IEEE P802.11
Wireless LANs

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| 802.11bi – Clause 10.71.2.2 |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Antonio de la Oliva | Interdigital Ltd, UC3M |  |  | aoliva@it.uc3m.es |
| Joseph Levy | Interdigital Ltd. |  |  |  |

Abstract

This submission addresses the comments with CID: 2030, 2031, 2049, 2068, 2145, 2194, 2195, 2217, 2218, 2219, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2232, 2233, 2234, 2235, 2358, 2360, 2361, 2395, 2398, 2477.

**Comment Resolution**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page(C)** | **Line(C)** | **Comment** | **Proposed Change** | **Resolution** |
| 2030 | 10.71.2.2 | 95 | 60 | "The non-AP MLD may include in an encrypted (Re)Association Request frame an EPP element indicating the parameters for the EPP group it requests to join." How can it do that if the AP, it is not shown how the AP advertizes the epochs. Back at line 54, need to add that the AP MLD includes the EPP Epoch Setting field somewhere, presumably in the beacon or association response or what? | At 95.54 need to add how AP advertizes epochs so STA knows what to do at line 60. | REVISEA note has been added explaining the behavior Editor please implement changes tagged as (2030) in this document.  |
| 2031 | 10.71.2.2 | 97 | 19 | "The CPE AP MLD may create the new EPP group with the received parameters." OK, but what's important is that there are enough members of the epoch to make it useful. For example a group of 1 would be useless, maybe 10 is a minimum number (I don't know). Just agreeing to what the STA wants is not good. Maybe add a note to state that the AP should try to place enough STAs in each epoch? | Add a note somewhere to the effect that epochs should be formed with enough members to provide the anonimity that they crave. | REVISEDText has been included to explain this behaviorEditor please implement changes tagged as (2031) in this document. |
| 2049 | 10.71.2.2 | 97 | 58 | The sentence describes a comparison, not an assignment. | Change "set to" to "equal to". There is the same issue at P119.54, P119.65, P152.50, P153.14, P162.15, P163.21, P163.24, P164.02, P164.29, P165.39 and P165.43. | ACCEPT |
|  |  |  |  |  |  |  |
| 2068 | 10.71.2.2 | 97 | 15 | indicating "Create" -> "Create" is now "Create/Join" | ..indicating "Create/Join"... | ACCEPT |
| 2145 | 10.71.2.2 | 97 | 27 | Add words to sentence | Change "specified in (Re)Association Request frame." to "specified in the earlier (Re)Association Request frame." | REVISEDUsed a received instead of earlierEditor please implement changes tagged as (2219) in this document. |
| 2194 | 10.71.2.2 | 96 | 31 | Paragraoh: "Within the EPP element:-- If the Epoch Start Time Variation Range field is present, the Epoch Start Time Variation Range fieldvalue shall not exceed 20% of the Epoch Interval Length subfield value.-- If the Group Epoch Seed field is present, the Group Epoch Seed field value shall be the same foreach transmission to any member of an EPP group for a given EPP Epoch sequence. An EPP APshall select a new random Group Epoch Seed value for each EPP Epoch sequence."Should not be there, it should be moved to page 97 after paragraph "The CPE AP MLD shall not include an AID Storage Size or the Minimum Epoch Pacing fields on transmitted EPP Epoch Settings fields." | As per comment | ACCEPT |
| 2195 | 10.71.2.2 | 97 | 35 | Indicating "Join" should be indicating "Create/Join" | As per comment | ACCEPT |
| 2217 | 10.71.2.2 | 95 | 55 | Add "A BPE AP MLD advertises the support for EPP group operations in Privacy Beacon frames by setting the Group EPP Epoch Supported field of the Extended RSN Capabilities field of the RSNXE to 1" | As in comment | REJECTThe Privacy Beacon does not carry a RSNXE. |
| 2218 | 10.71.2.2 | 95 | 60 | Change "The non-AP MLD may include" to "A CPE non-AP MLD may include" | As in comment | REVISEChange has been applied although the phrase changed due to other comments.Editor please implement changes tagged as (2218) in this document. |
| 2219 | 10.71.2.2 | 95 | 61 | Change "If no EPP element is included in the encrypted (Re)Association Request frame, the AP MLD assigns the CPE non-AP MLD to the default EPP group" to "If no EPP element is included in a received encrypted (Re)Association Request frame, the AP MLD assigns the requesting CPE non-AP MLD to the default EPP group" | As in comment | REJECTEDThe phrase do not longer exist due to other CIDs changes. |
| 2221 | 10.71.2.2 | 95 | 65 | if "EPP epoch number" is a noun, then "epoch is a number" is not true. If we intend to use "number" as a verb, it's better to say "numbered". BTW, P100L20 considers it as a noun. | Change to "The first EPP epoch of an EPP epoch sequence has EPP epoch number 0".Or change to "The first EPP epoch of an EPP epoch sequence is an EPP epoch numbered 0" | REVISEDThe second writing is preferred. Editor please implement changes tagged as (2221) in this document. |
| 2222 | 10.71.2.2 | 96 | 1 | Change " (Re)Association Request frames" to "encrypted (Re)Association Request frames" | As in comment | ACCEPT |
| 2223 | 10.71.2.2 | 96 | 4 | Remove the first bullet, since EPP Epoch Settings Control field is not optional field in 9.4.1.84 EPP Epoch Settings field. | As in comment | ACCEPT |
| 2224 | 10.71.2.2 | 96 | 7 | Remove the second bullet, and add a new paragraph "Within the EPP Epoch Settings field sent in encrypted (Re)Association Request frames, EPP Epoch Request frames and EPP Epoch Response frames, the CPE non-AP MLD indicates in the Epoch Interval field the desired duration of the EPP epoch the CPE non-AP MLD wants to join", or describe the meaning of the field in clause 9. | As in comment | REVISEDEditor please implement changes tagged as (2224) in this document. |
| 2225 | 10.71.2.2 | 96 | 13 | Restructure the lines 13 ~ 26, to be "The CPE non-AP MLD may include an EPP Group ID field in the EPP Epoch Settings field indicating ... The CPE non-AP MLD may include a Minimum Epoch Pacing field in the EPP Epoch Settings field indicating ... The rest of the fields in the EPP Epoch Settings field shall not be transmitted by a CPE non-AP MLD. | As in comment | REVISEDExplanation of the Group ID has been added but the bullet points have not been removed. Creating a paragraph out of these two bullets breaks the text flow and requires a lot of repetition of the conditions.Editor please implement changes tagged as (2225) |
| 2226 | 10.71.2.2 | 96 | 31 | It should be an EPP element transmitted by an AP. Remember that the previous paragraph says "The rest of the fields in the EPP Epoch Settings field shall not be transmitted by a CPE non-AP MLD" | Change to "Within an EPP element transmitted by an EPP AP"And move this paragraph to P97L9, since it is AP's behaviour.And add EPP element into (Re)Association Response frame body in clause 9. | REVISEDMinor changes in writing, instead of AP it should be EPP AP MLDEditor please implement the changes tagged as. (2226) in this document. |
| 2227 | 10.71.2.2 | 96 | 45 | It is not clear in which frame the Minimum Epoch Pacing Parameters field is carried. | Change to: The assigned EPP epoch durationshall not be shorter than indicated in the Minimum Epoch Pacing Parameters field of the corresponding encrypted (Re)Association Request frame. | REVISEDMinimum Pacing can be transmitted in encrypted (Re)Association Request frames, EPP Epoch Request frames and EPP Epoch Response frames, as indicated in the text.To make it clear, I have added the frames to the description.Editor please implement changes tagged as (2227) in this document. |
| 2228 | 10.71.2.2 | 96 | 48 | Add "encrypted" before "(Re)Association" in P96L48, P96L52, P97L5, P97L54, P100L4. | As in comment | ACCEPTEditor please implement changes tagged as (2228) in this document. |
| 2229 | 10.71.2.2 | 96 | 56 | Remove the first bullet and the third bullet, since EPP Epoch Settings Control field and Epoch Interval field are not optional fields by definition. | As in comment | REVISEFirst and second bullets have been removed as requested.Editor please implement changes tagged as (2229) (2223) and (2224) in this document. |
| 2230 | 10.71.2.2 | 97 | 8 | EPP element is not included in all the frames mentioned at the first line of the paragraph, so we should refer only to the EPP Epoch Settings field. | Remove "within the EPP element" | ACCEPT |
| 2232 | 10.71.2.2 | 97 | 19 | "the received parameters" from which frames? | Change to "with the received parameters indicated in (Re)Association Request frames, EPP Epoch Request frames and EPP Epoch Response frames" | REVISEDThis text refers to the received Epoch Request frame as the paragraph above.Editor please implement changes tagged as (2232) in this document. |
| 2233 | 10.71.2.2 | 97 | 36 | When joining an existing group, no parameter needed other than EPP Group ID. | Change "the parameters of the EPPgroup it requests to join" to "the EPP group ID of the EPP group it requests to join" | REJECTED EPP Interval field is mandatory so only the GROUP ID cannot be sent. |
| 2234 | 10.71.2.2 | 97 | 43 | Change "the newly joined EPP group" to "the newly assigned EPP group", since it is talking about CPE AP MLD's behavior. | As in comment | REVISEDMinor writing changes.Editor please implement the changes tagged as (2234) in this document. |
| 2235 | 10.71.2.2 | 97 | 65 | Change to "of the EPP Epoch Settings field (considering the operations in 10.71.2.4 (EPP Epoch Start Time Computation)) in the received EPP Epoch Response frame or EPP Epoch Assignment frame. | As in comment | ACCEPT |
| 2358 | 10.71.2.2 | 95 | 62 | The default EPP element shall be included in the (Re)Assication Response if no EPP element is provided by the STA in the (RE) Association Request frame. Otherwise the STA cannot get EPP parameters. | As in comment | REVISEDEditor please implement the changes tagged as (2358) in this document. |
| 2360 | 10.71.2.2 | 97 | 31 | For the Join procedure, why don't use only the EPP Group ID to indicate which group the CPE non-AP MLD wants to join as required parameter rather than the EPP Epoch Settings Control field and the Epoch Interval field? | Please indicate that the join can be done with the group id and AID Storage Size field only. Or clarify what are the benefits to include the EPP Epoch Settings Control field and Epoch Interval field in the join procedure. | REJECTEDThe EPP Settings field does not allow the transmission of only the Group ID and AID Storage Size field.In general, the non-APMLD does not know the Group ID and the only information relevant is the duration of the Epoch. |
| 2361 | 10.71.2.2 | 95 | 50 | Assign and allocate are used to say that a CPE non-AP MLD is admitted in a group, could be good to have uniform wording. | as in the comment | REVISEDThe occurrence of Allocate has been modified to Assing.Editor please implement changes tagged as (2361) in this document. |
|  |  |  |  |  |  |  |
| 2395 | 10.71.2.2 | 96 | 31 | My understanding is that the text in lines 31-37 are details of the EPP element created by the CPE AP MLD. In the current localion, this text reads as details of the EPP element created by the CPE non-AP MLD. The text should be moved to a more appropriate location. | Move the text in page 96 lines 31 to 37 to page 97 line 4. | REVISEDText has been moved, but to P97 L 9.Editor please implement changes tagged with (2226) in this document. |
| 2398 | 10.71.2.2 | 97 | 61 | Regarding the text "as per 10.71.3 (Establishing CPEMAC header anonymization parameter sets)":if BPE is enabled, then "10.71.4 (Establishing BPE MAC header anonymization parameter sets)". | Append the following to the identified text:" and (if applicable) as per 10.71.4 (Establishing BPE MAC header anonymization parameter sets)" | REJECTThe paragraph considers the transition between EPP Groups, which is never allowed in BPE. Therefore the text is not required. |
| 2477 | 10.71.2.2 | 95 | 62 | Why does AP need to always assign STA to default EPP Group in this case? AP should be able to assign a STA to any EPP group for better distribution of STAs across EPP groups, if no EPP element is received from the STA. | Suggest to support AP logic where if STA does not provide any EPP element in (Re)Assoc Request, AP can assign STA to any epoch group and not always to a default EPP group. | REJECTThe group prefers to have a clear procedure, by which the result is always known for the association. In case the non-AP MLD wants to change group, it can, or in case the AP wants to modify the group, it also can do it. |

Proposed resolution

**EPP group operations**

A CPE AP MLD advertises the support for EPP group operations in Beacon and Probe Response frames by setting the Group EPP Epoch Supported field of the Extended RSN Capabilities field of the RSNXE to 1.

A non-AP MLD advertises the support for EPP epoch group operations in (Re)Association Request frames by setting the Group EPP Epoch Supported field of the Extended RSN Capabilities field of the RSNXE to 1.

(2218) A CPE non-AP MLD shall (2030) include in an encrypted (Re)Association Request frame an EPP element indicating the parameters for the EPP group it requests to join. (2030)

NOTE: The EPP parameters indicated in the (Re)Association Request frame correspond to the desired parameters by the CPE non-AP MLD. These parameters do not need to match the parameters of any EPP group existing in the AP MLD. (2030).

The first EPP epoch of an EPP epoch sequence is an EPP epoch numbered (2221) 0.

Within the EPP Epoch Settings field sent in encrypted (2222) (Re)Association Request frames, EPP Epoch Request frames and EPP Epoch Response frames, the CPE non-AP MLD indicates in the Epoch Interval field the desired duration of the EPP epoch the CPE non-AP MLD wants to join, and shall include an AID Storage Size field indicating the number of AIDs the CPE non-AP MLD is capable of storing. (2224)

~~shall include the following fields:~~ (2224)

~~An EPP Epoch Settings Control field, indicating the optional fields included in the EPP Epoch Settings field.~~ (2223)

~~An Epoch Interval field, indicating the desired duration of the EPP epoch the CPE non-AP MLD wants to join.~~ (2229)

~~An AID Storage Size field indicating the number of AIDs the CPE non-AP MLD is capable of storing.~~ (2224)

The CPE non-AP MLD may also include within the EPP Epoch Settings field sent in the encrypted (Re)Association Request frames, EPP Epoch Request frames and EPP Epoch Response frames, the following fields (2227):

* an EPP Group ID field indicating the identifier of the EPP Group the CPE non-AP MLD wants to join (2225), and
* a Minimum Epoch Pacing field.

The rest of the fields in the EPP Epoch Settings field shall not be transmitted by a CPE non-AP MLD. The Minimum Epoch Pacing field includes(#2136) the Minimum Epoch Pacing Parameters field, indicating the minimum epoch interval length supported by the CPE non-AP MLD. If the value resulting from(#2137) the multiplication of the Epoch Interval Length field by the Epoch Interval Unit field included in the Minimum Epoch Pacing field is greater than the value resulting from(#2138) the multiplication of the Epoch Interval Length field by the Epoch Interval Unit field for the default EPP group (group 0) or of any other EPP group already created, then the CPE non-AP MLD is not assigned to any EPP group at (re)association.

NOTE 1—The CPE non-AP MLD might remain associated without FA and might request the creation of a new EPP group (through the EPP Epoch Request frame (see 9.6.42.5 (EPP Epoch Request frame format))).

The CPE AP MLD, upon reception of the EPP element in an encrypted (Re)Association Request frame, shall assign the CPE non-AP MLD to the EPP group with parameters that best match the parameters requested, also considering the size of the available EPP groups (2031), (#2139) and shall include (2358) an EPP element in the encrypted (Re) Association Response frame, creating a new EPP group or assigning the CPE non-AP MLD to an already existing EPP group. The assigned EPP epoch duration shall not be shorter than indicated in the Minimum Epoch Pacing Parameters field.

The parameters of the assigned EPP group are provided to the CPE non-AP MLD through an EPP element in the encrypted (2228)(Re)Association Response frame. If no EPP element is included in the encrypted (2228) (Re)Association Response frame, the CPE non-AP MLD is not assigned to any EPP group.

A CPE AP MLD transmitting an (#2140) EPP Epoch Settings field in an (#2140) encrypted (2228) (Re)Association Response frame, EPP Epoch Response frames, EPP Epoch Assignment frames or EPP Groups Parameter frames shall include the following fields:

EPP Epoch Settings Control field indicating the optional fields included in the EPP Epoch Settings field.

EPP Group ID field.

Epoch Interval field.

Transition Period field.

First Epoch TSF Start Time, and associated Group Epoch Seed field.

Epoch Number Offset field.

Epoch Start Time Variation Range field.

Epochs Remaining field.

A CPE AP MLD transmitting EPP Epoch Settings fields in an(#2141) encrypted (2228) (Re)Association Response frame, EPP Epoch Response frames, EPP Epoch Assignment frames or EPP Groups Parameters frames may also include the Number Of Participating Affiliated STAs in the EPP Epoch Settings field ~~within the EPP element~~ (2230).

The CPE AP MLD shall not include an AID Storage Size or the Minimum Epoch Pacing fields in (#2142) transmitted EPP Epoch Settings fields.

(2226)(2194) an transmitted by an EPP AP MLD

An associated CPE non-AP MLD may request creation of a new EPP group by sending an EPP Epoch Request frame (see 9.6.42.5 (EPP Epoch Request frame format)) with an (#2143) Epoch Request field indicating “Create/Join (2068)” and indicating the parameters for the EPP group to be created in the EPP Epoch Settings field.

The CPE AP MLD may create a (#2144) new EPP group with the received parameters indicated in EPP Group Request frame (2232). Alternatively, the CPE AP MLD may assign (2361) the CPE non-AP MLD to an already existing EPP group with *similar* parameters. This may be signaled to the CPE non-AP MLD in an EPP Group Response frame setting the Status Code field to indicate SUCCESS\_SIMILAR\_EPOCH, and providing the EPP Epoch Settings field with the parameters of the EPP group. In this context, an EPP group with “similar parameters” refers to an existing EPP group whose epoch duration is equal or smaller than the one requested by the CPE non-AP MLD (i.e., most privacy-preserving). This choice is made while ensuring adherence to any pacing limits indicated in the Minimum Epoch Pacing Parameters field that the CPE non-AP MLD may specify in any transmitted EPP Epoch Settings field (2232). ~~has specified in previously in the received (2145) encrypted (2228) (Re)Association Request frame.~~

Once the CPE non-AP MLD is associated and has been assigned an EPP group, it may request to join a different EPP group. Information on the available EPP groups may be distributed periodically by the CPE AP MLD transmitting EPP Groups (#2146) Parameter frames. To join a different EPP group, the CPE non-AP MLD shall send an EPP Epoch Request frame (see 9.6.42.5 (EPP Epoch Request frame format)), indicating “Create/Join (2195)” in the Epoch Request field and providing the EPP Epoch Settings field indicating the parameters of the EPP group it requests to join.

Upon reception of the request, the CPE AP MLD may assign the CPE non-AP MLD to another EPP group and remove it from the previous EPP group. The result of the operation is indicated to the CPE non-AP MLD through an EPP Epoch (#2147) Response frame. This frame indicates in the Status Code field “SUCCESS”, and may include (2234) an optional EPP Epoch Settings field to indicate the parameters of the newly assigned (2234) EPP group.

The CPE AP MLD may request the associated CPE non-AP MLD to transition to a different EPP group, by sending an EPP Epoch Assignment frame to the associated CPE non-AP MLD including the EPP Epoch Settings field with the parameters of the suggested EPP group. The CPE non-AP MLD shall report the status of the operation by responding with an EPP Epoch Response frame. This operation allows the CPE AP MLD to reorganize the EPP groups in use. Following this reorganization, the resulting EPP groups should maintain the same level of restrictiveness or be even more restrictive, i.e., shorter epoch durations, while also respecting any pacing limits indicated in the Minimum Epoch Pacing Parameters field that the CPE non-AP MLD has specified in the encrypted (2228) (Re)Association Request frame.

Once the CPE non-AP MLD receives an EPP Epoch Response frame or transmits an EPP Epoch Response frame in response to an EPP Epoch Assignment frame signaling successful (Status code field set to SUCCESS, SUCCESS\_SIMILAR\_EPOCH, SUCCESS\_ALREADY\_EXISTING\_EPOCH or SUCCESS\_AID\_LIST\_PARTIALLY\_STORED) reception of new EPP group parameters, the CPE non-AP MLD shall compute the new MHA parameters for the current EPP epoch, as per 10.71.3 (Establishing CPE MAC header anonymization parameter sets), and apply them in the next epoch starting time as indicated by the First Epoch TSF Start Time field of the EPP Epoch Settings field (considering the operations in 10.71.2.4 (EPP Epoch Start Time Computation)) in the received EPP Group Response frame or EPP Group Assignment frame (2235).

**Comment 2049**

***Editor please do the following changes across the document***

Page 119.54

The BTM Query frame with the BSS Transition Query Reason field equal (2049) to a BPE AP MLD indicates that the non-AP

MLD is interested to only receive information of the available BPE AP MLDs.

Page 119.65

The non-AP STA may send an individually addressed encrypted Neighbor Report Request frame to request

Neighbor Report elements of available BPE AP MLDs in the ESS when the Radio Measurement Action

field is equal (2049) to Neighbor Report Request and the frame includes BPE AP MLD Discovery Request field and

Page 152.50

The Encapsulation Length field indicates 0 if the status is equal (2049) to STATUS\_INVALID\_AKMP.

Page 153.14

The Encapsulation Length field indicates 0 if the status is equal (2049) to STATUS\_INVALID\_AKMP.

Page 162.15

An FTO that sets the (Re)Association Frame Encryption Support field in the RSNXE to 1 and receives an

RSNXE from the FTR with the (Re)Association Frame Encryption Support field equal (2049) to 1 shall:

Page 163.21

Otherwise, an FTR that sets dot11EPPReAssociationFrameEncryptionSupportActivated to false or does not

receive the RSNXE in the first message of the FT protocol with the (Re)Association Frame Encryption Sup-

port field equal (2049) to 1 shall not include a Diffie-Hellman Parameter element in the second message of the FT pro-

tocol.

Page 163.24

After receiving the second message of the FT protocol with the status code equal (2049) to SUCCESS, an FTO shall:

Page 164.02

An originator that sets the (Re)Association Frame Encryption Support field in the RSNXE to 1 receives an

RSNXE from the responder with the (Re)Association Frame Encryption Support field equal (2049) to 1, and intends

to continue association after authentication shall do the following in the first Authentication frame:

Page 164.29

Otherwise, an originator that sets dot11EPPReAssociationFrameEncryptionSupportActivated to false or

does not receive the RSNXE from the responder with the (Re)Association Frame Encryption Support field

equal (2049) to 1 shall not include a Diffie-Hellman Parameter element nor an RSNE nor an RSNXE nor a Nonce ele-

ment in the first Authentication frame for IEEE 802.1X authentication.

Page 165.39

Otherwise, a responder that sets dot11EPPReAssociationFrameEncryptionSupportActivated to false or does

not receive the RSNXE in the first Authentication frame with the (Re)Association Frame Encryption Sup-

port field equal (2049) to 1 shall not include a Diffie-Hellman Parameter element nor a Nonce element nor an RSNE in

the second Authentication frame for IEEE 802.1X authentication.

Page 165.43.

After receiving the second Authentication frame with the status code equal (2049) to SUCCESS, an originator shall:

**Comment 2228**

***Editor make the following change to page 100 line 4***

Upon reception of an EPP Epoch Response frame, or of an encrypted (2228) (Re)Association Response frame containing an

EPP element on a link, the non-AP STA of a non-AP MLD shall: