IEEE P802.11
Wireless LANs

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| --- |
| Comment resolution for sensing session |
| Date: 2022-09-26 |
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Abstract

This submission resolves comments of CID 299, 308, 316, 481, 93, 141, 145, 430, 611, 774, 463, 21, 570, 912.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Change ‘STA-STA’ to ‘SR2SR’
* Rev 2: Add CID 463, 299, 308, 316, 481.
* Rev 3: Editorial changes
* Rev 4:
	+ Add a description for active/inactive state
	+ Add frame exchange timer

# Discussion

**SP3** shows majority support (**4A/16B/10C**) for keep sensing session as in the proposal in 21/1934r9 “Discussion on Session Setup”.

* **Which of the following options do you prefer?**
	+ **Option A**: Remove sensing session, add a subclause to describe sensing capability exchange for all STAs, and describe the active/inactive state machine for U-STA only.
	+ **Option B**: Keep sensing session for all STAs, describe sensing capability exchange in sensing session setup for all STAs, and describe the active/inactive state machine in sensing session for U-STA only.
	+ **Option C**: Abstain

**SP1, SP2, SP4 and SP5** in 21/1934r9 “Discussion on Session Setup” provide much more detail information about sensing session setup/termination, and were **supported unanimously**.

* **Do you agree with the following?**
	+ An unassociated STA (denoted as U-STA) and an AP maintain a **state machine** as shown in slide 10.
	+ An associated STA (denoted as A-STA) and an AP does NOT maintain the state machine shown in slide 10.
	+ The timeout (value is TBD) used in the exchange of measurement setup (denoted as MS) Request and MS Response is named as **frame** **exchange timeout T1**, which is also the time limit the AP shall respond the received MS Query with the MS Request. The U-STA does not wait for the MS Request for a longer time than T1 after it delivers the MS Query frame.
	+ An **U-STA** **activity timeout T2** is predefined (value is TBD), when which expires the U-STA is considered as inactive. Both the AP and U-STA maintain this activity timer locally. Both sides reset the timer when
		- an TB/non-TB MS between the AP and U-STA succeeds.
		- or the U-STA participates in a running measurement instance.
	+ An **U-STA** **comeback timeout T3** is defined (value is TBD), before which expires the U-STA is expected to transmit an MS Query frame at least once. Both the AP and U-STA maintain this comeback timer locally. Both sides reset the timer when
		- the exchange of the MS Query and the MS Request with ‘comeback=1’ has completed.
		- or the exchange of the Polling TF with ‘comeback=1’ and CTS within the polling phase of a measurement instance has completed.
* **Do you agree with the following?**
	+ An unassociated STA (denoted as U-STA) transmits the measurement setup (denoted as **MS**) **Query** frame to solicit an MS Request frame from an AP.
	+ Upon receiving an MS Query frame, the AP responds with an MS Request frame to the U-STA within frame exchange timeout T1.
		- The MS Request frame contains the USID assigned to the U-STA.
		- The MS Request frame contains one bit to inform the U-STA to **comeback before the U-STA comeback timeout T3** **expires** to solicit an MS Request frame.
	+ Upon receiving an MS Query frame, the AP can also send a MS Termination frame to the U-STA, which indicates termination of one or more MSs.
	+ The Polling TF within the polling phase of a measurement instance contains one bit to inform the U-STA to **comeback before the U-STA comeback timeout T3** **expires** to transmit an MS Query frame outside the measurement instance.
* **Do you agree with the following?**
	+ Beacon, Probe Response and (Re)Association Response frames shall carry the AP’s sensing capabilities.
	+ (Re)Association Request frame shall carry the non-AP STA’s sensing capabilities.
	+ MS Query frame shall carry the non-AP U-STA’s sensing capabilities.
* **Do you agree with the following?**
	+ Unicast Probe Response frame comprises the following field:
		- **Invitation of responder for sensing** (one bit), which indicates whether or not to invite an intended STA to join a sensing measurement as a sensing responder.
	+ The element carrying the field is TBD.

# 299, 308, 316, 481 - frames

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **299** | Rojan Chitrakar | 57.19 | Sensing Session Setup/termination frames are missing. | Add Sensing Session Setup/termination frames. | ***Rejected****:* The group has discussed the issue, and agrees:Sensing session setup/termination for associated STA is done by the assocation/disassoci-ation procedure, so no new frames should be added. And there is no explicit sensing session setup/termination procedure for unasssociated STA, but rather we have the implicit sensing session setup/termination procedure as defined in *IEEE 802.11-22/1385r4.* |
| **308** | Rojan Chitrakar | 66.49 | Details of the frames used for Sensing Session Setup are missing. | Add details of the frames used for Sensing Session Setup. | ***Revised****:* Changes for (re)association frame and measurement setup query/request/response frames are made.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 308.* |
| **316** | Rojan Chitrakar | 72.45 | Details of the frames used for Sensing Session termination are missing. | Add details of the frames used for Sensing Session Setup/termination. | ***Rejected****:* Same resolution as CID 299. |
| **481** | Rajat Pushkarna | 72.54 | Frame format for sensing session termination are missing | Add frame format details for sensing session termination | ***Rejected****:* Same resolution as CID 299. |

# 93, 141, 145, 430, 611, 774, 463 – setup procedure

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **93** | Claudio da Silva | 66.51 | As discussed in TGbf a couple of times, the sensing session setup ultimately consists of a capability exchange. Thus, there is no need to have an explicit sensing session setup. | Delete 11.21.18.3. Delete "Sensing session setup" from other subclauses within 11.21.18 (such as in the second and third paragraphs of 11.21.18.1). Support to WLAN sensing has already been defined in "Extended Capabilities field" (Table 9-190). Procedure to exchange detailed sensing-related capabilities will need to be defined. | ***Revised****:* Agree in principle, implicit sensing session setup is introduced. And a procedure to exchange sensing related capabilities is defined.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 93.* |
| **141** | Mahmoud Kamel | 66.51 | "A sensing session is an agreement between a sensing initiator and a sensing responder" The procedure of the sensing session setup is missing | Define the sensing session setup if there is any, or simply remove this procedure. | ***Revised****:* Same resolution as CID 93.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 141.* |
| **145** | Mahmoud Kamel | 66.01 | "The detailed sensing session setup procedure is TBD.". The sensing session setup procedure is missing | Define the sensing session setup if there is any, or simply remove this procedure. | ***Revised****:* Same resolution as CID 93.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 145.* |
| **430** | Assaf Kasher | 67.01 | "The detailed sensing session setup procedure is TBD" - define the details | define details of the sesstion setup procedure including what frames are exchanged, what parameters are in those frames and what are the interdependencies of these parameters | ***Revised****:* Same resolution as CID 93.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 430.* |
| **611** | Chaoming Luo | 67.01 | The detailed sensing session setup procedure needs to be defined. | As proposed by https://mentor.ieee.org/802.11/dcn/21/11-21-1934-06-00bf-discussion-on-session-setup.pptx | ***Revised****:* Same resolution as CID 93.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 611.* |
| **774** | Dibakar Das | 66.51 | The sensing session setup prcoedure does not seem to add much value relative to the frame exchanges that will be done for measurement setup. Especially for associated STA case it does not seem this phase is needed since the STAs already have a security context and have an AID assigned. Similarly, for NTB sensing. | Remove the sensing session setup procedure from the spec and merge any functionality with the measurement setup procedure. | ***Revised****:* Same resolution as CID 93.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 774.* |
| **463** | Sang Gook Kim | 66.55 | Identify the operational parameters associated with the sensing session and provide detail information. | As in the comment. | ***Revised****:* The group has discussed and agreed, no ‘session’ specific operational parameters are identified so far, propose to remove the sentence refered by the comments.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 463.* |

**Discussion:**

Clause 11.21.18.3 ‘Sensing session setup’ in D0.3:



Changes made by other CIDs:

~~A sensing session is an agreement between a sensing initiator and a sensing responder to participate in a WLAN sensing procedure.~~ (#399)

A sensing session is identified by ~~MAC addresses and/or~~ ~~associated AID/USID~~ the tuple: <AP’s MAC Address, non-AP STA’s identifier>, where the non-AP STA’s identifier is

 - AID of the associated non-AP STA, or

 - USID of the non-AP STA when the non-AP STA is unassociated with the AP and is assigned to be a sensing responder, or

 - MAC address of the non-AP STA otherwise. (#228, #729, #24, #142, #143).

**Resolution:**

### 9.6.7.1 Public Action frames

*TGbf Editor: Please modify “Table 9-447—Public Action field values” of 11bf D0.3 as following:*

**Table 9-447—Public Action field values**

|  |  |
| --- | --- |
| **Public Action field value** | **Description** |
| <ANA> | Sensing Measurement Setup Request |
| <ANA> | Sensing Measurement Setup Response |
| <ANA> | Sensing Measurement Report |
| <ANA> | Sensing Measurement Setup Termination |
| <ANA> | SBP Request |
| <ANA> | SBP Response |
| <ANA> | SBP Termination |
| <ANA> | SBP Report (#590) |
| <ANA> | Sensing Measurement Setup Query (#308, #93, #141, #145, #430, #611, #774) |

### 9.6.10 Protected Dual of Public Action frames

*TGbf Editor: Please modify “Table 9-487” of 11bf D0.3 as following:*

**Table 9-487—Public Action field values defined for Protected Dual of Public Action frames**

|  |  |  |
| --- | --- | --- |
| **Public Action field value** | **Description** | **Defined in** |
| <ANA> | Protected Sensing Measurement Setup Request | 9.6.7.49 (Sensing Measurement Setup Request frame format) |
| <ANA> | Protected Sensing Measurement Setup Response | 9.6.7.50 (Sensing Measurement Setup Responseframe format) |
| <ANA> | Protected Sensing Measurement Setup Termination | 9.6.7.52 (Sensing Measurement Setup Termination frame format) |
| <ANA> | Protected SBP Request | 9.6.7.53 (SBP Request frame format) |
| <ANA> | Protected SBP Response | 9.6.7.54 (SBP Response frame format) |
| <ANA> | Protected SBP Termination | 9.6.7.55 (SBP Termination frame format) |
| <ANA> | Protected Sensing Measurement Setup Query | 9.6.7.57 (Sensing Measurement Setup Query frame format) (#308, #93, #141, #145, #430, #611, #774) |

*TGbf Editor: Please insert the following subclause into 11bf D0.3*

### 9.6.7.57 Sensing Measurement Setup Query frame format (#308, #93, #141, #145, #430, #611, #774)

The Sensing Measurement Setup Query frame is transmitted by an unassociated non-AP STA to solicit a Sensing Measurement Setup Request frame from an AP. The format of the Sensing Measurement Setup Query frame Action field is defined in Figure 9-1139j (Sensing Measurement Setup Query frame Action field format).



**Figure 9-1139k— Sensing Measurement Setup Query frame Action field format**

The Category field is defined in 9.4.1.11 (Action field).

The Public Action field is defined in 9.6.7.1 (Public Action frames).

The Sensing Capabilities Element is described in 9.4.2.330 (Sensing Capabilities element).

*TGbf Editor: Please insert the following subclause into 11bf D0.3:*

### 9.4.2.330 Sensing Capabilities element (#308, #93, #141, #145, #430, #611, #774)

The Sensing Capabilities element contains fields that are used to advertise optional sensing

capabilities. The element may be present in the Association Request, Association Response, Reassociation Request, Reassociation Response, Probe Response and Sensing Measurement Setup Query frames. The Sensing Capabilities element is defined in Figure 9-1002ci (Sensing Capabilities element format).



**Figure 9-1002ci—Sensing Capabilities element format**

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

The Sensing Capabilities field is defined in Figure 9-1002cj (Sensing Capabilities field format).



**Figure 9-1002cj—Sensing Capabilities field format**

The Reporting Support subfield is set to 1 if the STA supports sending Sensing Measurement Report frame as a sensing receiver.

The Threshold Based Reporting Support subfield is set to 1 by a non-AP STA if the non-AP STA supports reporting CSI variation as a sensing receiver. Otherwise, the Threshold Based Reporting Support subfield is set to 0.

The Aggregated Reporting Support subfield is set to 1 by an AP if the AP supports obtaining more than one sensing measurement results, each from a different sensing measurement setup, in a single Sensing Measurement Report frame sent by a sensing responder. The Aggregated Reporting Support subfield is set to 1 by a non-AP STA if the non-AP STA supports transmitting more than one sensing measurement results, each from a different sensing measurement setup, in a single Sensing Measurement Report frame. Otherwise, the Aggregated Reporting Support subfield is set to 0.

The SR2SR Sensing Support subfield is set to 1 by a non-AP STA if the non-AP STA supports performing sensing measurements upon reception of a sensing NDP transmitted by another non-AP STA. The SR2SR Sensing Support subfield is set to 1 by an AP if the AP supports initiating a SR2SR sensing measurement instance (see 11.21.18.x (SR2SR sensing measurement instance)).

### 9.3.3 (PV0) Management frames

*TGbf Editor: Please insert the following rows into* ***Table 9-60—Beacon frame body, Table 9-62*** *(Association Request frame),* ***Table 9-63*** *(Association Response frame body),* ***Table 9-64*** *(Reassociation Request frame body),* ***Table 9-65*** *(Reassociation Response frame body),* ***Table 9-67****—Probe Response frame body, in 11bf D0.3:*

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | Sensing Capabilities | The element is defined in 9.4.2.330 (Sensing Capabilities element) and is present ifdot11WLANSensingImplemented is true. Otherwise, the element is not present. (#308, #93, #141, #145, #430, #611, #774) |

### 9.4.2 Elements

**9.4.2.1 General**

*TGbf Editor: Please insert the following row in Table 9-128 (Element IDs) of 11bf D0.3:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID****Extension** | **Extensible** | **Fragmentable** |
| Sensing Capabilities element (see 9.4.2.330( Sensing Capabilities element)) (#308, #93, #141, #145, #430, #611, #774) | 255 | <ANA> | Yes | No |

*TGbf Editor: Please insert the following subclause into 11bf D0.3*

### 9.4.2.331 Sensing Operation element (#308, #93, #141, #145, #430, #611, #774)

The Sensing Operation element contains fields that are used to advertise sensing operation information. The element may be present in the individually addressed Probe Response frame.

The Sensing Operation element is defined in Figure 9-1002ck (Sensing Operation element format).



**Figure 9-1002ck—Sensing Operation element format**

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

The Sensing Information field is defined in Figure 9-1002cl (Sensing Information field format).



**Figure 9-1002cl—****Sensing Information field format**

The Invitation Of Responder For Sensing subfield is set to 1 in an individually addressed Probe Response frame to indicate that the AP invites the intended non-AP STA to participate in a sensing measurement setup as a sensing responder and is set to 0 otherwise.

### 9.3.3 (PV0) Management frames

*TGbf Editor: Please insert the following rows in* ***Table 9-67****—Probe Response frame body, in 11bf D0.3:*

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | Sensing Operation | The element is defined in 9.4.2.331 (Sensing Operation element) and is optionally present ifdot11WLANSensingImplemented is true. Otherwise, the element is not present. (#308, #93, #141, #145, #430, #611, #774) |

### 9.4.2 Elements

**9.4.2.1 General**

*TGbf Editor: Please insert the following row in Table 9-128 (Element IDs) of 11bf D0.3:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID****Extension** | **Extensible** | **Fragmentable** |
| Sensing Operation element (see 9.4.2.331( Sensing Operation element)) (#308, #93, #141, #145, #430, #611, #774) | 255 | <ANA> | Yes | No |

### 9.6.7.49 Sensing Measurement Setup Request frame format

*TGbf Editor: Please modify Figure 9-1138a in clause ‘9.6.7.49’ of 11bf D0.3 as following:*



**Figure 9-1138a—Sensing Measurement Setup Request frame Action field format** (#308, #93, #141, #145, #430, #611, #774)

*TGbf Editor: Please insert the following text and figure after P69L44 in clause ‘9.6.7.49’ of 11bf D0.3 as following:*

The Sensing Comeback Info field is formatted as shown in Figure 9-1138c (Sensing Comeback Info field format). (#308, #93, #141, #145, #430, #611, #774)



**Figure 9-1138c—** **Sensing Comeback Info field format** (#308, #93, #141, #145, #430, #611, #774)

The Comeback subfield is set to 1 in a Sensing Measurement Setup Request frame addressed to an unassociated non-AP STA by an AP, to indicate that the AP is not currently able to perform a new sensing measurement setup with this non-AP STA. Otherwise, the Comeback subfield is set to 0. (#308, #93, #141, #145, #430, #611, #774)

The Comeback Expiry Exponent subfield contains an unsigned integer. It is encoded according to the conventions in 9.2.2 (Conventions). (#308, #93, #141, #145, #430, #611, #774)

The unassociated STA Comeback Expiry value is equal to 2(Comeback Expiry Exponent + 8) ms. It is a time during which the unassociated non-AP STA is expected to transmit a Sensing Measurement Setup Query frame to the AP (see 11.21.18.3 (Sensing session setup)). (#308, #93, #141, #145, #430, #611, #774)

*TGbf Editor: Please modify P89L12 in clause ‘11.21.18.1 Overview’ of 11bf D0.3 as following:*

### 11.21.18.1 Overview

…

During WLAN sensing procedure, an associated non-AP STA is identified by its AID and an unassociated non-AP STA is identified by its unassociated STA identifier (USID). The USIDs are assigned to unassociated STAs during the sensing measurement setup exchange. The AID and USID assignment shall be nonconflicting and shall have the same size and valid range (as defined in 9.4.1.8 (AID field)). The USID usage shall follow the same rules as that of AIDs(#781).

During WLAN sensing procedure, sensing frame exchange timeout is detected within a STA’s MAC when the response frame is not received or not sent within a sensing frame exchange timeout predefined as 10 ms. (#93, #141, #145, #430, #611, #774)

*TGbf Editor: Please modify clause ‘11.21.18.3 Sensing session setup’ of 11bf D0.3 as following:*

### 11.21.18.3 Sensing session setup

In the sensing session setup of a WLAN sensing procedure, a sensing session is established, ~~and operational parameters associated with the sensing session are determined and may be exchanged between STAs~~ and the sensing capabilities (see 9.4.2.26 (Extended Capabilities element) and 9.4.2.330 (Sensing Capabilities element)) of an AP and a non-AP STA are exchanged. (#463, #93, #141, #145, #430, #611, #774)

Upon reception of a Probe Request frame, an AP may set the Invitation Of Responder For Sensing subfield in the Sensing Information field of the Sensing Operation element in the individually addressed Probe Response frame to 1, if the AP invites the intended STA to participate in a sensing measurement setup as a sensing responder. (#93, #141, #145, #430, #611, #774)

If a non-AP STA intends to associate with an AP, the sensing session is established when the (re)association completes, i.e., the sensing session setup procedure is the association procedure. (#93, #141, #145, #430, #611, #774)

*TGbf Editor: Please insert the following Figure 11-41xxx in clause ‘11.21.18.3 Sensing session setup’ of 11bf D0.3:*



Figure 11-41c— Unassociated non-AP STA sensing state machine diagram

An unassociated non-AP STA that is in sensing active/inactive state is able/unable to perform sensing measurements. (#93, #141, #145, #430, #611, #774)

An unassociated non-AP STA shall be considered to be in sensing inactive state if the unassociated STA activity timer is not running. An unassociated non-AP STA shall be considered to be in sensing active state if the unassociated STA activity timer is running. The sensing session is established when the unassociated non-AP STA transits from sensing inactive state to sensing active state. (#93, #141, #145, #430, #611, #774)

A typical sensing state machine implementation of unassociated non-AP STA is provided in Figure 11-41c (Unassociated non-AP STA sensing state machine diagram). (#93, #141, #145, #430, #611, #774)

Upon successful sensing measurement setup (see 11.21.18.4 (Sensing measurement setup)) between an unassociated non-AP STA that is in sensing inactive state and the AP, both sides shall start one unassociated STA activity timer for this unassociated non-AP STA, and the unassociated non-AP STA shall transition to sensing active state. The unassociated STA activity timer shall be set to a predefined value of 26.1s. (#93, #141, #145, #430, #611, #774)

When an unassociated non-AP STA is in sensing active state, upon the success of the procedure specified in 11.21.18.4 (Sensing measurement setup) between the unassociated non-AP STA and the AP, both sides shall reset the unassociated STA activity timer for this unassociated non-AP STA. If the unassociated non-AP STA participates in a sensing measurement instance, i.e., if the corresponding measurement setup expiry timer resets, see 11.21.18.8 (Sensing measurement setup termination), both sides shall reset the unassociated STA activity timer for this unassociated non-AP STA. If the unassociated STA activity timer for this unassociated non-AP STA has expired, the unassociated non-AP STA shall transition to sensing inactive state. (#93, #141, #145, #430, #611, #774)

A sensing session is identified by the tuple: <AP’s MAC Address, non-AP STA’s identifier>, where the non-AP STA’s identifier is

 - AID of the associated non-AP STA, or

 - USID of the non-AP STA when the non-AP STA is unassociated with the AP and is assigned to be a sensing responder, or

 - MAC address of the non-AP STA otherwise. (#228, #729, #24, #142, #143).

~~A STA may participate in multiple sensing sessions either as a sensing initiator or as a sensing responder.~~ In a sensing session, the AP may participate in multiple measurement setups either as a sensing initiator or as a sensing responder, correspondingly the non-AP STA may participate in multiple measurement setups either as a sensing responder or as a sensing initiator. (#93, #141, #145, #430, #611, #774)

~~A sensing initiator~~ An AP may maintain multiple sensing sessions, each established with a different non-AP STA, to fulfill the requirements of a WLAN sensing procedure. A non-AP STA may maintain multiple sensing sessions, each established with a different AP, to initiate or participate in different WLAN sensing procedures. (#93, #141, #145, #430, #611, #774)

~~The detailed sensing session setup procedure is TBD.~~ (#463)

*TGbf Editor: Please modify P91L65 in clause ‘11.21.18.4 Sensing measurement setup’ of 11bf D0.3 as following:*

### 11.21.18.4 Sensing measurement setup

A sensing initiator shall transmit a Sensing Measurement Setup Request frame to a sensing responder with which it intends to initiate a sensing measurement setup(#88, #431, #453, #612, #751). If the sensing initiator is a non-AP STA, it shall set the Comeback subfield of the Sensing Comeback Info field in the Sensing Measurement Setup Request frame to 0. If the sensing responder is an associated non-AP STA, the AP shall set the Comeback subfield of the Sensing Comeback Info field in the Sensing Measurement Setup Request frame to 0. (#93, #141, #145, #430, #611, #774)

~~After receiving the~~ Upon reception of the Sensing Measurement Setup Request frame with the Comeback subfield of the Sensing Comeback Info field set to 0, (#93, #141, #145, #430, #611, #774)the sensing responder shall transmit a Sensing Measurement Setup Response frame to the sensing initiator which transmitted the Sensing Measurement Setup Request frame, according to the following rules:

— If the sensing responder accepts the requested sensing measurement setup parameters in the received Sensing Measurement Setup Request frame, it shall set the Status Code field to SUCCESS(#522) in the Sensing Measurement Setup Response frame.

— Otherwise, the sensing responder shall set the Status Code field to TBD in the Sensing Measurement Setup Response frame. The sensing responder may set the Status Code field to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED(#148, #522) and provide its preferred sensing measurement parameters in the Sensing Measurement Setup Response frame.

The sensing responder should transmit the Sensing Measurement Setup Response frame within a sensing frame exchange timeout (see 11.21.18.1 (Overview))in response to the Sensing Measurement Setup Request frame. If no Sensing Measurement Setup Response frame is received within this time period, or if a Sensing Measurement Setup Response frame is received with a status code other than 0 (SUCCESS), the Measurement Setup shall be considered unsuccessful(#770).

If an unassociated non-AP STA intends to participate in a sensing measurement setup initiated by an AP, it shall transmit a Sensing Measurement Setup Query frame to solicit a Sensing Measurement Setup Request frame from the AP. (#93, #141, #145, #430, #611, #774)

Upon reception of a Sensing Measurement Setup Request frame with the Comeback subfield of the Sensing Comeback Info field set to 1, a non-AP STA shall transmit a Sensing Measurement Setup Query frame to the AP before the corresponding unassociated STA comeback timer expires, to solicit a Sensing Measurement Setup Request frame from the AP. Both sides start the corresponding unassociated STA comeback timer when the exchange of the Sensing Measurement Setup Query and the Sensing Measurement Setup Request with the Comeback subfield set to 1 completes. The unassociated STA comeback timer shall be set to the Sensing Comeback Expiry value indicated in the Sensing Measurement Setup Request frame. (#93, #141, #145, #430, #611, #774)

If an AP intends to invite a sensing responder which is an unassociated non-AP STA, to participate another sensing measurement setup as a sensing responder, the AP may set the Comeback field of the corresponding User Info field in the Sensing Polling Trigger frame in a TB sensing measurement instance to 1. (#93, #141, #145, #430, #611, #774)

Upon reception of a Sensing Polling Trigger frame with the Comeback subfield of the Sensing Comeback Info field of the corresponding User Info field set to 1, a non-AP STA shall transmit a Sensing Measurement Setup Query frame to the AP before the corresponding unassociated STA comeback timer expires, to solicit a Sensing Measurement Setup Request frame from the AP. Both sides start the corresponding unassociated STA comeback timer when the exchange of Sensing Polling Trigger frame with the Comeback subfield of the corresponding User Info field set to 1 and CTS frame completes. The unassociated STA comeback timer shall be set to the Sensing Comeback Expiry value indicated in the Sensing Measurement Setup Request frame of the corresponding measurement setup. (#93, #141, #145, #430, #611, #774)

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 instance by setting Poll Assigned field in the Sensing Measurement Setup Request frame to 1. (#93, #141, #145, #430, #611, #774)

The Measurement Setup ID(#217) shall be assigned by a sensing initiator, the <sensing initiator’s MAC

address, Measurement Setup ID> tuple should be used to uniquely(#25) identify the corresponding sensing measurement setup(#861, #752).

…

*TGbf Editor: Please modify P94L60 in clause ‘11.21.18.6.2 Polling phase’ of 11bf D0.3 as following:*

### 11.21.18.6.2 Polling phase

The AP shall send a Sensing Polling Trigger frame to one or more STAs and shall allocate each RU indicated in the Polling Trigger frame to only one STA(#163). Any STA addressed by a User Info field in a Sensing Polling Trigger frame may request to participate in the TB sensing measurement instance by

responding with a CTS-to-self frame in its designated RU allocation as identified in the Sensing Polling

Trigger frame(#760).

*Editor’s Note: The format of Sensing Polling Trigger frame is TBD.*

If the AP intends to invite a sensing responder which is an unassociated non-AP STA, to participate another sensing measurement setup as a sensing responder, the AP may set the Comeback subfield of the Sensing Comeback Info field of the corresponding User Info field in the Sensing Polling Trigger frame in a TB sensing measurement instance to 1. (#93, #141, #145, #430, #611, #774)

*TGbf Editor: Please modify P99L14 in clause ‘11.21.18.8 Sensing measurement setup termination’ of 11bf D0.3 as following:*

### 11.21.18.8 Sensing measurement setup termination(#132)

After it is established (see 11.21.18.4 (Sensing measurement setup)), a sensing measurement setup is terminated either explicitly or implicitly. Under the explicit sensing measurement setup termination, a STA uses the Sensing Measurement Setup Termination frame for the sensing measurement setup termination. Under the implicit sensing measurement setup termination, the sensing measurement setup is terminated after the expiration of the measurement setup expiry timer(#51, #175, #568, #569).

Sensing measurement setup(s) may be terminated explicitly at any time by either the sensing initiator or the sensing responder by transmitting an individually addressed Sensing Measurement Setup Termination frame(#203, #634).

Upon reception of a Sensing Measurement Setup Query frame from an unassociated STA, the AP may transmit a Sensing Measurement Setup Termination frame to the unassociated STA within a sensing frame exchange timeout (see 11.21.18.1 (Overview)), to terminate one or more sens ing measurement setup(s). (#93, #141, #145, #430, #611, #774)

# 21, 570, 912, – termination procedure

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **21** | Rajat Pushkarna | 72.48 | Sensing session termination should provide specifics on how the termination in a sensing session would occur? If there are multiple sensing session, does it means if the sensing initiator/responder initiates a sensing termination frame does it terminates all the sensing sessions? | The details of sensing session termination shall be provided. The sensing session must terminate based on the sensing session ID and may either be initiated by a sensing initiator or a sensing responder with the sensing termination frame carrying the measurement setup ID. | ***Revised****:* One <AP, non-AP STA> pair only have one sensing session, and it shall be terminated when disassocate for associated STA, or shall be terminiated implicitly for unassociated STA.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 21.* |
| **570** | Dong Guk Lim | 72.50 | Define the sensing session termination procedure and delte the text in lin 50. | As in comment. | ***Revised****:* Same resolution as CID 21.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 570.* |
| **912** | Zinan Lin | 72.48 | Can any STA initiate the sensing session termination? | Add details on which device can initiate the sensing session termination and how the devices receive the sensing session termination notification | ***Revised****:* Same resolution as CID 21.*TGbf editor to make the changes shown in IEEE 802.11-22/1385r4 under all headings that include CID 912.* |

**Resolution:**

*TGbf Editor: Please modify clause ‘11.21.18.9 Sensing session termination’ of 11bf D0.3 as following:*

### 11.21.18.9 Sensing session termination

In the sensing session termination, ~~STAs~~ an AP and a non-AP STA ~~stop performing measurements and~~ (#21, #570, #912) terminate the sensing session established between them.

~~The detailed procedure is TBD.~~ (#21, #570, #912)

The sensing session between an AP and an associated non-AP STA shall be terminated when the non-AP STA disassociates with the AP, i.e., the sensing session termination procedure is the disassociation procedure. (#21, #570, #912)

The sensing session between an AP and an unassociated non-AP STA shall be terminated whenthe unassociated non-AP STA transits from sensing active state to sensing inactive state, see 11.21.18.3 (Sensing session setup). (#21, #570, #912)

SP:

Do you support resolutions to the following CIDs and incorporate the text changes into the latest TGbf draft: 299, 308, 316, 481, 93, 141, 145, 430, 611, 774, 463, 21, 570, 912 in 11-22/*1385r4* [14 CIDs]

Y/N/A