### IEEE P802.11Wireless LANs

|  |
| --- |
| **REVmf CFP Support for Ranging/Sensing Trigger frames** |
| Date: 2025-07-17 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | San Diego, California |  |  |
| Abhishek Patil | Qualcomm Inc. | San Diego, California |  |  |

Abstract

This document contains proposed resolutions for several LB comments on REVmf D1.0 (5 CIDs):

**Changes to be done w.r.t. D1.0 of REVmf.**

Revisions:

* Rev 0: Initial version of the document. One pending AI is to move the capability bit to RSNXE.
* Rev 1: Incorporated feedback received during the presentation and offline. And moved the capability bit to RSNXE as suggested. Changes highlighted in green.
* Rev 2: Incorporated additional suggestions received online. Changes still highlighted in green. Also added the relevant comments.
* Rev 3: Added CID numbers.

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 REVmf Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the REVmf Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***REVmf Editor: Editing instructions preceded by “REVmf Editor” are instructions to the REVmf editor to modify existing material in the REVmf draft. As a result of adopting the changes, the REVmf editor will execute the instructions rather than copy them to the REVmf Draft.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 137 | Alfred Asterjadhi | 12.2.13 | 3230.45 | Ranging/Sensing Trigger frames have different properties/functionalities compared to other variants of Trigger frames. Hence their protection needs to be under a separate capability bit | Add a capability bit that indicates support of control frame protection for Ranging Trigger frames and its subvariants, including Sensing Triggers. |  Revised –Agree in principle. Proposed resolution accounts for the suggested changes.TGbn editor to make the changes shown in 11-25/1156r3 under all headings that include CID 137. |
| 138 | Alfred Asterjadhi | 9.4.2.316 | 1707.48 | Length should be replaced with Reserved. Also bit locations are missing in the figure. Add them | Replace "Length" with "Reserved". And add bit locations above the figure, namely "B0 B3" and "B4 B7". | Revised –Agree in principle. Proposed resolution accounts for the suggested changes.TGbn editor to make the changes shown in 11-25/1156r3 under all headings that include CID 138. |
| 139 | Alfred Asterjadhi | 9.4.2.316 | 1707.56 | send versus transmit… transmit is better. | Replace "sends" with "transmits" | Revised –Agree in principle. Proposed resolution accounts for the suggested changes.TGbn editor to make the changes shown in 11-25/1156r3 under all headings that include CID 139. |
| 140 | Alfred Asterjadhi | 12.2.13 | 3230.44 | Individually addressed and group addressed need to be listed separately as they will have different support requirements in terms of which STA is indicating support.  | Explicitly call out the requirements for each trigger frame and Multi-STA BA frames based on the peer STA(s) capability. | Revised –Agree in principle. Proposed resolution accounts for the suggested changes.TGbn editor to make the changes shown in 11-25/1156r3 under all headings that include CID 140. |

### Discussion: *None.*

* RSNXE

***REVmf editor: Modify the Table 9-373 as follows [137]:***

* Extended RSN Capabilities field

|  |  |  |
| --- | --- | --- |
| Bit | Information | Notes |
| … |  |  |
| <ANA> | CIP Ranging/Sensing Supported | The CIP Ranging/Sensing Supported field is set to 1 when dot11CIPActivated is true and the integrity protection of Ranging/Sensing Trigger frames is supported and is set to 0 otherwise. *[#137]* |

***REVmf editor: Please change the subclause below as follows [138, 139]:***

**9.4.2.316 CIP Capabilities element**

The CIP Capabilities element contains fields that are used to advertise padding delay used with CIP.

The format of the CIP Capabilities element is shown in Figure 9-1092 (CIP Capabilities element).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Padding Delay |
| Octets: | 1 | 1 | 1 | 1 |
| Figure 9-1092 - CIP Capabilities element format |

The Element ID, Length and Element ID Extension fields are defined in 9.4.2.1 (General).

The Padding Delay field contains the MIC padding delay used with CIP*[#138]*. The format of the Padding Delay field is shown in Figure 9-1093 (Padding Delay field).

|  |  |  |
| --- | --- | --- |
|  | B0 B3 | B4 B7 |
|  | MIC Padding Delay | Reserved*[#138]* |
|  Bits |  4 |  4 |

**Figure 9-1093 – Padding Delay field**

The MIC Padding Delay field indicates the minimum padding duration that is needed (see 12.5.5.7 (Padding)) within a PPDU that solicits a protected Control frame from the STA transmitting the CIP Capabilities element and/or the minimum padding duration that is needed within a protected Control frame that is addressed to the STA transmitting the CIP Capabilities element*[#139]*.

The MIC Padding Delay field is set as defined in Table 9-419 (Encoding of the MIC Padding Delay field).

Table 9-419—Encoding of the MIC Padding Delay field

|  |  |
| --- | --- |
| MIC Padding Delay field value | MIC padding delay |
| 0 | 0 µs |
| 1 | 4 µs |
| 2 | 8 µs |
| 3 | 12 µs |
| 4 | 16 µs |
| 5 | 20 µs |
| 6 | 24 µs |
| 7 | 28 µs |
| 8 | 32 µs |
| 9-15 | Reserved |

***REVmf editor: Please change the subclause below as follows [137, 140]:***

**12.2.13 Requirements for control frame protection**

The Control frames that are defined to be protected are:

— Individually addressed Trigger frames exchanged between an associated non-AP STA and an AP that have negotiated control frame protection except that:

* + Ranging Trigger frames are defined to be protected only if both the associated non-AP STA and the AP have set the CIP Ranging/Sensing Supported field in the RSNXE to 1 and have negotiated control frame protection.
* Group addressed Trigger frames transmitted by an AP that are addressed to at least one associated non-AP STA that has negotiated control frame protection except that
	+ Ranging Trigger frames are defined to be protected only if at least one associated non-AP STA and the AP have set the CIP Ranging/Sensing Supported field in the RSNXE to 1 and have negotiated control frame protection. *[#137, 140]*

— Individually addressed Multi-STA BlockAck frames exchanged between an associated non-AP STA and an AP that have negotiated control frame protection.

— Group addressed Multi-STA BlockAck frames transmitted by an AP that are addressed to at least one associated non-AP STA that has negotiated control frame protection.*[#140]*— Individually addressed Compressed BlockAckReq frames exchanged between an associated non-AP STA and an AP that have negotiated control frame protection.

— Individually addressed Multi-TID BlockAckReq frames exchanged between an associated non-AP STA and an AP that have negotiated control frame protection.*[#140]*

When control frame protection is negotiated, individually addressed and group addressed Control frames that

are defined to be protected shall be encapsulated using the procedure defined in 12.6.22 (Protection of Control

frames(#M7)).

NOTE – Ranging Trigger frames sent by an AP that has set the CIP Ranging/Sensing Supported field in the RSNXE to 0 are not protected even when Control frame protection is negotiated. Group addressed Ranging Trigger frames sent by an AP that has set the CIP Ranging/Sensing Supported field to 1 are defined to be protected if at least one of the recipients is a non-AP STA that has set the CIP Ranging/Sensing Supported field to 1. Another recipient of these Trigger frames that has set the CIP Ranging/Sensing Supported field to 0 ignores the User Info fields in the Trigger frames that contain the PN and MIC. The responses to these Ranging Trigger variants will continue to follow baseline rules as defined in 11.21.6 (FTM procedure) and in 11.55 (WLAN sensing). *[#137]*

### 12.6.22 Protection of Control frames

***REVmf editor: Please change the subclause below as follows [137]:***

This subclause defines rules that shall be followed by an RSNA non-AP STA on a link with an associated AP.

Control frame protection is an optional feature. A STA that supports control frame protection has dot11CIPActivated equal to true. If both the associated non-AP STA and AP have set the CIP Supported field to 1 in the RSNXE, then control frame protection is negotiated.

A STA that supports Control frame protection of Ranging Trigger frames (see 9.3.1.22.10 (Ranging Trigger variant)) shall set the CIP Ranging/Sensing Supported field in the RSNXE to 1 and the CIP Supported field in the RSNXE to 1. A STA that does not support control frame protection of Ranging Trigger frames shall set the CIP Ranging/Sensing Supported field in the RSNXE to 0.*[#137]*

Protection of group addressed Control frames that are defined to be protected shall be provided by a service in the MLME as described in 11.55 (Group addressed control frame protection procedures(#M7)). Protection of individually addressed Control frames that are defined to be protected shall be provided by a service in the MLME (see 12.2.4 (RSNA establishment)).

A non-AP STA indicates in the CIP Capabilities element of the (Re)Association Request frame the padding duration of the protected Control frames and PPDUs that solicit protected Control frames. An AP indicates in the CIP Capabilities element of the (Re)Association Response frame the padding durations of the protected Control frames and PPDUs that solicit protected Control frames.

A STA shall use a protected Multi-STA BlockAck frame to provide acknowledgement of individually addressed frames that solicit an acknowledgement to another STA if the STAs have negotiated control frame protection.

A protected GCR MU-BAR Trigger frame shall solicit a protected Multi-STA BlockAck frame instead of a GCR BlockAck frame. A non-AP STA that supports GCR and that has negotiated control frame protection shall include a protected Multi-STA BlockAck frame, instead of a GCR BlockAck frame, in the TB PPDU that is sent in response to a protected GCR MU-BAR Trigger frame (see 9.3.1.22.7 (GCR MU-BAR Trigger frame format)). An AP shall not send a GCR BlockAckReq frame to a non-AP STA that supports GCR and that has negotiated control frame protection.

A protected MU-BAR Trigger frame shall solicit a protected Multi-STA BlockAck frame. A non-AP STA that has negotiated control frame protection shall include a protected Multi-STA BlockAck frame in the TB PPDU that is sent in response to a protected MU-BAR Trigger frame (see 9.3.1.22.4 (MU-BAR Trigger frame format)).