### IEEE P802.11Wireless LANs

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| 11be D1.4 CR for updating NSTR Bitmap via EHT OM Control subfield or Operation Mode field |
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Abstract

This submission proposes resolutions for the following CIDs:

5672

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Add scenarios in discussion.

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 D1.4 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.4 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.***

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 5672 | Julien Sevin | 35.3.14.3 | 274.60 | How to indicate a modification of the NSTR bitmap in operation time | As in comment | **Revised:**Agree with the commenter in principle.NSTR Bitmap may change along with Channel Width update. So it is better to update both in one frame.The proposed solution is:1) The NSTR non-AP MLD delivers its preconfigured NSTR Indication Bitmap 0, NSTR Indication Bitmap 1, etc, in STA Info field of ML element in (Re)Association Request frame.2) The NSTR non-AP MLD indicates the NSTR Indication Bitmap to be used through the Index of NSTR Indication Bitmap subfield included in Operating Mode field or in EHT OM Control subfield.Tgbe editor: please implement changes as shown in doc 11-22/0515r0 tagged as 5672 |

**Discussion:**

***Scenario 1:***

*The non-AP MLD with 3 affiliated STAs setup 3 links in 5 GHz band with the AP MLD. The STA on link 1 changed its Channel Width from 20 MHz to 80 MHz, which leaded to a change from STR to NSTR between link 1 and link 2, because of frequency gap between them are too small to do STR. Then the non-AP MLD has to inform the AP MLD the NSTR Indication Bitmap to be used as well as the Channel Width update.*

*In this scenario, NSTR Indication Bitmap changed along with Channel Width update. So it is better to update both in one frame.*

*According to 35.3.16.4 Nonsimultaneous transmit and receive (NSTR) operation, NSTR Indication Bitmap is actually a PHY parameter. So it is reasonable to update it through Operating Mode field or OM Control subfield.*

***Proposed Solution:***

*The NSTR non-AP MLD delivers its preconfigured NSTR Indication Bitmap 0, NSTR Indication Bitmap 1, etc, in STA Info field of ML element in (Re)Association Request frame. The number of NSTR Indication Bitmap is indicated by STA Control Field of the ML element.*



*A subfield in Operating Mode field or EHT OM Control field indicates which NSTR Indication Bitmap is to to used.*



*The Index of NSTR Bitmap can indicate one NSTR Indication Bitmap from at most 8 preconfigured NSTR Indication Bitmaps, which is enough in practice. To be future proof, value 7 is reserved.*

***Other scenarios:***

*Scenario 2:*

*The NSTR Indication Bitmap of the non-AP MLD was changed because of CSA/eCSA of an AP affiliated with the AP MLD.*

*In this scenario, after CSA/eCSA, it’s the non-AP MLD to iniate a frame exchange. So non-AP MLD can inform the AP MLD its new NSTR Inidcaiton Bitmap at first.*

*Scenario 3:*

*The NSTR Indication Bitmap of the non-AP MLD was changed because of an AP affiliated with the AP MLD update its Channel Width.*

*In this scenario, it is unreasonable for the AP to indicate the change of Channel Width to each STA on the link, one by one, through Operating Mode field or OM Control subfield. Critial Update would be utilized in general. So it is similar to Scenario 2.*

**End of discussion**

**Propose:**

*TGbe editor: Change 9.4.2.312.2.3 Link Info field of the Basic Multi-Link element as follows (track changes on):*

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The format of the STA Control field is defined in [Figure 9-1002k (STA Control field format)](#bookmark135).

B0 B3 B4 B5 B6 B7 B8 B10 B11 B12 B15

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Link ID | Complete Profile | MACAddress Present | Beacon Interval Present | DTIM Info Present | Number of NSTRBitmap | NSTRBitmap Size | Reserved |

Bits: 4 1 1 1 1 3 1 4

**Figure 9-1002k—STA Control field format(5672)**

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(5672)If the value of the Maximum Number Of Simultaneous Links subfield in the MLD Capabilities field is greater than 0, the Number of NSTR Bitmap subfield that is greater than 0 in the STA Control field indicates if at least one NSTR link pair is present in the MLD that contains the link corresponding to that STA. It is set to the number of NSTR Indication Bitmap subfield(s) contained in the STA Info field if there is at least one such link pair; otherwise it is set to 0. Value 7 is reserved for the number of NSTR Indication Bitmap subfield(s).

(5672)If the Complete Profile subfield is equal to 1 and the Number of NSTR Bitmap subfield is greater than 0 in the STA Control field, then the STA Info field contains NSTR Indication Bitmap subfield(s). The size of each NSTR Indication Bitmap subfield is indicated in the NSTR Bitmap Size subfield; otherwise, the NSTR Indication Bitmap subfield(s) is not present in the STA Info field. The number of NSTR Indication Bitmap subfield(s) in the STA Info field is the Number of NSTR Bitmap subfield in the STA Control field. The NSTR Bitmap Size subfield in the STA Control field is set to 1 if the length of the corresponding NSTR Indication Bitmap subfield is 2 octets and is set to 0 if the length of the corresponding NSTR Indication Bitmap subfield is 1 octet. The NSTR Bitmap Size subfield in the STA Control field is reserved if the Number of NSTR Bitmap subfield in that field is 0.

The format of the STA Info field is defined in [Figure 9-1002l (STA Info field format)](#bookmark136).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| STA Info Length | STA MACAddress | Beacon Interval | DTIM Info | NSTRIndication Bitmap 0 | NSTR Indication Bitmap 1 | …… |

 Octets: 1 0 or 6 0 or 2 0 or 2 0 or 1 or 2 0 or 1 or 2

**Figure 9-1002l—STA Info field format(5672)**

*TGbe editor: Change 9.2.4.7.9 EHT OM Control as follows (track changes on):*

* + - * 1. **EHT OM Control**

(5672)The Control Information subfield in an EHT OM Control subfield contains information related to the OM changes for bandwidth of 320 MHz, Tx NSTS larger than 8, Rx NSS larger than 8, and NSTR Indication Bitmap for the STA transmit ting the frame containing this information (see 35.9 (Operating mode indication)). The format of the subfield is shown in [Figure 9-33a (Control Information subfield format in an EHT OM Control subfield)](#bookmark5).

B0 B1 B2 B3 B5

|  |  |  |  |
| --- | --- | --- | --- |
| Rx NSSExtension | Channel Width Extension | Tx NSTSExtension |  Index of NSTR Indication Bitmap |

Bits: 1 1 1 3

**Figure 9-33a—Control Information subfield format in an EHT OM Control subfield(5672)**

*TGbe editor: Add the following paragraph at the end of 9.2.4.7.9 EHT OM Control as follows (track changes on):*

(5672)The Index of NSTR Indication Bitmap subfield indicates which NSTR Indication Bitmap contained in the STA Info field of the per-STA profile subelement in Multi-Link element, that is delivered by (Re)Association Request frame, is to be used. If it is 0, the NSTR Indication Bitmap 0 is to be used; if it is 1, the NSTR Indication Bitmap 1 is to be used; etc. The value 7 for the NSTR Indication Bitmap is reserved.

*TGbe editor: Change 9.4.1.53 Operating Mode field as follows (track changes on):*

* **Operating Mode field**

The Operating Mode field is present in the Operating Mode Notification frame (see 9.6.22.4 (Operating Mode Notification frame format)) and Operating Mode Notification element (see 9.4.2.165 (Operating Mode Notification element)).

The Operating Mode field for a non-S1G STA is shown in Figure 9-182 (Operating Mode field format when it is carried in a non-S1G PPDU).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 | B3 | B4 B6 | B7 | B8 B10 |
|  | Channel Width | 160/80+80 BW | No LDPC | Rx NSS | Rx NSS Type | Index of NSTR Indication Bitmap |
| Bits: | 2 | 1 | 1 | 3 | 1 | 3 |
| * **Operating Mode field format when it is carried in a non-S1G PPDU**
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The STA affiliated with a non-AP MLD transmitting this field indicates which NSTR Indication Bitmap is to be used.

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| * **Subfield values of the Operating Mode field**
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|  |  |
| --- | --- |
| (5672)Index of NSTR Indication Bitmap | (5672)The Index of NSTR Indication Bitmap subfield indicates which NSTR Indication Bitmap contained in the STA Info field of the per-STA profile subelement in Multi-Link element, that is delivered by (Re)Association Request frame, is to be used. If it is 0, the NSTR Indication Bitmap 0 is to be used; if it is 1, the NSTR Indication Bitmap 1 is to be used; etc. The value 7 for the NSTR Indication Bitmap is reserved. |

*TGbe editor: Change 9.2.4.7.9 EHT OM Control as follows (track changes on):*

* + - 1. **Multi-link device capability signaling**

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(5672)An MLD shall set the Number of NSTR Bitmap subfield value to 0 in a STA Control field that corresponds to link ID *i* (where 0  *i*  15 ) if it is a multi-radio MLD and does not contain any NSTR link pair formed by the link with link ID *i*; otherwise it shall set the subfield value to the number of NSTR Indication Bitmap(s) contained in the STA Info field that corresponds to the link. An NSTR mobile AP MLD shall set the Number of NSTR Bitmap subfield value to 1 in the STA Control field that corresponds to link ID *i*. An AP MLD that is not an NSTR mobile AP MLD shall set the Number of NSTR Bitmap subfield value in each STA Control field to 0.

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*TGbe editor: Change 35.4 Operating mode indication as follows (track changes on):*

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(5672)An OMI initiator that transmits a frame including an EHT OM Control subfield and an OMI responder that receives a frame including an EHT OM Control field shall follow the rules defined in 26.9 (Operating mode indication), except that the *NSS ,* the *NSTS* , the maximum operating channel width, and the Index of NSTR Indication Bitmap.

(5672)The *NSS ,* the *NSTS* , and/or the maximum operating channel width shall be calculated by the EHT OM Control subfield combined with the OM Control subfield as defined in 9.2.4.7.8 (EHT OM Control).

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*TGbe editor: Add the following paragraph at the end of 35.4 Operating mode indication as follows (track changes on):*

(5672)The NSTR Indication Bitmap 0 is the default NSTR Indication Bitmap, which shall be used at first. The NSTR Indication Bitmap can be updated. The NSTR non-AP MLD may indicate the NSTR Indication Bitmap to be used through the Index of NSTR Indication Bitmap subfield included in Operating Mode field carried in Operating Mode Notification frame or in EHT OM Control subfield. If the Index of NSTR Indication Bitmap subfield is not equal to 7, the AP MLD, shall update the NSTR Indication Bitmap being used for the non-AP MLD after receiving a frame that contains the subfield from the non-AP MLD.