IEEE P802.11
Wireless LANs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |
| --- |
| LB 272 CR for CID 2241 |
| Date: 2023-07-06 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Mahmoud Kamel | InterDigital |  |  | mahmoud.kamel@interdigital.com |
| Zinan Lin | InterDigital |  |  |  |
| Rui Yang | InterDigital |  |  |  |
| Claudio Da Silva | Meta |  |  | claudiodasilva@meta.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

 |

Abstract

This submission proposes resolutions for CID 2241 in subclause 11.55.1.4 in P802.11bf D1.0:

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version

##  CID: 2241

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2241 | 11.55.1.4 | 173.31 | It is better to have a separate subclause to talk about the sensing measurement set up with an unassociated non-AP STA | Add a separate subclause related to unassociated non-AP STA sensing measurement setup | **Revised**Agree in principle with the comment. Reorganization of the text is shown belowTGbf editor: please incorporate changes shown in 11-23/0XXXr0 below. |

***TGbf editor: please make the following change in subclause 11.55.1.4, P133L22 in D1.1.***

* Sensing measurement session
	+ - * 1. General (# 2241)

Sensing measurement session is an agreement between a sensing initiator and a sensing responder on operational parameters associated with sensing measurement exchanges of a given Measurement Session ID.

A sensing initiator shall transmit a Sensing Measurement Request frame to a sensing responder with which it intends to establish a sensing measurement session. A sensing initiator shall not attempt to establish sensing measurement sessions more than the value of the Max Number of Supported Sessions field(#1010) in the last Sensing Capabilities element received from the sensing responder(#1009, #1534, #1996, #2239).

The Comeback field of the Sensing Comeback Info field within the Sensing Measurement Request frame shall be reserved if any of the following is true(#1101):

* the frame is sent by a non-AP STA.
* the frame is sent by an AP and is addressed to a non-AP STA that is associated with this AP.

Upon reception of a Sensing Measurement Request frame with the Comeback field of the Sensing Comeback Info field set to 0 or reserved (# 2241), the sensing responder shall transmit a Sensing Measurement Response frame to the sensing initiator which transmitted the Sensing Measurement Request frame, according to the following rules:

* If the sensing responder accepts the requested sensing measurement session parameters in the received Sensing Measurement Request frame, it shall set the Status Code field to SUCCESS in the Sensing Measurement Response frame.
* If the sensing responder declines the requested sensing measurement session parameters in the received Sensing Measurement Request frame and provides its preferred sensing measurement parameters in the Sensing Measurement Response frame, it shall set the Status Code field to REJECTED\_WITH\_SUGGESTED\_CHANGES in the Sensing Measurement Response frame.
* If the sensing responder declines the requested sensing measurement session parameters in the received Sensing Measurement Request frame without providing its preferred sensing measurement parameters in the Sensing Measurement Response frame, it shall set the Status Code field to REQUEST\_DECLINED in the Sensing Measurement Response frame.

The sensing responder should transmit the Sensing Measurement Response frame within a Sensing Frame Exchange Timeout (see Table 11-29a (Sensing procedure timeout values)) in response to the Sensing Measurement Request frame. If no Sensing Measurement Response frame is received within this time period, or if a Sensing Measurement Response frame is received with a status code other than SUCCESS, the sensing measurement session shall not be resumed and is considered unsuccessful(#1103).

The Measurement Session ID shall be assigned by a sensing initiator to a sensing responder during the establishment of a sensing measurement session. The same Measurement Session ID may be assigned to different sensing responders(#1951, #1979). The <sensing initiator’s MAC address, Measurement Session ID> tuple should be used to uniquely identify the corresponding sensing measurement session.

During a sensing measurement session, the sensing initiator shall assign the role(s) of a sensing responder as one of the following(#1532) (see 9.4.2.319 (Sensing Measurement Parameters element)):

* Sensing receiver
* Sensing transmitter
* Sensing transmitter and sensing receiver

In both TB and non-TB sensing measurement exchanges, if a sensing initiator assigns in a Sensing Measurement Request frame the role of sensing receiver to the sensing responder and sets the Sensing Measurement Report Requested field to 1, the sensing responder shall send Sensing Measurement Report frames in sensing measurement exchanges that result from the sensing measurement session(#1106, #1863).

In non-TB sensing measurement exchanges, if a sensing initiator assigns in a Sensing Measurement Request frame the role of sensing receiver to the sensing responder and sets the Sensing Measurement Report Requested field to 0, the sensing responder shall not send Sensing Measurement Report frames in sensing measurement exchanges that result from the sensing measurement session(\*0474).

NOTE—Whether the sensing measurement report is requested or not, sensing measurements are available locally to the SME of the sensing receiver(#1428, #1429).

If a sensing initiator assigns in a Sensing Measurement Request frame only the role of sensing receiver to the sensing responder and sets the Sensing Measurement Report Requested field to 0, the sensing initiator shall also assign the sensing responder to be polled in the TB sensing measurement exchange by setting the Poll Assigned field in the TB Sensing Specific subelement of the Sensing Measurement Parameters element in the Sensing Measurement Request frame to 1(#1550, #1551).

In non-TB sensing measurement exchanges, if a sensing initiator assigns in a Sensing Measurement Request frame the role of sensing receiver to the sensing responder and also sets the Sensing Measurement Report Requested field to 0, the sensing responder shall not send Sensing Measurement Report frames in sensing measurement exchanges that result from the sensing measurement session.

In TB sensing measurement exchanges, the sensing initiator shall not assign any RU to a sensing responder in a Sensing Reporting Trigger frame if the sensing initiator assigns in a Sensing Measurement Request frame the role of sensing receiver to the sensing responder and also sets the Sensing Measurement Report Requested field to 0.

Operational parameters defined in the Sensing Measurement Parameters field of the Sensing Measurement Parameters element, and in the TB Sensing Specific subelement or the Non-TB Sensing Specific subelement, in the establishment of a sensing measurement session corresponding to a Measurement Session ID shall be fixed until the session is terminated(#1108, #1431, #1533, #1713, #1811).

If the sensing initiator includes a TB Sensing Specific subelement in a Sensing Measurement Request frame, then the RSTA Availability Information field in the RSTA Availability Window element shall contain exactly one Availability Window Information field. The Availability Window Information field in a Sensing Measurement Request frame represents the sensing availability window assigned by the sensing initiator. The Availability Window Broadcast Format field in the Header field in the RSTA Availability Information field in this RSTA Availability Window element shall be set to 0 (see 9.4.2.297 (RSTA Availability Window element)).

If the sensing initiator includes a TB Sensing Specific subelement in a Sensing Measurement Request frame, the Poll Assigned field shall be(#1119) set to 1 if the Poll Required field within the Sensing field(#1599) in the last Sensing Capabilities element received from the sensing responder is set to 1.

If the sensing initiator includes a TB Sensing Specific subelement in a Sensing Measurement Request frame, the SR2SR field shall not be(#1120) set to 1 if the SR2SR Support(#2111) field within the Sensing field in the last Sensing Capabilities element received from the sensing responder is set to 0, and it may be set to 1 if the SR2SR Support field is set to 1.

If the sensing initiator is a non-AP STA, it shall include a non-TB Sensing Specific subelement as part of the Sensing Measurement Parameters element in a Sensing Measurement Setup Request frame and shall assign a value in the Min Time Between Measurements field which is not lower than the value of the Min Time Between Measurements field within the Sensing field in the last Sensing Capabilities element or in the non-TB Sensing Specific subelement in the last Sensing Measurement Parameters element received from the sensing responder(#1715).

If a Sensing Measurement Parameters element is included in the Sensing Measurement Request frame, the sensing initiator shall assign the following parameters in the Sensing Measurement Parameters field after accounting for the sensing capabilities of the sensing responder known from last received Sensing Capabilities element from that STA:

* The maximum bandwidth to be used in TB and non-TB sensing measurement exchanges. This value shall not be greater than the maximum bandwidth the sensing responder supports for sensing. This value is referred to as Sensing Assigned Max Bandwidth.
* The maximum number of HE-LTF repetitions that the sensing responder transmits in an SR2SI or SR2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP in the Max TX HE-LTF Repetition field. This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of transmitting. This value is referred to as Sensing Assigned SR2SI Rep.
* The maximum number of HE-LTF repetitions that the sensing responder receives in an SI2SR or SR2SR NDP that is either a HE Ranging NDP in the Max RX HE-LTF Repetition field. This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of receiving. This value is referred to as Sensing Assigned SI2SR Rep.
* The maximum number of space-time streams the sensing responder receives in an SR2SI or SR2SR NDP in the Max RX STS field. This value shall not be greater than the maximum number of space-streams that the sensing responder is capable of receiving for all bandwidths smaller than or equal to the maximum bandwidth used in TB and non-TB sensing measurement exchanges. This value is referred to as Sensing Assigned SI2SR STS.
* The maximum number of space-time streams the sensing responder transmits in an SI2SR or SR2SR NDP in the Max TX STS field. This value shall not be greater than the maximum number of space-streams that the sensing responder is capable of transmitting for all bandwidths smaller than or equal to the maximum bandwidth used in TB and non-TB sensing measurement exchanges. This value is referred to as Sensing Assigned SR2SI STS.
* The number of antennas to be used in the reception of SI2SR and SR2SR NDPs by the sensing responder. This value shall not be greater than the maximum number of antennas the sensing responder is capable of using.
* The number of bits used in the encoding of each CSI value reported in a Sensing Measurement Report frame by the sensing responder in the  field. This value shall be 10 bits if the  field is set to 1. And this value shall be 8 bits if the  field is set to 0.
* The subcarrier grouping to be used in a Sensing Measurement Report frame by sensing responder in the  field. This value shall be 16 if the  field is set to 1. And this value shall be either 4 or 8 if the  field is set to 0 (see 9.4.1.75.3 (Sensing Measurement Report Control field)).

If the negotiation is successful, the corresponding Sensing Measurement Response frame from the sensing responder shall not include a Sensing Measurement Parameters element(#2112).

Following the successful establishment of a sensing measurement session between an AP and a non-AP STA, both STAs shall start a sensing measurement session expiry timer. The sensing measurement session expiry timer shall be set to the Sensing Measurement Session Expiry value (see Table 11-29a (Sensing procedure timeout values))(\*0477).

After a sensing measurement session between an AP and a non-AP STA is established, both STAs shall reset the sensing measurement session expiry timer for the sensing measurement session if participating in the corresponding TB and/or non-TB sensing measurement exchanges(\*0477).

A sensing measurement session established between an AP and a non-AP STA shall be terminated explicitly or implicitly if the corresponding sensing measurement session expiry timer expires at either STA(\*0477).

A typical state machine implementation of a sensing measurement session between an AP and a non-AP STA is provided in Figure 11-74a (Sensing measurement session state machine diagram)(\*0477).



* Sensing measurement session state machine diagram

11.55.1.4.2 Sensing measurement session with unassociated STAs (# 2241)

The Comeback field of the Sensing Comeback Info field within the Sensing Measurement Request frame shall be set to 0 if the frame is sent by an AP, it is addressed to an unassociated non-AP STA, and it includes a Sensing Measurement Parameters element (see 9.4.2.319 (Sensing Measurement Parameters element))(#1560).

The Comeback field of the Sensing Comeback Info field within the Sensing Measurement Request frame shall be set to 1 if the frame is sent by an AP, it is addressed to an unassociated non-AP STA, and it does not include a Sensing Measurement Parameters element (see 9.4.2.319 (Sensing Measurement Parameters element))(# 1560).

NOTE—The Comeback field is only applicable for sensing measurement setups with unassociated non-APSTAs(\*0474).

If an unassociated non-AP STA intends to participate in a sensing measurement session initiated by an AP, it shall transmit a Sensing Measurement Query frame to solicit a Sensing Measurement Request frame from the AP.

Upon reception of a Sensing Measurement Request frame with the Comeback field of the Sensing Comeback Info field set to 1, a non-AP STA shall transmit a Sensing Measurement Query frame to the AP after the time specified as Unassociated STA Comeback After value (see Table 11-29a (Sensing procedure timeout values)) and before the time specified as Unassociated STA Comeback Before value (see Table 11-29a(Sensing procedure timeout values)) to solicit a Sensing Measurement Request frame from the AP. Both STAs(#1085) start a corresponding unassociated STA comeback timer when the exchange of the Sensing Measurement Query frame and the Sensing Measurement Request frame with the Comeback field of the Sensing Comeback Info field set to 1 completes. The unassociated STA comeback timer shall be set to the Unassociated STA Comeback Before value (see Table 11-29a (Sensing procedure timeout values)) indicated in the Sensing Measurement Request frame.

If an AP intends to request from one of the unassociated non-AP STAs in this TB sensing measurement exchange to participate in another sensing measurement session as a sensing responder, the AP may set the Comeback field of the corresponding User Info field in the Sensing Polling Trigger frame to 1.

If the sensing responder is an unassociated non-AP STA, the sensing initiator shall assign the sensing responder to be polled in the TB sensing measurement exchange by setting the Poll Assigned field in the TB Sensing Specific subelement of the Sensing Measurement Parameters element in the Sensing Measurement Request frame to 1(#1548, #1549, #2109).

A sensing initiator shall only request a sensing availability window from an unassociated sensing responder that overlaps with a 10 TU interval in which the sensing responder is available as signaled by the ISTA Availability Window element (see 9.4.2.296 (ISTA Availability Window element)) in the Sensing Measurement Query frame.