IEEE P802.11
Wireless LANs

|  |
| --- |
| 11bi D2.0 Clause 3.2 CRs  |
| Date: 2025-10-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Jerome Henry | Cisco Systems |  |  | jerhenry@cisco.com |
| Domenico Ficara | Cisco Systems |  |  | dficara@cisco.com |
| Ugo Campiglio | Cisco Systems |  |  | ucampigl@cisco.com |
| Federico Lovison | Cisco Systems |  |  | flovison@cisco.com |

Abstract

This submission proposes resolutions for the following CIDs:

2181, 2220, 2370, 2054, 2464, 2182, 2369, 2371, 2372, 2282, 2375, 2337.

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2181 | 3.2 | 25.20 | Definition of CPE sounds strange to me. | Change defition to "Features for enhancing privacy of non-AP STAs and non-AP MLDs." | RevisedAgree in principles, implemented without the short hand notation. TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2181. |
| 2220 | 3.2 | 25.25 | Suggest to define what is an "EPP epoch sequence", e.g., consecutive EPP epochs identified by the same EPP Group ID. | As in comment | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2220. |
| 2370 | 3.2 | 25.55 | The definition refers to "EPP epoch sequence", but "EPP epoch sequence" is not defined. The concept of "EPP epoch seqeunce" seems important enough to have a definition, although I do not feel qualified to be the person defining this. | Add a definition of "EPP epoch sequence". The commenter will submit a document containing a proposal. | RevisedDefinition added (also with CID 2220). TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2370. |
| 2054 | 3.2 | 0.00 | Add definition of an EPP epoch sequence. When does an EPP epoch sequence end? |   | Revised Definition added, also as part of CID 2220. TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2054. |
| 2464 | 3.2 | 25.50 | It is not clear what is the difference between EPP epoch and EPP epoch interval."[EPP epoch] A period of time during which each non-access point (non-AP) multi-link device (MLD) of a set of non-AP MLDs applies a set of EPP settings""[EPP epoch interval] A period of time between thetarget start times of two consecutive EPP epochs in an EPP epoch sequence."EPP epoch interval is the time between start of wo consecutive EPP epochs which is also the EPP epoch time. | Clarify how these two terms are different in the definition. | Revised.TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2464. |
| 2182 | 3.2 | 25.52 | EPP Settings are the same as EPP Epoch Settings? | Change EPP Settings to EPP Epoch Settings in the EPP Epoch definition | RevisedThe settings the non-AP MLD apply may be related to the epoch itself, or not (like group membership, which does not relate to an epoch in particular), however, the non-AP MLD applies FA parameters, not EPP settings. TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2182. |
| 2369 | 3.2 | 25.52 | "EPP settings" are not used elsewhere in the document. I think "FA parameters" was intended. I also recommend clarifying that the FA parameters change every EPP epoch. | Replace "applies a set of EPP settings." with "applies FA using a fixed set of FA parameters that are generated independently for each EPP epoch." | RevisedThe settings can indeed be renamed FA parameters, but it is incorrect to say that the settings are generated independently for each epoch. For example, the group ID does not need to change in most cases. TGbi editor to make the changes shown in the latest version of 11-25/1776 under all headings that include CID 2369. |
| 2371 | 3.2 | 25.59 | My understanding is that EPP epoch settings is a set of parameters characterizing an entire EPP epoch sequence, not characterizing a single EPP epoch. | Replace "EPP epoch" with "EPP epoch sequence" | RejectedSee 9.4.1.84. EPP Epoch settings can include parameters that may change along the sequence, like the number of participating STAs, the number of epochs remaining etc. |
| 2372 | 3.2 | 25.62 | "..that apply identical EPP epoch settings" is true, but it could be helpful to identify that this means the non-AP MLDs use identical EPP epoch sequences. | Replace the identified text with "..that apply identical EPP epoch settings (i..e, the non-AP MLDs in an EPP group apply an identicial EPP epoch sequence)" | RejectedThey apply identical EPP epoch settings, which indeed include sequence, group ID and other parameters, all included in “identical EPP epoch settings”. It is unclear why it would be necessary to single out the sequence out of the set. |
| 2282 | 3.2 | 26.01 | "EPP parameter" is not used in the spec text. | Remove it. | Accepted |
| 2375 | 3.2 | 26.01 | The term "EPP parameter" is not used elsewhere in the document.The definition is un-necessary | Remove the definition of "enhanced privacy protection (EPP) parameter: [EPP parameter]" | Accepted  |
| 2337 | 3.2 | 26.17 | I could not find any requirements on the OTA MAC address. Presumably its format follows the requirements in 12.2.11. (i.e. a randomized the local bit set, etc.). Certainly it cannot be configured as a universal MAC address | Add a requirement, where appropriate to required the OTA MAC address to follow the format of a randomized MAC address defined in 12.2.11 of the baseline | RejectedThe OTA MAC is transmitted unencrypted and seen over the air, there is no requirement that it must be randomized. |

**Discussion**

CID 2181

Accepted

**client privacy enhancements (CPE):** [CPE] ~~Privacy~~ features for enhancing privacy of non-access point (AP) stations (STAs)(#2102) and non-AP multi-link devices (MLDs)(#2102).

CID 2220, 2370, 2054

Revised

**enhanced privacy protection (EPP) epoch sequence: [EPP epoch sequence]** an ordered set of consecutive EPP epochs for a particular EPP group (identified by its EPP Group ID), beginning at the First Epoch TSF Start Time and numbered from 0, that operate under a common EPP Epoch Settings configuration and Group Epoch Seed.

CID 2464

Revised

Before:

**enhanced privacy protection (EPP) epoch:** [EPP epoch] A period of time during which each non-access point (non-AP) multi-link device (MLD) of a set of non-AP MLDs applies a set of EPP settings.

**enhanced privacy protection (EPP) epoch interval:** [EPP epoch interval] A period of time between the target start times of two consecutive EPP epochs in an EPP epoch sequence.

Proposal:

**enhanced privacy protection (EPP) epoch:** [EPP epoch] The operating period for an EPP group bounded by two consecutive EPP epoch start times and during which a set of FA parameters for that epoch and that group apply.

**enhanced privacy protection (EPP) epoch interval:** [EPP epoch interval] The nominal period (in TU) between two planned consecutive epoch start times within an EPP epoch sequence.

CID 2182, 2369

Revised

**enhanced privacy protection (EPP) epoch:** [EPP epoch] A period of time during which each non-access point (non-AP) multi-link device (MLD) of a set of non-AP MLDs applies a set of FA parameters ~~EPP settings~~.

CID 2282, 2375

Accepted

**~~enhanced privacy protection (EPP) parameter:~~** ~~[EPP parameter] A client privacy enhancements (CPE) or basic service set (BSS) privacy enhancements (BPE) parameter.~~

*TGbi editor: Modify clauses 3.2 as follows (track change on):*

**3.2 Definitions specific to IEEE 802.11**

***Insert the following definitions (maintaining alphabetical order):***

**basic service set (BSS) privacy enhancements (BPE):** [BPE] BSS privacy features for access point (AP) multi-link devices (MLDs)(#2000, #2101)and non-AP MLDs, including client privacy enhancements **(**CPE)(#2101) features.

**basic service set (BSS) privacy enhancements (BPE) access point (AP) multi-link device (MLD):** [BPE AP MLD] An AP MLD implementing BPE features.

**basic service set (BSS) privacy enhancements (BPE) non-access point (non-AP) multi-link device (MLD):** [BPE non-AP MLD] A non-AP MLD implementing BPE features.

**client privacy enhancements (CPE):** [CPE] features for enhancing privacy of (#2181) non-access point (AP) stations (STAs)(#2102) and non-AP multi-link devices (MLDs)(#2102).

**client privacy enhancements (CPE) access point (AP) multi-link device (MLD):** [CPE AP MLD]An AP MLD implementing CPE features.

**client privacy enhancements (CPE) non-access point (non-AP) multi-link device (MLD):** [CPE non-AP MLD] A non-AP MLD implementing CPE features.

**distribution system (DS) medium access control (MAC) address:** [DS MAC address] A MAC address used by an enhanced privacy protection (EPP) access point (AP) or an EPP AP multi-link device (MLD) as the address to notify the DS and establish the destination mapping for an EPP non-AP STA or an EPP non-AP MLD after (re)association.

**enhanced privacy protection (EPP) access point (AP):** [EPP AP] An AP with support for at least one of the EPP features.

**enhanced privacy protection (EPP) non-access point (AP) station (STA):** [EPP non-AP STA] A non-AP STA with support for at least one of the EPP features.

**enhanced privacy protection (EPP) access point (AP) multi-link device (MLD):** [EPP AP MLD] An AP MLD with support for at least one of the EPP features.

**enhanced privacy protection (EPP) non-access point (AP) multi-link device (MLD):** [EPP non-AP MLD] A non-AP MLD with support for at least one of the EPP features.

**enhanced privacy protection (EPP) epoch:** [EPP epoch] The operating period for an EPP group bounded by two consecutive EPP epoch start times and during which a set of FA parameters for that epoch and that group apply (#2464).

**enhanced privacy protection (EPP) epoch interval:** [EPP epoch interval] The nominal period (in TU) between two planned consecutive epoch start times within (#2464) an EPP epoch sequence.

**enhanced privacy protection (EPP) epoch sequence: [EPP epoch sequence]** an ordered set of consecutive EPP epochs for a particular EPP group (identified by its EPP Group ID), beginning at the First Epoch TSF Start Time and numbered from 0, that operate under a common EPP Epoch Settings configuration and Group Epoch Seed. (#2220, #2370, #2054)

**enhanced privacy protection (EPP) epoch settings:** [EPP epoch settings] A set of parameters characterizing an EPP epoch.

**enhanced privacy protection (EPP) group:** [EPP group] A construct for representing a collection of non-access point (non-AP) multi-link devices (MLDs) associated with a single AP MLD that apply identical EPP epoch settings. An EPP group includes zero or more members.

**(#2282, #2375)**

**frame anonymization:** [FA] An enhanced privacy protection (EPP) mechanism for multi-link devices (MLDs) that periodically anonymizes values transmitted unencrypted in MAC headers and control frames that identify an MLD either directly or indirectly.

**identity key:** A random value, assigned by the basic service set (BSS) privacy enhancements (BPE) access point (AP) multi-link device (MLD), that is used to detect the identity of the BPE AP MLD.

**medium**(#2103) **access control (MAC) header anonymization**: [MHA] frame anonymization mechanisms applied to selected fields of the MAC header.

**over the air (OTA) medium access control (MAC) address:** [OTA MAC address] A MAC address in the MAC header transmitted over the wireless medium.

**over-the-air packet number:** [OPN] The value transmitted in an individually addressed Counter Mode (CTR) with cipher-block chaining message authentication code (CBC-MAC) protocol (CCMP) header or Galois/Counter Mode (GCM) protocol (GCMP) header in the place of the packet number as part of frame anonymization.

**over-the-air sequence number:** [OSN] The value transmitted in an individually addressed medium access control (MAC) protocol data unit (MPDU) header in the place of the sequence number as part of frame anonymization.

**privacy group temporal key (PGTK):** [PGTK] A random value, assigned by an access point (AP) multi-link device (MLD), shared to all non-access point (non-AP) multi-link devices (MLDs) associated to the AP MLD for frame anonymization.