IEEE P802.11
Wireless LANs

|  |
| --- |
| PDT MAC UHR on operating mode and parameter updates (generic enablement/disablement) |
| Date: July 30, 2025 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Gaurang Naik | Qualcomm |  |  | gnaik@qti.qualcomm.com |
| Alfred Asterjadhi | Qualcomm |  |  | aasterja@qti.qualcomm.com |
| Abhishek Patil | Qualcomm |  |  | appatil@qti.qualcomm.com |
| George Cherian | Qualcomm |  |  | gcherian@qti.qualcomm.com |
| Sherief Helwa | Qualcomm |  |  | shelwa@qti.qualcomm.com |
| Insun Jang | LGE |  |  | insun.jang@lge.com |
| Binita Gupta | Cisco |  |  | binitag@cisco.com |
| Laurent Cariou | Intel |  |  | laurent.cariou@intel.com |
| Reza Hedayat | Apple |  |  | reza\_hedayat@apple.com |
| Morteza Mehrnoush | Apple |  |  | morteza.mehrnoush@apple.com |
| Chitto Ghosh | Apple |  |  | chitto.ghosh@apple.com |
| Brian Hart | Cisco |  |  | brianh@cisco.com |
| Xiandong Dong | Xiaomi |  |  | dongxiandong@xiaomi.com |
| Seongho Byeon | Samsung |  |  | Sh.byeon@samsung.com |
| Vishnu Ratnam | Samsung |  |  | Vishnu.r@samsung.com |
| Zhenpeng Shi | Huawei |  |  | shizhenpeng1@huawei.com |
| Liuming Lu | Oppo |  |  | luliuming@oppo.com |
| Yajun Cheng | Xiaomi |  |  | chengyajun@xiaomi.com |

 Abstract

This submission proposes draft text for operating mode and parameter updates (i.e., the generic enablement/disablement) of UHR features and provides resolutions for the following CIDs:

* 2478, 2480, 2471, 2648, 2651, 2711, 2712, 3650, 3678, 3952,
* 721, 2121, 2122, 2123, 252, 2491, 2492, 2591, 2592, 3716,
* 3764, 1278, 1279, 1280, 1281, 1282

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Modifications based on offline feedback. ~~Changed paragraphs highlighted.~~
	+ Changed the Note on page 6 that describes updates to multiple mode(s) and STA(s) to a normative statement (“may”).
	+ Some updates to the text on contents of OMP request and OMP response for clarity.
* Rev 2: Updated the affiliations and emails for the co-authors.
	+ No other technical or editorial changes.
* Rev 3: Following updates:
	+ Added transition timeout
	+ Removed DBE and DSO
	+ Editorial changes
* Rev 4: Changes based on offline feedback:
	+ Updated baseline to 11bn D0.3
	+ Rearranged text to have the OMP request/response definitions appear before the usage
	+ Added xref to the normative subclause 37.27 in the NOTE for each feature subclause
* Rev 5: Changes based on feedback received during 06/09 teleconference and offline. Major changes highlighted.
	+ Fixed the subclause number for Link Reconfiguration Request frame
	+ Included resolutions for CIDs addressed by the proposed text changes.
	+ Added a UHR Mode Change element in Clause 9 that carries information corresponding to which modes are enabled, disabled, or are requested for parameter updates and modified the corresponding descriptions in Clause 37.27
	+ Added support for enabling/disabling/updating parameters for more modes (Co-BF, Co-SR & EMLSR)
	+ Modified the value of the Type field in the UHR Link Reconfiguration Request and Notify frames to 3 to make the text changes in line with CR document 11-25/1101
* Rev 6: Changes based on offline feedback
	+ Fixed Table numbers in the subclause on Link Reconfiguration Notify frame and UHR Operating Mode Timeout field
	+ Modified the descriptions for the Mode Length field
	+ Other editorial changes
* Rev 7: Changes based on offline feedback
	+ Fixed subclause number for UHR Link Reconfiguration Notify frame
	+ Editorial changes (changed “Feature Parameters” to “Mode Parameters” in subclause titles).
	+ Updates to text in 37.17.2 to make the text aligned with CR document 11-25/437r18.
* Rev 8: Changes based on offline feedback
	+ Clarified that values other than 0 and 15 are used for enable & update cases
	+ Added clarifications on setting of other fields in Reconfig ML element
	+ Clarified that the Mode Parameters field of the UHR Mode Change element carries all parameters even if only a subset of parameters are updated.
	+ Changed the name of the “UHR Operating Mode Timeout” field to “UHR Operating Mode And Parameters Update Timeout”
* Rev 9:
	+ Added text to clarify the initial state after association for each mode.
	+ Updated text in 37.17.5 to align with document 11-25/744r5. Modified the subclause title and changed all occurrences of LOM to AOM.
* Rev 10: Changes highlighted.
	+ Added clarification in EMLSR subclause.
	+ Renamed “OMP request/response” to “UHR OMP request/response”
	+ Added a rule for preventing race conditions.
	+ Modified the format of the UHR Mode Change element based on offline feedback
		- Added a Mode Control field as the first octet in the Mode Parameters field, which explicitly differentiates enable, disable, and update parameters.
		- Updated the corresponding descriptions throughout the document.
* Rev 11: Changes based on offline feedback
	+ Updated text in EMLSR subclause.
	+ Minor changes to the definition of OMP request.
* Rev 12:
	+ Updated the description text for Mode Length field.
	+ Added DSO as a mode that can be enabled using the framework. Details in 11-25/1164
	+ Added in CoBF and CoSR that the non-AP STA needs to follow rules defined in 37.13.2.1 and 37.13.2.2
	+ Modifications to the UHR Mode Change element format
		- Mode Control field is made mode-specific
	+ Modifications to DPS mode
		- Added signaling to indicate Default mode and Parameterized mode in Mode Control
	+ Editorial updates
* Rev 13: changes highlighted.
	+ Clarified that the OMP request does not carry Mode Tuples for modes that are not enabled/disabled/updated in the OMP request.
	+ In 37.27, split the statement about non-AP MLD sending the OMP request in two cases – when a non-AP MLD is requesting the update and when a non-AP STA is requesting the update.
* Rev 14: Updates based on feedback received during 07/29 PM2
	+ Removed previous highlights. Changes compared to Rev13 highlighted.
	+ Split OMP Operation field into two bits – one for enable/disable and another for update
	+ Removed duplication of the Table on OMP Operation encoding
	+ Removed “Parameterized mode” field in the Mode Control field of DPS
	+ Added clarification text in Reconfig ML element subclause to remove conflict between this document and baseline
	+ Removed the figure in the Mode Specific Parameters for AOM subclause as it is defined in 11-25/744
* Rev 15: Updates based on offline feedback.
	+ Modified the UHR Mode Change element format based on offline feedback (changes highlighted)
		- Moved the Mode Enable and Mode Update fields between Mode ID and Mode Length
	+ Updates in the text for AOM in Mode Specific Parameters – replace non-AP STA with AOM STA
	+ Added In-device coexistence activities field in the Mode Specific Parameters for EMLSR
* Rev 16:
	+ Added the statement – “The Mode Length, Mode Specific Control, and Mode Specific Parameters fields are not included if the Mode Enable field is set to 0 or the value of Mode ID corresponds to a mode without parameters.” In clause 9 for UHR Mode Change element.

**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** |
| 2478 | Laurent Cariou | 37.1 | 78.21 | Define the procedure for the non-AP STA to enable and disable NPCA, if the AP has enabled NPCA. If the AP has enabled NPCA, the AP shall accept the request from a non-AP STA to enable or disable NPCA. | as in comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2478.**  |
| 2480 | Laurent Cariou | 37.1 | 78.37 | Define the procedure for the non-AP STA to enable and disable NPCA, if the AP has enabled NPCA. If the AP has enabled NPCA, the AP shall accept the request from a non-AP STA to enable or disable NPCA. Use the generic UHR Operating Mode Announcement frame that is used for DUO, DPS, ... | as in comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2480.**  |
| 2471 | Laurent Cariou | 37.9.1 | 76.62 | Enablement procedure has to be defined. Should be a generic enablement method for DUO, DPS, DSO and NPCA and should be kept as simple as possible following the example of eMLSR enablement in 11be. | Define a new UHR Operating Mode Notification frame for a STA to notify that it enables or disables the feature and to include the parameters needed for the feature. The same frame can be used to acknowledge the change from the AP side. The enablement/disablement is per STA if the STA belongs to an MLD. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA, DPS and DUO. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. Furthermore, the framework allows to enable/disable/update modes for multiple links at the same time. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2471.**  |
| 2648 | Chittabrata Ghosh | 37.9.1 | 77.01 | The enablement mechanism involves a TBD request frame - resolve the specific frame exchange sequence and signaling for enablement mechanism in the following text - "The non-AP STA shall transmit an TBD Request frame with the DPS Mode field of the UHR Controlfield set to 1 to the AP, and include a DPS Operation Parameters field in the TBD Request frame." | Resolve the specific request frame format (e.g., UHR Mode Enablement Notification frame) for DPS enablement mechanism | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2648.**  |
| 2651 | Chittabrata Ghosh | 37.9.1 | 77.04 | The enablement mechanism involves a TBD response frame -in the following text - "The AP shall respond with a TBD Response frame to the non-AP STA, after the AP is ready to servethe non-AP STA in the DPS mode." | Resolve the specific response frame format (e.g., UHR Mode Enablement Notification frame) for the DPS enablement mechanism | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2651.**  |
| 2711 | Chittabrata Ghosh | 37.9.1 | 77.09 | The disablement mechanism involves a TBD request frame - resolve the specific frame exchange sequence and signaling for enablement mechanism in the following text - "The non-AP STA shall transmit an TBD request frame with the DPS Mode field of the frame set to 0 to its associated AP." | Resolve the specific request frame format for DPS disablement mechanism | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2711.**  |
| 2712 | Chittabrata Ghosh | 37.9.1 | 77.11 | The disablement mechanism involves a TBD response frame - resolve the specific frame exchange sequence and signaling for enablement mechanism in the following text - The associated AP shall transmit an TBD response frame to the non-AP STA, after the AP is no longerserving the non-AP STA in the DPS mode. | Resolve the specific response frame format for DPS disablement mechanism | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2712.**  |
| 3650 | Alfred Asterjadhi | 37.9.1 | 77.01 | Several TBD Requests and TBD Responses throughout the draft. Suggest to have a harmonized protocol that allows enablement/disablement/update of modes. Better if the protocol inherits from 11be MLD in terms of providing this functionalitiy cross link and even better if for multi link (of course while preserving the per-link properties of certain modes of operation). | As in comment. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. Furthermore, the framework allows to enable/disable/update modes for multiple links at the same time. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 3650.**  |
| 3678 | Sherief Helwa | 37.9.1 | 77.01 | Proposal to reuse the Link Reconfiguration signaling framework for Request and Response frames. It is good to take leverage of signaling frameworks that are already in the spec. Additionally, using the ML Reconfiguration signaling framework for DPS enablement /disablement allows us to to do so for multiple STAs that are affiliated with the same MLD in the same frame exchange since DPS is defined per STA and not per MLD. Please consider this comment for other similar instances. | Explained in the comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames (i.e., Link Reconfiguration Request/Notify frames) and elements (i.e., Reconfiguration ML element and a new element viz. UHR Mode Change element) are used, their corresponding formats, and the rules for the AP upon receiving the request frame. Furthermore, the framework allows to enable/disable/update modes for multiple links at the same time. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 3678.**  |
| 3952 | Binita Gupta | 37.9.1 | 77.01 | DPS is one of the operating mode defined in 11bn. There are other client operating modes defined in 11bn including NPCA, DUO + DSO operating mode is being discussed in the TGbn group. Each of these operating modes would need a way to enable/disable the OM mode and update the operating parameters. It is better to define a common UHR operating mode notification mechanism that can be used across multiple OM modes. it is also desirable that a STA can enable/disable OM modes or update operating parameters cross-link to reduce UHR OMN overhead. | Define a common UHR operating mode notification (OMN) framework that can be used across multiple OM modes for enable/disable of one or more link specific OM modes and update of operation parameters. Define a new Multi-Link Operating Mode Notification (ML OMN) frame, that allows STA to update OM modes for multiple links and for multiple feature/OM modes. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA, DPS, DUO and various other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. Furthermore, the framework allows to enable/disable/update modes for multiple links at the same time. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 3952.**  |
| 721 | Chien-Fang Hsu | 37.9.1 | 77.04 | The non-AP STA's DPS behavior between the Request frame and the Response frame is not clear. | Add a rule that "The non-AP STA shall not enable the DPS mode until it has successfully received the TBD Response frame from the AP." | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA, DPS, DUO and various other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. Added rules for when the mode change takes effect at the non-AP and the AP, i.e., after the successful exchange of the OMP response.**TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 721.**  |
| 2121 | Vishnu Ratnam | 37.9.1 | 76.62 | The spec needs to define the mechanism for a non-AP to enable/disable DPS operation or update its DPS parameters. | As in comment. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2121.**  |
| 2122 | Vishnu Ratnam | 37.9.1 | 77.05 | It has to be clarified if the AP needs to send the TBD Response within a time limit of receiving the TBD Request frame. | As in comment. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., the time within which the AP is expected to send the OMP response and the behavior if the AP does not send the OMP response). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2122.**  |
| 2123 | Vishnu Ratnam | 37.9.1 | 77.13 | It has to be clarified if the AP needs to send the TBD Response within a time limit of receiving the TBD Request frame. | As in comment. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DPS. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., the time within which the AP is expected to send the OMP response and the behavior if the AP does not send the OMP response). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2123.**  |
| 252 | Yuxin LU | 37.10 | 78.21 | The non-AP STA may disable NPCA mode from the enabling mode, there lacks a description | Suggest to change the last sentence to "It is TBD how the non-AP STA enables or disables NPCA mode" | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 252.**  |
| 2491 | Laurent Cariou | 37.11.2 | 81.19 | An AP shall always accept a Request to enable DPS, DSO, NPCA, DUO. | as in comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including NPCA, DUO, DPS and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request for all modes). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2491.**  |
| 2492 | Laurent Cariou | 37.11.2 | 81.25 | An AP shall always accept a Request to enable DUO. | as in comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request for all modes, including DUO). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2492.**  |
| 2591 | Minyoung Park | 37.11.2 | 81.19 | The DUO Mode subfield is not defined. | Define the DUO Mode subfield in a frame that enables/disables the DUO Mode. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2591.**  |
| 2592 | Minyoung Park | 37.11.2 | 81.19 | Resolve TBDs in this paragraph for DUO mode enablement procedure. | Define a frame that enables/disables DUO mode that is similar to the EMLSR operation. For example, UHR Mode Enablement Notification frame. | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 2592.**  |
| 3716 | Li-Hsiang Sun | 37.11.2 | 81.25 | DUO supporting AP should not reject STA's request to enable DUO | as in comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request for all modes, including DUO). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 3716.**  |
| 3764 | Yongho Seok | 37.11.2 | 81.25 | "It is TBD whether the AP can reject the request to enable the DUO mode at the STA side and the enablement procedure is TBD."The AP must accept the request to enable DUO mode if it is a DUO-supporting AP. | As in the comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request for all modes, including DUO). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 3764.**  |
| 1278 | Hong Won Lee | 37.11.1 | 81.18 | Reponse Timer should be considered for the DUO mode enable/disable mechanism | When a non-AP STA successfully transmits the request frame but does not receive the response frame afterward, a timeout mechanism (i.e., response timeout) should be considered. If the response timer expires on the non-AP STA side, the non-AP STA can assume that the DUO is enabled. Conversely, if the response timer expires on the AP side (e.g., if the AP receives the request frame and transmits the response frame but does not receive an acknowledgment for the response frame, resulting in a retransmission), the AP can also assume that the DUO is enabledThe commenter can provide a resolution proposal for this comment | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., the time within which the AP is expected to send the OMP response and the behavior if the AP does not send the OMP response). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 1278.**  |
| 1279 | Hong Won Lee | 37.11.1 | 81.19 | TBD Request frame (TBD) should be defined | The request frame can be new action frame or using existing action frame(or another new management frame). The subfields such as the DUO enable and/or the Response Timeout can be included | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 1279.**  |
| 1280 | Hong Won Lee | 37.11.1 | 81.22 | TBD Response frame (TBD) should be defined | The response frame can be new action frame or using existing action frame(or another new management frame). The subfields such as the DUO enable can be included | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes. Added normative rules for which frames (i.e., Link Reconfiguration Request & Notify frames) and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 1280.**  |
| 1281 | Hong Won Lee | 37.11.1 | 81.25 | TBD should be resolved | The rejection mechanis may not be necessary. The AP supporting the DUO shall accept the DUO mode because the DUO mode is dependent on the non-AP side | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes, including DUO and other modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame (e.g., AP must always accept the request for all modes, including DUO). **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 1281.**  |
| 1282 | Hong Won Lee | 37.11.1 | 81.36 | The disablement procedure is already described in preceding paragraphs | Please remove the line, "The disablement procedure is TBD" | **Revised**Agree with the commenter in principle. Defined a common framework using which a non-AP STA can enable, disable or update parameters of various UHR-defined modes. Added normative rules for which frames and elements are used, their corresponding formats, and the rules for the AP upon receiving the request frame. **TGbn editor: please implement the changes shown in document 11-25/0882r16 tagged as 1280.**  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**Text to be adopted begins here:**

**3.1 Definitions**

***TGbn editor: Insert the following definitions (maintaining alphabetical order) in subclause 3.1 (Definitions):***

**(#3678, 2471)** UHR Operating mode and parameters (OMP) request: A UHR Link Reconfiguration Request frame, of Category UHR protected (a Protected UHR Action frame) and with the Type field in the frame set to 3, that is transmitted by a non-AP MLD, via its affiliated non-AP STA, to an AP MLD to enable or disable a UHR mode of operation or update the parameters of an enabled mode of operation for the non-AP MLD or its affiliated non-AP STA(s).

**(#3678, 2471)** UHROMP response: A UHR Link Reconfiguration Notify frame of Category UHR protected (a Protected UHR Action frame) with the Type field in the frame set to 3 that is transmitted by an AP MLD, via its affiliated AP, to a non-AP MLD as a response to the UHR OMP request.

**3.4 Abbreviations and acronyms**

***TGbn editor: Insert the following acronyms (maintaining alphabetical order):* (#2471)**

**(#2471)** OMP operating mode and parameters

**9.4.2.322.4 Reconfiguration Multi-Link element**

***TGbn editor: please update the following subclause as shown below.* (#3650, 2491, 2471, 3952)**

**Table 9-417p—Reconfiguration Operation Type subfield encoding**

|  |  |
| --- | --- |
| **Value** | **Name** |
| 0 | AP Removal |
| 1 | Operation Parameter Update |
| 2 | Add Link |
| 3 | Delete Link |
| 4 | NSTR Status Update |
| 5 | UHR Operating Mode and Parameters Update |
| 6-15  | Reserved |

***TGbn editor: please update the following paragraph in 9.4.2.322.4 as shown below.* (#3650, 2491, 2471, 3952)**

If the Complete Profile subfield is set to 1, the STA Profile field includes the complete profile for the STA identified by the STA MAC Address as defined in 35.3.6.4 (Link reconfiguration to the setup links). If the Complete Profile subfield is set to 0, the STA Profile field is not included, unless the Reconfiguration Operation Type field is set to 5, in an OMP request transmitted by a non-AP STA in which case the STA Profile field is included and the STA Profile field includes a UHR Mode Change element.

***TGbn editor: please add the following subclause as shown below.* (#3678)**

**(#3678) 9.6.43.3 UHR Link Reconfiguration Notify frame format**

The UHR Link Reconfiguration Notify frame is an Action or Action No Ack frame of category Protected UHR. The Action field of a UHR Link Reconfiguration Notify frame contains the information shown in Table 9-XYZ1 (UHR Link Reconfiguration Notify frame Action field format).

**Table 9-XYZ1—UHR Link Reconfiguration Notify frame Action field format**

|  |  |
| --- | --- |
| **Order** | **Meaning** |
| 1 | Category |
| 2 | Protected UHR Action |
| 3 | Dialog Token |
| 4 | Type |

The Category field is defined in 9.4.1.11 (Action field) and is set to Protected UHR.

The Protected UHR Action field is defined in 9.6.38.1 (Protected UHR Action field).

The Dialog Token field is set to the value of the Dialog Token field from the corresponding UHR Link Reconfiguration Request frame.

The Type field indicates the type of the UHR Link Reconfiguration Notify frame and is set per table 9-XYZ2 (Type field encoding).

**Table 9-XYZ2—** **Type field encoding**

|  |  |
| --- | --- |
| **Value** | **Meaning** |
| 3  | A response to a UHR Link Reconfiguration Request frame with Type field equals 3. |

**9.4.2.aa2 UHR Capabilities element**

**9.4.2.aa2.2 UHR MAC Capabilities Information field**

***TGbn editor: please update the following subclause as shown below.* (#2122, 2123, 1278)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B4 | B5 | B6 | B7 | B8 |
|  | DPS Support | DPS Assisting AP | Multi-Link Power Management | NPCA Supported | BSR Enhancement Support | Additional Mapped TID Support | EOTSP Support | DSO Support |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B9 | B10 | B11 B14 | … | … | … | … | B14 Bz |
|  | P-EDCA Support | DBE Support | UHR Operating Mode And Parameters Update Timeout **(#2122, 2123, 1278)** | … | … | … | … | Reserved |
| Bits: | 1 | 1 | 4 | … | … | … | … | x |

**Figure 9-aa1 – UHR MAC Capabilities Information field format**

**(#2122, 2123, 1278)** When the UHR Operating Mode And Parameters Update Timeout field is included in a frame sent by an AP affiliated with an AP MLD, the UHR Operating Mode And Parameters Update Timeout field is set as defined in Table 9-XYZ3 (Encoding of the UHR Operating Mode And Parameters Update Timeout field). When the UHR Operating Mode And Parameters Update Timeout field is included in a frame sent by a non-AP STA affiliated with a non-AP MLD, the UHR Operating Mode And Parameters Update Timeout field is reserved.

**(#2122, 2123, 1278) Table 9-XYZ3— Encoding of the UHR Operating Mode And Parameters Update Timeout field**

|  |  |
| --- | --- |
| **UHR Operating Mode And Parameters Update Timeout subfield value** | **UHR Operating Mode And Parameters Update Timeout** |
| 0 | 0 TUs |
| 1 | 128 us |
| 2 | 256 us |
| 3 | 512 us |
| 4 | 1 TU |
| 5 | 2 TUs |
| 6 | 4 TUs |
| 7 | 8 TUs |
| 8 | 16 TUs |
| 9 | 32 TUs |
| 10 | 64 TUs |
| 11 | 128 TUs |
| 12-15 | Reserved |

***TGbn editor: please add the following subclauses in Clause 9 as shown below.* (#3650, 2491, 2471, 3952)**

**(#3650, 2491, 2471, 3952) 9.4.2.X UHR Mode Change element**

The format of the UHR Mode Change element is shown in Figure9-aax1 (UHR Mode Change element format).

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

**Figure 9-aax2 --- UHR Mode Change element format**

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 B5 | B6 | B7 | B8 B11 | B12 B15 | variable |
|  | Mode ID | Mode Enable | Mode Update | Mode Length | Mode Specific Control | Mode Specific Parameters |
| Bits: | 6 | 1 | 1 | 4 | 4 | variable |

**Figure 9-aax3 --- 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-XYZ4 (Encoding of the Mode ID field).

**Table 9-XYZ4 --- Encoding of the Mode ID field**

|  |  |
| --- | --- |
| **Value** | **Mode** |
| 0 | DPS |
| 1 | NPCA |
| 2 | DUO |
| 3 | DSO |
| 4 | P-EDCA |
| 5 | ELR Reception |
| 6 | AOM |
| 7 | LLI |
| 8 | Co-BF |
| 9 | Co-SR |
| 10 | EMLSR |
| 11-63 | Reserved |

The Mode Enable field indicates whether the non-AP STA is requesting to enable or disable the mode identified by the Mode ID. The field is set to 1 if the non-AP STA is requesting to enable the mode and is set to 0 if the non-AP STA is requesting to disable the mode.

The Mode Update field indicates whether the non-AP STA is requesting to update the parameters of an already enabled mode. The field is set to 1 if the non-AP STA is requesting to update the parameters of an already enabled mode and it is set to 0 otherwise. The field is reserved if the Mode Enable field is set to 0.

The Mode Length field indicates the number of octets in the Mode Parameters field.

The Mode Length, Mode Specific Control, and Mode Specific Parameters fields are not included if the Mode Enable field is set to 0 or the value in the Mode ID field corresponds to a mode without parameters.

The definition of the Mode Specific Control field and the Mode Specific Parameters field depends on the value of the Mode ID field for that mode tuple. The Mode Specific Parameters field is described in the subclauses below.

**9.4.2.X.1 Mode Specific Parameters for DPS**

When the value of the Mode ID field is 0,

* the Mode Tuple field corresponds to DPS, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field carries the parameters for DPS.

The Mode Specific Parameters field for DPS and the encoding of fields in the Mode Specific Parameters field for DPS is the same as the DPS Operation Parameters field defined in 9.4.1.85 (DPS Operation Parameters field).

NOTE – Even if a non-AP STA intends to update a subset of parameters for DPS mode, the non-AP STA provides all parameters.

**9.4.2.X.2 Mode Specific Parameters for NPCA**

When the value of the Mode ID field is 1,

* the Mode Tuple field corresponds to NPCA, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field carries the parameters for NPCA.

The Mode Specific Parameters field for NPCA is defined in Figure 9-aax6 (Mode Specific Parameters field for NPCA).

The encoding of fields in the Mode Specific 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 B5 | B6 B11 | B12 B15 |
|  | NPCA Switching Delay | NPCA Switch Back Delay | Reserved |
| Bits: | 6 | 6 | 4 |

**Figure 9-aax6 --- Mode Specific Parameters field for NPCA**

NOTE – Even if a non-AP STA intends to update a subset of parameters for NPCA mode, the non-AP STA provides all parameters.

**9.4.2.X.3 Mode Specific Parameters for DUO**

When the value of the Mode ID field is 2,

* the Mode Tuple field corresponds to DUO, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.5 Mode Specific Parameters for P-EDCA**

When the value of the Mode ID field is 4,

* the Mode Tuple field corresponds to P-EDCA, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.6 Mode Specific Parameters for ELR Reception**

When the value of the Mode ID field is 5,

* the Mode Tuple field corresponds to ELR Reception, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.7 Mode Specific Parameters for AOM**

When the value of the Mode ID field is 6,

* the Mode Tuple field corresponds to AOM, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field carries the parameters for AOM.

NOTE – Even if an AOM STA intends to update a subset of parameters for AOM, the AOM STA provides all parameters.

**9.4.2.X.8 Mode Specific Parameters for LLI**

When the value of the Mode ID field is 7,

* the Mode Tuple field corresponds to LLI, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.9 Mode Specific Parameters for Co-BF**

When the value of the Mode ID field is 8,

* the Mode Tuple field corresponds to Co-BF, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.10 Mode Specific Parameters for Co-SR**

When the value of the Mode ID field is 9,

* the Mode Tuple field corresponds to Co-SR, and
* the Mode Update field is reserved, and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field is not present.

**9.4.2.X.11 Mode Specific Parameters for EMLSR**

When the value of the Mode ID field is 10,

* the Mode Tuple field corresponds to EMLSR and
* the Mode Specific Control field is reserved, and
* the Mode Specific Parameters field carries the parameters for EMLSR.

The Mode Specific Parameters field for EMLSR is defined in Figure 9-aax7 (Mode Specific Parameters field for EMLSR).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B15 | B16 B21 | B22 B27 | B28 | B29 B31 |
|  | EMLSR Link Bitmap | EMLSR Padding Delay | EMLSR Transition Delay | In-Device Coexistence Activities | Reserved |
| Bits: | 16 | 6 | 6 | 1 | 3 |

**Figure 9-aax7 --- Mode Specific Parameters field for EMLSR**

The EMLSR Link Bitmap field indicates the subset of the enabled links that is used by a UHR non-AP MLD in the EMLSR mode. The bit position i of the EMLSR Link Bitmap field corresponds to the link with the Link ID field equal to i and is set to 1 to indicate that the link is used by the UHR non-AP MLD for the EMLSR mode and is a member of the EMLSR link(s); otherwise, the bit position is set to 0.

The EMLSR Padding Delay field indicates the minimum MAC padding duration of the initial Control frame requested by the UHR non-AP MLD as defined in 35.5.2.2.3 (Padding for a Trigger frame) starting from 0us and in units of 4 us.

The EMLSR Transition Delay field indicates the transition delay time needed by a non-AP MLD to switch from exchanging PPDUs on one of the enabled link(s) to the listening operation on the enabled link(s) in units of 4 ms.

The In-Device Coexistence Activities field indicates whether the non-AP MLD has in-device coexistence activities on its EMLSR link(s). When DUO is supported on all of the EMLSR link(s) indicated by the EMLSR Link Bitmap at the APs, the field is not used. When DUO is not supported on one or more EMLSR Link(s), the field is set to 1 to indicate the non-AP MLD has in-device coexistence activities on the EMLSR link(s) on which DUO is not supported, and set to 0 to indicate the non-AP MLD has no, or does not know whether it has, in-device coexistence activities on the EMLSR link(s) on which DUO is not supported, and the field is ignored by the AP on the EMLSR Link(s) on which DUO is supported. When included in a frame transmitted by an AP affiliated with an AP MLD, the In-device Coexistence Activities field is reserved.

NOTE – Even if a non-AP STA intends to update a subset of parameters for EMLSR, the non-AP STA provides all parameters.

**37.5 Prioritized EDCA**

***TGbn editor: please add the following paragraphs as shown below.* (#2491, 2471, 3952)**

An AP that has enabled P-EDCA operation shall set the P-EDCA Enabled field in UHR operation element to 1.

**(#2491, 2471, 3952)** When a non-AP STA that supports P-EDCA mode (re)associates with an AP, P-EDCA mode is disabled by default for the non-AP STA.A UHR non-AP STA that supports P-EDCA mode and that intends to enable or disable P-EDCA mode shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates). The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#2491, 2471, 3952)** NOTE – For a non-AP STA to enable P-EDCA mode, the associated AP must support P-EDCA and must have P-EDCA enabled for the BSS (see 37.27 (Procedure for operating mode and parameter updates)).

**37.15 Power Management**

**37.15.1 Dynamic power save (DPS) operation**

***TGbn editor: please update the following paragraphs as shown below.* (#3650, 2711, 2712, 3678, 3952, 2121, 2491, 721, 2122, 2123)**

* **(#3650, 2648, 2651, 3678, 3952, 2121)**
* **(#3650, 2711, 2712, 3678, 3952, 2121)**

**(#3650, 2711, 2712, 3678, 3952, 2121, 2491, 721, 2122, 2123)** When a non-AP STA that supports DPS mode (re)associates with an AP, DPS mode is disabled by default for the non-AP STA.A UHR non-AP STA that supports DPS mode and that intends to enable, disable or update the parameters of DPS mode shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates). In the UHR OMP request sent to enable or update the parameters of DPS mode for the non-AP STA, the non-AP STA shall include the DPS Operation Parameter field. The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#3650, 2711, 2712, 3678, 3952, 2121, 2491, 721, 2122, 2123)** NOTE – For a non-AP STA to enable DPS mode, the associated AP must be a DPS assisting AP (see 37.27 (Procedure for operating mode and parameter updates)).

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

***TGbn editor: please update the following paragraph as shown below.* (#3650, 2478, 2480, 252)**

**(#3650, 2478, 2480, 252)** 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.

***TGbn editor: please update the following paragraph as shown below.* (#3650, 2478, 2480, 252)**

**(#3650)** **(#2478, 2480, 252, 3650)** When a non-AP STA that supports NPCA mode (re)associates with an AP, the NPCA mode is disabled by default for the non-AP STA.A UHR non-AP STA that supports NPCA mode and that intends to enable, disable or update the parameters of NPCA mode shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates). In the UHR OMP request sent to enable or update the parameters of NPCA mode for the non-AP STA, the non-AP STA shall include the following in the Mode Parameters field of the Mode Tuple field:

* NPCA switching delay,
* NPCA switch back delay.

**(#2478, 2491)** The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#2478, 2491)** NOTE – For a non-AP STA to enable NPCA mode, the associated AP must support NPCA and must have NPCA enabled for the BSS (see 37.27 (Procedure for operating mode and parameter updates)).

**37.17.2 Dynamic Unavailability Operation (DUO) mode**

***TGbn editor: please update the following paragraphs as shown below.* (#2492, 3716, 2491, 2591, 2592, 3716, 3764, 1279, 1278, 1281, 1282)**

* **(#3650, 2592)**

**(#3650, 1281, 2592) (#1282, 3650, 2592)**

**(#2492, 3716, 2491, 2591, 2592, 3716, 3764, 1279, 1278, 1281, 1282)** When a DUO non-AP STA (re)associates with an AP, DUO mode is disabled by default for the DUO non-AP STA.A DUO non-AP STA that intends to enable or disable DUO mode shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates) to notify its associated DUO assisting AP. The associated DUO assisting AP shall accept the request to enable or disable DUO mode for the non-AP STA and shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**37.17.5 Adaptive operation mode**

***TGbn editor: please update the following paragraphs as shown below.* (#3650, 2491, 2471, 3952)**

**(#3650, 2491, 2471, 3952) (#3650, 2491, 2471, 3952)** When an AOM STA (re)associates with an AOM assisting AP, AOM is disabled by default.An AOM STA that intends to enable, disable or update the parameters of AOM shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#3650, 2491, 2471, 3952)** In the UHR OMP request sent to enable or update the parameters of AOM for the AOM STA, the AOM STA shall include the following in the Mode Parameters field of the Mode Tuple field:

**(#3650, 2491, 2471, 3952)**

* a Maximum PPDU Duration subfield that indicates the maximum PPDU duration, in microseconds, that is supported by the STA in transmit and/or receive when the non-AP STA is in LOM mode.
* a Maximum MCS subfield that indicates the maximum MCS that is supported by the STA in transmit and/or receive when the non-AP STA is in LOM mode.
* An LDPC Mode subfield that indicates whether LDPC is supported by the STA in transmit and/or receive when the non-AP STA is in LOM mode.
* An HT-Immediate BA Mode subfield that indicates whether all HT-immediate BA agreements are active or suspended when the non-AP STA is in LOM mode.
* A Disabled Subchannel Bitmap subfield that indicates whether one or more of the 20 MHz subchannels that lie within the BSS bandwidth are enabled or disabled when the non-AP STA is in LOM mode. The Disabled Subchannel Bitmap subfield 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 the BSS bandwidth is reserved.
* Whether there are other fields is TBD.

**(#3650, 2491, 2471, 3952) (#3650, 2491, 2471, 3952) (#3650, 2491, 2471, 3952)**

**(#3650, 2491, 2471, 3952)** The AOM assisting AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates) and shall satisfy the AOM parameters indicated in the OMP request.

**(#3650, 2491, 2471, 3952)** NOTE – For an AOM STA to enable AOM, the associated AP must be an AOM assisting AP (see 37.27 (Procedure for operating mode and parameter updates)).

**37.22 Low Latency Indication**

**37.22.1 General**

***TGbn editor: please add the following paragraphs as shown below.* (#3650, 2491, 2471, 3952)**

**(#3650, 2491, 2471, 3952)** When a non-AP STA that supports LLI mode (re)associates with an AP, LLI mode is disabled by default for the non-AP STA.A non-AP STA that supports LLI mode and that intends to enable or disable LLI mode shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#3650, 2491, 2471, 3952)** The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#3650, 2491, 2471, 3952)** NOTE – For a non-AP STA to enable the LLI mode, the associated AP must support LLI (see 37.27 (Procedure for operating mode and parameter updates)).

**37.19 Enhanced multi-link single-radio (EMLSR) operation for a UHR non-AP MLD**

***TGbn editor: please add the following paragraphs as shown below.* (#3650, 2491, 2471, 3952)**

In EMLSR mode, a UHR non-AP MLD shall follow the rules defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) and in this subclause.

**(#3650, 2491, 2471, 3952)** When a UHR non-AP MLD that supports EMLSR mode (re)associates with an AP MLD, the EMLSR mode is disabled by default for the non-AP MLD.A UHR non-AP MLD shall not use the procedure to enable, disable or update parameters defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) when associated with a UHR AP MLD with dot11EHTEMLSROptionActivated equal to true. Instead, if the UHR non-AP MLD intends to enable, disable or update the parameters of EMLSR mode with its associated UHR AP MLD, the UHR non-AP MLD shall follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates). In the UHR OMP request sent to enable or update the parameters of EMLSR mode for the non-AP MLD, the non-AP MLD shall include the following in the Mode Parameters field of the Mode Tuple field:

* EMLSR link bitmap
* EMLSR padding delay
* EMLSR transition delay
* In-Device Coexistence Activities field

**(#3650, 2491, 2471, 3952)** The associated AP MLD shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**(#3650, 2491, 2471, 3952)** NOTE – For a non-AP MLD to enable EMLSR mode, the associated AP MLD must have dot11EHTEMLSROptionActivated equal to true (see 37.27 (Procedure for operating mode and parameter updates)).

**37.13.2.1 Coordinated beamforming**

***TGbn editor: please add the following paragraphs as shown below.* (#3650, 2491, 2471, 3952)**

The objective of coordinated beamforming (Co-BF) is to allow more efficient medium usage by enabling concurrent transmissions of two APs with multiple transmit chains to each AP’s associated STAs while minimizing interference to OBSS STAs by using the CSI of the channels between each AP and the recipient STAs of the other AP of the Co-BF transmission. The number of participating APs in a Co-BF transmission shall be 2. The maximum number of spatial streams for each recipient STA of the Co-BF transmission shall be 2. The sounding procedure needed for obtaining the CSI for performing the Co-BF transmission is described in 37.12 (UHR Co-BF sounding operation).

**(#3650, 2491, 2471, 3952)** When a non-AP STA that supports Co-BF operation (re)associates with an AP, the Co-BF operation is disabled by default.A UHR non-AP STA that supports Co-BF operation and that intends to enable or disable Co-BF operation shall follow the rules on how often such requests may be sent as defined in this subclause and the procedure defined in 37.27 (Procedure for operating mode and parameter updates). The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

**37.13.2.2 Coordinated spatial reuse**

**37.13.2.2.1 General**

***TGbn editor: please add the following paragraphs as shown below.* (#3650, 2491, 2471, 3952)**

The objective of coordinated spatial reuse (Co-SR) is to allow more efficient medium usage by concurrent transmissions of multiple APs using transmit power control. The Co-SR transmission is initiated by an AP that obtains a TXOP and becomes the sharing AP. The sharing AP transmits a Trigger frame to the shared AP identified by the AP ID carried in the AID12 field of the User Info field of the Trigger frame to initiate the Co-SR transmission.

**(#3650, 2491, 2471, 3952)** When a non-AP STA that supports Co-SR operation (re)associates with an AP, the Co-SR operation is disabled by default. A UHR non-AP STA that supports Co-SR operation and that intends to enable or disable Co-SR operation shall follow the rules on how often such requests may be sent as defined in this subclause and the procedure defined in 37.27 (Procedure for operating mode and parameter updates). The associated AP shall accept the request and follow the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

***TGbn editor: please add the following subclause as shown below.* (#2478, 2480, 2471, 2648, 2651, 2711, 2712, 3650, 3678, 3952, 2121, 252, 2591, 2592, 721)**

**(#3650, 2491, 2471, 3952) 37.27 Procedure for operating mode and parameter updates**

**(#3650, 2491, 2471, 3952)** The procedure defined in this subclause allows a UHR non-AP MLD to enable or disable one or more of the following modes of operation or update the parameters associated with those mode(s) for the non-AP MLD or its affiliated non-AP STA(s) operating on any enabled link that is setup between the non-AP MLD and its associated AP MLD.

* DPS (see 37.15.1 (Dynamic power save (DPS) operation))
* NPCA (see 37.16 (Non-primary channel access (NPCA)))
* DUO (see 37.17.2 (Dynamic Unavailability Operation (DUO) mode))
* DSO with exceptions as defined in 37.24 (Dynamic subband operation)
* P-EDCA (see 37.5 (Prioritized EDCA))
* ELR Reception (see 37.4.2 (Enhanced long range (ELR) operation))
* AOM (see 37.17.5 (Adaptive operation mode))
* LLI (see 37.22 (Low Latency Indication))
* Co-BF (see 37.13.2.1 (Coordinated beamforming))
* Co-SR (see 37.13.2.2 (Coordinated spatial reuse))
* EMLSR (see 37.19 (Enhanced multi-link single-radio (EMLSR) operation for a UHR non-AP MLD))

**(#3650, 3678, 2471, 3952)** A non-AP MLD shall transmit, via an affiliated non-AP STA, to its associated AP MLD, an UHR OMP request to enable or disable one or more UHR modes of operation for the non-AP MLD or one or more affiliated non-AP STAs operating on enabled link(s). If a UHR mode of operation is not supported by the AP MLD, then the non-AP MLD shall not request to enable that mode for the non-AP MLD. If a UHR mode of operation is not supported by an AP affiliated with an AP MLD, then the non-AP MLD shall not request to enable that mode for the non-AP STA operating on the corresponding AP’s link.

**(#3650, 3678)** A non-AP MLD may update the parameters associated with one or more enabled UHR modes for the non-AP MLD or one or more of its affiliated non-AP STAs by transmitting an UHR OMP request.

**(#3650, 3678)** In the same UHR OMP request, the non-AP MLD may request the enablement/disablement and update of parameters for multiple mode(s) and for multiple non-AP STA(s) that are affiliated with the same non-AP MLD.

**(#3678)** The UHR OMP request shall be a UHR Link Reconfiguration Request frame with the Type field in the frame set to 3.

**(#3650, 2491, 2471, 3952)** In an UHR OMP request to enable, disable, or update the parameters of the UHR mode(s), the non-AP MLD shall include a Reconfiguration Multi-Link element.

* If the UHR OMP request is to enable, disable, or update parameters of one or more of the following modes:
	+ DPS, NPCA, DUO, DSO, P-EDCA, ELR Reception, AOM, LLI, Co-BF, or Co-SR,
* then the non-AP MLD shall
	+ set all fields in the Presence Bitmap field of the Reconfiguration Multi-Link element to 0
	+ include in the Link Info field of the Reconfiguration Multi-Link element, a Per-STA Profile subelement for each link on which the non-AP MLD intends to enable, disable, or update the parameters of the requested UHR mode(s), with the fields set as follows:
		- The Link ID field of the STA Control field of each Per-STA Profile subelement shall be set to the link identifier of the link on which the non-AP MLD is requesting to enable, disable, or update the parameters of the mode(s).
		- The Reconfiguration Operation Type field of the STA Control field of each Per-STA Profile subelement shall be set to 5 (UHR Operation Mode and Parameters Update).
		- All other fields in the STA Control field shall be set to 0.
		- A UHR Mode Change element shall be included in the STA Profile field of each Per-STA Profile subelement
			* The UHR Mode Change element shall include a Mode Tuple field for each mode that is requested to be enabled or disabled or for which a parameter update is requested for the corresponding link.
* If the UHR OMP request is to enable, disable, or update the parameters of the EMLSR mode then the non-AP MLD shall
	+ set all fields in the Presence Bitmap field of the Reconfiguration Multi-Link element to 0
	+ include in the Link Info field of the Reconfiguration Multi-Link element, one Per-STA Profile subelement with the Link ID field of the STA Control field set to value 15 and other fields set as follows:
		- The Reconfiguration Operation Type field of the STA Control field of the Per-STA Profile subelement shall be set to 5 (UHR Operation Mode and Parameters Update).
		- All other fields in the STA Control field shall be set to 0.
		- A UHR Mode Change element shall be included in the STA Profile field of the Per-STA Profile subelement
			* The UHR Mode Change element shall include a Mode Tuple field for EMLSR.
				+ The EMLSR Link Bitmap field shall indicate the EMLSR link(s)

**(#3650)** A non-AP MLD shall not include a Mode Tuple field corresponding to a mode in the OMP request if the non-AP MLD does not intend to enable, disable, or update parameters corresponding to that mode.

**(#3650)** NOTE – See 37.5 (Prioritized EDCA), 37.15.1 (Dynamic power save (DPS) operation), 37.16 (Non-primary channel access), 37.17.2 (Dynamic Unavailability Operation (DUO) mode), 37.17.5 (Adaptive operation mode), 37.22 (Low Latency Indication), 37.4.2 (Enhanced long range (ELR) operation), 37.13.2.1 (Coordinated beamforming), 37.13.2.2 (Coordinated spatial reuse), and 37.19 (Enhanced multi-link single-radio (EMLSR) operation for a UHR non-AP MLD) for details on whether there are parameters associated with the modes and if so, the set of parameters that are included by the non-AP STA in the UHR OMP request.

**(#2122, 2123, 2491, 2492, 1278)** An AP MLD that receives, via an affiliated AP, the UHR OMP request from an associated non-AP MLD to enable, disable or update the parameters of one or more UHR modes should successfully transmit the UHR OMP response on an enabled link where the corresponding non-AP STA affiliated with the non-AP MLD is in awake state:

* after all applicable AP(s) affiliated with the AP MLD is (are) ready to serve their associated non-AP STA(s) affiliated with that non-AP MLD in the requested mode(s) of operation and the requested parameters (if any), and
* within a transition timeout interval that starts at the end of the PPDU carrying the acknowledgment to the UHR OMP request and that is initialized to the value carried in the UHR Operating Mode And Parameters Update Timeout field of the AP MLD’s UHR Capabilities element.

**(#3678)** The UHR OMP response shall be a UHR Link Reconfiguration Notify frame with the Type field in the frame set to 3.

**(#721)** A non-AP MLD that sends an UHR OMP request to enable, disable, or update the parameters of UHR mode(s) for the non-AP MLD or its affiliated non-AP STA(s) shall have its affiliated non-AP STA(s) start operating with the mode(s) as indicated in the UHR OMP request on the corresponding link(s) with the indicated parameters (if applicable) immediately after sending an acknowledgement to the UHR OMP response received from the associated AP MLD or at the expiration of the transition timeout, whichever comes first. Until the expiration of the transition timeout or until the non-AP MLD receives the UHR OMP response, whichever comes first, the non-AP MLD shall not transmit another UHR OMP request.

**(#721)** An AP MLD that receives an UHR OMP request to enable, disable, or update the parameters of UHR mode(s) for the associated non-AP MLD or affiliated non-AP STA(s) of the associated non-AP MLD shall have its affiliated AP(s) start serving the non-AP STA(s) with the mode(s) as indicated in the UHR OMP request on the corresponding link(s) with the indicated parameters (if applicable) immediately after receiving an acknowledgement to the UHR OMP response transmitted by the associated AP MLD or at the expiration of the transition timeout, whichever comes first. Until the AP MLD receives the acknowledgement to the UHR OMP response or until the transition timeout expires, whichever comes first, the corresponding AP(s) affiliated with the AP MLD shall serve the corresponding non-AP STA(s) on the corresponding link(s) according to the previously indicated mode(s) and parameter(s) (if applicable).