### IEEE P802.11Wireless LANs

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| Proposed Draft Specification for leftover TBDs |
| Date: 2021-04-02 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc |  |  | aasterja@qti.qualcomm.com |
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Abstract

This document keeps track of the TBDs in P802.11be D0.4.

Revisions:

* Rev 0: Initial version of the document. Contains all TBDs in D0.4, accounting for documents pending motions (highlighted in green) and those scheduled for discussion in any of the queues (highlighet in yellow). PHY subclauses are yet to be completed. Pending availability of the RTF files. Same for Annex B. Document will be updated to account for ongoing progress.

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 subsequent TGbe Draft. This introduction is not part of the adopted material.

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

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

**Discussion:**

**Propose:**

***TGbe editor: No action.***

## MAC

### 3.2 Definitions specific to IEEE 802.11 – 1 TBD [1-X]

single link/radio non-access-point (non-AP) multi-link device (MLD): A non-AP MLD that supports operation on more than one link but receives or transmits frames only on one link at a time.

Editor’s Note: Per the authors of 20/1291r12, the name of the definition “single link/radio non-AP MLD” is TBD.

### **6.5 PLME SAP interface - Placeholder**

Editor’s Note: It is a placeholder subclause.

### 9.3.1.2 RTS frame format – 1 TBD *[1-494r5]*

***Change the third paragraph as follows:***

The TA field is the address of the STA transmitting the RTS frame or the bandwidth signaling TA of the STA transmitting the RTS frame. In an RTS frame transmitted by a VHT STA or an HE STA or an EHT STA in a non-HT or non-HT duplicate format to another VHT STA or HE STA or an EHT STA, the scrambling sequence carries the TXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT and DYN\_BANDWIDTH\_IN\_NON\_HT (see 10.3.2.7 (VHT and SIG RTS procedure)) and the TA field is a bandwidth signaling TA. In an RTS frame transmitted by an EHT STA in a non-HT duplicate format with bandwidth greater than 160 MHz to another EHT STA, the TBD field in the SERVICE field carriers the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT as in Table 36-1 (TXVECTOR and RXVECTOR parameters)and the TA field is a bandwidth signaling TA.*[494r5]*

### 9.3.1.5 PS-Poll frame format – 1 TBD *[1-494r5]*

**9.3.1.5.1 General**

***Change the second paragraph as follows:***

The BSSID (RA) field is set to the address of the STA contained in the AP. The TA field value is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA or an HE STA or an EHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA. In a PS-Poll frame transmitted by an EHT STA in a non-HT duplicate format with bandwidth greater than 160 MHz to another EHT STA, the TBD field in the SERVICE field carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT as in Table 36-1 (TXVECTOR and RXVECTOR parameters) and the TA field value is a bandwidth signaling TA. *[494r5]*

### 9.3.1.6 CF-End frame format – 1 TBD *[1-494r5]*

***Change the last paragraph as follows:***

If transmitted by a non-DMG STA, the BSSID (TA) field is the address of the STA contained in the AP except that the Individual/Group bit of the BSSID (TA) field is set to 1 in a CF-End frame transmitted by a VHT STA to a VHT AP or an HE STA or an EHT STA to an EHT AP to an HE AP in a non-HT or non-HT duplicate format to indicate that the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT. If transmitted by a DMG STA, the TA field is the MAC address of the STA transmitting the frame. In a CF-End frame transmitted by an EHT STA in a non-HT duplicate format with bandwidth greater than 160 MHz, the TBD field in the SERVICE field carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT as in Table 36-1 (TXVECTOR and RXVECTOR parameters) and the TA field value is a bandwidth signaling TA. *[494r5]*

### 9.3.1.7 BlockAckReq frame format – 1 TBD *[1-494r5]*

**9.3.1.7.1 Overview**

***Change the fourth paragraph as follows:***

The TA field value is the address of the STA transmitting the BlockAckReq frame or a bandwidth signaling TA. In a BlockAckReq frame transmitted by a VHT STA or an HE STA or an EHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA. In a BlockAckReq frame transmitted by an EHT STA in a non-HT duplicate format with bandwidth greater than 160 MHz, the TBD field in the SERVICE field carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT as in Table 36-1 (TXVECTOR and RXVECTOR parameters) and the TA field value is a bandwidth signaling TA. *[494r5]*

### 9.3.1.19 VHT/HE/EHT NDP Announcement frame format – 1 TBD *[1-494r5]*

**…**

The TA field is set to the address of the STA transmitting the VHT/HE/EHT NDP Announcement frame or the bandwidth signaling TA of the STA transmitting the VHT/HE/EHT NDP Announcement frame. In a VHT/HE/EHT NDP Announcement frame transmitted by a VHT, ~~or~~ HE or EHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field is set to a bandwidth signaling TA. In an EHT NDP Announcement frame transmitted by an EHT STA in a non-HT duplicate format with bandwidth greater than 160 MHz, the TBD field in the SERVICE field carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT as in Table 36-1 (TXVECTOR and RXVECTOR parameters) and the TA field value is a bandwidth signaling TA.*[494r5]*

### 9.3.1.22.1.2 User Info List field – 0 TBD [490r0]

***…***

***Insert the following paragraphs as the second and third paragraphs of this second child subclause:***

All User Info fields in the User Info List field of a Trigger frame have the same length unless the Trigger frame is an MU BAR Trigger frame (see 9.3.1.22.4 (MU-BAR Trigger frame format) and 9.3.1.22.1.3 (Special User Info field)).

A User Info field that is addressed to a non-AP STA is either an HE variant or EHT variant. The User Info field is an EHT variant if it is addressed to an EHT non-AP STA and a Special User Info field is present in the Trigger frame (see 9.3.1.22.1.3 (Special User Info field)); otherwise it is an HE variant (TBD).*[Fixed by 490r0]*

### 9.3.1.22.1.3 Special User Info field – 0 TBD [490r0]

***Insert the following paragraphs as follows***

If the Special User Info field is included in the Trigger frame, then the Special User Info field present subfield of the EHT variant of the Common Info Field is set to 0, otherwise it is set to 1.

The Special User Info field is identified by an AID12 value of 2007 and is optionally present in a Trigger frame that is generated by an EHT AP.

NOTE 1—An EHT AP does not use the value 2007 as an AID for any STA associated to it (see 35.4.2 (UL MU operation)).

NOTE 2— The length of the Special User Info field is equal to the length of the other User Info fields present in the same Trigger frame, except when the Trigger frame is an MU-BAR Trigger frame, since the lengths of the User Info fields in the MU-BAR are not necessarily the same.

The Special User Info field, if present, is located immediately after the Common Info field of the Trigger frame and carries the nonderived subfields of the U-SIG field of a solicited EHT TB PPDU, and the Special User Info Field Present subfield of the Common Info Field is set to 0.

If HE/EHT P160 subfield of the Common Info field is set to 0 then a User Info field addressed to an EHT STA is an EHT variant User Info field (TBD). *[Fixed by 490r0]* The addressed EHT STA responds to the Trigger frame with an EHT TB PPDU as defined in 35.4.2 (UL MU operation), except for an MU-RTS in which case the EHT STA responds to the Trigger frame with a non-HT duplicate PPDU.

If HE/EHT P160 subfield of the Common Info field is set to 1 then a User Info field addressed to an EHT STA is an HE variant User Info field (TBD). *[Fixed by 490r0]* The addressed EHT STA responds to the Trigger frame with an HE TB PPDU as defined in 26.5.2 (UL MU operation), except for an MU-RTS in which case the EHT STA responds to the Trigger frame with a non-HT duplicate PPDU.

### 9.3.1.22.5 MU-RTS Trigger frame format – 3 TBD *[3-268r0]*

***Insert the following paragraphs after the third paragraph (“The UL Length, GI And HE-LTF Type, MU-MIMO HE-LTF Mode, ...”):***

The GI And HE-LTF Mode subfield in the Common Info field is set to a TBD nonzero value to signal an MU-RTS Trigger frame by an EHT AP that allocates time within an obtained TXOP to an EHT non-AP STA for transmitting one or more non-TB PPDUs sequentially (see 35.2.1.3 (Triggered TXOP sharing procedure)); an EHT AP sets it to 0 otherwise.***[268r0]***

An MU-RTS Trigger frame with the GI And HE-LTF Mode subfield set to TBD nonzero***[268r0]*** value is called an MU-RTS TXOP Sharing (TXS) Trigger frame for the remainder of this subclause and Clause 35 (Extremely high throughput (EHT) MAC specification).

A TBD subfield in the MU-RTS TXS Trigger frame indicates the time duration allocated to the non-AP STA within the TXOP obtained by the AP. ***[268r0]***

### 9.3.3.2 Beacon frame format – 1 TBD *[1-254r0]*

***Insert a new row to Table 9-32 (Beacon frame body(#1004)(#2246)(#3352)):***.

|  |
| --- |
| * Beacon frame body(#1004)(#2246)(#3352)
 |
| Order | Information | Notes |
| <ANA> | Multi-Link | The Basic variant Multi-Link element is TBD ***[254r0]***present if the AP is affiliated with an AP MLD. Otherwise it is not present. |
| <ANA> | EHT Capabilities | The EHT Capabilities element is present if dot11EHTOptionImplemented is true; otherwise it is not present. |
| <ANA> | EHT Operation | The EHT Operation element is present if dot11EHTOptionImplemented is true; otherwise it is not present. |

### 9.4.1.67a EHT MIMO Control field – 1 TBD [1-X]

The EHT MIMO Control field is defined in Figure 9-144b (EHT MIMO Control field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B7 | B8 B10 | B11 | B12 B13 | B14 B16 |
|  | Nc Index | Nr Index | BW | Grouping | Feedback Type | Reserved |
| Bits:  | 4 | 4 | 3 | 1 | 2 | 3 |
|  | B17 B19 | B20 | B21 B29 | B30 B35 | B36 | B37 B39 |
|  | Remaining Feedback Segments | First Feedback Segment | Partial BW Info (TBD) | Sounding Dialog Token Number | Codebook Information | Reserved |
| Bits:  | 3 | 1 | 9 | 6 | 1 | 3 |

### 9.4.1.67d EHT CQI Report field – 0 TBD [272r3]

…

 is the number of RU indices for which the CQI report is sent back to the beamformer.  is based on the number of 26-tone RU indicated in the Partial BW Info subfield of the EHT MIMO Control field (TBD).*[Fixed in 272r3]* The 26-tone RU subcarrier indices for 20 MHz, 40 MHz, 80 MHz, 160 MHz, and 320 MHz are defined in Table 27-7 (Data and pilot subcarrier indices for RUs in a 20 MHz HE PPDU and in a non-OFDMA 20 MHz HE PPDU), Table 27-8 (Data and pilot subcarrier indices for RUs in a 40 MHz HE PPDU and in a non-OFDMA 40 MHz HE PPDU), Table 36-5 (Data and pilot subcarrier indices for RUs in an 80 MHz EHT PPDU), Table 36-6 (Data and pilot subcarrier indices for RUs in a 160 MHz EHT PPDU), and Table 36-7 (Data and pilot subcarrier indices for RUs in a 320 MHz EHT PPDU), respectively.

### 9.4.2.295a EHT Operation element – 3 TBD [3-X]

…

The format of the EHT Operation element is shown in Figure 9-788ee (EHT Operation element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | EHT Operation Information |
| Octets: | 1 | 1 | 1 | TBD |
| * EHT Operation element format
 |

…

The EHT STA obtains the channel configuration information from the EHT Operation element if operating in the 6 GHz band. The subfields of EHT Operation Information field are defined in Table 9-322al (EHT Operation Information subfields).

|  |
| --- |
| * EHT Operation Information subfields
 |
| Subfield | Definition | Encoding |
| Channel Width | This field defines the EHT BSS bandwidth. | Set to 0 for 20 MHz EHT BSS bandwidth.Set to 1 for 40 MHz EHT BSS bandwidth.Set to 2 for 80 MHz EHT BSS bandwidth.Set to 3 for 160 MHz EHT BSS bandwidth.Set to 4 for 320 MHz EHT BSS bandwidth.Other values are reserved. |
| CCFS | TBD | TBD |

### 9.4.2.295b Multi-Link element – 9 TBD *[9-X]*

**9.4.2.295b.1 General**

The format of the Multi-Link Control field is defined in Figure 9-788eg (Multi-Link Control field).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 TBD | TBD | TBD | TBD | TBD | TBD B15 |
|  | Type | MLD MAC Address Present | ELM Capabilities Present | Link ID Info Present | Change Sequence Present | Reserved |
| Bits: | TBD | 1 | 1 | 1 | 1 | TBD |
| * Multi-Link Control field*[Added by 397r6, 319r3]*
 |

The Type subfield is defined in Table 9-322am (Type subfield encoding) and is used to differentiate the various variants of the Multi-Link element. Different variants of the Multi-Link element are used for different multi-link operations.

|  |
| --- |
| * Type subfield encoding
 |
| Type subfield value | Multi-Link element variant name |
| 0 | Basic |
| 1 | Probe Request |
| TBD | Reserved |

### 9.4.2.295b.2 Basic variant Multi-Link element – 6 TBD *[1-254r0, 5-506r0]*

The format of the Common Info field of the Basic variant Multi-Link element is defined in Figure 9-788eh (Common Info field of the Basic variant Multi-Link element format).

|  |  |  |
| --- | --- | --- |
|  | MLD MAC Address | TBD. ***[254r0]*** |
| Octets: | 0 or 6 | TBD. ***[254r0]*** |
| * Common Info field of the Basic variant Multi-Link element format
 |

…

Other fields are TBD. ***[254r0]***

…

The format of the Per-STA Control field is defined in Figure 9-788ej (Per-STA Control field format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B3 | B4 | B5 TBD.***[254r0]*** |
|  | Link ID | Complete Profile | Reserved |
| Bits: | 4 | 1 | TBD. ***[254r0]*** |
| * Per-STA Control field format
 |

 The Link ID subfield specifies a value that uniquely identifies the link where the reported STA is operating on.

The Complete Profile subfield is set to 1 when the Per-STA Profile subelement of the Multi-Link element is complete as defined in 35.3.2.2 (Complete or partial per-STA profile). Otherwise the subfield is set to 0.

Other subfields are TBD. ***[254r0]***

### 9.4.2.295b.3 Probe Request variant Multi-Link element – 2 TBD *[2-X]*

…

The subfields of the Multi-Link Control field of the Probe Request variant Multi-Link element except the Type subfield are TBD.

The presence and format of the Common Info field in the Probe Request variant Multi-Link element are TBD.

### 9.4.2.295c EHT Capabilities element

### 9.4.2.295c.1 General – 3 TBD *[3-X]*

A STA declares that it is an EHT STA by transmitting the EHT Capabilities element.

The EHT Capabilities element contains a number of fields that are used to advertise the EHT capabilities of an EHT STA. The EHT Capabilities element is defined in Figure 9-788el (EHT Capabilities element format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element | Length | Element ID Extension | EHT MAC Capabilities Information | EHT PHY Capabilities Information | Supported EHT-MCS And NSS Set | EHT PPE Thresholds (Optional) |
| Octets: | 1 | 1 | 1 | TBD | TBD | TBD | variable |
| * EHT Capabilities element format
 |

### 9.4.2.295c.2 EHT MAC Capabilities Information field – 3 TBD *[3-X]*

The format of the EHT MAC Capabilities Information field is defined in Figure 9-788em (EHT MAC Capabilities Information field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | TBD |
|  | NSEP Priority Access Supported | EHT OM Control Support | Triggered TXOP Sharing Support | TBD |
| Bits: | 1 | 1 | 1 | TBD |

### 9.4.2.295c.3 EHT PHY Capabilities Information field – 4 TBD *[4-X]*

The format of the EHT PHY Capabilities Information field is defined in Figure 9-788en (EHT PHY Capabilities Information field format),

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| B0 | B1 | B2 | B3 | B4 | B5 |
| Reserved | Support For 320 MHzIn 6 GHz | Support for242-tone RU In BW Wider Than 20 MHz | NDP With 4´ EHT-LTF And 3.2 µs GI | Partial Bandwidth ULMU-MIMO | SU Beamformer |
| Bits: 1 | 1 | 1 | 1 | 1 | 1 |
| B6 | B7 | B8 B10 | B11 B13 | B14 B16 | B17 B19 |
| SU Beamformee | MU Beamformer | Beamformee SS (≤ 80 MHz) | Beamformee SS (= 160 MHz) | Beamformee SS (= 320 MHz) | Number Of Sounding Dimensions (≤ 80 MHz) |
| Bits: 1 | 1 | 3 | 3 | 3 | 3 |
| B20 B22 | B23 B25 | B26 | B27 | B28 | B29 |
| Number Of Sounding Dimensions (= 160 MHz) | Number Of Sounding Dimensions (= 320 MHz) | Ng = 16 SU Feedback | Ng = 32 SU Feedback | Codebook Size SU Feedback | Codebook Size SU Feedback |
| Bits: 3 | 3 | 1 | 1 | 1 | 1 |
| B30 | B31 | B32 | B33 | B34 | B35 |
| Triggered SU Beamforming Feedback | Triggered MU Beamforming Partial BW Feedback | Triggered CQI Feedback | Partial Bandwidth DL MU-MIMO | PSR-Based SR Support | Power Boost Factor Support (TBD) |
| Bits: 1 | 1 | 1 | 1 | 1 | 1 |
| B36 | B37 B39 | B40 | B41 | B42 | B43 |
| EHT MU PPDU With 4´ EHT-LTF And 0.8 µs GI | Max Nc | Non-Triggered CQI Feedback | Tx 1024-QAM And 4096-QAM < 242-tone RU Support | Rx 1024-QAM And 4096-QAM < 242-tone RU Support | PPE Thresholds Present |
| Bits: 1 | 3 | 1 | 1 | 1 | 1 |
| B44 B45 | B46 B50 | B51 B54 | B55 | B56 | B57 B63 |
| Common Nominal Packet Padding | Maximum Number Of Supported EHT-LTFs | Support of MCS 15 | Support Of EHT DUP In 6 GHz | Support For 20 MHz Operating STA Receiving NDP With Wider Bandwidth  | Reserved |
| Bits: 2 | 5 | 4 | 1 | 1 | 7 |
| * EHT PHY Capabilities Information field format
 |

The subfields of the EHT PHY Capabilities Information field are defined in Table 9-322ap (Subfield of the EHT PHY Capabilities Information field).

|  |
| --- |
| * Subfield of the EHT PHY Capabilities Information field
 |
| Subfield | Definition | Encoding |
| … | .. | ... |
| Power Boost Factor Support (TBD) | Indicates that the STA supports a power boost factor for the RUs in an EHT MU PPDU in the range [0.5, 2]. (TBD) | Set to 0 if not supported.Set to 1 if supported. (TBD) |
| EHT MU PPDU With 4´ EHT-LTF And 0.8 µs GI | Indicates support for the reception of an EHT MU PPDU with 4´ EHT-LTF and 0.8 µs guard interval duration. | Set to 0 if not supported. Set to 1 if supported. |

### 9.4.2.295c.4 Supported EHT-MCS And NSS Set – 0 TBD [468r1]

TBD*[Fixed by 468r1]*

### 12.7.2 EAPOL-Key frames 6 TBD [6-483r0]



***[483r0]***



***[483r0]***



***[483r0]***

### 35.2.1.3.3 Non-AP STA behavior – 1 TBD *[1-268r0]*

After a non-AP STA receives an MU-RTS TXS Trigger frame from its associated AP and addressed to it, the STA shall transmit one or more non-TB PPDUs within the time allocation signaled in the TBD field of the MU-RTS TXS Trigger frame. The first PPDU of the exchange shall be a CTS frame transmitted per the rules defined in 26.2.6.3 (CTS frame response to an MU-RTS Trigger frame).***[268r0]***

### 35.3.2.2 Complete or partial per-STA profile – 1 TBD *[1-254r0]*

(#2295)A STA affiliated with an MLD may provide complete or partial information of another STA of its MLD in the Per-STA Profile subelement of the Basic variant Multi-Link element that it transmits. The exact set of elements/fields that constitute partial information is TBD. ***[254r0]***

### 35.3.2.3 Inheritance in a per-STA profile – 2 TBD *[2-254r0]*

When carried in a Management frame transmitted by an MLD(#2295), each Per-STA Profile subelement in a Basic variant Multi-Link element that is a complete profile shall contain a list of elements as follows:

The Per-STA Control field is the first field

* TBD fields in fixed order ***[254r0]***
* TBD elements in fixed order ***[254r0]***

### 35.3.4.2 Use of ML probe request and response – 1 TBD *[1-X]*

An ML probe request is a Probe Request frame that is sent outside the context of active scanning that is used to discover an AP:

* (#1045)(#1187)(#1673)(#2150)with the Address 1 field set to the broadcast address and the Address 3 field set to the BSSID of an AP, or with the Address 1 field set to the BSSID of an AP’s BSS.
* (#1808)(#2124)(#3217)and that includes a Probe Request variant Multi-Link element defined in 9.4.2.295b.3 (Probe Request variant Multi-Link element).

NOTE 1—If and how the transmitting AP info can be explicitly requested or not requested is TBD.

### 35.3.4.4 Multi-link element usage rules in the context of discovery–1 TBD *[1-254r0]*

An AP affiliated with an AP MLD should include, in a Beacon frame or a Probe Response frame, which is not an ML probe response, only the Common Info field of the Basic variant Multi-Link element as defined in 9.4.2.247b (Multi-Link element).

NOTE—Whether the Basic variant Multi-Link element is always present in a Beacon frame or a Probe Response frame, which is not an ML probe response, or is optionally present is TBD. ***[254r0]***

### 35.3.6.1 TID-to-link mapping

### 35.3.6.1.1 General – 1 TBD *[1-19r6]*

By default, all TIDs shall be mapped to all setup links for both UL and DL (see 35.3.6.1.2 (Default mapping mode)).

NOTE 1—It is TBD whether the negotiation for TID-to-link mapping other than default mapping is optional or mandatory.***[19r6****]*

### 35.3.6.1.2 Default mapping mode–1 TBD *[1-19r6]*

This mode refers to the default mapping described in 35.3.6.1.1 (General). Under this mode, all TIDs are mapped to all links for DL and UL, and all setup links are enabled. A non-AP MLD and an AP MLD that performed multi-link setup shall operate under this mode if a TID-to-link mapping negotiation for a different mapping did not occur or was not successful or was torn down.

NOTE—It is TBD if support for TID-to-link mapping negotiation is mandatory or optional*[19r6]*

### 35.3.6.1.4 Power state after enablement – 1 TBD *[1-X]*

When a link is enabled for a STA that is part of a non-AP MLD through signaling (multi-link setup or TID to link mapping update) send on another link, the initial power management mode of the STA, immediately after the exchange, is power save mode, and its power state is doze, unless TBD.

### 35.3.8 BSS parameter critical update procedure – 7 TBD *[7-X]*

An AP within an AP MLD shall include in the Beacon and Probe Response frames it transmits a Change Sequence field for each of all APs in the same AP MLD.

* The Change Sequence field for each of other APs of the MLD shall be carried in the MLD Parameters subfield in the TBTT Information field of the Reduced Neighbor Report element corresponding to that AP.
* The Change Sequence field for the AP shall be carried in the TBD field.

If an AP within an AP MLD is transmitted BSSID in a multiple BSSID set, then the AP shall include in the Beacon and Probe Response frames it transmits a Change Sequence field for each of nontransmitted BSSIDs in the same multiple BSSID set.

* The Change Sequence field for each of the nontransmitted BSSIDs shall be carried in the TBD field.

An AP within an AP MLD shall increase the value (modulo TBD maximum value) of the Change Sequence field for the AP when a critical update occurs to any of the elements for the AP. An AP within an AP MLD shall increase the value (modulo TBD maximum value) of the Change Sequence field for another AP in the same AP MLD when a critical update occurs to any of the elements for that AP. An AP within an AP MLD that is transmitted BSSID shall increase the value (modulo TBD maximum value) of the Change Sequence field for a nontransmitted BSSID in the same multiple BSSID set when a critical update occurs to any of the elements for the nontrasnmitted BSSID.The critical updates are defined in 11.2.3.15 (TIM Broadcast) and the TBD additional update can be added. The name and format of the Change Sequence field are TBD.

NOTE—The Change Sequence field is at most 1 octet in length.

### 35.3.10.4 Traffic indication – 1 TBD *[1-X]*

An AP MLD may recommend a non-AP MLD to use one or more enabled links. The AP’s indication may be carried in a broadcast or a unicast frame. The format of the indication is TBD.

### 35.3.12.1 Beacon transmission - Placeholder

* It is a placeholder subclause.

### 35.3.13.3 Nonsimultaneous transmit and receive (NSTR) operation – 2 TBD *[2- 558r2]*

* As per the author of 20/1395r14, the following two paragraphs are TBD.

An MLD may indicate a pair of links as STR by setting the TBD field in the TBD elements that it transmits if the receiver requirements specified in Clause 36 (Extremely high throughput (EHT) PHY specification) on one link are met whenever it is transmitting on the other link.

A pair of links that is not indicated as STR shall be indicated as NSTR.***[558r2]***

An AP that is affiliated with an MLD should not transmit to a STA affiliated with a non-AP MLD, a frame on a link of an NSTR link pair of the non-AP MLD at the same time that the non-AP MLD is transmitting a frame on the other link of the NSTR link pair.

### 35.3.13.4 Capability signaling – 2 TBD [2-373r7]

An MLD can indicate capability to support exchanging frames simultaneously by affiliated STAs on a set of links to another MLD in TBD capability field/element*[Fixed in 373r7]*. The capability field/element indicates the MLD is a multi-radio MLD or other types of MLD. A multi-radio MLD operating on multiple links can announce whether it supports transmission on one link concurrent with reception on the other link for each pair of links, in which case the pair of link is STR or NSTR. The two links of each link pair are on different channels.

NOTE—If an MLD supports transmission on link 1 concurrent with reception on link 2, but cannot support transmission on link 2 concurrent with reception on link 1, this pair of links is NSTR.

The ability of a non-AP MLD to perform STR on a pair of setup links may change after multi-link setup. The non-AP MLD may use TBD signaling on any enabled link to inform the AP MLD about the ability change to perform STR.

The limitation of updating frequency of the ability to perform STR as well as the switching delay is TBD.

### 35.3.13.5 PPDU end time alignment – 2 TBD *[2-X]*

When an AP MLD simultaneously transmits more than one PPDU to the same NSTR non-AP MLD and at least one of the PPDUs carries a frame that is a QoS data soliciting an immediate response, then

* The AP shall align the end time of the PPDUs soliciting an immediate response per the rules defined in this subclause, except if the PPDU carries a high priority frame (the definition of the high priority frame is TBD).
* The end time of the PPDU that does not solicit an immediate response shall meet the TBD condition.

### 35.3.13.6 Start time sync PPDUs medium access – 1 TBD *[1-X]*

A non-STR MLD contending for the WM to become a TXOP holder and that aligns the start times of the PPDUs scheduled for transmission on more than one link shall ensure that the EDCA count down procedure is completed in all the links.

NOTE 1—The backoff counters for each link count down as specified in 10.23.2.4 (Obtaining an EDCA TXOP).

NOTE 2—Whether to extend this mechanism to STR MLD is TBD.

### 35.3.13.7 Medium synchronization recovery procedure – 6 TBD *[??-221r7, [2-267]*

A STA that has lost medium synchronization due to transmission by another STA affiliated with the same MLD shall start a MediumSyncDelay timer at the end of that transmission event. It is TBD whether the STA is required to start the MediumSyncDelay timer if the transmission event is shorter than TBD duration.***[267]***

The MediumSyncDelay timer is a single timer, shared by all EDCAFs within a non-AP STA, which is initialized with a default TBD value. The STA shall update the timer duration value with the one contained in the TBD field of the TBD element in the most recent frame received from its associated AP. In addition, the timer resets to zero when any of the following events occur:

* The STA receives a PPDU with a valid MPDU.
* The STA receives a PPDU whose corresponding RXVECTOR parameter TXOP\_DURATION is not UNSPECIFIED.

While the MediumSyncDelay timer is running at a STA, it shall perform CCA and shall not transmit a frame that initiates a TXOP except under TBD conditions.

### 35.3.14 Enhanced multi-link single radio operation – 3 TBD *[2-160r0, 1-288r3]*

A non-AP MLD may operate in the EMLSR mode on the enabled links between the non-AP MLD and its associated AP MLD.

* Per the authors of 20/1291r12, the name of the EMLSR mode is TBD. [288r3]

An MLD with dot11EHTEMLSROptionImplemented equal to true shall set the EMLSR mode subfield of the Common Info field of the Basic variant Multi-Link element to 1; otherwise, the MLD shall set the EMLSR mode subfield to 0.

When a non-AP MLD is operating in the EMLSR mode with an AP MLD supporting the EMLSR mode the following applies:

* The non-AP MLD shall be able to listen on the enabled links, by having its affiliated STA(s) corresponding to those links in the awake state. The listening operation includes CCA and receiving the initial Control frame of a frame exchange sequence that is initiated by an AP MLD.
* The initial Control frame of a frame exchange sequence shall be sent in the OFDM PPDU or non-HT duplicate PPDU format using a rate of 6 Mbps, 12 Mbps, or 24 Mbps.
* The initial Control frame shall be an MU-RTS Trigger frame or a BSRP Trigger frame.

NOTE 1—Mandatory or optional support for the non-AP MLD of reception of MU-RTS and BSRP Trigger frames is TBD.*[160r0]*

NOTE 2—Optional support for the non-AP MLD of reception of Basic Trigger frame is TBD.*[160r0]*

* The non-AP MLD shall indicate the delay time needed by the non-AP MLD in the EMLSR Delay field in the Common Info field of the Basic variant Multi-Link element. The value in the EMLSR Delay field indicates the MAC padding duration of the Padding field of the initial Control field. The EMLSR Delay field is 3 bits and set to 0 for 0 µs, set to 1 for 32 µs, set to 2 for 64 µs, set to 3 for 128 µs, set to 4 for 256 µs, and the values 5 to 7 are reserved.
* The AP MLD shall initiate a frame exchange sequence with the non-AP MLD on one of the enabled links by transmitting an initial Control frame to the non-AP MLD with the limitations specified above.
* After receiving the initial Control frame of a frame exchange sequence, the non-AP MLD shall be able to transmit or receive frames on the link in which the initial Control frame was received and shall not transmit or receive on the other link(s) until the end of the frame exchange sequence, and subject to its spatial stream capabilities, operation mode, and link switch delay, the non-AP MLD shall be capable of receiving a PPDU that is sent using more than one spatial stream a SIFS after the end of its response frame transmission solicited by the initial Control frame. During the frame exchange sequence, the AP MLD shall not transmit frames to the non-AP MLD on the other link(s). The non-AP MLD switches back to the listening operation on the enabled links immediately after the end of the frame exchange sequence.

### 35.3.15 Enhanced multi-link multi-radio operation– 8 TBD [4-335r3, 4-X]

A non-AP MLD may operate in the EMLMR mode on a specified set of the enabled links between the     non-AP MLD and its associated AP MLD. The specified set of the enabled links in which the EMLMR mode is applied is called EMLMR links.

* Per the authors of 20/1440r7, the name of the EMLMR mode is TBD.[335r3]

An MLD with dot11EHTEMLMROptionImplemented equal to true shall set the EMLMR Support subfield of the TBD Capabilities element, which indicates MLD level capabilities, to 1; otherwise, the MLD shall set the EMLMR Support subfield to 0.***[335r3]***

A non-AP MLD with dot11EHTEMLMROptionImplemented equal to true shall set the EMLMR Rx NSS subfield of TBD element to dot11SupportedEMLMRRxNSS and the EMLMR Tx NSS subfield of TBD element to dot11SupportedEMLMRTxNSS, which indicate MLD level capabilities.

A non-AP MLD with dot11EHTEMLMROptionImplemented equal to true operates in the EMLMR mode by TBD signaling. ***[335r3]***

A non-AP MLD with dot11EHTEMLMROptionImplemented equal to true may indicate its link switch delay in a TBD management frame***.[335r3]***

When a non-AP MLD operates in the EMLMR mode, after initial frame exchange subject to its per-link spatial stream capabilities and operating mode on one of the EMLMR links, the non-AP MLD shall be able to support the following until the end of the frame exchange sequence initiated by the initial frame exchange:

* Receive PPDUs with the number of spatial streams up to the value as indicated in the EMLMR Rx NSS subfield of TBD element at a time on the link for which the initial frame exchange was made.
* Transmit PPDUs with the number of spatial streams up to the value as indicated in the EMLMR Tx NSS subfield of TBD element at a time on the link for which the initial frame exchange was made.

### 35.3.16 NSTR soft AP MLD operation – Placeholder

* General
* It is a placeholder subclause.

### 35.4.2.2.1 Allowed settings of the Trigger frame fields and TRS Control subfield – 0 TBD [490r0]

An EHT AP shall include a Special User Info field immediately after the Common Info field of a Trigger frame to indicate that the Trigger frame is soliciting an EHT TB PPDU (TBD). *[Fixed by 490r0]* The AID12 subfield of the Special User Info field shall be set to 2007. An EHT AP that includes the Special User Info field in a Trigger frame shall set Special User Info Field present to 0. An EHT AP that includes the Special User Info field in a Trigger frame shall set HE/EHT P160 subfield of the Common Info Field of the Trigger frame to 0. An EHT AP that includes the Special User Info field in a Trigger frame shall set HE/EHT P160 subfield of the Common Info Field of the Trigger frame to 0 (TBD). *[Fixed by 490r0]*

An EHT AP shall not assign an AID value of 2007 to any STA

An EHT AP shall set the UL Length subfield of a transmitted Trigger frame that solicits an EHT TB PPDU to the value given by Equation (27-11) with .

NOTE—This is the same rule as that of an AP that transmits a Trigger frame that solicits an HE TB PPDU (see 26.5.2.2.4 (Allowed settings of the Trigger frame fields and TRS Control field)).

An EHT non-AP STA that transmits a TB PPDU shall satisfy the conditions defined in 26.5.2.3 (Non-AP STA behavior for UL MU operation). If HE/EHT P160 subfield of the Common Info field in the Trigger frame is set to 1 then the TB PPDU shall be an HE TB PPDU; otherwise, the TB PPDU shall be an EHT TB PPDU (TBD). *[Fixed by 490r0]*

### 35.5.3 Rules for EHT sounding protocol sequences – 1 TBD [6-272r3, 1-X]

…

An EHT beamformer that transmits an EHT NDP Announcement frame as part of an EHT TB sounding sequence shall set the Nc subfield of the STA Info field to indicate a value less than or equal to the minimum of:

* The maximum number of supported spatial streams according to the corresponding EHT beamformee’s Rx EHT-MCS Map ≤ 80 MHz, Rx EHT-MCS Map = 160 MHz, and Rx EHT-MCS Map = 320 MHz subfields in the Supported EHT-MCS And NSS Set field in the EHT Capabilities element sent by the EHT beamformee.
* The maximum number of supported spatial streams according to the Rx NSS subfield value in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OM Control subfield sent by the corresponding EHT beamformee (see 35.x (Operating mode indication) (TBD)). *[Fixed in 272r3]*
* The maximum indicated by the Max Nc subfield in the EHT PHY Capabilities Information field in the EHT Capabilities element sent by the EHT beamformee.

…

The EHT beamformer shall use the lowest , which is the lower bound of the  indicated by the Partial BW Info subfield of a STA Info field that is equal to the maximum of:

* The minimum subcarrier index located within the channel width indicated in the VHT Operation Information field of either the HE Operation element or the VHT Operation element, whichever is present, and within the channel width indicated in the HT Operation element
* The minimum subcarrier index located within the channel width indicated in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OM Control subfield sent by the corresponding EHT beamformee (see 35.x (Operating mode indication) (TBD)).*[Fixed in 272r3]*

The EHT beamformer shall use the highest , which is the upper bound of the  indicated by the Partial BW Info subfield of a STA Info field that is equal to the minimum of:

* The maximum subcarrier index located within the channel width indicated in the VHT Operation Information field of either the HE Operation element or the VHT Operation element, whichever is present, and within the channel width indicated in the HT Operation element
* .
* The maximum subcarrier index located within the channel width indicated in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OM Control field sent by the corresponding EHT beamformee (see 35.x (Operating mode indication) (TBD)).*[Fixed in 272r3]*

**…**

An EHT beamformee that receives an EHT NDP Announcement frame as part of an EHT TB sounding sequence with a STA Info field identifying it soliciting SU or MU feedback shall generate an EHT compressed beamforming/CQI report using the feedback type, , codebook size, and  indicated in the STA Info field. If the EHT beamformee then receives a BFRP Trigger frame with a matching STA Info field, the EHT beamformee transmits an EHT TB PPDU containing th EHT compressed beamforming/CQI report following the rules defined in 26.5.2.3 (Non-AP STA behavior for UL MU operation) (TBD). *[Fixed in 272r3]* If the EHT NDP Announcement frame has the TA field set to the transmitted BSSID, and the EHT beamformee is a non-AP STA associated with an AP corresponding to a nontransmitted BSSID that supports receiving Control frames with TA field set to the transmitted BSSID, then the EHT compressed beamforming/CQI report sent in response shall have the RA field set to as defined in 26.5.2.3.5 (RA field for frame carried in an HE TB PPDU) (TBD).

NOTE 1—A non-AP EHT beamformee that transmits an OM Control subfield with the UL MU Disable field set to 1 does not respond to BFRP Trigger frames (see 35.x (Operating mode indication) (TBD)). *[Fixed in 272r3]*

An EHT beamformer that sends a BFRP Trigger frame shall set the Feedback Segment Retransmission Bitmap fields of the BFRP Trigger frame to all 1s.

NOTE 2—The BFRP Trigger frame contains one or more User Info fields, each of which identifies an EHT beamformee.

The SNR per subcarrier computation should be done on at least four subcarriers in a 26-tone RU. (TBD) *[Fixed in 272r3]*

### 35.6.1 EHT subchannel selective transmission - Placeholder

* It is a placeholder subclause.

### 35.7.2 Restricted TWT agreement setup

### 35.7.2.1 General – 1 TBD *[1-X]*

TBD

### 35.7.3 Restricted TWT service periods announcement – 4 TBD *[4-X]*

If there is any restricted TWT agreement set up, the EHT AP shall announce the restricted TWT service period schedule information in the modified broadcast TWT element contained in transmitted Beacon, TBD (broadcast and/or individual) Probe response frames, (Re)Association frames, and other TBD frames as described in TBD.

In order to provide additional protection for restricted TWT service periods, subject to TBD rules, the EHT AP may announce quiet intervals by including Quiet elements in Management frames that it transmits, that overlap with restricted TWT service periods. Non-AP EHT STAs may ignore the quiet intervals that overlap with restricted TWT service periods following the rules below:

* Non-AP EHT STAs with dot11RestrictedTWTOptionImplemented set to true shall follow channel access rules as defined in 35.7.4 (Channel access rules for restricted TWT service periods).
* Non-AP EHT STAs with dot11RestrictedTWTOptionImplemented set to false may behave as if such overlapping quiet intervals do not exist.

### 35.9 Spatial reuse operation – Placeholder

### 35.9.1 General – Placeholder

* It is a placeholder subclause.

### 35.9.2 General operation with non-SRG OBSS PD level – Placeholder

* It is a placeholder subclause.

### 35.9.3 General operation with SRG OBSS PD level – Placeholder

* It is a placeholder subclause.

### 35.9.4 Adjustment of OBSS PD and transmit power – Placeholder

* It is a placeholder subclause.

### 35.10.1 Setting TXVECTOR parameters for an EHT PPDU

### 35.10.1.1 STA\_ID – 3 TBD *[3-X]*

For an individually addressed RU that is addressed to an associated non-AP STA the parameter STA\_ID shall be set to the TBD value that identifies the STA receiving the PSDU contained in that RU. If an RU is intended for an AP (i.e., the TXVECTOR parameter UPLINK\_FLAG is 1), then the parameter STA\_ID shall contain only one element that is set to the TBD value that identifies the non-AP STA transmitting the PPDU.

The behavior of the STAs depending on the STA\_ID values upon reception of an EHT PPDU is TBD.

### 35.11 Nominal packet padding values selection rules – 1 TBD *[1-X]*

The nominal packet padding value shall be 0 for all RU or MRU with size less than 242 unless the RU size is 106 or MRU size is 132 and EHT-MCS 15 is applied to the RU or MRU (TBD).

### 35.13.3 NSEP priority access procedure – 3 TBD *[3-X]*

If the negotiation to enable NSEP priority access between an AP STA and a non-AP STA is successful, then both the AP STA and the non-AP STA shall apply NSEP priority access to NSEP traffic using a TBD procedure. The AP shall ensure that only authorized non-AP STAs can invoke NSEP priority access. An AP STA may apply NSEP priority access to NSEP traffic using the same TBD procedure prior to completion of the negotiation to enable NSEP priority access.

Additional details regarding NSEP priority access operation between non-AP MLD and AP MLD is TBD.

### 35.15 Multi-AP operation– Placeholder

### 35.15.1 Introduction– Placeholder

* It is a placeholder subclause.

### 35.15.2 Setup– Placeholder

* It is a placeholder subclause.

### 35.15.3 Channel sounding– Placeholder

It is a placeholder subclause.

### 35.15.4 Coordinated transmission– Placeholder

* It is a placeholder subclause.

## PHY (partial-pending RTF files)

### 36.2.2 TXVECTOR and RXVECTOR parameters – X TBD *[494r5]*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| CH\_BANDWIDTH\_IN\_NON\_HT(TBD)*[494r5]* | FORMAT is NON-HT | Not Present | N | N |
| Otherwise |

|  |  |  |
| --- | --- | --- |
|

|  |  |
| --- | --- |
|

|  |
| --- |
| See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters) or Table 27-1 (TXVECTOR and RXVECTOR parameters). |

 |

 |

 |

### 36.3.5 EHT duplicate transmission- 1 TBD *[1-556r0]*

…transmitting EHT-SIG in 40 MHz, 80 MHz, 160 MHz, and 320 MHz. The DCM tone mapper, which is defined in 36.3.13.7 (Constellation mapping(#3115)), is applied only if the EHT-SIG-MCS field in the U-SIG field indicates EHT-SIG-MCS is TBD.***[556r0]***

### 36.3.14 Packet extension – partial [527r0]

where

is the value indicated by UL Length subfield of the Common Info field in the Trigger frame (TBD). *[Fixed in 527r0]*