IEEE P802.11
Wireless LANs

|  |
| --- |
| cc50-cid-1780-discussion-on-npca-switch-back |
| Date: April 10, 2025 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Chaoming Luo | OPPO |  |  | luochaoming@oppo.com |
| Liuming Lu |  |  |  |
| Ning Gao |  |  |  |
| Yapu Li |  |  |  |
| Liangxiao Xin |  |  |  |

 Abstract

This submission proposes resolution for CID 1780 received for CC50.

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Change the document format from ppt to doc
* Rev 2: Correction of typo “TGbf” with “TGbn”; Add “or transmit an NPCA ICF” for when to do the comparison.

***TGbn editor: The baseline for this document is P802.11bn D0.2 and P802.11REVmeD7.0***

# **CID 1780**:

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Page.line** | **Comment** | **Proposed Change** | **Resolution** |
| 1780 | Chaoming Luo | 37.10 | 78.01 | The NPCA duration time is limited, STA is better to switch back to BSS P-channel early, instead of continue contending the NPCA P-channel incase the NPCA P-channel is busy. | As in comment. | **Revised**Agree with the commenter in principle.**TGbn editor, please incorporate changes tagged with 1780 in 11-25/0538r2.** |

## **Discussion:**

The time a STA/AP stays on the NPCA primary channel is limited. Ideally, the STA/AP needs to switch back to BSS primary channel before basic NAV expires.

* If there are STAs (e.g., legacy STAs) do not switch to NPCA primary channel, it’s fairer for an AP to switch back as early as possible considering about possible OBSS TXOP truncation.
* If a STA/AP switches back late more than 72 us, the STA/AP loses the medium synchronization on the BSS primary channel.

Then, what if the STA/AP does not gain channel access on the NPCA primary channel?

* Should it keep retrying? There may be no enough time left to finish even a single MSDU transmission after it gain the channel access.
* Should it switch back to BSS primary channel immediately? When the basic NAV is long, there is possibility that it can retry and obtain a TXOP to finish data transmission.
* So, we need a balance!

A simple solution: if the time left is less than a NPCA Transmission Threshold, the STA and AP switch back; otherwise, the STA and AP may keep retrying.

The NPCA Transmission Threshold is a minimum time required to finish at least a single MSDU transmission on the NPCA primary channel:

* At least one ICF + SIFS + ICR + SIFS sequence, consumes a minimum around 232 us.
	+ Assume ICF takes around 128 us (using non-HT PPDU or non-HT duplicate PPDU format using a rate of 6 Mb/s, 12 Mb/s, or 24 Mb/s), ICR takes around 72 us.
* At least one Data + SIFS + Ack/BA sequence, consumes a minimum around 160 us.
	+ Assume Data takes no less than 72 us, ICR takes around 72 us.
	+ Although QoS Data with No Ack ack policy do not need Ack, prefer to still consider Ack in NPCA as a common case
* At least a NPCA Switch Back Delay of the AP

So, we propose:

Add a NPCA Transmission Threshold field into the NPCA Operation Information field.

when an NPCA STA intends to start or retry contending on the NPCA primary channel, it shall check that the remain time is no less than this threshold.

The NPCA Transmission Threshold is derived from a minimum time required to finish at least a single MSDU transmission on the NPCA primary channel.

The NPCA Transmission Threshold is greater than or equal to the NPCA Switch Back Delay of the AP plus 392 us.

## **Proposed Text:**

**9.4.2.aa1 UHR Operation Element**

***TGbn Editor: Please modify the paragraph at P66L7 in 11bn D0.2 as follows:***

The format of the NPCA Operation Information field is defined in Figure 9-aa3 (NPCA Operation Information field format),

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 Bx | Bx+1 Bx+6 | Bx+7 Bx+12 | Bx+13 Bx+24 |
|  | **NPCA Primary Chanel** | **NPCA Minimum Duration Threshold** | **NPCA Switching Delay** | **NPCA Switch Back Delay** | **NPCA Transmission Threshold** |
| Bits: | 8 | TBD | 6 | 6 | 12 |

**Figure 9-aa3 —NPCA Operation Information field format [1780]**

The NPCA Primary Channel field indicates the channel number of a channel within the BSS bandwidth that corresponds to the channel that the NPCA AP and its associated NPCA non-AP STAs switch to in order to perform NPCA operation, as described in 37.11 (Non-primary channel access (NPCA)).

The NPCA Minimum Duration Threshold field indicates the minimum duration of inter-BSS activity (inter-BSS PPDU or inter-BSS TXOP) that is required to have been indicated on the primary channel of the BSS as a necessary condition to permit an NPCA STA to switch to the NPCA primary channel to perform NPCA operation. The encoding and the maximum value of this field are TBD.

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

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 us.

***TGbn Editor: Please add the paragraph at P66L38 in 11bn D0.2 as follows:***

The NPCA Transmission Threshold field indicates a minimum NPCA transmission duration in microseconds before an NPCA STA switch back to the BSS primary channel when an NPCA STA intends to start or retry contending on the NPCA primary channel or transmit an NPCA ICF. The value of the NPCA Transmission Threshold field is the minimum NPCA transmission duration minus the NPCA Switch Back Delay of the NPCA AP and 392 us. [1780]

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

…

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

…

***TGbn Editor: Please add the following paragraph at P86L58 in 11bn D0.2:***

9) The NPCA STA shall switch back to the BSS primary channel when it intends to start or retry contending for the NPCA primary channel or transmit an NPCA ICF if the remain OBSS PPDU duration due to condition 1) above or the remain OBSS TXOP duration due to condition 2) above is less than the minimum NPCA transmission duration indicated in the most recently received or transmitted NPCA Transmission Threshold field corresponding to its BSS. [1780]

# **SP**

Do you support resolution to the CID 1780 and incorporate the corresponding text changes in 11-25/0538r2 into the latest TGbn draft?

Y/N/A