IEEE P802.11
Wireless LANs

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| 11bi D2.0 CRs in 10.71.2.5 |
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Abstract

This submission proposes resolutions for the following CIDs:

2240, 2038, 2200, 2310, 2363, 2242, 2202, 2078, 2243, 2311, 2312, 2244, 2364.

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.***

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2240 | 10.71.2.5 | 101.13 | The collision occurs per link, so the text should describe it clearly. | Change to: An EPP AP MLD shall determine whether an OTA MAC address that an associated EPP non-AP MLD will use in a subsequent epoch on a link will cause a collision with the BSSID of the affiliated AP on that link of the AP MLD, an OTA MAC address of the affiliated non-AP STA on that link of another non-AP MLD or another non-AP STA on that link. | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2240. |
| 2038 | 10.71.2.5 | 101.16 | "When such a collision risk is anticipated with the OTA MAC of a non-CPE or non-BPE STA or non-AP MLD, the EPP AP MLD shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to risk occurring and indicated in the Colliding Epoch field, instructing the EPP non-AP MLD to apply the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision." The first part repeats the previous sentence and can be deleted also this is a long sentence and gets difficult to parse as it goes on. Would be worthwhile seeing if it can be improved by re-writing. | Replace cited sentence with "When such a collision risk is anticipated, the EPP AP MLD, before the epoch when the collision is anticipated, shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame. In the Colliding Epoch field, the EPP AP MLD instructs the EPP non-AP MLD to apply the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame, to avoid address collision." | Revised Disagree with the proposed resolution (suppress text), because the text does not repeat the previous sentence, it expresses one of two collision cases. Reworded to clarify this 2-case structure. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2038. |
| 2200 | 10.71.2.5 | 101.20 | Please check grammar of "when the collision is anticipated to risk occurring and indicated in the Colliding Epoch field," | As per comment | Revised The collision can risk occurring, or be anticipated to occur, but not anticipated to risk occurring. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2200. |
| 2310 | 10.71.2.5 | 101.22 | Although it is implied, clarify that the jump occurs for all links, not just the one where the collision occurs | As in the comment | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2310. |
| 2363 | 10.71.2.5 | 101.22 | In the sentence : "When such a collision risk is anticipated with the MAC address of a EPP STA affiliated with a EPP non-AP MLD, the AP shall send the OTA MAC Collision Notification frame to both EPP STAs affiliated with the EPP non-AP MLDs" both could be unappropriated. Even if it is rare it could be good to handle collision with more than two stations. | Please replace "both EPP STAs" by "colliding EPP STAs" to cover any number of colliding stations | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2363. |
| 2242 | 10.71.2.5 | 101.33 | To be clearer, suggest to use the exact epoch number instead of relative numbers. | Change "for the epoch occurring after m epochs" to "for the epoch with epoch number c".And change "for the epoch occurring m+q epochs later" to "for the epoch with epoch number c+q".And change "in the subsequent epoch" to "in the epoch with epoch number c+1".And change "m+q+1 epochs later" to "for the epoch with epoch number c+q+1". | AcceptedNote: TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2242 |
| 2202 | 10.71.2.5 | 101.35 | "subsequente epoch" is not clear enough, maybe "subsequent m+q+1 epoch? | As per comment | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2202. |
| 2078 | 10.71.2.5 | 101.38 | "The sum m+q cannot be larger than the value of the Epochs Remaining fieldsignaled during the epoch when the AP sent the OTA MAC Collision Notificationframe."This scenario is actually likely to occur: What should the AP do if for examplethe collision happens in the last epoch of a sequence? How should a STAbehave if the collision happens before, but it is carring an offset q during therest of the sequence once the current epoch + q is larger than the sequencesize? | The commenter will provide a contribution addressing this comment. | Revised.TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2078. |
| 2243 | 10.71.2.5 | 101.38 | Use "shall not" instead of "cannot", since it is normaltive behaviour when setting the fields. | Change to "The sum m+q shall not be larger than" | RevisedSentence was deleted. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2243. |
| 2311 | 10.71.2.5 | 101.38 | The mechanism here does not apply if the collision is at epoch 255 (or 65535 if we count that epoch remaining has 2 bytes) | Introduce exception and describe what happens when collision is on last epoch of the sequence | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2311. |
| 2312 | 10.71.2.5 | 101.38 | The AP indicates the colliding epoch (1 byte = 255 max) but the sequence can include 65535 epochs. How does the AP indicate a colliding epoch more than 255 epochs in the future? | Clarify that the AP tells the STA less than 255 ahead | Revised. TGbi editor to make the changes shown in the latest version of 11-25/1629 under all headings that include CID 2312. |
| 2244 | 10.71.2.5 | 101.46 | It's too late and very risky for the AP to discard the traffic when the address collision occurs. Doing so, the AP may discard the traffic from a legitimate STA whose address is collided by the EPP STA. | Change to: The AP should disassociate a EPP non-AP MLD that rejected the proposed remediation before the epoch that the collisionis expected to occur. | RejectedThe non-AP MLD is expected to take some action, which can be to disconnect, stay silent during the epoch or other. The AP cannot conclude that the STA will transmit during the colliding epoch simply because the STA refused to skip an epoch. This is why these various options are layed out. |
| 2364 | 10.71.2.5 | 101.46 | In the sentence: "The AP may not accept traffic from, or forward traffic to, a EPP STA affiliated with the non-AP MLD that rejected the proposed remediation for the affected link, during the epoch when the collision occurs." shouldn't it be a "shall not accept" rather than "may not accept". In which case the AP can accept the traffic of a STA that rejected the remediation? Does that mean that a sta rejecting the remediation shall refrain to transmit during the epoch when the collision occurs? | Please clarify the behaviour when a sta reject a remediation, it is not clear in which circumstances the AP can accept the traffic from this STA | RejectedThe behavior is left to implementation on purpose. The STA is expected to take some action, which may be to disconnect by itself, or stay silent during the epoch (if it rejects the skip proposal). Therefore the AP expects no traffic from the colliding MAC during the colliding epoch, but many scenarios are possible (including that oen of the colliding STAs did skip, thus there is no collision anymore). Attempting to list all the combinations and scenarios sounds risky, this is why the paragraph offers possibilities without dictating what each side should do. |

**Discussion**

10.71.2.5 before addressing CIDs

**10.71.2.5 OTA MAC address collision avoidance**

An EPP (CPE or BPE) AP MLD and an EPP (CPE or BPE) non-AP MLD anonymize selected OTA MAC header fields of individually addressed frames they transmit to each other.

An EPP AP MLD shall determine whether the OTA MAC address that an EPP non-AP MLD will use in a subsequent epoch will cause a collision with the BSSID of the affiliated APs of the associated AP MLD, the OTA MAC address of another non-AP MLD(s) or another STA on a link. When such a collision risk is anticipated with the OTA MAC of a non-CPE or non-BPE STA or non-AP MLD, the EPP AP MLD shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to risk occurring and indicated in the Colliding Epoch field, instructing the EPP non-AP MLD to apply the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision. When such a collision risk is anticipated with the MAC address of a EPP STA affiliated with a EPP non-AP MLD, the AP shall send the OTA MAC Collision Notification frame to both EPP STAs affiliated with the EPP non-AP MLDs.

In general, the operation is as follows. If the collision is expected to occur m epochs after the current epoch (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for the epoch occurring after m epochs, the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for the epoch occurring m+q epochs later. Then, in the subsequent epoch, the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use m+q+1 epochs later, unless the EPP AP MLD also signals a collision notification for that epoch. The sum m+q cannot be larger than the value of the Epochs Remaining field signaled during the epoch when the AP sent the OTA MAC Collision Notification frame. A non-AP MLD that received an OTA MAC Collision Notification frame shall respond with an OTA MAC Collision Response frame with the Collision Status field set to either 1, accepting the EPP AP MLD proposed remediation, thus applying the offset requested by the EPP AP MLD, or 2, rejecting the EPP AP MLD proposed remediation, thus using the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for that epoch before receiving the EPP AP MLD OTA MAC Collision Notification frame. The AP may not accept traffic from, or forward traffic to, a EPP STA affiliated with the non-AP MLD that rejected the proposed remediation for the affected link, during the epoch when the collision occurs. Alternatively, the AP may disassociate a EPP non-AP MLD that rejected the proposed remediation.

NOTE 1—A non-AP MLD might decline to apply the requested offset for procedural reasons, e.g., the inability to skip epoch FA parameter sequences, or internal privacy configuration or policy reasons.

NOTE 2— Detection and remediation of a BPE AP MLD BSSID collision with MAC addresses other than the BPE AP MLD associated non-AP MLDs is outside the scope of this standard.

CID 2240

Revised

An EPP AP MLD shall determine whether the OTA MAC address that an EPP non-AP MLD will use in a subsequent epoch on a link (#2240) will cause a collision with the BSSID of the affiliated APs on that link (#2240) of the associated AP MLD, the OTA MAC address of another non-AP MLD(s) or another STA on ~~a~~ that (#2240) link.

CID 2238

Revised

The EPP AP MLD should then act as follows (#2238):

* When such a collision risk is anticipated with the OTA MAC of a non-CPE or non-BPE STA or non-AP MLD, the EPP AP MLD shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to risk occurring and indicated in the Colliding Epoch field, instructing the EPP non-AP MLD to apply the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision.
* When such a collision risk is anticipated with the MAC address of a EPP STA affiliated with a EPP non-AP MLD, the AP shall send the OTA MAC Collision Notification frame to both EPP STAs affiliated with the EPP non-AP MLDs.

CID 2200

Revised

The EPP AP MLD should then act as follows (#2238):

* When such a collision risk is anticipated with the OTA MAC of a non-CPE or non-BPE STA or non-AP MLD, the EPP AP MLD shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to ~~risk~~ occur~~ring~~ (#2200) and indicated in the Colliding Epoch field, instructing the EPP non-AP MLD to apply the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision.
* When such a collision risk is anticipated with the MAC address of a EPP STA affiliated with a EPP non-AP MLD, the AP shall send the OTA MAC Collision Notification frame to both EPP STAs affiliated with the EPP non-AP MLDs.

CID 2310

Revised

The EPP AP MLD should then act as follows (#2238):

* When such a collision risk is anticipated with the OTA MAC of a non-CPE or non-BPE STA or non-AP MLD, the EPP AP MLD shall send to the EPP non-AP MLD an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to occur (#2200) and indicated in the Colliding Epoch field, instructing the EPP non-AP MLD to apply to all its links (#2310) the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision.
* When such a collision risk is anticipated with the MAC address of a EPP STA affiliated with a EPP non-AP MLD, the AP shall send the OTA MAC Collision Notification frame to both EPP STAs affiliated with the EPP non-AP MLDs.

CID 2363

Revised

The EPP AP MLD should then act as follows (#2238):

* When such a collision risk is anticipated with the OTA MAC of one or more ~~a~~ (#2363) non-CPE or non-BPE STAs or non-AP MLDs, the EPP AP MLD shall send to the EPP non-AP MLDs an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to occur (#2200) and indicated in the Colliding Epoch field, instructing the EPP non-AP MLDs to apply to all its links (#2310) the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision.
* When such a collision risk is anticipated with the MAC address of one or more (#2363) ~~a~~ EPP STAs affiliated with ~~a~~ EPP non-AP MLDs, the AP shall send the OTA MAC Collision Notification frame to ~~both~~ the colliding (#2363) EPP STAs affiliated with the EPP non-AP MLDs.

CID 2242

Revised

In general, the operation is as follows. If the collision is expected to occur m epochs after the current epoch n (#2242) (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for ~~the~~ epoch c (#2242) ~~occurring after m epochs~~, the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for ~~the~~ epoch number c + q ~~occurring m+q epochs later~~ (#2242). Then, in the subsequent epoch, the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use ~~m+q+1 epochs later~~ for epoch c+q+1 (#2242), unless the EPP AP MLD also signals a collision notification for that epoch.

CID 2202

Revised

In general, the operation is as follows. If the collision is expected to occur m epochs after the current epoch n (#2242) (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for epoch c (#2242), the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch number c + q (#2242). Then, in the subsequent epoch c+1 (#2202), the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch c+q+1 (#2242), unless the EPP AP MLD also signals a collision notification for that epoch.

CID 2078, 2243, 2311

Revised

Discussion:

The Epoch count can be unlimited or limited (e.g. “200 epochs max”). The AP sets the limit, primarily for privacy or refresh reasons, but the STA could compute “epoch 201” if the AP did not stop at 200.

Simple solution: allow the STA to compute parameters for “epoch 201” and use them in “epoch 200”:

AP, at epoch 195: “collision at epoch 200! Skip 1”

STA, at epoch 199: use parameters of epoch value (n) = 199

STA at epoch 200: colliding epoch, skip 1 -> use parameters of “epoch value = 200 + 1 = 201”

AP understands that STA skipped 1, thus uses c+q = 200+1 = 201.

Similarly, if collision is at epoch 198:

AP, at epoch 195: “collision at epoch 198! Skip 1”

STA, at epoch 197: use parameters of epoch value (n) = 197

STA at epoch 198: colliding epoch, skip 1 -> use parameters of “epoch 199”

AP understands that STA skipped 1, thus uses c+q = 198+1 = 199.

STA at epoch 199: use parameters of epoch value = 200

STA at epoch 200: use parameters of epoch value = 201

In general, the operation is as follows. If the collision is expected to occur m epochs after the current epoch n (#2242) (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for epoch c (#2242), the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch number c + q (#2242). Then, in the subsequent epoch c+1 (#2202), the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch c+q+1 (#2242), unless the EPP AP MLD also signals a collision notification for that epoch. This computation occurs even if the EPP AP MLD has set a maximum number of epochs s for the group. if the EPP non-AP MLD has skipped q epochs at the current epoch r, the EPP non-AP MLD uses the FA parameters planned for epoch r + q, even if r + q > s. ~~The sum m+q cannot be larger than the value of the Epochs Remaining field signaled during the epoch when the AP sent the OTA MAC Collision Notification frame.~~ (#2078)

CID 2312

Revised

In general, the operation is as follows. If the collision is expected to occur m epochs (where m ≤ 255) (#2312) after the current epoch n (#2242) (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for epoch c (#2242), the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch number c + q (#2242). Then, in the subsequent epoch c+1 (#2202), the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch c+q+1 (#2242), unless the EPP AP MLD also signals a collision notification for that epoch. This computation occurs even if the EPP AP MLD has set a maximum number of epoch s for the group. if the EPP non-AP MLD has skipped q epochs at the current epoch r, the EPP non-AP MLD uses the FA parameters planned for epoch r + q, even if r + q > s. ~~The sum m+q cannot be larger than the value of the Epochs Remaining field signaled during the epoch when the AP sent the OTA MAC Collision Notification frame.~~ (#2078)

*TGbi editor: Modify clause 10.71.2.5 as follows (track change on – changes from version after 11-25/626):*

**10.71.2.5 OTA MAC address collision avoidance**

An EPP (CPE or BPE) AP MLD and an EPP (CPE or BPE) non-AP MLD anonymize selected OTA MAC header fields of individually addressed frames they transmit to each other.

An EPP AP MLD shall determine whether the OTA MAC address that an EPP non-AP MLD will use in a subsequent epoch on a link (#2240) will cause a collision with the BSSID of the affiliated APs on that link (#2240) of the associated AP MLD, the OTA MAC address of another non-AP MLD(s) or another STA on that (#224) link. The AP should then act as follows (#2238):

* When such a collision risk is anticipated with the OTA MAC of one or more (#2363) non-CPE or non-BPE STAs or non-AP MLDs, the EPP AP MLD shall send to the EPP non-AP MLDs an OTA MAC Collision Notification frame before the epoch when the collision is anticipated to occur (#2200) and indicated in the Colliding Epoch field, instructing the EPP non-AP MLDs to apply to all its links (#2310) the non-AP MLD specific FA parameters epoch offset signaled in the AP MLD OTA MAC Collision Notification frame to avoid address collision.
* When such a collision risk is anticipated with the MAC address of one or more (#2363) EPP STAs affiliated with EPP non-AP MLDs, the AP shall send the OTA MAC Collision Notification frame to the colliding (#2363) EPP STAs affiliated with the EPP non-AP MLDs.

In general, the operation is as follows. If the collision is expected to occur m epochs (where m ≤ 255) (#2312) after the current epoch n (#2242) (colliding epoch number c = n + m), then the EPP AP MLD sends an OTA Collision Warning element to the EPP non-AP MLD with the value of the Colliding Epoch field in the Collision Warning element equal to m, the Collision Status field set to 0, indicating the collision risk, and the non-AP MLD Specific Collision Epoch Offset field set to q, where q is the epoch count that the non-AP MLD is requested to skip. The EPP AP MLD is therefore requesting that for epoch c (#2242), the EPP AP MLD uses the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch c + q (#2242). Then, in the subsequent epoch c+1 (#2202), the EPP non-AP MLD is expected to use the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for epoch c + q +1 (#2242), unless the EPP AP MLD also signals a collision notification for that epoch. This computation occurs even if the EPP AP MLD has set a maximum number of epochs s for the group. if the EPP non-AP MLD has skipped q epochs at the current epoch r, the EPP non-AP MLD uses the FA parameters planned for epoch r + q, even if r + q > s. (#2078) A non-AP MLD that received an OTA MAC Collision Notification frame shall respond with an OTA MAC Collision Response frame with the Collision Status field set to either 1, accepting the EPP AP MLD proposed remediation, thus applying the offset requested by the EPP AP MLD, or 2, rejecting the EPP AP MLD proposed remediation, thus using the EPP non-AP MLD FA parameters that the EPP non-AP MLD had planned to use for that epoch before receiving the EPP AP MLD OTA MAC Collision Notification frame. The AP may not accept traffic from, or forward traffic to, a EPP STA affiliated with the non-AP MLD that rejected the proposed remediation for the affected link, during the epoch when the collision occurs. Alternatively, the AP may disassociate a EPP non-AP MLD that rejected the proposed remediation.

NOTE 1—A non-AP MLD might decline to apply the requested offset for procedural reasons, e.g., the inability to skip epoch FA parameter sequences, or internal privacy configuration or policy reasons.

NOTE 2— Detection and remediation of a BPE AP MLD BSSID collision with MAC addresses other than the BPE AP MLD associated non-AP MLDs is outside the scope of this standard.