IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11be D2.0 CR for 3.1 and 3.2 | | | | |
| Date: 2022-10-17 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel |  |  |  |

Abstract

This submission proposes resolutions for the following CIDs:

12455, 11475, 11814, 11473, 11474, 10187, 11813, 11166, 11167

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial revision
* Rev 2: Editorial revision during the teleconference

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 D2.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D2.0 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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 12455 | Ryuichi Hirata | 3.2 | 52.40 | It is unclear whether a single MLD is capable of supporting both AP and non-AP STA or not. | Please clarify the definition of MLD. | Rejected –  The definition of MLD has generic description. To have specific operation involving AP or non-AP STA, specific MLD like AP MLD or non-AP MLD are defined. There is no specific MLD definition to include both AP and non-AP STA in one framework. |
| 11475 | Xiaofei Wang | 3.1 | 52.41 | It is unclear when an MLD contains only one affiliated AP, is that considered as a MLD or just an EHT AP? Neither the definition of the AP MLD or definitoin of MLD make this clear. | as in comment; please clarify | Rejected –  An MLD can operate using one affiliated STA and is still an MLD. The definition of MLD allows this operation. |
| 11814 | Alfred Asterjadhi | 3.2 | 52.41 | They seem complementary rather than contradictory. Replace "but can also" with "and can" | As in comment. | Accepted - |
| 11473 | Xiaofei Wang | 3.1 | 52.40 | It is unlcear what "supporting more than one affiliated STA" means, does it mean support the association of multiple affiliated STAs, since "affliated STA" only means STAs operating within a MLD according to definition? Suggest to change to "operate" or change to "support more than one STAs affiliated with itself" to make things clear. | as in comment | Rejected –  The definition only talks about one logical entity, so we do not need to repeat in the definition. |
| 11474 | Xiaofei Wang | 3.1 | 52.41 | since "more than one affiliated STA" has already been covered in the first part of the sentence, then "can also operate using one or more affiliated STAs" should cover the case of just one STA, change "can also operate using one or more affiliated STAs" to "can also operate using one affiliated STA". | as in comment | Rejected –  Through the discussion that leads to the current definition, it is identified that “support” and “operate” are two different concepts. “Support” basically means “capable of” and  “operate” means the actual operation. Hence, the second part of the sentence does not cover the first part of the sentence. |
| 10187 | John Wullert | 3.1 | 52.39 | First two clauses of definition seem redundant and thus do not provide desired clarity. Also, construct of "has one medium access ... to the logical link control" is not clear. | Revise defintion as "A logical entity that is capable of supporting more than one affiliated station (STA) and is operating using one or more of those affiliated STAs and that exposes one medium access control (MAC) data service and a single MAC service access point (SAP) to the logical link control (LLC) sublayer" | Revised –  We add “that” in the second part to better connect the sentence.  We note that the first part of definition are not redundant. It describes the “support” and “operate” requirement. “is operating” seems to describe some of the affiliated STAs is always there, which may not be true when certain AP is deleted.  As for the usage of “expose”, the term is used in the baseline only when describing security related clauses like “does not expose PMK …”. Based on the following baseline description, we use the word “presents”.  *IEEE Std 802.11 is required to appear to higher layers [logical link control (LLC) sublayer] as a generalpurpose IEEE 802 LAN.*  *When transparent FST is used,*  *the STA shall present a single MAC SAP to higher layers for all frequency bands/channels in which it uses that MAC address.*  TGbe editor to make the changes shown in 11-22/1777r2 under all headings that include CID 10187 |
| 11813 | Alfred Asterjadhi | 3.2 | 52.02 | I am thinking that the STA not only provides MAC services but also PHY services. Please amend. | As in comment. | Revised –  Agree in principle with the commenter. We add the PHY services as well.  TGbe editor to make the changes shown in 11-22/1777r2 under all headings that include CID 11813 |
| 11166 | Joseph Levy | 3.2 | 52.01 | The definition of "affiliated STA" is confusing and can be misleading. In particular the use of the phrase "that provides link-specific, lower MAC services within an MLD." is very confusing. 802.11 defines a link as a MAC SAP to MAC SAP link connected over the WM (see 802.11REVme D1.2 181.20, 191.25, 193.50, 196.56, 197.51, 200.25, 203.55, 204,4, 205.10, Note: link margin 196.34, communications link 203.31, refer to the RF link and not a SAP to SAP link, but in these cases it is clear that this is a different use of the term "link". The type of "link" that an affiliated STA "provides" should be clearly stated - an affiliated STA supports WM access in a channel (over an RF link) of the MLD. Also an affiliated STA is not a STA, as a STA is "A logical entity that is a singly addressable instance of a MAC and PHY interface to the WM" (802.11REVme D1.2 203.34). An affiliated STA does not have a singly addressable MAC. Also further confusing this definition is that an AP and a non-AP MLD may have significantly different configurations. An MLD AP, may contain multiple MAC SAPs when an MLD AP is supporting both non-AP non-MLD STAs and non-AP MLDs. Such a device would need to have a MAC SAP for each "legacy" AP and a MAC SAP for the MLD AP. Each of these SAPs is individually addressable. A non-AP MLD does not have multiple MAC SAPs - it has a single MAC SAP. When an non-AP MLD is instantiated it will have a single MAC SAP and multiple WM interfaces (one for each channel supported (link as used in the current definition). Note: it should be clear if an affiliated STA is a logical device or description of a physical hardware (hardware). To align with current definition of STA an affiliated should be a logical device. | Delete the current definition of affiliated STA and replace it with: "affiliated station (STA): A portion of a STA that provides lower medium access control (MAC) protocol services and a physical layer (PHY) interface to the wireless media (WM) for a channel of a multi-link device (MLD)" | Revsied –  We note that the definition of link in 802.11 is described as the physical path between two STAs. See below. As a result, the description “link specific” is appropriate.  *link: In the context of an IEEE 802.11 medium access control (MAC) entity, a physical path consisting of exactly one traversal of the wireless medium (WM) that is usable to transfer MAC service data units (MSDUs) between two stations (STAs)*  However, agree that we will need to describe PHY services.  TGbe editor to make the changes shown in 11-22/1777r2 under all headings that include CID 11813 |
| 11167 | Joseph Levy | 3.2 | 51.64 | The definition of "access point (AP) multi-link device (MLD)" is confusing and can be misleading. This definition has several problems. 1) an AP is "An entity that contains one STA and provides access to the DS, via the WM for associated STAs. An AP comprises a STA and a DSAF." hence a STA is never an AP it is only a portion of an AP. 2) it is not necessary for an affiliated STA of an MLD AP to be an AP (it need not have a DSAF), as there is no service that an affiliated STA must provide an MLD AP that requires it to have a DSAF. Some configuration of devices that are an MLD AP may have APs in them to support non-MLD associations and provide group addressed transmissions, but this is not a requirement to support MLO. This definition should be cleaned up to provide a clear definition of what an AP MLD is - a device that provides access to DSS via the WM for associated MLDs. | Delete the current definition of AP MLD and replace it with: "access point (AP) multi-link device (MLD): An entity that contains one or more affiliated STAs and provides access to the distribution system service, via the wireless medium (WM), for associated non-AP MLDs. An AP MLD comprises one or more affiliated STAs and a distribution system access function (DSAF). | Rejected –  It is obvious that for MLO group addressed transmission is needed, and for MLO, we also mandate synchronize sequence number space for delivery of group addressed data frame and duplicate of group addressed data frame for each AP.  It is then clear that “AP” needs to be coordinated by the MLD. It is indeed true that some of the functions will be provided to legacy STA and some of the functions will be provided to both legacy STA and MLD. The specification clearly define which part of the operation is like legacy and which part of the operation is pushed to MLD. |

**Discussion: None**

*TGbe editor: Change Clause 3.2 as follows (track change on):*

**3.2 Definitions specific to IEEE 802.11**

(…existing texts …)

**affiliated STA:** A station (STA), which can be an access point (AP) STA or non-access point (non-AP) STA, that provides link-specific, lower medium access control (MAC) services and physical layer (PHY) services(#11813) within a multi-link device (an MLD).

(…existing texts …)

**multi-link device (MLD):** A logical entity that is capable of supporting more than one affiliated station (STA) and can (#11814) operate using one or more affiliated STAs, and that presents(#10187) one medium access control (MAC) data service and a single MAC service access point (SAP) to the logical link control (LLC) sublayer.

(…existing texts …)