### IEEE P802.11 Wireless LANs

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| 11be D1.0 CR for 35.3.11 and 35.3.12 | | | | |
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Abstract

This submission proposes resolutions for the following CIDs:

6029, 6030, 6679, 6680, 6681, 6682, 6683, 6710, 7512

6308, 6736, 8200, 8201, 8202, 8203, 8242, 8243, 8244

6377

Revisions:

* Rev 0: Initial version of the document.

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.0 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** |
| 6679 | Rajat Pushkarna | 10.3.2.14.2 | 167.61 | "An MLD with dot11QMFActivated equal to false maintains one sequence number space that is used...". "A single sequence number space" seems more proper than "one sequence number space". | Replace one with "a single". | Accepted - |
| 6680 | Rajat Pushkarna | 10.3.2.14.2 | 168.15 | "A STA affiliated with an MLD shall support SNS9 instead of SNS2 in Table 10-5 ..." The phrase "shall support" is confusing, does this mean a separate SNS9 is maintained by each of the STAs of the MLD and not a single SNS9 at the MLD level? SNS9 should be maintained by the MLD itself and not by individual STAs. | change the sentence as "An MLD shall support SNS9 instead of SNS2 in Table 10-5 ..." | Revised –  In the baseline, SNS2 is maintained by the STA, so the proposed text is not entirely correct.  We simply directly clarify that SNS9 is maintained by the MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6680. |
| 6681 | Rajat Pushkarna | 10.3.2.14.2 | 168.18 | "A STA affiliated with an MLD shall support SNS10 instead of SNS1 in Table 10-5 ..." The phrase "shall support" is confusing, does this mean a separate SNS10 is maintained by each of the STAs of the MLD and not a single SNS10 at the MLD level? SNS10 should be maintained by the MLD itself and not by individual STAs. | change the sentence as "An MLD shall support SNS10 instead of SNS1 in Table 10-5 ..." | Revised –  In the baseline, SNS1 is maintained by the STA, so the proposed text is not entirely correct.  We simply directly clarify that SNS10 is maintained by the MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6681. |
| 6682 | Rajat Pushkarna | 10.3.2.14.2 | 170.01 | "All STAs affiliated with an MLD shall implement RC14 instead of RC2 in Table 10-6..." Is RC14 implemented at STA level and not at MLD level? Why not simply have a single RC14 at MLD level? | change the sentence as: "An MLD shall implement RC14 instead of RC2 in Table 10-6 (Receiver caches) to discard duplicate individually addressed QoS Data frames belonging to a TID without BA negotiation that are transmitted from the STAs affiliated with the associated MLD." | Revised –  In the baseline, cache of RC2 is maintained by the STA, so the proposed text is not entirely correct.  We simply directly clarify that cache of RC14 is maintained by the MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6682. |
| 6683 | Rajat Pushkarna | 10.3.2.14.2 | 170.05 | "All STAs affiliated with an MLD with dot11QMFActivated equal to false shall implement RC15 instead of RC1 in Table 10-6..." Is RC15 implemented at STA level and not at MLD level? Why not simply have a single RC15 at MLD level? | change the sentence as: "An MLD with dot11QMFActivated equal to false shall implement RC15 instead of RC1 in Table 10-6 (Receiver caches) to discard duplicate individually addressed Management frame..." | Revised –  In the baseline, cache of RC1 is maintained by the STA, so the proposed text is not entirely correct.  We simply directly clarify that cache of RC15 is maintained by the MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6683. |
| 6029 | Liwen Chu | 10.3.2.14.3 | 171.08 | This should be applied to MLD instead of STA affiliated with MLD. The reason is that the retransmission and the initial transmission can be done through different links. | As in comment | Revised –  We simply directly clarify that cache of RC14 is maintained by the MLD. Any STA affiliated with the MLD receiving the data frame will use that cache maintained by the MLD to detect duplicate.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6682. |
| 6030 | Liwen Chu | 10.3.2.14.3 | 171.23 | This should be applied to MLD instead of STA affiliated with MLD. The reason is that the retransmission and the initial transmission can be done through different links. | As in comment | Revised –  We simply directly clarify that cache of RC15 is maintained by the MLD. Any STA affiliated with the MLD receiving the management frame will use that cache maintained by the MLD to detect duplicate.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6683. |
| 6710 | Rojan Chitrakar | 10.3.2.14.2 | 170.05 | "All STAs affiliated with an MLD with dot11QMFActivated equal to false shall implement RC15 instead of RC1 in Table 10-6..." Is RC15 implemented at STA level and not at MLD level? Why not simply have a single RC15 at MLD level? | change the sentence as: "An MLD with dot11QMFActivated equal to false shall implement RC15 instead of RC1 in Table 10-6 (Receiver caches) to discard duplicate individually addressed Management frame..." | Revised –  In the baseline, cache of RC1 is maintained by the STA, so the proposed text is not entirely correct.  It is clear from “Multiplicity” column that there is only one cache in MLD level.  We simply directly clarify that cache of RC15 is maintained by the MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6683. |
| 7512 | Tomoko Adachi | 10.3.2.14.2 | 167.60 | "... that are used when an STA affiliated with the MLD transmits an individually addressed QoS Data frame to an STA affiliated with ...". For the term "STA", indefinite "a" is used. | Change it to read "... that are used when a STA affiliated with the MLD transmits an individually addressed QoS Data frame to a STA affiliated with ...". | Accepted - |
| 6308 | Ming Gan | 35.3.12 | 271.56 | subclause 35.3.11 and subclause 35.3.10 have almost the same content except that one is for Data frame and the other is Management frame. Please combine them into one subclause | as in the comment | Rejected –  We note that even if we combine the subclasues, it will still lead to separate sentences in most of the cases.  Combining description of data and management into one sentence will lead to “respective” description and does not necessarily make it easier to read. |
| 6736 | Rojan Chitrakar | 35.3.12 | 273.01 | Can the failed management frames be delivered on a link that is different from the link where it was originally transmitted? | Clarify whether a failed management frame can be delivered on a link that is different from the link where it was originally transmitted. | Rejected –  We already clarify that delivery frames on a link will subject to additional constraints. For example, if a link is disabled, then you can not transmit management frame on that link as described in the following texts in D1.0.  *If a link is disabled, it shall not be used for frame exchange, including Management frames both for DL and UL.* |
| 8200 | Yunbo Li | 35.3.11 | 272.26 | "another STA" is not correct, transmit other individually addressed QoS Data frames to the same receiving STA is also not allowed. | changes "another STA" to "any STA". | Revised –  “Another” is used to simply describe the peer STA of the setup link.  We revise the sentence to basically say that any STA can not transmit other data frame to another STA on the corresponding link.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 8200. |
| 8202 | Yunbo Li | 35.3.12 | 273.13 | "another STA" is not correct, transmit other individually addressed Management frames to the same receiving STA is also not allowed. | changes "another STA" to "any STA". | Revised –  “Another” is used to simply describe the peer STA of the setup link.  We revise the sentence to basically say that any STA can not transmit other management frame to another STA on the corresponding link.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 8202. |
| 8201 | Yunbo Li | 35.3.11 | 272.29 | "retry fail" is not accurate, the STA may retry several times, it should be "reach the retry limit". | as in comment | Revised –  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 8201. |
| 8203 | Yunbo Li | 35.3.12 | 273.15 | "retry fail" is not accurate, the STA may retry several times, it should be "reach the retry limit". | as in comment | Revised –  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 8203. |
| 8242 | Yuxin LU | 35.3.11 | 271.59 | I suppose only enabled links can be used for data delivery. Suggest to change "on the setup links" to "on the enabled links" | As in comment | Rejected –  This is already covered by “subject to additional constraints in 35.3.6 (Link management).” |
| 8243 | Yuxin LU | 35.3.11 | 272.17 | I suppose only enabled links can be used for data delivery. Suggest to change "on the setup links" to "on the enabled links" | As in comment | Rejected –  This is already covered by “subject to additional constraints in 35.3.6 (Link management).” |
| 8244 | Yuxin LU | 35.3.11 | 272.18 | Change "any of the following conditions occur" to "any of the following conditions occurs" | As in comment | Accepted - |
| 6377 | Morteza Mehrnoush | 35.3.14.8 | 281.8 | What happens to the retry counter in this case? Does the retry counter on the first link will be reset when frame is sent on another link? Or we have one retry counter per link and the retry counter will be updated per link corresponsingly? | Please add more clarification in response to the question in the comment. | Revised –  Retry counter is only relevant when there is no negoatied BA.  Based on the offline discussion, how to maintain retry counter can be implementation specific. Further, the retry limit is never conveyed to the peer anyway, so we propose to just keep the maintenance and limit of retry counter implementation specific.  We also observe the missing texts for A-MSDU timer and add the missing texts for MLD.  TGbe editor to make the changes shown in 11-21/1360r0 under all headings that include CID 6377. |

**Discussion for CID 6377:**

Baseline has the following texts on A-MSDU timer, so we need to have corresponding texts for MLD.

*When A-MSDU aggregation is used, the HT STA maintains a single timer for the whole A-MSDU. The timer  
is restarted each time an MSDU is added to the A-MSDU. The result of this procedure is that no MSDU in the  
A-MSDU is discarded before a period of dot11EDCATableMSDULifetime has elapsed.*

Relevant spec texts in 802.11-2020 about frame retry count are provided below.

***10.23.2.12 Retransmit procedures  
10.23.2.12.1 General***

*A QoS STA shall maintain a frame retry count for each MSDU, A-MSDU, or MMPDU that belongs to a TC  
that requires acknowledgment. The initial value for the frame retry count shall be 0.*

*The frame retry count for an MSDU or A-MSDU that is not part of a block ack agreement or for an MMPDU shall be incremented every time transmission fails for that MSDU, A-MSDU, or MMPDU, including of an associated RTS.*

*Retries for failed transmission attempts shall continue until one or more of the following conditions occur:  
— The frame retry count for the MSDU, A-MSDU, or MMPDU is equal to dot11ShortRetryLimit.*

*For internal collisions, the frame retry counts associated with the MSDUs, A-MSDUs, or MMPDUs involved  
in the internal collision shall be incremented.*

***10.23.2.2 EDCA backoff procedure***

*If the backoff procedure is invoked for reason c), d), or e) above, CW[AC] and QSRC[AC] shall be updated as  
follows:  
— If QSRC[AC] is less than dot11ShortRetryLimit,  
— QSRC[AC] shall be incremented by 1.  
— CW[AC] shall be set to the lesser of CWmax[AC] and 2QSRC[AC] × (CWmin[AC] + 1) – 1.  
— Else  
— QSRC[AC] shall be set to 0.  
— CW[AC] shall be set to CWmin[AC]*

Due to the fact that maintain retry counter and retry limit can be implementation specific. We propose to keep them implementation specific.

**Propose:**

***TGbe editor: Modify 10.3.2.14 Duplicate detection and recovery as follows (track change on):***

**10.3.2.14 Duplicate detection and recovery** **10.3.2.14.2 Transmitter requirements *Change the first paragraph as follows:***

A STA maintains one or more sequence number spaces that are used when transmitting a frame to determine

the sequence number for the frame. (#2751)An MLD maintains one or more sequence number spaces that are used when a(#7512) STA affiliated with the MLD transmits an individually addressed QoS Data frame to a(#7512) STA affiliated with an associated MLD to determine the sequence number for the frame. (#2496)An MLD with dot11QMFActivated equal to false maintains a single(#6679) sequence number space that is used when a STA affiliated with the MLD transmits an individually addressed Management frame (except the frames that are excluded in 35.3.13 (Multi-link device individually addressed Management frame delivery(#2496))) to a STA affili- ated with another MLD to determine the sequence number for the frame. When multiple sequence number spaces are supported, the appropriate sequence number space is determined by information from the MAC con- trol fields of the frame to be transmitted. Except as noted below, each sequence number space is represented by a modulo 4096 counter, starting at 0 and incrementing by 1, for each MSDU or MMPDU transmitted using that sequence number space. If dot11MACPrivacyActivated is true, the counter in each sequence number space shall be set to a random number modulo 4096 when the STA’s MAC address is changed.

***Change the fourth paragraph as follows:***

A transmitting STA shall support the applicable sequence number spaces defined in [Table 10-5 (Transmitter](#bookmark2) [sequence number spaces)](#bookmark2). An MLD shall support the applicable sequence number spaces defined in [Table 10-5 (Transmitter sequence number spaces)](#bookmark2). (#2751)A STA affiliated with an MLD shall support SNS9 mainatined by the MLD(#6680) instead of SNS2 in [Table 10-5 (Transmitter sequence number spaces](#bookmark2)) to determine the sequence num- ber of an individually addressed QoS Data frame that is transmitted to a STA affiliated with the associated MLD. (#2496)A STA affiliated with an MLD shall support SNS10 maintained by the MLD(#6681) instead of SNS1 in [Table 10-5 (Trans-](#bookmark2) [mitter sequence number spaces](#bookmark2)) to determine the sequence number of an individually addressed Manage- ment frame (except the frames that are excluded in 35.3.13 (Multi-link device individually addressed Management frame delivery(#2496))) that is transmitted to a STA affiliated with another MLD. Applicabil- ity is defined by the Applies to column. The Status column indicates the level of support that is required if the Applies to column matches the transmission. The Multiplicity column indicates whether the sequence number space contains a single counter, or multiple counters and in the latter case identifies any indexes.

The Transmitter requirements column identifies requirements for the operation of this sequence number space. The referenced requirements are defined at the end of the table.

***Insert two new rows to*** [***Table 10-5 (Transmitter sequence number spaces)***](#bookmark2)***:***.

**Table 10-5—Transmitter sequence number spaces**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sequence number space identifier** | **Sequence number space** | **Applies to** | **Status** | **Multiplicity** | **Transmitter requirements** |
| SNS9(#27 51) | Individually addressed QoS Data | Any STA affiliated with an MLD transmitting an individ- ually addressed QoS Data frame that is not a QoS(+) Null frame to a STA affiliated with the associated MLD.(#1162)(#2751) | Mandatory | Indexed by  <MLD MAC  Address that the STA iden- tified by Address 1 is affiliated with, TID> per MLD |  |
| SNS10(#2 | Individually | Any STA affiliated with an | Manda- | Indexed by |  |
| 496) | addressed | MLD transmitting an individ- | tory(#2496) | <MLD MAC |
|  | Management | ually addressed Management |  | Address that |
|  | frame (except | frame (except the frames that |  | the STA iden- |
|  | the frames | are excluded in 35.3.13 |  | tified by |
|  | that are | (Multi-link device individu- |  | Address 1 is |
|  | excluded in | ally addressed Management |  | affiliated |
|  | 35.3.13 | frame delivery(#2496))) to a |  | with> per |
|  | (Multi-link  device indi- | STA affiliated with another  MLD.(#2496) |  | MLD(#2496) |
|  | vidually |  |  |  |
|  | addressed |  |  |  |
|  | Management |  |  |  |
|  | frame deliv- |  |  |  |
|  | ery(#2496)))( |  |  |  |
|  | #2496) |  |  |  |

**10.3.2.14.3 Receiver requirements**

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

A STA maintains one or more duplicate detection caches. An MLD maintains one or more duplicate detection caches. [Table 10-6 (Receiver caches)](#bookmark3) defines the conditions under which a duplication detection cache is sup- ported and the rules followed by the receiver for the cache. When a Data, Management or Extension frame is received, a record of that frame is inserted in an appropriate cache. That record is identified by a sequence num- ber and possibly other information from the MAC control fields of the frame. When a Data, Management or Extension frame is received in which the Retry subfield of the Frame Control field is equal to 1, the appropriate cache, if any, is searched for a matching frame. In DMG, when a group addressed frame is received the appro- priate cache is searched for a matching frame. When a PV1 Data frame or PV1 Management frame is received, the appropriate cache is searched for a matching frame, regardless of the presence of the Retry sub- field of the Frame Control field. If the search is successful, the frame is considered to be a duplicate. Duplicate frames are discarded.

***Change the third paragraph as follows:***

A receiving STA shall implement the applicable receiver requirements defined in [Table 10-6 (Receiver](#bookmark3) [caches)](#bookmark3) with Status indicated as Mandatory. An MLD shall implement the applicable receiver requirements defined in [Table 10-6 (Receiver caches](#bookmark3)) with Status indicated as Mandatory. (#2751)All STAs affiliated with an MLD shall implement RC14, where the duplicate detection cache is mainated by the MLD,(#6682) instead of RC2 in [Table 10-6 (Receiver caches](#bookmark3)) to assist the MLD in discarding duplicate individually addressed QoS Data frames belonging to a TID without BA negotiation that are transmitted from the STAs affiliated with the associated MLD. (#2496)All STAs affiliated with an MLD with dot11QMFActivated equal to false shall implement RC15, where the duplicate detection cache is mainated by the MLD,(#6683) instead of RC1 in [Table 10-6](#bookmark3) [(Receiver caches](#bookmark3)) to assist the MLD in discarding duplicate individually addressed Management frame (except the frames that are excluded in 35.3.13 (Multi-link device individually addressed Management frame delivery(#2496))) that are transmitted from the STAs affiliated with the associated MLD. A receiving STA should implement the applicable receiver requirements defined in [Table 10-6 (Receiver caches)](#bookmark3) with Status indicated as Recommended. A receiving STA may implement the applicable receiver requirements defined in [Table 10-6 (Receiver caches)](#bookmark3) with Status indicated as Optional. Applicability is defined by the Applies to column. The Status column indicates the level of support that is required if the Applies to column matches the received frame. The Multiplicity / Cache size column indicates the indexes that identify a cache entry and the number of entries that shall be supported. The Receiver requirements column identifies requirements for the operation of this cache. The referenced requirements are defined at the end of the table. The requirements relate to caching information that identifies a cache entry and discarding duplicate MPDUs.

***Change the existing rows RC1 and RC2, insert two new rows and a new footnote after RR6 to*** [***Table 10-6 (Receiver caches)***](#bookmark3)***:***

**Table 10-6—Receiver caches**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Receiver cache identifier** | **Cache name** | **Applies to** | **Status** | **Multiplicity / Cache size** | **Receiver requirements** |
| RC1 | Not QoS Data | A STA receiving frames (individually or group addressed) that are not QoS Data, excluding if supported:  RC4 RC5 RC6 RC7 RC8 RC10  RC15(#2496) | Mandatory | Indexed by: <Address 2, sequence number, frag- ment number>.  At least the most recent cache entry per  <Address 2>. | RR1 RR2 RR5 |
| RC2 | QoS Data | A STA receiving an (indi- vidually or group addressed) QoS Data frame, excluding RC3, and if supported:  RC7, RC8, RC9, ~~and~~  RC10, and RC14(#1163)(#2751) | Mandatory | Indexed by: <Address 2, TID, sequence number, fragment number>.  At least the most recent cache entry per  <Address 2, TID> pair in this cache. | RR1 RR5 |

**Table 10-6—Receiver caches *(continued)***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Receiver cache identifier** | **Cache name** | **Applies to** | **Status** | **Multiplicity / Cache size** | **Receiver requirements** |
| RC14(#275 1) | Individu ally addresse d QoS Data | Any STA affiliated with an MLD receiving an individually addressed QoS Data frame that is not a QoS(+) Null frame from a STA affiliated with the associated MLD.(#1163)(#2751) | Mandatory | Indexed by <MLD MAC address that the STA identified by Address 2 is affiliated with, TID, sequence number> per MLD.  At least the most recent cache entry per <MLD MAC address that the STA identified by Address 2 is affiliated with, TID> pair in this cache.(#2751) | RR7(#2751) |
| RC15(#249 6) | Individ- ually addresse d Man- age- ment frame (except the frames that are exclude d in 35.3.13  (Multi- link device individ- ually addresse d Man- age- ment frame deliv- ery(#24 96)))(#2  496) | Any STA affiliated with an MLD with dot11QMFActivated equal to false receiving an individually addressed Management frame (except the frames that are excluded in 35.3.13 (Multi-link device individually addressed Management frame delivery(#2496))) from a STA affiliated with another MLD.(#2496) | Mandatory( #2496) | Indexed by <MLD MAC address that the STA identified by Address 2 is affiliated with, sequence number> per MLD. At least the most recent cache entry per MLD MAC address that the STA identified by Address 2 is affiliated with in this cache.(#2496) | RR7(#2496) |
| (#2751)RR7: The MLD shall discard the frame if the Retry subfield of the Frame Control field is 1 and it matches an entry in the cache. | | | | | |

***TGbe editor: Modify 35.3.12 (Multi-link device individually addressed data delivery without block ack negotiation) and 35.3.13 Multi-link device individually addressed Management frame delivery as follows (track change on):***

**35.3.12 Multi-link device individually addressed data delivery without block ack negotiation**

An MLD may deliver individually addressed QoS Data frames belonging to a TID without block ack negotiation to an associated MLD on the setup links subject to additional constraints in [35.3.6 (Link](#bookmark18) [management)](#bookmark18).

An MLD shall follow the rules described in 10.3.2.14.2 (Transmitter requirements) to determine the sequence number of an individually addressed QoS Data frame belonging to a TID that is delivered to the associated MLD.

An MLD shall follow the rules as described in 10.3.2.14.3 (Receiver requirements) to discard duplicate individually addressed QoS Data frames belonging to a TID without block ack negotiation that are delivered from the associated MLD.

(#2328)An MLD shall maintain a transmit MSDU timer for each MSDU passed to the MAC. The transmit MSDU timer shall be started when the MSDU is passed to the MAC. STAs affiliated with an MLD shall have the same dot11EDCATableMSDULifetime.

When A-MSDU aggregation is used, the MLD maintains a single timer for the whole A-MSDU. The timer  
is restarted each time an MSDU is added to the A-MSDU. The result of this procedure is that no MSDU in the A-MSDU is discarded before a period of dot11EDCATableMSDULifetime has elapsed.(#6377)

For an MLD, the frame retry count and retry limit for each MSDU or A-MSDU that belongs to a TC that requires acknowledgment is implementation specific. (#6377)

(#2328)An MLD shall continue to deliver the failed individually addressed QoS Data frame belonging to a TID without block ack negotiation to an associated MLD on the setup links subject to additional constraints (see [35.3.6 (Link management)](#bookmark18)) until any of the following conditions occurs: (#8244)

* The retry limit is met.
* The transmit MSDU timer for the MSDU exceeds dot11EDCATableMSDULifetime.
* The individually addressed QoS Data frame is successfully delivered.

(#1174)Any(#8200) STA affiliated with the MLD shall not transmit other individually addressed QoS Data frames belonging to the TID without block ack negotiation to another STA affiliated with the associated MLD, where the another STA affiliated with the associated MLD has a setup link with the STA affiliated with the MLD,(#8200) while the current individually addressed QoS Data frame belonging to the TID without block ack negotiation has not yet completed to the point of success, reaching retry limit, (#8201) or other MAC discard (e.g., lifetime expiration).

**35.3.13 Multi-link device individually addressed Management frame delivery(#2496)**

The following individually addressed Management frames are excluded from the rules defined in this subclause.

* + - * CSI frame
      * Noncompressed Beamforming frame
      * Compressed Beamforming frame
      * VHT Compressed Beamforming frame
      * HE Compressed Beamforming/CQI frame
      * EHT Compressed Beamforming/CQI frame
      * Probe Response frame
      * LMR frame
      * FTM frame

An MLD with dot11QMFActivated equal to false shall follow the rules described in 10.3.2.14.2 (Transmitter requirements) to determine the sequence number of an individually addressed Management frame (except the frames that are excluded above) that is delivered to the associated MLD.

An MLD with dot11QMFActivated equal to false shall follow the rules as described in 10.3.2.14.3 (Receiver requirements) to discard duplicate individually addressed Management frames (except the frames that are excluded above) that are delivered from the associated MLD.

An MLD with dot11QMFActivated equal to false shall maintain a transmit MMPDU timer for each MMPDU (except the frames that are excluded above). The transmit MMPDU timer shall be started when the MMPDU is passed to the MAC.

For an MLD with dot11QMFActivated equal to false, the frame retry count and retry limit for each MMPDU that belongs to a TC that requires acknowledgment is implementation specific. (#6377)

An MLD with dot11QMFActivated equal to false shall continue to deliver the failed individually addressed Management frame (except the frames that are excluded above) to an associated MLD on the setup links subject to additional constraints (see [35.3.6 (Link management)](#bookmark18))) until any of the following conditions occurs: (#8244)

* + - * The retry limit is met.
      * The transmit MMPDU timer for the MMPDU exceeds dot11EDCATableMSDULifetime.
      * The individually addressed Management frame is successfully delivered.

Any(#8202) STA affiliated with the MLD with dot11QMFActivated equal to false shall not transmit other individually addressed Management frames (except the frames that are excluded above) to another STA affiliated with the associated MLD, where the another STA affiliated with the associated MLD has a setup link with the STA affiliated with the MLD, (#8202) while the current individually addressed Management frame (except the frames that are excluded above) has not yet completed to the point of success, reaching retry limit, (#8203) or other MAC discard (e.g., lifetime expiration).