IEEE P802.11  
Wireless LANs

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| **CC40 CR for Trigger frame** |
| **Date:** 2022-10-13 |
| **Author(s):** |

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Abstract

This submission proposes the resolutions for following 17 CIDs:

* 126, 129, 164, 166, 168, 454, 498, 504, 543, 547, 549, 551, 554, 561, 765, 99, 101

This amendment is based on the 11bf D0.2.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revise the text based on the comments received in the previous CC
* Rev 2: updated by offline discussion and add the CID 99 and 101

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 TGbf D0.2 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbf D0.2 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

#### *CID 504, 765, 129*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 504 | 9.3.1 | 28.07 | The various variant of the Trigger frame is used for the sensing measurement. Define the trigger frame for the sensing as proposed in 22-11/457r1 | Define the sensing Trigger frame variant based on the proposal of 22/457r1. | Revised.  Agree with the commenter in principle. We have discussed the sensing Trigger frame in the previous 11bf CCs. Based on the suggestions (DCN 22/457r1 and 22/557r0), we can define the sensing trigger frame.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 765 | 11.21.18.6.3 | 70.21 | Define Sensing Trigger frame format | As per comment | Revised.  Agree with the commenter in principle. We have discussed the sensing Trigger frame in the previous 11bf CCs. Based on the suggestions (DCN 22/457r1 and 22/557r0), we can define the sensing trigger frame. Please refer to the resolution of CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 129 | 11.21.18.6.5 | 71.10 | 802.11bf appears to define quite a number of new Trigger frames. Based on Table 9-46--Trigger Type subfield encoding in REVme D1.1, there are only 8 available Trigger types left. | Consider how to reduce the number of used Trigger types. | Revised.  Agree with the commenter in principle. We have discussed the sensing Trigger frame in the previous 11bf CCs. Based on the suggestions (DCN 22/457r1 and 22/557r0), we can define the sensing trigger frame. Please refer to the resolution of CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx |

Discussion:

There were two contributions (22/457r1 and 22/557r0) discussed in previous 11bf CCs. To define the new Trigger frame for sensing measurement, two methods as follow have been suggested.

Option 1. Define a new Sensing Trigger frame variant

Option 2. Reuse the Ranging Trigger frame variant

When we discussed these options in those 11bf CCs, I understood that many members preferred to define the sensing trigger frame by using option 2 instead of using option 1. So, in this contribution, we focus on defining the sensing trigger frame by reusing the ranging trigger frame and based on the proposed method related to option2.

As described in the above documents, the sensing trigger frame can be defined by using the same value (i.e., 8) of the trigger type subfield of the common field in the trigger frame format. And, since the equal value of trigger type subfield is used for both the Ranging Trigger frame and Sensing Trigger frame, the Sensing Trigger frame also includes Trigger Dependent Common Info subfield and it can be configured with the same format of Trigger Dependent Common Info subfield in the Ranging Trigger frame variant. This field is composed of 1-byte information.

Similar to 11az, to indicate the various Trigger frame subvariants that are used in the sensing measurement, the Sensing Trigger subtype subfield is included in the Trigger Dependent Common info subfield, where this field is composed of 4 bits. As a subvariant of the Sensing Trigger frame variant, we can consider the following.

* Poll, Sounding, Report
* Except for the above, additional subvariants of the Sensing Trigger frame variant can be defined within the 11bf if needed.

And, the assignment of value of Sensing Trigger Subtype subfield can be rephrased because all subvariants defined in 11az are not used in the Sensing measurement.

Also, there needs a method to identify whether the Trigger frame variant is either Ranging or Sensing additionally because of using the same value of Trigger type subfield. For that, it seems better to use one bit (B4) in the Trigger Dependent Common info subfield. If the Sensing Trigger frame is transmitted, this bit (B4) is set to 1. Otherwise, it is set to 0. It is not only able to maintain the conventional frame format but also minimize the impact on the legacy devices (i.e., 11az STA).

The remaining bits (i.e., 3bit) except the above bits are reserved or can be used for identification if needed. Since we need more discussion, those bits are set to reserve in this contribution.

As described above, since we consider the reuse of the Ranging Trigger frame format, the User Info field for each Sensing Trigger frame subvariant is also configured by reusing the User Info field for the Ranging Trigger frame subvariant. Note that we can decide on many sub-fields of the User Info field to be Reserved if those sub-fields are not needed in the Sensing measurement or reinterpret them to indicate other information

#### *CID 164, 454, 498, 547, 549, 99*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 164 | 11.21.18.6.1 | 70.45 | The format of the Sensing Polling Trigger frame is not defined | Define the Sensing Polling Trigger frame format | Revised.  Agree with the commenter in principle. The Polling Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 454 | 11.21.18.6.1 | 69.32 | Sensing Polling Trigger frame is undefined. | A Sensing Polling Trigger frame should be defined in Clause 9. | Revised.  Agree with the commenter in principle. The Polling Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 498 | 11.21.18.6.1 | 69.47 | This polling trigger frame should be defined as one of Sensing Trigger frame (Sub)variants. | Define the Sensing Trigger frame format including this (Sub)variant for polling. | Revised.  Agree with the commenter in principle. The Polling Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 547 | 11.21.18.6.1 | 69.32 | The Sensing Polling Trigger frame is not defined yet, define the Sensing Polling Trigger frame in the clause 9 | As in comment. | Revised.  Agree with the commenter in principle. The Polling Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 549 | 11.21.18.6.1 | 69.47 | Delete the Editor's Note. And define the format of Sensing Polling Trigger frame in the cluase 9. | As in comment. | Revised.  Agree with the commenter in principle. The Polling Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 99 | 11.21.18.6.1 | 69.47 | The note is not needed. It is clear that the polling frame will need to be defined. | Delete the Editor's Note. | Revised.  Since we definded the sensing Trigger frame format by the resolution for CID 504, this note is not needed.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |

P69L47 in 11bf D0.1



***TGbf Editor : Please delete the Editor’s Note in P85L47***

#### *CID 166, 543, 551, 765, 101*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 166 | 11.21.18.6.3 | 70.10 | The format of the Sensing Sounding Trigger frame is not defined | Define the Sensing Sounding Trigger frame format | Revised.  Agree with the commenter in principle. The Sounding Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 543 | 11.21.18.6 | 68.62 | The sensing sounding Trigger frame is not defined in 11bf D0.1. Define this frame. | As in comment. | Revised.  Agree with the commenter in principle. The Sounding Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 551 | 11.21.18.6.3 | 70.21 | The sensing sounding Trigger frame is not defined in 11bf D0.1. Define this frame and delete the Editor's Note | As in comment. | Revised.  Agree with the commenter in principle. The Sounding Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 101 | 11.21.18.6.3 | 70.20 | The note is not needed. It is clear that the frame and NDP will need to be defined. | Delete the Editor's Note. | Revised  Based on the resolution for CID 504 in 22/1332r1 and Motion 141 in 20/18874r73, the format of sensing sounding trigger frame and SR2SI NDP was defined. So, this note is not needed.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |

P70L20 in 11bf D0.1



***TGbf Editor : Please delete the Editor’s Note in P86L20***

#### *CID 126, 168, 554*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 126 | 11.21.18.6.4 | 70.33 | "a sensing initiator shall send a Sensing Trigger Report frame". Where is this defined? Should it be "Sensing Report Trigger frame"? | Clarify | Revised.  Agree with the commenter in principle. The Report Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx. |
| 168 | 11.21.18.6.4 | 70.33 | The format of the Sensing Trigger Report frame is not defined | Define the Sensing Trigger Report frame format | Revised.  Agree with the commenter in principle. The Report Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx |
| 554 | 11.21.18.6.4 | 70.33 | The Sensing Trigger Report frame is not defined in the 11bf D0.1. Please define this frame. | As in comment. | Revised.  Agree with the commenter in principle. The Report Sensing Trigger frame is not defined yet. So we should define this frame in 11bf.  Please refer the resolution for CID 504.  Instruction to TGbf Editor: incorporate the changes in https://mentor.ieee.org/802.11/dcn/22/ 11-22-1332-01-00bf-CC40-CR-for-Trigger frame.docx |

***TGbf Editor : Please add the follows into subclasue 9.3.1.22***

9.3.1.22 Trigger frame format

***Change the Table 9-46 as shown below***

|  |  |
| --- | --- |
| Trigger Type subfield value | Trigger frame variant |
| 8 | Ranging/Sensing |
| 9-15 | Reserved |

1. Table 9-46—Trigger Type subfield encoding

***Change the paragraph in 9.3.1.22.1 of 802.11be-D1.5 as shown below***

The More TF subfield of the Common Info field indicates whether a subsequent Trigger frame is scheduled for transmission. The More TF subfield is set as defined in 26.8.2 (Individual TWT agreements), ~~and~~ 26.8.3.2 (Rules for TWT scheduling AP), and 11.21.18.6 (TB sensing measurement instance).

9.3.1.22.1.2 User Info List field

***Change the first paragraph in 9.3.1.22.1.2 of draft 802.11be-D1.5 as shown below***

The User Info field is defined in Figure 9-90 (User Info field format(11ax)) for all Trigger frame variants, except the NFRP Trigger frame, which is defined in 9.3.1.22.9 (NFRP Trigger frame format), the Ranging Trigger frame which is defined in 9.3.1.22.10 (Ranging Trigger variant), and the Sensing Trigger frame which is defined in 9.3.1.22.11 (Sensing Trigger variant).

***Insert the following new clauses***

9.3.1.22.11 Sensing Trigger variant

The format of the Trigger Dependent Common Info field for Poll, Sounding, Report Sensing Trigger frame is shown in Figure 9-xxx (Trigger Dependent Common Info subfield for the Sensing Trigger variant).

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|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B3 | B4 | B5 B7 |
|  | Sensing Trigger Subtype | Sensing | Reserved |
| Bits: | 4 | 1 | 3 |

1. Figure 9-xxx - Trigger Dependent Common Info subfield for the Sensing Trigger variant

The Sensing Trigger Subtype subfield value in the Trigger Dependent Common Info field of the Sensing Trigger frame, see Table 9-xxxx (Sensing Trigger subtype field encoding), signals the Sensing Trigger frame subvariants which can be one of three frame types: Sensing Poll, Sensing Sounding, Sensing Report Trigger frame. The Sensing subfield indicates whether the Trigger frame is a Sensing Trigger variant. The Sensing subfield is set to 1 in the Sensing Trigger variant. Otherwise, it is set to 0.

~~Note: The inclusion of the measurement setup ID in the Trigger Dependent Common Info subfield is TBD~~.

The value of the Sensing Trigger Subtype subfield for the Sensing Trigger frame variant is defined in Table 9-xxxx.

1. Table 9-xxxx — Sensing Trigger Subtype field encoding

|  |  |
| --- | --- |
| Sensing Trigger Subtype field value | Sensing Trigger frame variant |
| 0 | Sensing Poll |
| 1 | Sensing Sounding |
| 2 | Sensing Report |
| 3-15 | Reserved |

The RA field and the CS Required, UL BW subfields in the Common Info field of the Sensing Trigger frame are identical to the Basic Trigger frame described in 27.5.3.5 and 9.3.1.23, except that the RA field in Sensing Trigger frames with only one User Info field can be either unicast or broadcast.

The More TF subfield of the Common Info field of the Sensing Trigger frame indicates whether a subsequent extra TB sensing measurement instance is scheduled within a sensing availability window defined in 11.21.18.6 (TB sensing measurement instance)

The TA address of a Trigger frame destined to responders in a TB Measurement instance is set to the AP’s MAC address when these responders have received the measurement setup request frame containing the same AP’s MAC address. The TA address of a Trigger frame destined to responders in a TB Measurement instance is set to the transmitted BSSID when these responders have received the measurement setup request frame containing different BSSID from an AP that support Multiple BSSID.

9.3.1.22.11.1 Sensing Poll Trigger frame

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0-B11 | B12-B19 | B20 | B21-B24 | B25 | B26-B31 | B32-B38 | B39 |
|  | AID12/USID12 | RU Allocation | UL FEC Coding Type | UL HE-MCS | UL DCM | SS Allocation /  RA-RU Information | UL Target Receive Power | Reserved |
| Bits | 12 | 8 | 1 | 4 | 1 | 6 | 7 | 1 |

The format of the User Info field in the Sensing Poll Trigger frame is defined in Figure 9-xxxx (User Info field format for Sensing Poll Trigger frame).

1. Figure 9-xxxx—User Info field for Sensing Poll Trigger frame

The AID12/USID12 subfield carries either the 12 LSBs of the AID for an associated STA or the 12 LSBs of the USID for an unassociated STA. The RU Allocation, UL FEC Coding Type, UL HE-MCS, UL DCM, SS Allocation/RA-RU Information, UL Target Receive Power subfields are identical to the corresponding subfield in the Basic Trigger frame; see 9.3.1.22 (Trigger Frame format.)

The Trigger Dependent User Info subfield is not present in the Sensing Poll Trigger frame.

9.3.1.22.11.2 Sensing Sounding Trigger frame

The format of the User Info field in the Sensing Sounding Trigger frame is defined in Figure 9-xxxx (User Info field format for Sounding subvariant)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0-B11 | B12-B25 | B26-B31 | B32-B38 | B39 |
|  | AID12/USID12 | Reserved | SS Allocation /  RA-RU Information | UL Target Receive Power | Reserved |
| Bits | 12 | 14 | 6 | 7 | 1 |

1. Figure 9-xxxx—User Info field for Sensing Sounding Trigger frame

The AID12/USID12 subfield is identical to the corresponding subfield in the Sensing Poll Trigger frame.

The SS Allocation/RA-RU Information and UL Target Receive Power subfields are identical to the corresponding subfields in the Basic Trigger frame; see 9.3.1.22 (Trigger Frame format).

The Trigger Dependent User Info subfield is not present in the Sensing Sounding Trigger frame.

9.3.1.23.11.3 Sensing Report Trigger frame

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0-B11 | B12-B19 | B20 | B21-B24 | B25 | B26-B31 | B32-B38 | B39 |
|  | AID12/USID12 | RU Allocation | UL FEC Coding Type | UL HE-MCS | UL DCM | SS Allocation /  RA-RU Information | UL Target Receive Power | Reserved |
| Bits | 12 | 8 | 1 | 4 | 1 | 6 | 7 | 1 |

The format of the User Info field in the Sensing Report Trigger frame is defined in Figure 9-xxxx (User Info field format for Sensing Report Trigger).

1. Figure 9-xxxx—User Info field for Sensing Report Trigger frame

The Trigger Dependent User Info subfield is not present in the Sensing Report Trigger frame.