IEEE P802.11  
Wireless LANs

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| PDT MAC on modes enablement and parameter updates at the AP | | | | |
| Date: July 22, 2025 | | | | |
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Abstract

This submission proposes comment resolutions for the following CIDs received during the Comment Collection 50 on 11bn Draft 0.2:

* 2512, 2479, 2692, 913, 3405, 2473, 3652, 3680, 2124, 3802
* 3801

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Changes in response to offline feedback
  + Modified the descriptions for the Mode Length field

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

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Section** | **Pg.Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 2512 | Laurent Cariou | 37 | 67.05 | Define a critical update procedure to allow enablement/disablement of NPCA from the AP for the entire BSS. The list of parameters from NPCA or other UHR features that are allowed to be modified by the critical udpate procedure shall be dynamic parameters from the UHR Operation element and have to be clearly identified | as in comment | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable NPCA mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 2512.** |
| 2479 | Laurent Cariou | 37.1 | 78.32 | Include also the NPCA switch Back and NPCA switching delay in the operation element and always include the Operation element in Beacon and Probe Response frames transmitted by the AP. | as in comment | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes and parameters (e.g., change the NPCA switching/switch back delays) as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 2692.** |
| 2692 | Salvatore Talarico | 9.42.aa1 | 59.49 | Procedure on how the NPCA primary channel is updated over time is missing | Procedure on how the NPCA primary channel can be update over time shall be defined. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes and parameters (e.g., change the NPCA primary channel) as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 2692.** |
| 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 | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable NPCA mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 913.** |
| 3405 | Gaurang Naik | 37.9.1 | 77.20 | Define a procedure for the DPS AP to enable/disable the DPS mode. When the AP transitions from the DPS disabled to the DPS enabled mode, the non-AP STA must start preceding all frames to the AP with an ICF. Similarly, when the AP transitions from the DPS disabled to the DPS enabled mode, the non-AP STA need not precede frames with an ICF. 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. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable DPS mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 3405.** |
| 2473 | Laurent Cariou | 37.9.1 | 77.21 | Define a generic way for an AP to enable DPS and other features for the BSS that impact the STAs, with sufficient time for the STA to prepare for the changes, applying something similar to the critical udpate. | as in comment | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable DPS mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 2473.** |
| 3652 | Alfred Asterjadhi | 37.9.1 | 77.21 | Define enablement/disablement procedure at the AP side in line with existing protocols (via beacons, and categorized as critical updates) so that STAs are aware of these changes at AP side. | As in comment. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable NPCA, DPS, P-EDCA mode, etc.) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 3652.** |
| 3680 | Sherief Helwa | 37.9.1 | 77.20 | I propose the following:  "Define a mechanism ensuring that this enablement/disablement are part of the critical updates of the AP and possibly include other DPS-related parameters that might change in this category." | Explained in the comment | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable DPS mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 3680.** |
| 2124 | Vishnu Ratnam | 37.9.1 | 77.19 | The spec needs to define the mechanism for a mobile AP to enable/disable DPS operation or update its DPS parameters. | The commentor will bring a contribution to resolve the issue. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable DPS mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 2124.** |
| 3802 | Yongho Seok | 37.9.1 | 77.21 | "The mechanism for enablement/disablement of DPS by an AP is TBD." Please describe the DPS enablement/disablement mechanism of the AP. The AP should indicate the enablement start time in advance and notify it. | Please describe the DPS enablement/disablement mechanism of the AP. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes (e.g., enable/disable DPS mode) and parameters as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 3802.** |
| 3801 | Yongho Seok | 37.9.1 | 77.19 | "A DPS AP shall have value 1 in its transmitted DPS Enabled field to announce that it has enabled DPS and 0 otherwise." If DPS is enabled, the DPS AP should also announce the DPS Operation Parameters. Please define the DPS Operation Parameters announcemnt mechanism. | Please define the DPS Operation Parameters announcemnt mechanism. | **Revised**  Agree with the commenter in principle. Added a procedure for a UHR AP to change its operation modes and parameters (e.g., announce its DPS parameters) as well to announce these changes in advance.  **TGbn editor: please implement the changes shown in 11-25/1091r1 tagged as 3801.** |

**Discussion**

None

**Text to be adopted begins here:**

***TGbn editor: please add the following subclause as shown below.* (#2512, 2479, 2473, 3652, 3680)**

**(#2512, 2479, 2473, 3652, 3680) 9.4.2.X UHR Parameters Update element**

The format of the UHR Parameters Update element is shown in Figure9-aax1 (UHR Parameters Update element format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Countdown Timer | Mode Tuple List |
| Octets: | 1 | 1 | 1 | 1 | variable |

**Figure 9-aax1 --- UHR Parameters Update element format**

The Countdown Timer field is set to the number of TBTTs until the TBTT at which the update(s) indicated in the UHR Parameters Update element take effect at the AP corresponding to the element. The Countdown Timer field value 1 indicates that the update(s) takes effect at the next TBTT. A Countdown Timer field value greater than 127 indicates that the update(s) indicated in the element have already taken effect. If the Countdown Timer field is set to a value greater than 127, the update(s) took effect at the TBTT in the past given by the Countdown Timer field minus 127.

The Mode Tuple List field contains one or more Mode Tuple fields.

The Mode Tuple field is defined in Figure 9-aax2 (Mode Tuple field format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B3 | B4 B7 | variable |
|  | Mode ID | Mode Length | Mode Parameters |
| Bits: | 4 | 4 | variable |

**Figure 9-aax2 --- Mode Tuple field format**

The Mode ID field contains the identifier for the UHR mode associated with the mode tuple. The encoding of this field is defined in Table 9-aay1 (Encoding of the Mode ID field).

**Table 9-aay1 --- Encoding of the Mode ID field**

|  |  |
| --- | --- |
| **Value** | **Mode** |
| 0 | DPS |
| 1 | NPCA |
| 2 | DUO |
| 3 | P-EDCA |
| 4 | DBE |
| 5 | AP PUO |
| 6 | ELR Reception |
| 7-15 | Reserved |

The Mode Length field indicates the number of octets in the Mode Parameters field. The value of the Mode Length field depends on the value of the Mode ID field for that mode tuple and are defined in Table 9-aay2 (Recognized values for the Mode Length field by UHR non-AP STAs). In addition,

* a value 0 in the Mode Length field indicates that no parameters are present for the corresponding mode, the Mode Parameters field is not present for that mode tuple, and the mode is enabled at the TBTT indicated in the Countdown Timer field, and
* a value 15 in the Mode Length field indicates that no parameters are present for the corresponding mode, the Mode Parameters field is not present for that mode tuple, and the mode is disabled at the TBTT indicated in the Countdown Timer field, and
* a value other than 0 or 15 in the Mode Length field indicates that the parameters corresponding to the mode are present in the Mode Parameters field for that mode tuple, and the mode is enabled at the TBTT indicated in the Countdown Timer field with the indicated parameters.

**Table 9-aay2 --- Recognized values for the Mode Length field by UHR non-AP STAs**

|  |  |
| --- | --- |
| **Mode ID field value** | **Recognized Mode Length field values** |
| 0 (DPS) | 4, 15 |
| 1 (NPCA) | 4, 6, 15 |
| 2 (DUO) | 1 |
| 3 (P-EDCA) | 0, 3, 15 |
| 4 (DBE) | 2, 15 |
| 5 (AP PUO) | 0, 15 |
| 6 (ELR Reception) | 0, 15 |
| 7-15 | Reserved |

Note – If a non-AP STA receives a UHR Parameters Update element with a Mode Tuple field carrying a Mode Length field value that is not included in Table 9-aay2 (Recognized values for the Mode Length field by UHR non-AP STAs), the non-AP STA parses the fields in the Mode Parameters field up to the value indicated in Table 9-aay2 (Recognized values for the Mode Length field by UHR non-AP STAs) for that mode and ignores the remaining portion of the Mode Parameters field.

The Mode Parameters field contains the parameters for the mode corresponding to the mode tuple. The contents of the Mode Parameters field depend on the value of the Mode ID field and the Mode Length field for that mode tuple and are described in the subclauses below.

**9.4.2.X.1 Mode Length and Mode Parameters for DPS**

When the value of the Mode ID field is 0, the value of Mode Length field is equal to 4 or 15. If the value of the Mode Length field is 4, the Mode Parameters field carries the parameters for DPS. Otherwise, the Mode Parameters field is not present.

The Mode Parameters field for DPS is the same as the DPS Operation Parameters field defined in 9.4.1.85 (DPS Operation Parameters field).

Note – An AP that is not a mobile AP that does not carry a Mode Tuple field with the Mode ID field set to 0.

**9.4.2.X.2 Mode Length and Mode Parameters for NPCA**

When the value of the Mode ID field is 1, the value of Mode Length field is equal to 4, 6, or 15. If the value of the Mode Length field is 4 or 6, the Mode Parameters field carries the parameters for NPCA. Otherwise, the Mode Parameters field is not present.

The Mode Parameters field for NPCA when the Mode Length field is 4 is as defined in Figure 9-aax3 (Mode Parameters field for NPCA when Mode Length field is 4). The Mode Parameters field for NPCA when the Mode Length field is 6 is as defined in Figure 9-aax4 (Mode Parameters field for NPCA when Mode Length field is 6).

The encoding of fields in the Mode Parameters field for NPCA is the same as the encoding of the corresponding fields in the NPCA Operation Parameters field defined in 9.4.2.aa1 (UHR Operation element).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B11 | B12 B17 | B18 B23 | B24 B25 | B26 | B27 B31 |
|  | NPCA Primary Channel | NPCA Minimum Duration Threshold | NPCA Switching Delay | NPCA Switch Back Delay | Initial NPCA QSRC | MAC Header-Based NPCA | Reserved |
| Bits: | 8 | 4 | 6 | 6 | 2 | 1 | 5 |

**Figure 9-aax3 --- Mode Parameters field for NPCA when Mode Length field is 4**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B11 | B12 B17 | B18 B23 | B24 B25 | B26 | B27 B31 | B32 B47 |
|  | NPCA Primary Channel | NPCA Minimum Duration Threshold | NPCA Switching Delay | NPCA Switch Back Delay | Initial NPCA QSRC | MAC Header-Based NPCA | Reserved | NPCA Disabled Subchannel Bitmap |
| Bits: | 8 | 4 | 6 | 6 | 2 | 1 | 5 | 16 |

**Figure 9-aax3 --- Mode Parameters field for NPCA when Mode Length field is 6**

**9.4.2.X.3 Mode Length and Mode Parameters for DUO**

When the value of the Mode ID field is 2, the value of Mode Length field is equal to 1. If the value of the Mode Length field is 1, the Mode Parameters field carries the parameters for DUO. Otherwise, the Mode Parameters field is not present.

Note – An AP does not set the Mode Length field to 15 if the Mode ID field is equal to 2.

The Mode Parameters field for DUO is as defined in Figure 9-aax4 (Mode Parameters field for DUO).

|  |  |  |
| --- | --- | --- |
|  | B0 B4 | B5 B7 |
|  | MaxStandaloneDUOBSRP | Reserved |
| Bits: | 5 | 3 |

**Figure 9-aax4 --- Mode Parameters field for DUO**

**9.4.2.X.4 Mode Length and Feature Parameters for P-EDCA**

When the value of the Mode ID field is 3, the value of Mode Length field is equal to 0, 3, or 15. If the value of the Mode Length field is 3, the Mode Parameters field carries the parameters for NPCA. Otherwise, the Mode Parameters field is not present.

The Mode Parameters field for P-EDCA is as defined in Figure 9-aax5 (Mode Parameters field for P-EDCA).

Note – If the value of the Mode Length field is equal to 0, the default values for P-EDCA parameters are used as defined in 37.5 (Prioritized EDCA).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B7 | B8 B11 | B12 B13 | B14 B15 | B16 B17 | B18 B23 |
|  | P-EDCA CWmin | P-EDCA CWmax | P-EDCA AIFSN | CW DS | P-EDCA PSRC threshold | P-EDCA QSRC threshold | Reserved |
| Bits: | 4 | 4 | 4 | 2 | 2 | 2 | 6 |

**Figure 9-aax5 --- Mode Parameters field for P-EDCA**

**9.4.2.X.5 Mode Length and Feature Parameters for DBE**

When the value of the Mode ID field is 4, the value of Mode Length field is equal to 2 or 15 and the Mode Parameters field carries the parameters for DBE.

The Mode Parameters field for DBE is as defined in Figure 9-aax6 (Mode Parameters field for DBE).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B2 | B3 B7 | B8 B15 |
|  | DBE Bandwidth | Reserved | DBE CCF |
| Bits: | 3 | 5 | 8 |

**Figure 9-aax6 --- Mode Parameters field for DBE**

The encoding of fields in the Mode Parameters field for DBE is the same as the encoding of the corresponding fields in the DBE Operation Parameters field defined in 9.4.2.aa1 (UHR Operation element).

**9.4.2.X.7 Mode Length and Feature Parameters for AP PUO**

When the value of the Mode ID field is 5, the value of Mode Length field is equal to 0 or 15. When the Mode Length field is equal to 0, the parameters for AP PUO are carried in a TWT element as defined in 37.17.4 (AP PUO mode).

**9.4.2.X.8 Mode Length and Feature Parameters for ELR Reception**

When the value of the Mode ID field is 6, the value of Mode Length field is equal to 0 or 15.

Note – For the Mode Tuple field corresponding to ELR Reception, the UHR AP uses value 0 in the Mode Length field to indicate that it intends to enable reception of ELR PPDUs or value 15 to indicate that it intends to disable reception of ELR PPDUs.

***TGbn editor: please add the following subclauses as shown below.* (#2512, 2479, 2692, 913, 3405, 2473, 3652, 3680, 2124, 3802, 3801)**

**(#2512, 2479, 2692, 913, 3405, 2473, 3652, 3680, 2124, 3802, 3801) 37.28 Enhanced BSS parameter critical update procedure**

A UHR AP shall follow the rules defined in 35.3.10 (BSS parameter critical update procedure) and 35.3.11 (ML procedures for (extended) channel switching and channel quieting) and additional rules and exceptions defined in this subclause.

**37.28.1 Enhanced critical update events**

The following events about the BSS parameters of an AP shall classify as an enhanced critical update:

* Insertion of the UHR Parameters Update element

**37.28.2 Advance notification of updates to operation modes and parameters**

**37.28.2.1 Operations eligible for advance notification**

The following operations, when intended to be performed by an AP, are eligible for an advance notification:

* The AP is a mobile AP and intends to enable, disable, or update one or more parameters for DPS (See 37.10.1 (Dynamic power save (DPS) operation)), or
* Enable, disable, or update one or more parameters for NPCA (See 37.16 (Non-primary channel access)), or
* Enable, disable, or update one or more parameters for DBE (See 37.26 (Dynamic bandwidth expansion)), or
* Update one or more parameters for DUO (See 37.17.2 (Dynamic unavailability operation (DUO) mode))
* Enable, disable, or update one or more parameters for P-EDCA (See 37.5 (Prioritized EDCA)), or
* Enable, disable, or update one or more parameters for AP PUO (See 37.17.4 (AP PUO mode)), or
* Enable or disable reception of ELR PPDUs (See 37.4.2 (Enhanced long range (ELR) operation)).

**37.28.2.2 Procedure for advance notification**

If an AP (affected AP) intends to perform one or more of the operations defined in 37.28.2.1 (Operations eligible for advance notification), then a reporting AP includes the UHR Parameters Update element in the Beacons and Probe Response that the reporting AP transmits, subject to the conditions defined below.

On the link on which the affected AP operates:

* If the affected AP is not part of a multiple BSSID set or if the affected AP is the transmitted BSSID of a multiple BSSID set, then the reporting AP is the same as the affected AP
  + The UHR Parameters Update element shall be included outside of any Multiple BSSID element and Multi-Link element.
* If the affected AP is a nontransmitted BSSID of a multiple BSSID set, then the reporting AP is transmitted BSSID of that multiple BSSID set
  + The UHR Parameters Update element shall be included in the Nontransmitted BSSID Profile subelement, corresponding to the affected AP, of the Multiple BSSID element.
  + Note – In this case, the UHR Parameters Update element is included outside the Basic Multi-Link element carried in the Multiple BSSID element.
* The reporting AP shall start including the UHR Parameters Update element in its Beacon, Probe Response and (Re)Association Response frames a duration of dot11UHRParamUpdateAdvNotificationInterval before the eligible operation defined in 37.28.2.1 (Operations eligible for advance notification) is scheduled to occur and shall include the element until and including the DTIM Beacon immediately following the TBTT at which the eligible operation occurs.
* The reporting AP may continue including the UHR Parameters Update element in its Beacon, Probe Response, and (Re)Association Response frames after the eligible operations defined in 37.28.2.1 (Operations eligible for advance notification) have occurred. If included, the AP shall set the Countdown Timer to a value greater than 127 to indicate that the operation(s) have already taken effect.

On other link(s) of the AP MLD with which the affected AP is affiliated:

* The reporting AP is the AP (AP 2) affiliated with the same AP MLD as the affected AP if AP 2 is not part of a multiple BSSID set or is the transmitted BSSID in a multiple BSSID set.
  + The UHR Parameters Update element is carried in the per-STA profile corresponding to the affected AP of the Basic Multi-Link element
  + Note – In this case, the Basic Multi-Link element is carried outside the Multiple BSSID element.
* The reporting AP is the transmitted BSSID of the multiple BSSID set if the AP (AP 3) affiliated with the same AP MLD as the affected AP is a nontransmitted BSSID of the multiple BSSID set.
  + The UHR Parameters Update element is carried in the per-STA profile corresponding to the affected AP of the Basic Multi-Link element that is included in the Nontransmitted BSSID Profile corresponding to AP 3 of the Multiple BSSID element.
* The reporting AP should start including the UHR Parameters Update element in its Beacon frames and shall start including the UHR Parameters Update element in its Probe Response frames a duration of dot11UHRParamUpdateAdvNotificationInterval before the eligible operation defined in 37.28.2.1 (Operations eligible for advance notification) is scheduled to occur and shall include the element until and including the DTIM Beacon immediately following the TBTT at which the eligible operation occurs.
* The reporting AP may continue including the UHR Parameters Update element in its Beacon, Probe Response, and (Re)Association Response frames after the eligible operations defined in 37.28.2.1 (Operations eligible for advance notification) have occurred. If included, the AP shall set the Countdown Timer to a value greater than 127 to indicate that the operation(s) have already taken effect.

The value of dot11UHRParamUpdateAdvNotificationInterval is fixed for all APs affiliated with an AP MLD and should be selected to be sufficiently large so that all non-AP STAs associated with the affected AP, including those in the power save mode, have the opportunity to successfully receive the UHR Parameters Update element before the updates take effect.

An AP that includes the UHR Parameters Update element in its Probe Response frame should set the Address 1 field of the frame to the broadcast address, except if explicitly stated otherwise.

**C.3 MIB detail**

***TGbn editor: please add the following MIB entry as shown below.***

*dot11UHRParamUpdateAdvNotificationInterval OBJECT-TYPE*

*SYNTAX Unsigned32 (2..5)*

*MAX-ACCESS read-write*

*STATUS current*

*DESCRIPTION*

*"This is a control variable.*

*It is written by an external management entity.*

*This attribute specifies the time interval prior to a scheduled update to an AP’s operating mode(s) or parameters at which the AP begins announcing the forthcoming update..*

*"*

*DEFVAL { 5 }*

*::= { dot11UHRStationConfigEntry 11 }*