IEEE P802.11
Wireless LANs

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| 11bi D0.4 CR for 10.71.2 Consolidation |
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Abstract

This submission proposes resolutions for the following CIDs:

1026

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 TGbi D0.4 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbi D0.4 Draft. (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents). TGbi Editor: Editing instructions preceded by “TGbi Editor” are instructions to the TGbi editor to modify existing material in the TGbi draft. As a result of adopting the changes, the TGbi editor will execute the instructions rather than copy them to the TGbi Draft.***

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| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1026 | Chaoming Luo | 10.71.2.2 | 55.45 | Many duplicate text in 10.71.2.2, 10.71.2.3 and 10.71.2.4 | Suggest to merge them into one subclause. | REVISED As per discussion below |

**Discussion:**

CID 1026

Revised

Fist, a short analysis of clauses in 10.71.2 EDP epoch operation (free-style one line summary from the authors if this document of the main components of each clause):

10.71.2.1 Introduction

Headers are anonymized within EDP epochs

MLO required

AP signals support in beacons/probe responses

AP advertises default and possibly other groups

A STA may be placed in the default group, or it can ask for different structure. Can leave groups at any time

AP advertises groups parameters, STA uses that.

Epochs are used to schedule anonymization of parameters

AP has single epoch for each STA

STA has at most one epoch

Epochs starts with a transition period: old parameters for retries, transition timeout.

10.71.2.2 EDP epoch request

STA includes Minimum epoch pacing element in (re)assoc frames, AP uses that to assign the STA to the default group, otherwise STA is not member of a group.

STA can ask to join or form a group. AP will respond with EDP epoch setting response frame. STA can leave a group by sending the EDP setting request.

10.71.2.3 Group EDP epoch

AP signals support in beacons/probe responses.

STA signals support in (re)assoc frames

Support is optional.

AP advertises groups with action frame with one Enhanced Group Privacy Availabilty element for each group.

AP advertises groups to each STA at assoc and upon significant group change

STA is member of only one group at a time

STA can request to join group by sending EDP epoch setting request

AP responds with EDP epoch setting response, yay/nay

STA leaves group by sending EDP epoch setting request

When in a group, STA STA anonimize OTA fields as described in 10.71.3, 5 and 6.

10.71.2.4 Group EDP epoch setup

STA signals support in (re)assoc frames

AP puts STA in default group.

Assoc response provides default group parameters

AP then sends other groups details

STA can then pick another group with EDP epoch setting request

10.71.2.5 Epoch boundaries

Epoch structure, start margin parameters

10.71.2.6 OTA address collision avoidance

OTA MAC collision risk and warning message.

There are some repeated themes, and some sentences that seem to start in one clause and finish their thoughts in another clause. What do these sections intend to say?

1. Intro, general overview

2. Not sure, epoch setup can include the epoch request – use to distinguish individual epoch from group

3. What is a group epoch

4. How are groups and epochs setup

There are duplicated statements between these clauses. Below is a copy/paste of sentences in each clause that seem to focus on the same theme and same (or complementary) meanings.

**On OTA anonymization:**

*A CPE AP and CPE STA anonymizes selected OTA MAC Header fields of individually addressed frames of the CPE STA within EDP epochs. (10.71.2.1)*

*EDP epoch operation allows the AP to define an MLD specific(#Ed) schedule of anonymization events to anonymize selected OTA fields (e.g., STA address, AID, PN, SN, etc.) of individually addressed frames. (10.71.2.1)*

*If a CPE non-AP MLD is a member of a group EDP epoch, the non-AP MLD and the AP MLD shall anonymize the selected OTA fields of the individually addressed frames according to group epoch settings as defined in 10.71.2.3 (Establishing frame anonymization parameter sets), 10.71.2.4 (MAC Header anonymization and transmitting functions), 10.71.2.5 (MAC header anonymization and receiving functions) and 10.71.2.6 (Frame anonymization and AID). (10.71.2.3)*

**Support for EDP Epoch, how it is signaled:**

*A CPE AP MLD signals support of the EDP epoch in beacons and probe responses. (10.71.2.1)*

*A CPE AP MLD advertises group EDP epoch support in Beacon and Probe Response frames by setting value 1 to the Group EDP Epoch Supported field of the Extended RSN Capabilities field.*

*A CPE non-AP MLD advertises group EDP epoch support in (Re)Association Request frames by setting value 1 to the Group EDP Epoch Supported field of the Extended RSN element. (10.71.2.3)*

*A CPE non-AP STA signals support for group EDP epoch by setting the Group EDP Epoch Supported field in the RSNXE in the (Re)Association Request Frame. (10.71.2.4)*

**Default group behavior:**

*All CPE STAs joining the BSS may be placed in the default group EDP epoch by default upon association (see 10.71.2.2 (EDP epoch request)). (10.71.2.1)*

*If the value of the Group Epoch Interval Duration in the Minimum Epoch Pacing element is equal or larger than the value of the Group Epoch Interval Duration for the default EDP Epoch group (group 0), then the CPE non-AP MLD shall be assigned to the default group EDP epoch, with a Epoch ID of 0, when the non-AP MLD associates to the CPE BSS and both the AP MLD and non-AP MLD support group EDP epoch. (10.71.2.2)*

**Group joining/eaving procedure**

*If a CPE STA chooses not to join any existing group EDP epochs, it may send an EDP Epoch Sequence Request frame to the CPE AP to create a new group EDP epoch. A CPE STA can request to leave any group and/or join a different group at any time. (10.71.2.1)*

*A CPE non-AP MLD may subsequently send an EDP epoch request to join a specific group EDP epoch or the CPE non-AP MLD can request the AP MLD to start a new group EDP epoch that matches specified EDP epoch settings by sending an EDP epoch setting protected action request frame.*

*The AP MLD shall respond with an EDP epoch setting protected action response frame, accepting or rejecting the request.*

*A CPE non-AP MLD may leave the group EDP epoch by sending an EDP epoch setting protected action request frame. (10.71.2.2)*

*A CPE non-AP MLD may request to join a group EDP epoch by sending an EDP epoch setting protected action request frame, containing the group ID that the non-AP MLD wishes to join.*

*The AP MLD responds with an EDP epoch setting protected action response frame, accepting or rejecting the request.*

*A CPE non-AP MLD may leave the group EDP epoch by sending EDP epoch setting protected action request frame. (10.71.2.3)*

*The non-AP MLD may request to join another group EDP epoch, or provide EDP epoch settings, by sending a non-AP MLD Specific Epoch Setting action frame. (10.71.2.4)*

**Group advertisement**

*A CPE AP advertises at least a default EDP group and associated EDP epoch sequence parameters, and possibly other EDP groups and associated EDP epoch sequence parameters. (10.71.2.1)*

*A CPE AP MLD advertises group EDP epochs by sending an unicast protected Action(#Ed) frame containing an Enhanced Group Privacy Availability element for each relevant group EDP epoch in the BSS. A CPE AP MLD shall advertise group EDP epochs to each non-AP MLD that joins the BSS and may advertise group EDP epochs when significant changes have affected one or more groups. (10.71.2.3)*

*After the affiliated STAs of the non-AP MLD have associated, the CPE AP MLD sends to the CPE non-AP MLD one or more protected Action(#Ed) frames that include the Enhanced Group Privacy Availability Element, to signal the list of group EDP epochs supported in the BSS. (10.71.2.4)*

Consolidation proposal:

We could indeed consolidate these different statements, by removind 10.71.2.2 and inserting its sentences where they fit I 10.71.2.3 and 10.71.2.4, with the structure:

10.71.2.1 “introduction”

10.71.2.3 “what are groups and epochs”

10.71.2.4 “how groups are setup”

Then 10.71.2.2 may be removed and its content consolidated with the other clauses

For reference, the latest version of 10.71.2.2 (after 24/1359)

A CPE (#1079) non-AP MLD may include in its (Re)Association Request frame the Minimum (#1328, 1011, 1077) Epoch Pacing element. If the value of the Group Epoch Interval Duration field (#1328) in the Minimum Epoch Pacing element is equal or larger than the value of the Group Epoch Interval Duration field (#1328) for the default EDP Epoch group (group 0), then the CPE non-AP MLD shall be assigned to the default group EDP epoch, with a Group (#1012, 1081) ID of 0, when the non-AP MLD associates to the CPE AP MLD (#1168) and both the AP MLD and non-AP MLD support group EDP epoch. If the value of the Group Epoch Interval Duration field is less than the value of the Group Epoch Interval Duration field for the default EDP Epoch group (group 0), then (#1063) the non-AP MLD is not assigned to (#1020) any group EDP epoch (#1063) at (re)association. The group EDP epoch setup is described in 10.71.2.4 (Group EDP epoch setup). (#1063)

A CPE non-AP MLD may subsequently send an EDP Epoch Request (#1332) to join a specific group EDP epoch or the CPE non-AP MLD can request the AP MLD to start a new group EDP epoch that matches specified EDP epoch settings by sending an EDP Epoch Setting Request (#1332) frame.

The AP MLD shall respond with an EDP Epoch Setting Response (#1332) frame, accepting or rejecting the request.

A CPE non-AP MLD may leave the group EDP epoch by sending an EDP Epoch Setting Request (#1332) frame.

Latest 10.71.2.3 (after 24/1371)

**10.71.2.3 EDP Groups (#1113)**

A CPE AP MLD advertises EDP group (#1113) support in the Extended RSN Capabilities field of (#1333) Beacon and Probe Response frames by setting the Group EDP Epoch Supported field to 1 (#1333).

A CPE non-AP MLD advertises EDP group (#1113) support in the RSNXE (#1334) of (Re)Association Request frames by setting the Group EDP Epoch Supported field to 1 (#1333).

EDP group (#1113) support is optional (#1335).

A CPE AP MLD advertises EDP groups and their parameters (#1113) by sending an individually addressed EDP Group Paramaters (#1336, 1019, 1074) frame containing an Enhanced Group Privacy Availability element for each supported (#1075, 1171) EDP group (#1113) in the BSS. A CPE AP MLD shall advertise one or more (#1082) EDP groups (#1113) to each non-AP MLD that joins the BSS and may advertise EDP groups and their parameters (#1113) when (#1076) changes have affected one or more groups.

NOTE – When the AP sends an updated Enhanced EDP Group Parameters frame is implementation-dependent and outside the scope of this standard. (#1076).

A CPE non-AP MLD shall (#1337) be a member of only one group EDP epoch at a time.

A CPE non-AP MLD may request to join an EDP group (#1113) by sending an EDP Epoch Setting Request (#1338) frame, containing the group ID that the non-AP MLD wishes to join.

NOTE - Some CPE non-AP MLDs, for example in IoT devices, might choose a group with longer epochs, to limit parameter changes computation costs, while other CPE non-AP MLDs, for example in personal general devices, might choose a group with short epochs, to increase privacy protection. (#1513)

The AP MLD responds with an EDP Epoch Setting Response (#1338) frame, accepting or rejecting the request.

A CPE non-AP MLD may leave the EDP group (#1113) by sending an EDP Epoch Setting Request (#1338) frame.

If a CPE non-AP MLD is a member of an EDP group (#1113), the non-AP MLD and the AP MLD shall anonymize (#1339) the selected OTA fields of (#1339) individually addressed frames according to group epoch settings as defined in 10.71.3 (Establishing frame anonymization parameter sets), 10.71.4 (MAC Header anonymization and transmitting functions), 10.71.5 (MAC header anonymization and receiving functions) and 10.71.6 (Frame anonymization and AID).

Latest 10.71.2.4

**10.71.2.4 Group EDP epoch setup**

If a CPE AP MLD supports group EDP epoch and receives a (Re)Association Request frame with the Group EDP Epoch Supported field set, then the AP MLD shall assign the CPE non-AP MLD to the default group EDP Epoch if association succeeds.

The (#1093, 1343) Association Response frame provides the default group EDP information in the EDP (#1065) element (#1344).

After the affiliated STA of the non-AP MLD is (#1172) associated, the CPE AP MLD sends to the CPE non-AP MLD one or more EDP Group Parameter frames (#1345) to signal the list of group EDP epochs supported in the BSS. The non-AP MLD may request to join another group EDP epoch, or provide EDP epoch settings, by sending a Non-AP MLD Specific Epoch Setting (#1346) frame.

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With 10.71.2.2 insertions into 10.71.2.3 and 10.71.2.4, clause 10.71.2.2 disappears, and 10.71.2.3 and 10.71.2.4 become as follows:

(red, insert taken from 10.71.2.2, purple, new text, black, existing text).

Note: you will see new purple text, because inserting 10.71.2.2 into 10.71.2.4 surfaces the case where the non-AP MLD does not send a minimum epoch pacing element (we did not see this scenario when the sentenecs were spread) – purple text clarifies that in that case the non-AP MLD is put into the default group as well.

**10.71.2.3 EDP Groups (#1113)**

A CPE AP MLD advertises EDP group (#1113) support in the Extended RSN Capabilities field of (#1333) Beacon and Probe Response frames by setting the Group EDP Epoch Supported field to 1 (#1333).

A CPE non-AP MLD advertises EDP group (#1113) support in the RSNXE (#1334) of (Re)Association Request frames by setting the Group EDP Epoch Supported field to 1 (#1333).

EDP group (#1113) support is optional (#1335).

A CPE AP MLD advertises EDP groups and their parameters (#1113) by sending an individually addressed EDP Group Paramaters (#1336, 1019, 1074) frame containing an Enhanced Group Privacy Availability element for each supported (#1075, 1171) EDP group (#1113) in the BSS. A CPE AP MLD shall advertise one or more (#1082) EDP groups (#1113) to each non-AP MLD that joins the BSS and may advertise EDP groups and their parameters (#1113) when (#1076) changes have affected one or more groups.

NOTE – When the AP sends an updated Enhanced EDP Group Parameters frame is implementation-dependent and outside the scope of this standard. (#1076).

A CPE non-AP MLD shall (#1337) be a member of only one group EDP epoch at a time.

A CPE non-AP MLD may request to join an EDP group (#1113) by sending an EDP Epoch Setting Request (#1338) frame, containing the group ID that the non-AP MLD wishes to join.

NOTE - Some CPE non-AP MLDs, for example in IoT devices, might choose a group with longer epochs, to limit parameter changes computation costs, while other CPE non-AP MLDs, for example in personal general devices, might choose a group with short epochs, to increase privacy protection. (#1513)

The AP MLD responds with an EDP Epoch Setting Response (#1338) frame, accepting or rejecting the request.

A CPE non-AP MLD may leave the EDP group (#1113) by sending an EDP Epoch Setting Request (#1338) frame.

If a CPE non-AP MLD is a member of an EDP group (#1113), the non-AP MLD and the AP MLD shall anonymize (#1339) the selected OTA fields of (#1339) individually addressed frames according to group epoch settings as defined in 10.71.3 (Establishing frame anonymization parameter sets), 10.71.4 (MAC Header anonymization and transmitting functions), 10.71.5 (MAC header anonymization and receiving functions) and 10.71.6 (Frame anonymization and AID).

**10.71.2.4 Group EDP epoch setup**

A CPE (#1079) non-AP MLD may include in its (Re)Association Request frame the Minimum (#1328, 1011, 1077) Epoch Pacing element. (#1026)

If a CPE AP MLD supports group EDP epoch and receives a (Re)Association Request frame with the Group EDP Epoch Supported field set and no Epoch Pacing element, or a (Re)Association Request frame with the Group EDP Epoch Supported field set and ~~If~~ the value of the Group Epoch Interval Duration field (#1328) in the Minimum Epoch Pacing element is equal or larger than the value of the Group Epoch Interval Duration field (#1328) for the default EDP Epoch group (group 0), then the CPE non-AP MLD shall be assigned to the default group EDP epoch, with a Group (#1012, 1081) ID of 0. If the value of the Group Epoch Interval Duration field is less than the value of the Group Epoch Interval Duration field for the default EDP Epoch group (group 0), then (#1063) the non-AP MLD is not assigned to (#1020) any group EDP epoch (#1063) at (re)association. ~~then the AP MLD shall assign the CPE non-AP MLD to the default group EDP Epoch if association succeeds.~~ (#1026)

The (#1093, 1343) Association Response frame provides the default group EDP information in the EDP (#1065) element (#1344).

After the affiliated STA of the non-AP MLD is (#1172) associated, the CPE AP MLD sends to the CPE non-AP MLD one or more EDP Group Parameter frames (#1345) to signal the list of group EDP epochs supported in the BSS.

A CPE non-AP MLD may subsequently send an EDP Epoch Request (#1332) to join a specific group EDP epoch or the CPE non-AP MLD can request the AP MLD to start a new group EDP epoch that matches specified EDP epoch settings by sending an EDP Epoch Setting Request (#1332) frame.

The AP MLD shall respond with an EDP Epoch Setting Response (#1332) frame, accepting or rejecting the request.

A CPE non-AP MLD may leave the group EDP epoch by sending an EDP Epoch Setting Request (#1332) frame. (#1026) ~~The non-AP MLD may request to join another group EDP epoch, or provide EDP epoch settings, by sending a non-AP MLD Specific Epoch Setting action frame.~~

Leftover from 10.71.2.2:

The group EDP epoch setup is described in 10.71.2.4 (Group EDP epoch setup). (#1063)

(can be deleted)

**Proposal:**

*TGbi editor: Delete clause 10.71.1.2, renumber 10.71.2.3 accordingly. Modify Clauses 10.71.2.4 as follows:*

**10.71.2.4 Group EDP epoch setup**

A CPE (#1079) non-AP MLD may include in its (Re)Association Request frame the Minimum (#1328, 1011, 1077) Epoch Pacing element. (#1026)

If a CPE AP MLD supports group EDP epoch and receives a (Re)Association Request frame with the Group EDP Epoch Supported field set and no Epoch Pacing element, or a (Re)Association Request frame with the Group EDP Epoch Supported field set and the value of the Group Epoch Interval Duration field (#1328) in the Minimum Epoch Pacing element is equal or larger than the value of the Group Epoch Interval Duration field (#1328) for the default EDP Epoch group (group 0), then the CPE non-AP MLD shall be assigned to the default group EDP epoch, with a Group (#1012, 1081) ID of 0. If the value of the Group Epoch Interval Duration field is less than the value of the Group Epoch Interval Duration field for the default EDP Epoch group (group 0), then (#1063) the non-AP MLD is not assigned to (#1020) any group EDP epoch (#1063) at (re)association. (#1026)

The (#1093, 1343) Association Response frame provides the default group EDP information in the EDP (#1065) element (#1344).

After the affiliated STA of the non-AP MLD is (#1172) associated, the CPE AP MLD sends to the CPE non-AP MLD one or more EDP Group Parameter frames (#1345) to signal the list of group EDP epochs supported in the BSS.

A CPE non-AP MLD may subsequently send an EDP Epoch Request (#1332) to join a specific group EDP epoch or the CPE non-AP MLD can request the AP MLD to start a new group EDP epoch that matches specified EDP epoch settings by sending an EDP Epoch Setting Request (#1332) frame.

The AP MLD shall respond with an EDP Epoch Setting Response (#1332) frame, accepting or rejecting the request.

A CPE non-AP MLD may leave the group EDP epoch by sending an EDP Epoch Setting Request (#1332) frame. (#1026)