IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Proposed Draft Text for  MLO Multi-Link Channel Access: Capability Signaling | | | | |
| Date: 2021-03-04 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Yunbo Li | Huawei |  |  | liyunbo@huawei.com |
| Ming Gan |  |  |  |  |
| Yuchen Guo |  |  |  |  |
| Guogang Huang |  |  |  |  |
| Yiqing Li |  |  |  |  |
| Zhenguo Du |  |  |  |  |
| Rob Sun |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

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.

***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).***

The common info part of the basic ML element transmitted by a non-AP MLD in a (Re)Association Request frame shall include a field that indicates the maximum number of affiliated STAs in the non-AP MLD that support simultaneous exchange of Data frames (n).

* A field value that corresponds to n = 1 indicates that the non-AP MLD is a single radio MLD.
* A field value that corresponds to n = 2 or more indicates that the non-AP MLD is a multi-radio MLD.

[Motion 146, #SP340, [30] and [257]]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1759 | Hanseul Hong | 142.30 | 35.3.13.4 | The terminology 'multi-radio MLD' exists only here. Define the term or remove 'multi-radio' part. | As in the comment | Revised –  Add the definition of multi-radio MLD in subclause 3.2.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 2719 | Ryuichi Hirata | 142.30 | 35.3.13.4 | "multi-radio MLD" is not defined | Define multi-radio MLD. | Revised –  Add the definition of multi-radio MLD in subclause 3.2.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 2139 | Laurent Cariou | 0.00 | 35.3.13.4 | clarify the field to determine all the types of MLDs | as in comment | Revised –  Clarify the signalling is carried in Maximum Number Of Simultaneous Links subfield of Basic variant ML element.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 1465 | Dana Ciochina | 142.30 | 35.3.13.4 | "The capability field/element indicates the MLD is a multi-radio or other types of MLD." Other type of MLD is very vague. It should be replaced with a clear statement | replace the expression with a clear statement. | Revised –  Clarify that it is single radio MLD.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 2887 | Stephen McCann | 142.30 | 35.3.13.4 | What are the "other types of MLD"? | Define some other types of MLD. | Revised –  Clarify that it is single radio MLD.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 1466 | Dana Ciochina | 142.32 | 35.3.13.4 | The formulation " in which case the pair of link is STR or NSTR" is ambiguous. It may mean a STA announces an additional condition based on which a link is considered NSTR or STR or it refers to definition of a pair of links as STR or NSTR based on announcement. Furthermore, the actual signaling is missing. | remove the ambiguity and indicate the actual signalling involved. | Revised –  Clarify that it intends to indicate the STR/NSTR capability of each link pair.  TGbe editor to make the changes shown in 11-21/0373r6 |
| 1656 | Geonjung Ko | 142.33 | 35.3.13.4 | It is unclear what the below sentence means. "The two links of each link pair are on different channels."  If it means a condition, we need to make the capability signaling as conditional. | As per comment | Revised –  Delete this sentence, and add below sentence in 35.3.5.1 (Multi-link (re)setup procedure) to make it more clear.  “An MLD that requests or accepts multi-link (re)setup for any two links ensures that each link is located on the different non-overlapping channels.”  TGbe editor to make the changes shown in 11-21/0373r6 |
| 3392 | Zhou Lan | 142.33 | 35.3.13.4 | "links, in which case the pair of link is STR or NSTR. The two links of each link pair are on different channels.". Please clarify the meaning of channel here. | As stated in the comment | Revised –  Delete this sentence, and add below sentence in 35.3.5.1 (Multi-link (re)setup procedure) to make it more clear.  “An MLD that requests or accepts multi-link (re)setup for any two links ensures that each link is located on the different non-overlapping channels.”  TGbe editor to make the changes shown in 11-21/0373r6 |
| 1217 | Arik Klein | 142.32 | 35.3.13.4 | Typo: omit the word "link" in the sentence: " The two links of each \*link\* pair are on different channels" | The corrected sentence shall be: " The two links of each pair are on different channels" | Revised –  Delete this sentence, and add below sentence in 35.3.5.1 (Multi-link (re)setup procedure) to make it more clear.  “An MLD that requests or accepts multi-link (re)setup for any two links ensures that each link is located on the different non-overlapping channels.”  TGbe editor to make the changes shown in 11-21/0373r6 |
| 1796 | Insun Jang | 142.27 | 35.3.13.4 | "affiliated STAs on a set of links" is not clear because e.g., when transmitted an Association Request frame, it includes the affilaited STAs are STAs only requested for ML setup. We need to clarify whether the STAs are all affiliated STAs of the MLD or affilaited STAs only requested for ML setup | As in the comment, please clarify that STAs in "affiliated STAs on a set of links" are all affiliated STAs of the MLD or affilaited STAs only requested for ML setup | Revised –  Clarify that it is for the links requested for ML setup.  TGbe editor to make the changes shown in 11-21/0373r6 |
|  |  |  |  |  |  |  |

1. **Proposed spec text**

***TGbe editor: Please change the subclauses below as follows:***

**3.2 Definitions specific to IEEE 802.11**

multi-radio non-access point (non-AP) multi-link device (MLD): A non-AP MLD that supports reception and transmission frames on more than one link at a time. (#1759, 2719)

***TGbe editor: Please change the subclauses below as follows:***

9.4.2.295b.2 Basic variant Multi-Link element

|  |  |  |  |
| --- | --- | --- | --- |
|  | MLD MAC Address | MLD Capabilities | TBD |
| Octets: | 0 or 6 | 0 or 2 | TBD |

Figure 9- 788eh—Common Info field of the Basic variant Multi-Link element format

***TGbe editor: Please add below paragraphs in subclauses 9.4.2.295b.2 (Basic variant Multi-Link element):***

The format of the MLD Capabilities field is defined in Figure 9-788eh1 (MLD Information field format). (#2139)

|  |  |  |
| --- | --- | --- |
|  | B0-B3 | B4-B15 |
|  | Maximum Number Of Simultaneous Links | Reserved |
| Bits: | 4 | 12 |

Figure 9- 788eh1—MLD Capabilities field format

**Table 9-322xy- Subfields of the MLD Capabilities field**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Maximum Number Of Simultaneous Links | Indicates the maximum number of affiliated STAs in the MLD that support simultaneous transmission or reception of frames | Set to the maximum number of affiliated STAs in the MLD that support simultaneous transmission or reception of frames minus 1. |

***TGbe editor: Please change the subclauses below as follows:***

**35.3.5.1 Multi-link (re)setup procedure**

In the (Re)Association Requeust frame, the non-AP MLD indicates the links that are requested for (re)setup as described in 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup)

In the (Re)Association Response frame, the AP MLD indicates the links that are accepted for (re)setup as described in 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup).

After successful multi-link (re)setup between a non-AP MLD and an AP MLD, the non-AP MLD and the AP MLD setup links for multi-link operation, and the non-AP MLD is in associated state and is (re)associated with the AP MLD.

An MLD that requests or accepts multi-link (re)setup for any two links ensures that each link is located on different non-overlapping channels. (#1656, 3392, 1217)

***TGbe editor: Please change the subclauses below as follows:***

**35.3.13.4 Capability signaling**

An AP MLD shall set the Maximum Number Of Simultaneous Links subfield value to be greater than or equal to that of the number of Per-STA Profiles included in the Basic variant Multi-Link element in transmitted (Re)Association Response frames.

A single radio non-AP MLD shall set the Maximum Number Of Simultaneous Links subfield in the Basic variant Multi-Link element to 0 in transmitted (Re)Association Request frames.

A multi-radio non-AP MLD shall set the Maximum Number Of Simultaneous Links subfield in the Basic variant Multi-Link element to a value equals to or larger than 1 in transmitted (Re)Association Request frames. (#2139, 1465, 2887, 1796)

A multi-radio non-AP MLD shall announce each pair of links formed by links that requested for multi-link setup is STR or NSTR in transmitted (Re)Association Request frame.(#1466) (#1656, 3392, 1217)

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.

***End of change***