36 | The bandwidth of the CTS frame may be narrower than that of the RTS. If the RTS's TA is a BW TA, the CTS frame bandwidth information is included in the CTS frame. If the CTS does not occupy the NPCA PCH, the NPCA STA can perform NPCA operations. A rule modification is required to account for this situation. | Please change ii) and add iii) as the following:ii) If the Control frame is an RTS frame, then identification of the channel occupied by a received CTS frame in a non-HT (duplicate) PPDU is determined by examining the CTS frame (e.g., RXVECTOR)iii) If the Control frame is an MU-RTS frame, then identification of the channel occupied by a received CTS frame in a non-HT (duplicate) PPDU is determined by examining the MU-RTS frame | Rejected.The issue pointed out by this comment has been resolved in the current CR document of Matthew Fischer et al. (11-25/0936r11).  |

## Discussion

1. **CID #1817**
	1. The current NPCA operation does not define the NPCA AP’s UL MU transmission or DL MU PPDU. For these MU transmissions, multiple NPCA STAs need to transmit or receive on the NPCA primary channel. Therefore, the current NPCA operation shall be revised to restrict the NPCA AP from initiating MU transmissions until the largest NPCA switching time among the multiple STAs has elapsed.
2. **CID #1818 and 1831 (Rejected)**
	1. The issue pointed out by this comment has been resolved in the current CR document of Matthew Fischer et al. (11-25/0936r11).
3. **CID #1819**
	1. If the NPCA STA detects an inter-BSS PPDU transmission on the NPCA primary channel, there are no sufficient time for transmitting PPDUs due to inter-BSS PPDU transmission.
		1. It will be an implementation specific operation.
4. **CID #1821**
	1. ~~If a non-AP MLD is in the EMLSR mode and at least one NPCA STA is affiliated with the MLD, the same EMLSR rule shall be applied to the NPCA STA. Especially, the same EMLSR ICF rules shall be applied on the NPCA primary channel.~~
	2. When the EML (EMLSR or EMLMR) NPCA STA receives frame(s) from the peer NPCA STA on the NPCA primary channel, the EML NPCA STA, has received an EML ICF or initial frame from the NPCA AP, may need more delay, to switch back to the BSS primary channel, than the peer NPCA STA(s).
		1. For example, the more delay may consist of EMLSR/EMLMR switching back delay, aSIFSTime + aSlotTime + aRxPHYStartDelay (which is time of the EML NPCA STA waits for frame(s) from its associated AP.) and NPCA switching back delay.
5. **CID #1822**
	1. R-TWT SPs shall be respected on both the BSS primary channel and the NPCA Primary channel.
6. **CID #1823**
	1. In the current draft, when NPCA STAs switch to the NPCA primary channel based on condition 2) (i.e., based on a three-PPDU sequence including control frame exchange), the NPCA STAs set the Basic NAV based on the OBSS’s control frame exchange. During the NAV duration, the STAs detect the medium as busy because the NAV is not a per-channel timer, but a single timer maintained by each NPCA STA.
	2. We can consider two options if the NPCA AP has enabled MOPLEN NPCA in addition to PHYLEN NPCA:
		1. **Option 1**: Maintain separate NAV timers for the primary channel and the NPCA primary channel.
		2. **Option 2**: Reset the Basic NAV timer when the NPCA STA switches to the NPCA primary channel. Also, reset the Basic NAV timer when the NPCA STA switches back to the primary channel.
			1. The NPCA STA can follow the baseline NAV update rules, without small exceptions.
	3. We can consider two options if the NPCA AP has enabled PHYLEN NPCA only:
		1. **Option 1**: Maintain separate NAV timers for the primary channel and the NPCA primary channel.
		2. **Option 2**: Reset the Basic NAV timer when the NPCA STA switches to the NPCA primary channel. Also, reset the Basic NAV timer when the NPCA STA switches back to the primary channel
			1. After the NPCA STA switches back to the primary channel, it will detect the medium as busy if the OBSS’s PPDU transmission follows the three-PPDU sequence.
			2. The NPCA STA can follow the baseline NAV update rules, without small exceptions.
			3. In NPCA channel switching condition 1), in CR document 11-25/0936r11, the NPCA STA does not set NAV and returns to the BSS primary channel based on the length of the OBSS PPDU. Therefore, this proposed NAV reset modification rule is basically conceptually similar to condition 1).
	4. For simpler implementation, **Option 2** is the preferred approach.
7. **CID #1824**
	1. **A PPDU including CTS frame (including CTS-to-Self) or Trigger frame (except ICF) from OBSS can set long inter-BSS NAV in ‘my’ BSS.** To improve utilization of the NPCA primary channel, switching condition including one-PPDU sequence should be considered. When proposed one-PPDU based NPCA switching operation is used, the following can be considered.
		1. If only PHYLEN NPCA is enabled, the NPCA STA will switch to the NPCA primary channel if it detects a PPDU, has long RXTIME, which follows the PPDU including CTS-to-Self or TF. In other words, the NPCA STA does not matter the PPDU including CTS-to-Self or Trigger frame.
		2. However, if both MOPLEN NPCA and PHYLEN NPCA are enabled, the NPCA STA can switch to the NPCA primary channel if
			1. it detects a PPDU, has long RXTIME or RXTIME + TXOP\_DURATION, which follows the PPDU including CTS-to-Self or Trigger frame, or
				1. It’s an operation of the current CR document of Matthew Fischer et al. (11-25/0936r10)
			2. it received the PPDU including CTS-to-Self or TF (except ICF) and duration of the CTS-to-Self or TF is long enough. **(Newly proposing one-PPDU sequence switching condition)**
				1. (Optional) For more reliability for NPCA switching, the proposing condition can include two-PPDU sequence, similar to 11-25/0936r10 (e.g., TF and following UL MU PPDU sequence, CTS-to-Self and following DL PPDU sequence).
	2. **\*\*NOTE 1:** BSRP TF’s NAVTimeout rule is not defined in current 11bn D0.3. Therefore, receiving BSRP TF and no frame detection in ‘my’ BSS will not trigger NAVTimeout (As we know, MU-RTS will.). Therefore, reset of the Basic NAV timer based on BSRP TF is not possible. Considering this background, 11bn should define NAVTimeout triggering rule for BSRP TF.

## Proposed Text for 11bn D0.3

**37.16 Non-primary channel access (NPCA)**

***TGbn Editor: please apply the following changes***

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 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.

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.

An NPCA AP that has enabled NPCA operation shall include the NPCA Operation Information field in its UHR Operation element 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.

(#2697)An NPCA AP with dot11HEPSROptionImplemented set to true shall set the TXVECTOR parameter SPATIAL\_REUSE to PSR\_DISALLOW for PPDUs that it transmits, and shall set the PSR Disallowed subfield in the SR Control field of the Spatial Reuse Parameter Set element to 1 in Management frames it transmits before enabling NPCA operation in its BSS and while NPCA operation remains enabled.

A non-AP STA that supports NPCA operation shall announce its NPCA switching delay and NPCA switch back delay respectively in the NPCA Switching Delay field and NPCA Switch Back Delay fields of the TBD frames.

An NPCA AP may enable a mode of operation in which untriggered UL transmissions on the NPCA primary channel by NPCA non-AP STAs is not permitted. Whether the mode is for all associated non-APs or per non-AP is TBD. Whether MU EDCA parameters mechanism is used for this or not is TBD.

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:
2. the PPDU 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).
3. 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.
4. whether the RXVECTOR parameter TXOP\_DURATION of the PPDU is considered for this comparison and whether it is indicated by the AP is TBD.
5. 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.
6. TBD conditions.
7. 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:
8. 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).
9. 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.
10. Whether the RXVECTOR parameter TXOP\_DURATION of the received PPDU(s) are considered for this comparison is TBD.
11. 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.
12. 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.
13. 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.
14. TBD conditions.

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:
2. TBD.
3. 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:
4. TBD.
5. 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.
6. 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:
7. 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]).
8. QSRC\_NPCA[AC] shall be set to 0.
9. 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.
10. The STA shall reset the basic NAV. (#1823)

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
	1. 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 if the transmission is an SU transmission (including an EHT SU transmission) or,
	2. until the largest NPCA switching delay time among the STAs, which are addressd in the transmission, 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, if the transmission is triggering an UL MU transmission or a DL MU transmission which is not an EHT SU transmission. (#1817)
2. The STA shall begin all frame exchanges on the NPCA primary channel with an NPCA 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.
3. Details on the NPCA ICF are TBD.
4. 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.
5. The 20 MHz channels occupied by PPDUs transmitted by the STA shall meet all of the following conditions:
6. include at least the NPCA primary channel.
7. all be within the BSS bandwidth.
8. 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.
9. not include channels that are indicated as punctured in the Disabled Subchannel Bitmap field in the EHT Operation element.
10. It is TBD whether a frame that solicits a response other than TB PPDUs can puncture 20 MHz subchannels not indicated as punctured in the Disabled Subchannel Bitmap field of the EHT Operation element.
11. ~~If the NPCA STA affiliated with the non-AP MLD which is operating in EMLSR/EMLMR mode, and the NPCA STA is member of the EMLSR/EMLMR link, the following applies:~~
12. ~~If an NPCA AP intiates a TXOP, it shall ensure that all of the following are completed at or before the expiration of the NPCA\_TIMER:~~
	1. ~~the end of frame exchange with the NPCA STA, as defined in subclause 35.3.17 Enhanced Multi-Link Single-Radio (EMLSR) operation and Enhanced Multi-Link Multi-Radio (EMLMR) operation;~~
	2. ~~the completion of the subsequent EMLSR/EMLMR transition delay of the NPCA STA.~~
13. ~~If the NPCA STA initiates a TXOP, it shall ensure the following is completed at or before the expiration of the NPCA\_TIMER:~~
	1. ~~the TXOP and its subsequent EMLSR/EMLMR transition delay of the NPCA STA. (#1821)~~

## Proposed Text for 11bn D0.3 (Referring 25/0936r10)

***TGbn Editor: please apply the following changes to 25/0936r10 document for 11bn D0.3***

**37.10.3 Switching to the NPCA channel**

***(TGbn Editor: please add the following changes)***

1. 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
	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 if the initial Control frame is a BSRP Trigger frame or a BSRP NTB Trigger frame
		2. begins when the MAC receives a PHY-RXEND.indication primitive corresponding to the first
	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 37.4 (Intra-BSS and inter-BSS PPDU classification for UHR STA)
	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
		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
	6. The bandwidth of the first PPDU is determined by the STA to not overlap with the NPCA primary channel based on the channel allocations and the PPDU bandwidth that are signaled in the received PPDU or obtained from the RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT of the received PPDU.
		1. if the initial 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
2. All of the following conditions are true:
	1. A first PPDU, including a frame, which is one of an CTS frame or a Trigger frame except an initial Conrol frame, is detected on the BSS primary channel.
	2. The STA issued a PHY-RXEND.indication(NoError) primitive upon reception of the first PPDU and the frame has not resulted FCS error.
	3. The first PPDU is classified by the STA as an inter-BSS PPDU.
	4. The NPCA AP has enabled MOPLEN NPCA in addition to PHYLEN NPCA and the the value of the MAC variable NPCA\_CFRAME\_TXOP\_REM\_DUR derived from the received first PPDU is greater than the value indicated in the most recently received or transmitted NPCA Minimum Duration Threshold field corresponding to its associated BSS**.**
	5. The bandwidth of the first PPDU is determined by the STA to not overlap with the NPCA primary channel based on the channel allocations and the PPDU bandwidth that are signaled in the received PPDU or obtained from the RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT of the received PPDU.
	6. the STA’s intra-BSS NAV is zero(#1824)

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.

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.

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, plus the value of the TXOP\_DURATION parameter of the RXVECTOR of the PPDU.

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 initial Control frame in the received PPDU in condition 2), or the frame, which is one of the CTS frame or the Trigger frame, in condition 3) (#1824) 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 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 or the PHY-RXSTART.indication primitive of the second PPDU of the frame exchange sequence identified in condition 3) above at the time of the receipt of the PHY-RXSTART.indication primitive of the second PPDU. (#1824)

**37.10.3 NPCA transmission rules**

***(TGbn Editor: please add the following changes)***

1. If the NPCA STA affiliated with the non-AP MLD which is operating in EMLSR/EMLMR mode, and the NPCA STA is member of the EMLSR/EMLMR link, the following applies:
2. If an NPCA AP intiates a TXOP, it shall ensure that all of the following are completed at or before the expiration of the NPCA\_TIMER:
	1. the end of frame exchange with the NPCA STA, as defined in subclause 35.3.17 Enhanced Multi-Link Single-Radio (EMLSR) operation and Enhanced Multi-Link Multi-Radio (EMLMR) operation;
	2. the completion of the subsequent EMLSR/EMLMR transition delay of the NPCA STA.
3. If the NPCA STA initiates a TXOP, it shall ensure the following is completed at or before the expiration of the NPCA\_TIMER:
	1. the TXOP and its subsequent EMLSR/EMLMR transition delay of the NPCA STA. (#1821)
4. The NPCA STA shall follow the channel access rules defined in 35.8.4 (Channel access rules for R-TWT SPs) (#1822)

***(TGbn Editor: please apply the following changes)***

**37.10.4 Switching back from the NPCA channel**

1. An NPCA STA switches back to the BSS primary channel when the NPCA\_TIMER expires.
2. When the STA switches back to the BSS primary channel, it shall:
	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
	2. resume the backoff procedure
	3. The STA shall reset the basic NAV. (#1823)