### IEEE P802.11 Wireless LANs

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| 11be D0.3 CR for 11.3 part I | | | | |
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Abstract

This submission proposes resolutions for the following CIDs:

2277, 2278, 3241, 2078, 1665, 2080, 2077, 2079, 2076, 2081

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Add 2081

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 D0.3 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D0.3 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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2277 | Michael Montemurro | 87.40 | 11.3 | MLD is not needed in the title. It would be better just to drop the STA from the clause title | Change the title to "Authentication and Association Procedures". | Accepted - |
| 2278 | Michael Montemurro | 87.48 | 11.3.1 | The clarification is worded poorly. | Change to "In 11.3, the procedures described in this sub-clause do not refer to STAs that are affiliated with an MLD unless specified otherwise.  An alternative would be to make a statement that STA procedures in this sub-clause refer to state established between an AP MLD and a non-AP MLD unless otherwise specified. In that way, you could back-out almost all of the changes. | Revised –  We revise by following the first suggestion. We also move it to a separate general clause.  For the alternative method, we still can not back out the changes due to consideration that for MLD, various rules apply for each link of the MLD, and something just does not work for MLD at this point (ex DMG, PCP, mesh, PBSS, IBSS).  We use the first approach for clearly describe the situation and required corresponding revision for MLD.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 2278. |
| 3241 | Young Hoon Kwon | 87.47 | 11.3.1 | A "STA" should mean a "STA". In this sense, I think this sentence better be rephrased. | Change the text from "... the reference of a "STA" means that the "STA" is ..." to "... the reference of a "STA" means the "STA" that is ...". | Revised –  We revise as follows.  In 11.3 (Authentication and association), the procedures described in this sub-clause do not refer to STAs that are affiliated with an MLD unless specified otherwise.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 2278. |
| 2076 | Joseph Levy | 87.47 | 11.3.1 | The blanket statement that the reference of a "STA" means that the "STA" is not affiliated with an MLD unless specified otherwise." While a valiant attempt to discriminate between STA as used throughout the 802.11 specification and what MLO is redefining a STA to be is a very poor way to write a specification. This approach is very confusing and will require vigilance to insure the specification is correct (all instances of STAs that are part of an MLD must be clearly designated as being MLD affiliated STAs). Also placing this statement in clause 11.3.1 is very confusing as the statement state it applies to all 11.3 not just 11.3.1. | Suggest removing all changes to 11.3 and create a new clause addressing MLD authentication and association in a new sub-clause 11. | Revised –  We revise the statement as follows.  “In 11.3 (Authentication and association), the procedures described in this sub-clause do not refer to STAs that are affiliated with an MLD unless specified otherwise.”  We also place the sentence in an additional general clause.  We note that the reason why we do not have additional clause for MLD is that we reuse basically the core procedure and just add additional details that MLD introduces difference.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 2278. |
| 2078 | Joseph Levy | 89.51 | 11.3.2 | Is there such a think as a nonmesh MLD? | Please define a nonmesh MLD or remove the term nonmesh from the draft. | Rejected –  There is no definition of “nonmesh STAs” in the baseline, and the general meaning is that the STA does not do mesh functionality.  Nonmesh MLD is used to follow the current convention that here we are talking about MLD without mesh functionality. |
| 1665 | GEORGE CHERIAN | 89.01 | 11.3.2 | The state transition using MLD should be applicable only if both sides are MLDs. There is no text that says that. Please add the text | As in the comment | Revised –  We have the following sentences that describe that the states are maintained between two MLDs.  *An MLD (local) keeps an enumerated state variable for each MLD (remote) with which direct communication via the WM is needed.*  We also have title of 11-17 clarifies that it is between a give pair of nonmesh STAs or nonmesh MLDs.  *Relationship between state and services between a given pair of nonmesh STAs or nonmesh MLDs*  However, we agree that the description of the figure title is not reflected in the texts. We add that description to the texts.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 1665. |
| 2080 | Joseph Levy | 89.04 | 11.3.2 | How does figure 11-17 relate to an MLD? These are the states of a STA, but according to the draft an MLD consists of multiple STAs - What is the state of the MLD? What is the state of the associated STAs. How does this work? | Please clarify the state of an MLD and how it relates to its associated STAs and if they have states? | Revised –  We have title of 11-17 clarifies that it is between a give pair of nonmesh STAs or nonmesh MLDs.  *Relationship between state and services between a given pair of nonmesh STAs or nonmesh MLDs*  However, we agree that the description of the figure title is not reflected in the texts. We add that description to the texts.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 1665. |
| 2077 | Joseph Levy | 87.59 | 11.3.1 | What is meant by the text "An MLD (local) keeps an enumerated state variable for each MLD (remote) ..." is unclear. Does this mean the state of the MLD to MLD link? Or is it the state of a set of STA to STA links? Or both? The state variables must keep track of each STA to STA link so that the status of each of these links is know and it must keep track of the state of the MLD to MLD link. At best this needs to be explained more clearly. At worst this is just broken. | Please clarify what is the meaning of this requirement. Is there independence of the logical link status for the various affiliated STAs? What state needs to be enumerated? While this statement makes sense for a STA, it doesn't seem to make sense for an MLD as stated. If this is all at the "MLD level" why is there any reference to the affiliated STAs. | Revised –  We clarify the questions asked by the commenter as follows.  The requirement is for two MLDs to maintain a state machine rather than independent state machine in each link.  The states that are maintained between two MLDs are state 1, state 2, state 3, and state 4.  The reference to the affiliated STAs is just that for on-the-air transmission, it is done by the affiliated STAs of local MLD and affiliated STAs of remote MLD.  TGbe editor to make the changes shown in 11-21/0423r1 under all headings that include CID 2077. |
| 2079 | Joseph Levy | 89.63 | 11.3.3 | The statement that the current state existing between MLDs determines the frame type must be true, but the addition of the additional constraints in 35.3.6 is not a reference, it should not be parenthetical. Also there is no discussion of frame types in 35.3.6 or any restriction of frame types and MLD state. So I fail to understand what this text is referring to. The equivalent text for a STA clearly states the state of the STA determines the allowed frame types. This new text does not clearly state anything as what is meant be the state of the MLD is not clear, as the MLD has associated STAs. This must be clarified | Please clarify what is the meaning of this requirement and how the requirements in 35.3.6 relate to this requirement. | Rejected –  We clarify the meaning of the requiement and the difference with 35.3.6 as follows.  The requirement in 11.3.3 determines the allowed frame type (class 1, class 2, class 3).  35.3.6 talks about whether a link is enabled or disabled for frame exchange as shown below.  *If a link is disabled, it shall not be used for frame exchange, including Management frames.*  *If a link is enabled, it may be used for frame exchange, subject to the power state of the non-AP STA operating on that link.*  35.3.6 also defines TID to link mapping that defines which links can have data exchange for certain TIDs.  *If a TID is mapped in UL to a set of enabled links for a non-AP MLD, then the non-AP MLD can use any link within this set of enabled links to transmit frames carrying MSDUs or A-MSDUs with that TID. If a TID is mapped in DL to a set of enabled links for a non-AP MLD, then: — The non-AP MLD can retrieve buffered BUs corresponding to that TID on any links within this set of enabled links. — The AP MLD can use any link within this set of enabled links to transmit frames carrying MSDUs or A-MSDUs with that TID, subject to existing restrictions for transmissions of frames that apply to those enabled links* |
| 2081 | Joseph Levy | 90.26 | 11.3.4 | The statement that data frames are exchanged between an AP MLD and a non-AP MLD associated with the AP MLD is very confusing. While data frame must be capable of being exchanged between MLDs - this is not the way to make that statement. A non-AP MLD is not associated with an AP MLD, in an infrastructure configuration a non-AP MLD is associated with the BSS or ESS not the AP MLD. Association is not STA to STA, but STA to ESS in the current standard. This is the assumption throughout clause 11 and 12. Abandoning this basic assumption is break many of the basic 802.11 functions and will completely undermine the 802.11 mobility. | Please clarify what is meant by a non-AP MLD associated with the AP MLD. | Rejected –  We clarify that in the existing spec, non-AP STA is associated to an AP rather than STA associates with ESS.  *Before a STA is allowed to send an MSDU via an AP, it first becomes associated with the AP.*  We clarify that in 11be, the association operation has been extended to be between a non-AP MLD and an AP MLD so   * there is only one state machine that needs to be maintatined between a non-AP MLD and an AP MLD. * There is a clear mapping of non-AP MLD to AP MLD mapping to the DS |

**Discussion:** *None.*

**Propose:**

*TGbe editor: Change 11.3* *as follows (track change on):*

***Change the title of the subclause 11.3 as follows:***

* Authentication and association(#2277)

***Add new subclause 11.3.1 General as follows:***

11.3.1 General (#2278)

In 11.3 (Authentication and association), the procedures described in this sub-clause do not refer to STAs that are affiliated with an MLD unless specified otherwise.(#2278)

In 11.3 (STA/MLD authentication and association), when referring to MLD authentication, MLD deauthentication, MLD (re)association, MLD disassociation, or MLD 4-way handshake, the reference of “SME” means the entity that manages the MLD. (#2278)

* State variables

(#2278) (#2278)

***Insert the following paragraph after the now-shifted third paragraph (“A STA (local) for which dot11OCBAActiviated ...”):***

An MLD (local) keeps an enumerated state variable for each MLD (remote) with which direct communication between two MLDs through affiliated STAs of the two MLDs via the WM is needed. In this context, direct communication between two MLDs through affiliated STAs of the two MLDs refers to the transmission of any Class 2 or Class 3 frame with an Address 1 field that matches the MAC address of the STA affiliated with the remote MLD and an Address 2 field that matches the MAC address of the STA affiliated with the local MLD.(#2077)

***Insert the following paragraph after the now-shifted seventh paragraph (“For nonmesh STAs, this state variable ...”):***

For MLDs, this state variable expresses the relationship between the local MLD and the remote MLD. It takes on the following values:

* *State 1*: Initial start state for MLDs that perform IEEE 802.11 authentication. Unauthenticated and unassociated.
* *State 2*: Authenticated but unassociated.
* *State 3*: Authenticated and associated (Pending RSNA Authentication). The IEEE 802.1X Controlled Port is blocked.
* *State 4*: Authenticated and associated (RSNA Established or Not Required). The IEEE 802.1X Controlled Port is unblocked, or not present.

***Change the title of the subclause 11.3.2 as follows:***

* State transition diagram for nonmesh STAs or MLDs

***Change the first two paragraphs and replace Figure 11-17 as follows:***

Figure 11-17 (Relationship between state and services between a given pair of nonmesh STAs or nonmesh MLDs) shows the state transition diagram for nonmesh STA states between a given pair of nonmesh STAs or nonmesh MLD states between a given pair of monmesh MLDs.(#1665) Note that only events causing state changes are shown. The state of the sending STA or sending MLD given by Figure 11-17 (Relationship between state and services between a given pair of nonmesh STAs or nonmesh MLDs) is with respect to the intended receiving STA or the intended receiving MLD, respectively.

NOTE—A transition to State 1 might occur for other reasons such as no frames having been received from a STA or an MLD for a period of time.

***Change the title of the subclause 11.3.3 as follows:***

* Frame filtering based on STA or MLD state

***Change the first paragraph as follows:***

The current state existing between the transmitter and receiver STAs determines the IEEE 802.11 frame types that may be exchanged between that pair of STAs (see Clause 9 (Frame formats)). The current state existing between MLDs determines the IEEE 802.11 frame types that may be exchanged on any setup links between that pair of MLDs subject to additional constraints (see 35.3.6 (Link management)). A unique state exists for each pair of transmitter and receiver STAs or each pair of MLDs. The allowed frame types are grouped into classes and the classes correspond to the STA state or the MLD state. In State 1, only Class 1 frames are allowed. In State 2, only Class 1 or Class 2 frames are allowed. In State 3 and State 4, all frames are allowed (Classes 1, 2, and 3). In the definition of frame classes, the following terms are used:

* Within an infrastructure BSS: both the transmitting STA and the recipient STA participate in the same infrastructure BSS
* Within a PBSS: both the transmitting STA and the recipient STA participate in the same PBSS
* Within an IBSS: both the transmitting STA and the recipient STA participate in the same IBSS
* dot11RSNAActivated: reference to the setting of dot11RSNAActivated at the STA or the MLD that needs to determine whether a transmission or reception is permitted.

***Change the description of the Data frames and Management frames of Class 3 frame in the sixth paragraph as follows:***

The frame classes are defined as follows:

* Class 3 frames
* Data frames
* Data frames between STAs in an infrastructure BSS or in an MBSS
* Data frames between an AP MLD and a non-AP MLD associated with the AP MLD
* Management frames
* In an infrastructure BSS, an MBSS, or a PBSS, all Action and Action No Ack frames except those that are declared to be Class 1 or Class 2 frames
* Between an AP MLD and a non-AP MLD associated with the AP MLD, all Action and Action No Ack frames except those that are declared to be Class 1 or Class 2 frames

***Insert the following paragraph after the eighth paragraph (“A STA shall not transmit Class 2 ...”):***

A STA affiliated with an MLD shall not transmit Class 2 frames unless the MLD is in State 2 or State 3 or State 4.

***Insert the following paragraphs after the now-shifted tenth paragraph (“A STA shall not transmit Class 3 ...”):***

A STA affiliated with an MLD shall not transmit Class 3 frames unless the MLD is in State 3 or State 4.

NOTE—Frames transmissions on a link between an AP MLD and a non-AP MLD associated with the AP MLD is subject to additional constraints (see 35.3.6 (Link management)).