IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11bi D0.4 CR for 12.14.1, 12.14.2, 12.14.3 | | | | |
| Date: 2024-07-12 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel |  |  | po-kai.huang@intel.com |
|  |  |  |  |  |

Abstract

This submission proposes resolutions for the following CIDs:

1404, 1405, 1406, 1407, 1408, 1409, 1410, 1162, 1310, 1311,

1061, 1308, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418,

1419, 1309, 1420, 1421, 1422, 1423, 1424, 1425, 1391, 1400,

1306

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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1404 | Mark RISON | 12.14.1 | 71.11 | "This subclause defines rules for the contents of a Probe Request frame that is not a multi-link probe request to preserve privacy." is confusing. A probe request to preserve privacy? | As it says in the comment | Rejected –  We note that contents of a Probe Request frame maybe subject to elementer fingerprinting. Hence, the contents of a Probe Request frame are minimized to preserve privacy. |
| 1405 | Mark RISON | 12.14.1 | 71.16 | "even if the frame does not contain some of the elements described in Table 9-66 (Probe Request frame body)" this is about the ones that should be there, specifically | Change to "even if the frame does not contain some of the elements that Table 9-66 (Probe Request frame body) indicates shall be present" | Revised –  Agree in principle with the content.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1405 |
| 1406 | Mark RISON | 12.14.1 | 71.23 | There's more than one exception | Pluralise | Revised –  Agree in principle with the commenter.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1406 |
| 1407 | Mark RISON | 12.14.1 | 0.00 | I think we don't say "In x GHz", we say "In the X GHz band" | As it says in the comment | Revised –  Agree in principle with the commenter.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1407 |
| 1408 | Mark RISON | 12.14.1 | 71.26 | "EDP STA" missing article | As it says in the comment | Revised –  Agree in principle with the commenter.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1408 |
| 1409 | Mark RISON | 12.14.1 | 71.26 | It is not clear in what way these last 2 bullets form an "exception" to the rules elsewhere, especially since they are just "should"s | As it says in the comment | Rejected –  It is an exception because the Supported Rates and BSS Membership Selectors element supposed to indicate all the support rate. However, the last two bullet recommends to indicate only certain and not to reveal further information. Some mandatary requirements in the current spec that will have exceptation is the following.  “*For a STA that supports a combined total of eight or fewer data rates and BSS membership selectors the*  *Extended Supported Rates and BSS Membership Selectors element is optional, and may be included in all of*  *the frame types that include the Supported Rates and BSS Membership Selectors element.*  *A STA that supports a combined total of the number of rates in the OperationalRateSet parameter and the*  *number of BSS membership selectors that exceeds eight shall include an Extended Supported Rates and BSS*  *Membership Selectors element to specify the supported rates and BSS membership selectors that are not*  *included in the Supported Rates and BSS Membership Selectors element.”* |
| 1410 | Mark RISON | 12.14.1 | 71.43 | "The EDP STA can follow the rule defined in 12.2.10" should be "An EDP STA", and also is there really only one rule? | As it says in the comment | Revised –  Agree in principle with the commenter.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1410 |
| 1162 | Patrice Nezou | 9.6.38.1 | 50.43 | What is "Capabilities and Operation Parameters" ? Action frames related to EDP features should be listed in this table 9-628s, especially the link with all EDP elements defined in subclause 9.4.2 and used used within an EDP action frame. | Please clarify | Rejected –  For example, we have capabilities included in HT Capabilities element and operaton parameters included in HT Operation element. As we progress through each Wi-Fi generation, some operation parameters maybe included in other elements like TTLM. |
| 1310 | Mark RISON | 9.6.38.3 | 51.50 | What has happened to order 2? | As it says in the comment | Revised –  Agree in principle with the commenter that there is an error on the order label.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1310 |
| 1311 | Mark RISON | 9.6.38 | 0.00 | The size of the Dialog Token field is not specified | As it says in the comment | Revised –  Agree in principle with the commenter that there is an error on the order label.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1311 |
| 1061 | Antonio DeLaOlivaDelgado | 9.6.38.3 | 52.42 | Reference to 9.4.2.312 should be 9.4.2.321 | As in comment | Revised –  Agree that Multi-link element clause number has been changed to 9.4.2.321 in 11be D6.0. Note that the whole spec is still up to 11be D5.0, where Multi-link element clase number is 9.4.2.312. However, agree to update and eliminate the mistake when updating to 11be D6.0 later. We change the clause reference in other places as well.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1061 |
| 1308 | Mark RISON | 9.6.38.2 | 50.62 | "Capabilities and Operation Parameters Request Action field format " looks wrong. Maybe "Capabilities and Operation Parameters Request frame Action field format ". Other instances too | As it says in the comment | Revised –  Agree in principe that in the baseline, additional “frame” is added.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1308 |
| 1411 | Mark RISON | 12.14.2 | 71.50 | "management frame" should be "Management frame". Various locations | As it says in the comment | Revised –  Agree in principe. We change “individually addressed management frame” to “individually addressed Management frame”  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1411 |
| 1412 | Mark RISON | 12.14.2 | 71.59 | I am not sure "unrobust" is cromluent. Multiple instances | As it says in the comment | Revised –  Agree in principe. We use “Not robust”, which is used in the current revme.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1412 |
| 1413 | Mark RISON | 12.14.2 | 71.62 | "SM Power save frame" should be "SM Power Save frame" (2x) | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1413 |
| 1414 | Mark RISON |  | 0.00 | Do not call things blah Action frame unless the name of the frame really ends in Action (do any?) | As it says in the comment | Revised –  The commenter likely refers to Protected Quiet Time Period Action frame and Quiet Time Period Action frame. We remove action in the description.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1414 |
| 1415 | Mark RISON | 12.14.2 | 71.22 | "If management frame protection is not negotiated or the EDP Robust Individually Addressed Management Frame Support subfield in the RSNXE by either STA is set to 0" -- there might not be an RSNXE at all. Also "by" should be "from". Ditto for 12-11b below | Change to "Otherwise" | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1415 |
| 1416 | Mark RISON | 12.14.3.1 | 73.15 | "non-MLO" should be "Non-MLO". Also elsewhere | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1416 |
| 1417 | Mark RISON | 12.14.3.1 | 73.15 | Hyphens not allowed, so "NonMLO"? | As it says in the comment | Rejected-  There are 44 instances of “non-MLO” in 11be D6.0 |
| 1418 | Mark RISON | 12.14.3 | 73.10 | "This subclause defines rules to request and respond capabilities and operation parameters using EDP Capa-bilities and Operation Parameters Request frame and EDP Capabilities and Operation Parameters Response frame. " missing articles | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1418 |
| 1419 | Mark RISON |  | 0.00 | "EDP Capabilities and Operation Parameters Request frame" etc. -- all words in frame etc. names must start with an uppercase letter. Ditto "EDP Capabilities and Operation Parameters Request/Response Support subfield" etc. | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1419 |
| 1309 | Mark RISON |  | 0.00 | "Capabilities and Operation Parameters Request frame" -- all words should start with an uppercase letter. Ditto for response | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1419 |
| 1420 | Mark RISON | 12.14.3.1 | 73.20 | "without Basic Multi-Link element" missing an article | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1420 |
| 1421 | Mark RISON | 12.14.3.1 | 73.26 | "without Basic Multi-Link element shall respond an EDP ... without" should be "without a Basic Multi-Link element shall respond with an EDP ... without a " (3 fixes). Similarly below | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1421 |
| 1422 | Mark RISON | 12.14.3.1 | 73.34 | "and are in order as defined in a Probe Response frame. " should be "and shall be in the order defined for a Probe Response frame. " Also next page | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1422 |
| 1423 | Mark RISON | 12.14.3.2 | 73.40 | "For MLO, all STAs affiliated with an MLD sets" should be "... set" | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1423 |
| 1424 | Mark RISON |  | 0.00 | "respond an" should be "respond with an" | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1424 |
| 1425 | Mark RISON | 12.14.3.2 | 73.63 | " Per-STA profile subelemen" should be " Per-STA Profile subelemen". Also next page | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1425 |
| 1391 | Mark RISON | 12.5.2.4.4 | 0.00 | "Protected Beamforming/CSI/CQI frame" -- no such frame (several on this page, several on next). Also at least in some cases it should be "frames" | As it says in the comment | Revised –  Agree in principe.  TGbi editor to make the changes shown in 11-24/1112r0 under all headings that include CID 1391 |
| 1400 | Mark RISON | 12.6.18 | 69.32 | "The selection rules for individually addressed Protected TWT Setup, Protected TWT Teardown, and Pro- tected TWT Information frames are described in 10.47.1 (TWT overview). " -- why are we adding TWT requirements? | Delete the cited text | Rejected –  The sentence just describes the location of corresponding TWT frame requirements and does not add further requirements. |
| 1306 | Mark RISON | 9.6.32.3 | 46.56 | "STA-STA communication" -- everything is STA-STA communication. Ditto in 9.6.32.4 and 9.6.35.10 etc. | Delete "STA-STA" | Rejected –  The descriptions mimics the usage in the baseline. See below. “*The Protected Dual of Public Action frame is defined to allow robust STA-STA communications of the*  *same information that is conveyed in Action frames that are not robust (see 9.6.10 (Protected Dual of Public*  *Action frame details(#3729)))*.” |

**Discussion:**

**Proposal:**

*TGbi editor: Modify Clause 12.14.1 as follows (track change on):*

* Contents of Probe Request frame(#1079r1)

This subclause defines rules for the contents of a Probe Request frame that is not a multi-link probe request to preserve privacy.

An EDP AP shall follow the rules defined in 11.1.4.3.4 (Criteria for sending a response) when receiving a Probe Request frame addressed to it even if the frame does not contain some of the elements that Table 9-66 (Probe Request frame body) indicates to be present(#1405) when the soliciting non-AP STA follows the rules described in this subclause.

An EDP non-AP STA follows the rules defined in 35.3.4.5 (Probe Request frame content for a non-AP EHT STA) to determine the contents of a Probe Request frame that is not a multi-link probe request with the following exceptions: (#1406)

* The EDP non-AP STA may omit the Supported Rates and BSS Membership Selectors element.
* In the 2.4 GHz band(#1407), if the Supported Rates and BSS Membership Selectors element is included, the(#1408) EDP STA should indicate only 1, 2, 5.5, 6, 11, 12, and 24 Mb/s in the Supported Rates and BSS Membership Selectors element and should not include the Extended Supported Rates and BSS Membership Selectors element.
* In the 5 GHz or 6 GHz band(#1407), if the Supported Rates and BSS Membership Selectors element is included, the EDP STA should indicate only 6, 12, and 24 Mb/s in the Supported Rates and BSS Membership Selectors element and should not include the Extended Supported Rates and BSS Membership Selectors element.

NOTE 1—The inclusion of the Request element, the SSID List element, the Extended Request element, the FILS Request Parameters element, the Short SSID List element, Vendor Specific elements, and the Known BSSID element is optional as described in Table 9-66 (Probe Request frame body) and an EDP non-AP STA can omit these elements to preserve privacy.

NOTE 2—An(#1410) EDP STA can follow the rule defined in 12.2.10 (Requirements for support of MAC privacy enhancements) to avoid leakage of possibly sensitive network identifying information in SSID element.

*TGbi editor: Modify Clause 9.6.38.1 as follows (track change on):*

* EDP Action field

An EDP Action field, in the octet immediately after the Category field, differentiates the EDP Action frame formats. The EDP Action field values associated with each frame format within the EDP category are defined in Table 9-628s.

* EDP Action field values

|  |  |
| --- | --- |
| Value | Meaning |
| 0 | Capabilities And(#1419) Operation Parameters Request |
| 1 | Capabilities And(#1419) Operation Parameters Response |
| 2-255 | Reserved |

*TGbi editor: Modify Clause 9.6.38.2 as follows (track change on):*

**9.6.38.2 Capabilities And**(#1419) **Operation Parameters Request frame format**

The Capabilities And(#1419) Operation Parameters Request frame allows capabilities and operation parameters to be requested in a protected Action(#1414) frame.

The Action field of the Capabilities And(#1419) Operation Parameters Request frame contains the information

shown in Table 9-628t and Table 9-628u.

**Table 9-628t—Capabilities And(#1419) Operation Parameters Request frame(#1308) Action field format for non-MLO**

(…existing texts…)

**Table 9-628u—Capabilities And(#1419) Operation Parameters Request frame (#1308) Action field format for MLO**

(…existing texts…)

The Dialog Token field is defined in 9.4.1.12 (Dialog Token field) andis (#1311)set to a nonzero value to identify the request/response transaction.

The Basic Multi-Link element is defined in 9.4.2.321(#1061) (Multi-Link element) and is optionally present (see 12.14.3 (EDP capabilities and operation parameters request and response procedure)).

*TGbi editor: Modify Clause 9.6.38.3 as follows (track change on):*

**9.6.38.3 Capabilities And**(#1419) **Operation Parameters Response frame format**

The Capabilities And(#1419) Operation Parameters Response frame allows capabilities and operation parameters to be responded in a protected Action(#1414) frame.

The Action field of the Capabilities And(#1419) Operation Parameters Response frame contains the information shown in Table 9-628v and Table 9-628w.

**Table 9-628v—Capabilities And(#1419) Operation Parameters Response frame(#1308) Action field format for non-MLO**

|  |  |
| --- | --- |
| Order | Meaning |
| 0 | Category |
| 1 | EDP Action |
| 2 | Dialog Token |
| 3 | Beacon Interval |
| 4 | Capability Information |
| 5(#1310) | Elements in order as defined in Table 9-67 (Probe Response frame body) excluding Multi-Link element and Multiple BSSID element |

**Table 9-628w—Capabilities And(#1419) Operation Parameters Response frame(#1308) Action field format for MLO**

(…existing texts…)

The Dialog Token field is defined in 9.4.1.12 (Dialog Token field) andis (#1311)set to a nonzero value to identify the request/response transaction.

The Basic Multi-Link element is defined in 9.4.2.321(#1061) (Multi-Link element) and is optionally present (see 12.14.3 (EDP capabilities and operation parameters request and response procedure)).

*TGbi editor: Modify Clause 12.14.2 as follows (track change on):*

* EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame(#1975r4)

This subclause defines rules for the individually addressed Management(#1411) frames described in Table 12-11a and the individually addressed Beamforming/CSI/CQI frames described in Table 12-11b.

* EDP robust individually addressed Management frame and its corresponding (#1412)individually addressed Management frame(#1411) that is not robust(#1412)

|  |  |
| --- | --- |
| Robust | Not Robust(#1412) |
| Protected Notify Channel Width frame | Notify Channel Width frame |
| Protected SM Power Save(#1413) frame | SM Power Save(#1413) frame |
| Protected Group ID Management frame | Group ID Management frame |
| Protected Operating Mode Notification frame | Operating Mode Notification frame |
| Protected Quiet Time Period (#1414)frame | Quiet Time Period (#1414)frame |

When performing operations that need to use any (#1412)individually addressed Management(#1411) frame that is not robust(#1412) described in Table 12-11a, if management frame protection is negotiated and both STAs set the EDP Robust Individually Addressed Management Frame Support subfield in the RSNXE that they transmit to 1, the STAs shall

* use the corresponding robust individually addressed Management(#1411) frame described in Table 12-11a instead of the (#1412)individually addressed Management(#1411) frame that is not robust(#1412) and
* discard any (#1412)individually addressed Management(#1411) frame that is not robust(#1412) described in Table 12-11a from the peer STA, with which management frame protection is negotiated.

If management frame protection is not negotiated or RSNXE is not included by either STA(#1415) or the EDP Robust Individually Addressed Management Frame Support subfield in the RSNXE from(#1415) either STA is set to 0, the STAs shall not use any robust individually addressed Management(#1411) frame described in Table 12-11a.

* EDP robust individually addressed Beamforming/CSI/CQI frame and its corresponding (#1412)individually addressed Beamforming/CSI/CQI frame that is not robust(#1412)

|  |  |
| --- | --- |
| Robust | Not Robust(#1412) |
| Protected CSI frame | CSI frame |
| Protected Noncompressed Beamforming frame | Noncompressed Beamforming frame |
| Protected Compressed Beamforming frame | Compressed Beamforming frame |
| Protected VHT Compressed Beamforming frame | VHT Compressed Beamforming frame |
| Protected HE Compressed Beamforming/CQI frame | HE Compressed Beamforming/CQI frame |
| Protected EHT Compressed Beamforming/CQI frame | EHT Compressed Beamforming/CQI frame |

When performing operations that need to use any (#1412)individually addressed Beamforming/CSI/CQI frame that is not robust(#1412) described in Table 12-11b, if management frame protection is negotiated, the transmitting STA sets the EDP Robust Individually Addressed Beamforming/CSI/CQI Frame Tx Support subfield in the RSNXE that it transmits to 1, and the receiving STA sets the EDP Robust Individually Addressed Beamforming/CSI/CQI Frame Rx Support subfield in the RSNXE that it transmits to 1, then

* the transmitting STA shall use the corresponding robust individually addressed Management(#1411) frame described in Table 12-11b instead of the (#1412)individually addressed Management(#1411) frame that is not robust(#1412) and
* the receiving STA shall discard any (#1412)individually addressed Management(#1411) frame that is not robust(#1412) described in Table 12-11b from the peer STA, with which management frame protection is negotiated.

If management frame protection is not negotiated or the transmitting STA does not include RSNXE(#1415) or the transmitting STA sets the EDP Robust Individually Addressed Beamforming/CSI/CQI Frame Tx Support subfield in the RSNXE that it transmits to 0, or the receiving STA does not include RSNXE(#1415) or the receiving STA sets the EDP Robust Individually Addressed Beamforming/CSI/CQI Frame Rx Support subfield in the RSNXE that it transmits to 0, the transmitting STA shall not transmit any robust individually addressed Management(#1411) frame described in Table 12-11b to the receiving STA.

*TGbi editor: Modify Clause 12.14.3 as follows (track change on):*

* EDP capabilities and operation parameters request and response procedure(#0851r2)

This subclause defines rules to request and respond capabilities and operation parameters using an(#1418) EDP Capabilities And(#1419) Operation Parameters Request frame and an(#1418) EDP Capabilities And(#1419) Operation Parameters Response frame.

* Non-MLO(#1416)

For non-MLO, a non-AP STA that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1 may send an EDP Capabilities And(#1419) Operation Parameters Request frame without a(#1420) Basic Multi-Link element to request capabilities and operation parameters from an associated AP that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1.

An AP that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1 and receives an EDP Capabilities And(#1419) Operation Parameters Request frame without a(#1421) Basic Multi-Link element shall respond with(#1421) an EDP Capabilities And(#1419) Operation Parameters Response frame without a(#1421) Basic Multi-Link element. An AP that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1 may transmit an unsolicited EDP Capabilities And(#1419) Operation Parameters Response frame without a(#1421) Basic Multi-Link element to an associated non-AP STA that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1. The EDP Capabilities And(#1419) Operation Parameters Response frame shall include all elements that will be included in a Probe Response frame except Multi-Link element and Multiple BSSID element and shall be in the order defined for a Probe Response frame.(#1422)

* MLO

For MLO, all STAs affiliated with an MLD set(#1423) the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to the same value.

A non-AP STA affiliated with a non-AP MLD that sets the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1 may send an EDP Capabilities And(#1419) Operation Parameters Request frame with Basic Multi-Link element to request capabilities and operation parameters of APs affiliated with an associated AP MLD if APs affiliated with the associated AP MLD set the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1.

If APs affiliated with an AP MLD set the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1 and the AP MLD receives through a setup link from an associated non-AP MLD an EDP Capabilities And(#1419) Operation Parameters Request frame with Basic Multi-Link element, then the AP MLD shall respond with(#1424) an EDP Capabilities And(#1419) Operation Parameters Response frame through an affiliated AP over a setup link to the non-AP MLD. If APs affiliated with an AP MLD set the EDP Capabilities And Operation Parameters(#1419) Request/Response Support subfield in the RSNXE to 1, the AP MLD may send an unsolicited EDP Capabilities And(#1419) Operation Parameters Response frame to an associated non-AP MLD through a setup link, where non-AP STAs affiliated with the non-AP MLD set the EDP Capabilities And(#1419) Operation Parameters Request/Response Support subfield in the RSNXE to 1. The EDP Capabilities And(#1419) Operation Parameters Response frame shall include a Basic Multi-Link element, and the Basic Multi-Link element shall include a Per-STA Profile(#1425) subelement with the Complete Profile subfield set to 1 for each AP affiliated with the AP MLD (see 9.4.2.321.2.4(#1061) (Link Info field of the Basic Multi-Link element)). The STA profile field in the Per-STA Profile(#1425) subelement for each AP affiliated with the AP MLD includes the following in order and does not follow 35.3.3.3 (Advertisement of complete or partial per-link information):

* The Capability Information field as defined in 9.4.1.4 (Capability Information field).
* All elements that will be included in a Probe Response frame except Multi-Link element and Multiple BSSID element and shall be in the order defined for a Probe Response frame.(#1422)

*TGbi editor: Modify Clause 12.14.5.1 as follows (track change on):*

**12.14.5.1 Non-MLO(#1416)**

*TGbi editor: Modify Clause 9.6.32.1 as follows (track change on):*

* Protected HE Action field(#1975r4)

***Insert the following new rows to Table 9-632 while maintaining the numerical order and updating the reserved range (not all lines shown):***

* Protected HE Action field values

|  |  |
| --- | --- |
| Value | Meaning |
| ... |  |
| 1 | MU EDCA Reset |
| 2 | Protected HE Compressed Beamforming/CQI |
| 3 | Protected Quiet Time Period (#1414) |
| ~~2~~4-255 | Reserved |

*TGbi editor: Modify Clause 9.6.32.4 as follows (track change on):*

* Protected Quiet Time Period (#1414) frame format(#1975r4)

The Protected Quiet Time Period (#1414)frame allows robust STA-STA communication of the same information that is conveyed in the Quiet Time Period (#1414)frame that is not robust (see 9.6.31.1 (HE Action field)).

The Action field of the Protected Quiet Time Period (#1414)frame has the same format as the Action field of the Quiet Time Period (#1414)frame (see 9.6.31.3 (Quiet Time Period Action frame format)), except that the Order 2 item is the Protected HE Action field, which is defined in Clause 9.6.32.1, instead of the HE Action field.

*TGbi editor: Modify Clause 9.4.2.240 as follows (track change on):*

* RSNXE

***Insert the following new rows to Table 9-373 while maintaining the numerical order and updating the reserved range (not all lines shown):***

* Extended RSN Capabilities field

|  |  |  |
| --- | --- | --- |
| Bit | Information | Notes |
| … |  |  |
| <ANA>(#0851r2) | EDP Capabilities And(1419) Operation Parameters Request/Response Support | A EDP STA sets the EDP Capabilities And(#1419) Operation Parameters Request/Response subfield to 1 if dot11EDPCapabilitiesAndOperationParametersRequestResponseActivated is true. Otherwise, this subfield is set to 0. See 12.14.3 (EDP capabilities and operation parameters request and response procedure). |

*TGbi editor: Modify Clause 12.5.2.4.4 as follows (track change on):*

* PN and replay detection(#1975r4)

***Change item c) and d) of the third paragraph (not all shown) and create new items as follows:***

See 12.5.2.2 (CCMP MPDU format) for a description of how the PN is encoded in the CCMP header. The following processing rules are used to detect replay:

* If management frame protection is negotiated, the receiver shall set the MFPC bit on a given link to 1, it shall maintain a single replay counter for received individually addressed robust PV0 Management frames except Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing frame details)) and Protected Sensing frames (see 9.6.36 (Protected Sensing frame details)) that are received with the To DS subfield equal to 0 and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)), and (S1G STA only) a single replay counter for received individually addressed robust PV1 Management frames except Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing frame details)) and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)).
* If dot11RSNAProtectedManagementFramesActivated is true and dot11QMFActivated is also true, the recipient shall maintain an additional replay counter for each ACI for received individually addressed robust Management frames and robust PV1 Management frames that are received with the To DS subfield equal to 1, except Protected Fine Timing frames (9.6.34 Protected Fine Timing Frame details), protected PV1 Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing Frame details)), ~~and~~ Protected Sensing frames (see 9.6.36 (Protected Sensing Frame details)), and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)). The QMF receiver shall use the ACI encoded in the Sequence Number field of the received frame to select the replay counter to use for the received frame, and shall use the PN from the received frame to detect replays. A replayed frame occurs when the PN from the frame is less than or equal to the current value of the management frame replay counter that corresponds to the ACI of the frame.
* If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving individually addressed Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing frame details(11az))) and shall use the PN from the received frame to detect replays.
* If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving individually addressed Protected Sensing frames (see 9.6.36 (Protected Sensing frame details)) and shall use the PN from the received frame to detect replays.

***Insert the following paragraph after item f):***

* For non-MLO, if dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving EDP robust individually addressed Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)) and shall use the PN from the received frame to detect replays.
* For MLO, if dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter in each setup link for receiving EDP robust individually addressed Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)) and shall use the PN from the received frame to detect replays.

*TGbi editor: Modify Clause 12.5.4.4.4 as follows (track change on):*

* PN and replay detection(#1975r4)

***Change item c) and d) of the first paragraph (not all shown) and create new items as follows:***

To effect replay detection, the receiver extracts the PN from the GCMP header. See 12.5.4.2 (GCMP MPDU

format) for a description of how the PN is encoded in the GCMP header. The following processing rules are

used to detect replay:

* If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a single replay counter for received individually addressed robust Management frames except Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing Frame details)) and Protected Sensing frames (see 9.6.36 (Protected Sensing Frame details)) that are received with the To DS subfield equal to 0 and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)), and a single replay counter for received individually addressed robust PV1 Management frames except Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing Frame details)), and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)), and shall use the PN from the received frame to detect replays.
* If dot11RSNAProtectedManagementFramesActivated is true and dot11QMFActivated is also true, the recipient shall maintain an additional replay counter for each ACI for received individually addressed robust Management frames and robust PV1 Management frames that are received with the To DS subfield equal to 1, except Protected Fine Timing frames (9.6.34 Protected Fine Timing Frame details), protected PV1 Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing Frame details)), ~~and~~ Protected Sensing frames (see 9.6.36 (Protected Sensing Frame details)), and EDP robust Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)). The QMF receiver shall use the ACI encoded in the Sequence Number field of the received frame to select the replay counter to use for the received frame, and shall use the PN from the received frame to detect replays. A replayed frame occurs when the PN from the frame is less than or equal to the current value of the management frame replay counter that corresponds to the ACI of the frame.
* If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving individually addressed Protected Fine Timing frames (see 9.6.34 (Protected Fine Timing Frame details)) and shall use the PN from the received frame to detect replays.
* If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving individually addressed Protected Sensing frames (see 9.6.36 (Protected Sensing Frame details)) and shall use the PN from the received frame to detect replays.

***Insert the following paragraph after item f):***

* For non-MLO, if dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter for receiving EDP robust individually addressed Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)) and shall use the PN from the received frame to detect replays.
* For MLO, if dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a separate replay counter in each setup link for receiving EDP robust individually addressed Beamforming/CSI/CQI frames(#1391) (see 12.14.2 (EDP Robust Individually Addressed Management Frame and Robust Individually Addressed Beamforming/CSI/CQI Frame)) and shall use the PN from the received frame to detect replays.