IEEE P802.11
Wireless LANs

|  |
| --- |
| CR for 35.3.16.2 |
| Date: 2023-09-05 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yunbo Li | Huawei |  |  | liyunbo@huawei.com |
| Ming Gan |  |  |  |  |
| Yuchen Guo |  |  |  |  |
| Guogang Huang |  |  |  |  |
| Zhenguo Du |  |  |  |  |
| Yue Zhao |  |  |  |  |
| Maolin Zhang |  |  |  |  |
| Stephen McCann |  |  |  |  |
| Edward Au |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes comments resolution of the following 9 CIDs received for TGbe LB275:

CIDs:

19879 19115 19194 19327 19439 19871 19874 19167 19289

Revisions:

* Rev 0: Initial version of the document.

***TGbe editor: The baseline for this document is IEEE 802.11be D4.0***

1. **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 TGbe Draft. The introduction and the explanation of the proposed changes are not part of the adopted material.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause**  | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 19879 | Yunbo Li | 35.3.16.2.1 | 554.28 | 35.3.16.2.1 is the only subclause under 35.3.16.2, please remove the title of 35.3.16.2.1 | as in comment | Accepted |
| 19115 | Akira Kishida | 35.3.16.2.1 | 555.01 | Replace "A MLD" with "An MLD" in the first sentence. | As in the comment. | Accepted |
| 19194 | Yusuke Asai | 35.3.16.2.1 | 555.01 | "A MLD" should be "An MLD". | As in the comment. | Accepted |
| 19327 | Ryuichi Hirata | 35.3.16.2.1 | 555.38 | Spec says "The ability of a non-AP MLD to perform STR operation on a pair of setup links may change after ML setup. The non-AP MLD may use a Management frame on any enabled link to inform the AP MLD about the ability change to perform STR operation." however, there are no definition about the Management frame. | Define a frame format for a Management frame to inform the ability change to perform STR operation. | RevisedAgree with the commenter.A new operation update type (with Operation Update Type subfield = 1) is introduced in Multi-Link Operation Update Request/ Response frame to updated the NSTR Status of a non-AP MLD.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |
| 19439 | Guogang Huang | 35.3.16.2.1 | 555.38 | A new protected EHT Action frame is needed to cover the NSTR Capabilities update | make it complete as in comment | RevisedAgree with the commenter.A new operation update type (with Operation Update Type subfield = 1) is introduced in Multi-Link Operation Update Request/ Response frame to updated the NSTR Status of a non-AP MLD.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |
| 19871 | Ming Gan | 35.3.16.2.1 | 555.38 | The details of the Management frame is not specified, which make the spec broken | Complete the detatils of the Management frame | RevisedAgree with the commenter.A new operation update type (with Operation Update Type subfield = 1) is introduced in Multi-Link Operation Update Request/ Response frame to updated the NSTR Status of a non-AP MLD.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |
| 19874 | Yunbo Li | 35.3.16.2.1 | 555.38 | The details about the management frame for NSTR status update is not specified in the spec. | complete the frame format of this management frame, as well as the NSTR status update procedure. | RevisedAgree with the commenter.A new operation update type (with Operation Update Type subfield = 1) is introduced in Multi-Link Operation Update Request/ Response frame to updated the NSTR Status of a non-AP MLD.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |
| 19167 | Tomoko Adachi | 35.3.16.2.1 | 555.38 | "The ability of a non-AP MLD to perform STR operation on a pair of setup links may change after ML setup. The non-AP MLD may use a Management frame on any enabled link to inform the AP MLD about the ability change to perform STR operation." Clarify what the Management frame is. Also, it doesn't need to be limited to one way changing to STR operation but changing to NSTR operation can be also allowed. | Change this paragraph to read "The ability of a non-AP MLD to perform STR operation or NSTR operation on a pair of setup links may change after ML setup. The non-AP MLD may use a Multi-Link Operation Update Request frame on any enabled link to inform the AP MLD about the ability change to perform STR operation or to perform NSTR operation." | RevisedAgree with the commenter.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |
| 19289 | John Wullert | 35.3.16.2.1 | 555.39 | The phrase "ability change to perform" is hard to parse. | Rephrase as "The non-AP MLD may use a Management frame on any enabled link to inform the AP MLD about changes in its ability to perform STR operation." | RevisedAgree with the commenter.TGbe editor to make the changes with the CID tag 19327 in doc 11-23/1531r0 |

***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).***

1. **Proposed spec text**

***TGbe editor: Modify the Figure 9-1001l and Table 9-404k in 9.4.2.312.2.3 (Common Info field of the Basic Multi-Link element) as follows: (#***19327)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B1 B4 |  B5 | B6 B15 |
|  | Operation Parameter Update Support | Recommended Max Simultaneous Links | NSTR Status Update Support | Reserved |
| Bits | 1 | 4 |  | 11 |

**Figure 9-1002l— Extended MLD Capabilities and Operations subfield format**

**Table 9-404k—Subfields of the Extended MLD Capabilities and Operations subfield**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Operation Parameter Update Support | Indicates support of operation parameter update negotiation. | Set to 1 if dot11OperationParameterUpdateImplemented is true. Set to 0 otherwise.See 35.3.7.6 (Non-AP MLD operation parameter update). |
| Recommended Max Simultaneous Links | Recommended maximum number of enabled links that a non-AP MLD can operate on for simultaneous frame exchanges. | Reserved when carried in a frame that is not a Beacon frame or a broadcast Probe Response frame.Indicates the recommended maximum number of enabled links on which a non-AP MLD can operate on for simultaneous frame exchanges. A value of 0 indicates that the AP MLD does not advertise any such limit. The value 1 is reserved.See 35.3.7.1 (General). |
| NSTR Status Update Support | An AP MLD indicates support for updating the NSTR status of associated non-AP MLDs. | For an AP MLD:Set to 1 if dot11EHTNSTRStatusUpdatedImplemented is true.Set to 0 otherwise. Reserved for a non-AP MLD.See 35.3.16.2 (Multi-link device capability and operation signaling) |

***TGbe editor: Modify the Table 9-401l in 9.4.2.312.4 (Reconfiguration Multi-Link element) as follows: (#***19327)

**9.4.2.312.4 Reconfiguration Multi-Link element**

Table 9-401l – Operation Update Type subfield encoding

|  |  |
| --- | --- |
| **Value** | **Name** |
| 0 | AP Removal |
| 1 | Operation Parameter Update |
| 2 | Add Link |
| 3 | Delete Link |
| 4 | NSTR Status Update |
| 5 – 15 | Reserved |

***TGbe editor: Modify the paragraphes in 35.3.16.2 (Multi-link device capability and operation signaling) as follows:***

**35.3.16.2 Multi-link device capability and operation signaling**

 (#19879)An AP affiliated with an AP MLD shall set the MLD Capabilities And Operations Present subfield in the Multi-Link Control field of the Basic Multi-Link element to 1 when carried in transmitted Beacon, Probe Response, and (Re)Association Response frames. When a Basic Multi-Link element is carried in other frames, the AP shall set the MLD Capabilities And Operations Present subfield to 0.

A non-AP STA affiliated with a non-AP MLD shall set the MLD Capabilities And Operations Present subfield in the Multi-Link Control field of the Basic Multi-Link element to 1 when carried in a transmitted (Re)Association Request frame. When a Basic Multi-Link element is carried in other frames, the non-AP STA shall set the MLD Capabilities And Operations Present subfield to 0.

An AP MLD shall set the Maximum Number Of Simultaneous Links subfield in the Common Info field of the Basic Multi-Link element to the number of affiliated APs minus 1.

A single radio non-AP MLD shall set the Maximum Number Of Simultaneous Links subfield in the Common Info field of the Basic Multi-Link element to 0.

A single radio non-AP MLD with dot11EHTEMLSROptionActivated equal to true shall set the Maximum Number Of Simultaneous Links subfield in the Common Info field of the Basic Multi-Link element to 0.

If a multi-radio non-AP MLD requests more than one link during ML setup, the multi-radio non-AP MLD shall set the Maximum Number Of Simultaneous Links subfield in the Common Info field of the Basic Multi-Link element to a value equal to or larger than 1.

A multi-radio non-AP MLD shall announce each pair of links formed by links that requested a ML setup as STR or NSTR in a transmitted (Re)Association Request frame, by setting the corresponding bit in the NSTR Indication Bitmap subfield of the Basic Multi-Link element to 0 or 1, respectively (see 9.4.2.312.2 (Basic Multi-Link element)).

An (#19115) MLD shall be capable of simultaneously transmitting or receiving frames via affiliated STAs up to a value indicated in the Maximum Number Of Simultaneous Links subfield in the Basic Multi-Link element plus 1, under the rules defined in subclauses below.

A non-AP MLD shall set the NSTR Link Pair Present subfield value to 1 in a STA Control field that corresponds to link ID *i* (where ) only if it is a multi-radio MLD and contains at least one NSTR link pair formed by the link with link ID *i*; otherwise, it shall set the subfield value to 0. An NSTR mobile AP MLD shall set the NSTR Link Pair Present subfield value to 1 in the STA Control field that corresponds to link ID *i* unless the NSTR mobile AP MLD has removed the nonprimary link, in which case NSTR mobile AP MLD shall set the subfield to 0. An AP MLD that is not an NSTR mobile AP MLD shall set the NSTR Link Pair Present subfield value in each STA Control field to 0.

An MLD shall set to 0 every bit in the NSTR Indication Bitmap subfield, if present, of the Basic Multi-Link element that corresponds to a link pair where one of the STAs in the link pair operates in the 2.4 GHz band and the other STA operates in the 5 GHz or 6 GHz band.

A non-AP MLD may set the Frequency Separation For STR subfield in the Common Info field of the Basic Multi-Link element to a nonzero value if it intends to indicate the minimum frequency separation that is recommended between two links for the non-AP MLD for STR operation; otherwise, the non-AP MLD shall set the Frequency Separation For STR subfield to 0.

An AP MLD might take into account the information provided by associated non-AP MLDs in the Frequency Separation For STR subfield in their transmitted Multi-Link elements when the AP MLD intends to set up BSSs in the future referring to the information provided by those non-AP MLDs or switch the BSS operating channel of one or more of the setup links with those non-AP MLDs. How the AP MLD uses the information provided by the Frequency Separation For STR subfield is out of scope of the standard.

NOTE 1—The non-AP MLD ensures that the minimum frequency separation indicated in the Frequency Separation For STR subfield starts from the frequency edge of the maximum supported bandwidth indicated by the Supported Channel Width Set subfield in the HE Capabilities element and the Support For 320 MHz in 6 GHz subfield in the EHT Capabilities element of each link.

***(#***19327) An AP affiliated with an AP MLD that supports updating the NSTR status of associated non-AP MLDs shall set dot11EHTNSTRStatusUpdatedImplemented to true and shall set the NSTR Status Update Support subfield to 1 in the Extended MLD Capabilities And Operations subfield of the Basic Multi-Link element that it transmits.

The ability of a non-AP MLD to perform STR operation on a pair of setup links may change after ML setup if an AP affiliated with the associated AP MLD switches the BSS operating channel to a channel that would cause the associated non-AP STA to not satisfy the new STR requirements. If the non-AP MLD’s ability to perform STR/NSTR operations changes after the channel switch, the non-AP MLD may transmit a Multi-Link Operation Update Request frame with the Operation Update Type subfield set to 4 on any enabled link to indicate the updated STR/NSTR link status to the associated AP MLD, from which it has received a Basic Multi-Link element with the NSTR Status Update Support subfield equal to 1, using the NSTR Indication Bitmap subfields of the included Reconfiguration Multi-Link element. Otherwise, the non-AP MLD shall not transmit a Multi-Link Operation Update Request frame with Operation Update Type subfield set to 4.

NOTE 2 – A non-AP MLD that receives a Basic Multi-Link element with the NSTR Status Update Support subfield equal to 0 from its associated AP MLDmight perform a reassociation procedure (see 11.3.6.4 (Non-AP STA, non-AP MLD, and non-PCP STA reassociation initiation procedures)) with updated NSTR status of link pairs.

APs affiliated with an NSTR mobile AP MLD shall set the NSTR Status Update Support subfield in transmitted Basic Multi-Link element to 0.

When Operation Update Type subfield set to 4 in a Multi-Link Operation Update Request frame, the Reconfiguration Multi-Link element shall include a Per-STA Profile subelement for each link identified by the Link ID that is setup between the non-AP MLD and the AP MLD. In the Reconfiguration Multi-Link element of a Multi-Link Operation Update Request frame with Operation Update Type subfield set to 4 sent by a non-AP MLD:

* All subfields in the Presence Bitmap subfield of the Multi-Link Control field in the Reconfiguration Multi-Link element shall be set to 0.
* All subfields of the STA Control field in the Reconfiguration Multi-Link element except the Link ID and the NSTR Bitmap Size subfields shall be set to 0.
* The Link ID subfield shall be set to the identifier of the setup link for which the NSTR status is reported in the Per-STA Profile subelement.
* The NSTR Bitmap Size subfield shall be set to indicate the size of the NSTR Indication Bitmap subfield.
* The NSTR Indication Bitmap subfield shall be included and shall be set to indicate STR or NSTR for each pair of links formed between the link corresponding to the Link ID and other setup links for the non-AP MLD.

After receiving a Multi-Link Operation Update Request frame with Operation Update Type subfield equals to 4 from the non-AP STA affiliated with an associated non-AP MLD, the AP shall send a Multi-Link Operation Update Response frame to the non-AP STA with the Status Code subfield set to 0 (SUCCESS).

Immediately after receiving an acknowledgement for the Multi-Link Operation Update Response frame transmitted to a non-AP MLD, the AP MLD shall update the NSTR status of the setup link pairs for that non-AP MLD, and the AP MLD and non-AP MLD shall exchange frames using the updated constraints (see 35.3.16.3 (Simultaneous transmit and receive (STR) operation) and 35.3.16.4 (Nonsimultaneous transmit and receive (NSTR) operation)).

**Annex C**(normative)
**ASN.1 encoding of the MAC and PHY MIB
C.3 MIB Detail**

***TGbe editor: Please add following new MIB attribute in Annex C as shown below : (#***19327)

Dot11EHTStationConfigEntry ::=

SEQUENCE{

dot11EHTPPEThresholdsRequired TruthValue,

dot11TIDtoLinkMappingActivated TruthValue,

dot11EHTEPCSPriorityAccessActivated TruthValue,

dot11MSDTimerDuration Unsigned32,

(#16903)dot11MSDTXOPMax Unsigned32,

dot11MultiLinkActivated TruthValue,

dot11MLDAssociationSAQueryMaximumTimeout Unsigned32,

dot11EHTMCSFeedbackOptionImplemented INTEGER,

dot11EHTEMLSROptionImplemented TruthValue,

dot11EHTEMLSROptionActivated TruthValue,

dot11EHTEMLMROptionImplemented TruthValue,

dot11EHTEMLMROptionActivated TruthValue,

dot11OperationParameterUpdateImplemented TruthValue,

dot11EHTLinkReconfigurationOperationActivated TruthValue,

dot11EHTNSTRStatusUpdateImplementated TruthValue

}

dot11EHTNSTRStatusUpdatedImplemented OBJECT-TYPE
 SYNTAX TruthValue
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This is a capability variable.
 Its value is determined by device capabilities. This attribute, when true, indicates that the station implementation is capable of supporting NSTR status update operation)."

 DEFVAL { false }
::= { dot11EHTStationConfigEntry <Last assigned + 1> }

***End of change***