IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CC40 CR for Miscellenous negotiation related CIDs | | | | |
| Date: 2022-09-11 | | | | |
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Abstract

This submission addressed the following CIDs relative to 11bf draft 0.3:

**Revisions:**

* Rev 0: Initial version of the document.

| **CID** | **Page** | | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
| 735 | | 33.28 | 9.4.2.317 | Include in the sensing measurement parameter fied sounding parameters like Max BW, Max STS I2R & R2I (<80MHz & above 80MHz), I2R & R2I LTF Rep + Max LTF, BSS color some of which group need to discuss/agree parameters that are needed. These parameters are somewhat similar to sounding parameters for ranging. | As per comment | **Revised.**  Added corresponding parameters to Sensing Measurement Setup Request and Response frames.  **TGbf editor:** Apply the changes tagged with #735 in this document |
| 736 | | 33.28 | 9.4.2.317 | Add optional 'TB sensing measurement subelement' and 'Non-TB sensing measurement subelement' to include fields asssociated with each specific sequence. As such the Non-TB case requires min & potentially max TO values and TB reaquies UL MU MIMO, device class, and avaiability window IE and it relevant parameters, and potentially max TO. Members would need to discuss/refine parameters as needed similar to randing sounding. | As per comment | **Revised.**  Added corresponding parameters to Sensing Measurement Setup Query, Sensing Measurement Setup Request and Response frames.  **TGbf editor:** Apply the changes tagged with #736 in this document |
| 737 | | 33.28 | 9.4.2.317 | Add a capability bit for the non-AP STA to indicate that it does not need Trigger frame Poll as part of the the TB measurement instant and additionally add a assignment bit in the TB sensing measurment parameter subelement to assign whether AP sends the polling to the non-AP STA if it indicates that it doesn't need it. | As per comment | **Revised.**  Added this bit in Sensing Measurement Setup Request frame.  **TGbf editor:** Apply the changes tagged with #737 in this document |
| 738 | | 33.28 | 9.4.2.317 | Add a capability bit to indicate the receiver responder STA supports immediate or delayed reporting | As per comment | **Revised.**  Added this bit in Sensing Measurement Setup Response frame.  **TGbf editor:** Apply the changes tagged with #738 in this document |
| 739 | | 33.28 | 9.4.2.317 | Add a capability bit to indicate the responding STA supports number of simultaneous use-case (i.e., measurement setup) with min=1. | As per comment | **Reject.**  If the sensing responder is not capable of supporting more than a certain number of setups it can reject a new request. |
| 740 | | 33.28 | 9.4.2.317 | Add a capability bit to indicate as to whether the receiver responder STA supports reporting more than one delayed measurement reports in response to Sensing Trigger Resport in TB measurement instance. | As per comment | **Reject.**  A sensing responder should always be able to aggregate multiple Sensing Measurement Setup Report frames. |
| 783 | | 67.09 | 11.21.18.4 | Include the following parameters for measurement setup exchange: Badwidth, NSS, number of LTFs and LTF repetitions its capable of transmitting and receiving, | As in comment. | **Revised.**  Added corresponding parameters to Sensing Measurement Setup Request and Response frames.  **TGbf editor:** Apply the changes tagged with #735 in this document |
| 788 | | 69.33 | 11.21.18.6.1 | How does a STA, especially unassocaited STA, agree on this availability period. | Define the signaling needed for the AP and STA to arrive at a common availability perdiod. | **Revised.**  Added corresponding parameters to Sensing Measurement Setup Query, Sensing Measurement Setup Request and Response frames.  **TGbf editor:** Apply the changes tagged with #736 in this document |
| 798 | | 71.51 | 11.21.18.7 | If the sensing measurement is initiated too frequently, the measurement instance may not succeed. | Define a minimum time period that a STA needs to wait following a successful NTB measurement sequence to start another. | **Revised.**  Added corresponding parameters to Sensing Measurement Setup Request and Response frames  **TGbf editor:** Apply the changes tagged with #736 in this document |
| 790 | | 69.44 | 11.21.18.6.1 | To conserve power at a non-AP STA, define a signaling from AP for a STA that is participating in an availability period and not polled in the first Sensign Poll TF determine whether it is going to be scheduled in the rest of the period. | As in comment. | **Revised.**  This has been fixed in draft 0.3. Please see the following in P91L5:  “If the AP does not poll all STAs assigned to be polled in the sensing availability window using a single Sensing Polling Trigger frame, the AP shall attempt to schedule one or more extra TB sensing measurement  instances where each TB sensing measurement instance begins with a polling phase within the same sensing  availability window. The AP shall indicate the extra TB sensing measurement instance by setting the More  TF subfield in the Common Info field to 1 and the RA field to the broadcast address in the Sensing Polling  Trigger frame.”  **TGbf editor:** no further action needed. |
| 793 | | 69.64 | 11.21.18.6.2 | Clarify how the AP sets CH\_BANDWIDTH parameter in a Txvector in each phase relative to how it was set in the preceding phase of the TXOP | As in comment. |  |
| 797 | | 70.46 | 11.21.18.6.2 | Consider the case when two APs in the same Multiple BSSID set have setup measurement sessions with different STAs in the same overlapping period. Depending on the number of STAs that can participate in total, it may be more medium efficient to be able to aggregate those STAs in a single Poll sent from Transmitted BSSID rather than sending separate Polls. | Require that a responder STA participating in TB sensing session suppports reception of Control frames with TA equal to transmitted BSSID. |  |

**Discussion:**

Note the following SP seemed to have significant support regarding the sensing PPDU formats:

**Straw Poll 1:** Do you agree to include the following text in 802.11bf SFD?

* The HE Ranging NDP and HE TB Ranging NDP formats shall be used for 802.11bf sub-7 GHz sensing when PPDU BW ≤ 160 MHz
* The EHT sounding NDP format (including specified preamble puncturing) shall be used for 802.11bf sub-7 GHz sensing when PPDU BW = 320 MHz
* **Result:** Y/N/A: 30/7/8

This doc therefore assumes the results for this SP will hold.

So, in order to agree on the PHY parameters for TB and NTB sensing with BW < 320 MHz we need some of the parameters that are signaled in 11az ranging session setup. Now, in 11az those parameters are signaled using the Ranging Parameters element. We pick a few out of them

Similarly, for TB and NTB sensing with BW = 320 MHz we need some of the relevant PHY parameters that are signaled during EHT Association Request/Response mechanism.

We propose to carry those aggregate parameters in the Measurement Setup Request/Response frames’ Sensing Measurement Parameters element. They signal a assignment when carried in the Measurement Setup Request; they signal preferred parameters when carried in Measurement Setup Response frames. They signal a support when its carried in a Sensing element .

***TGbf editor: Revise the section starting at ?? of 11bf draft 0.3 as:***

### 9.4.2.330 Sensing element

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

capabilities and sensing operation information. 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 element is defined in Figure 9-1002ci (Sensing element format).

|  |  |  |  |
| --- | --- | --- | --- |
| Element ID | Length | Element ID Extension | Sensing |

Octets: 1 1 1 TBD

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Invitation of Responder for Sensing | BW | Max Tx STS ≤ 80 MHz | Max Tx STS = 160 MHz | Max Tx STS > 160 MHz |

Bits: 1 3 3 3 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Max Rx STS ≤ 80 MHz | Max Rx STS = 160 MHz | Max Rx STS > 160 MHz | Max Tx Repetition | Max Rx Repetition |

Bits: 3 3 3 3 3

|  |  |  |  |
| --- | --- | --- | --- |
| Max Tx HE-LTF Total | Max Tx EHT-LTF Total | Max Rx HE-LTF Total | Max Rx EHT-LTF Total |

Bits: 2 3 2 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device Class | Full Bandwidth UL MU-MIMO | Max number of supported MS Setups | MinTIme between measurements | Availability Window Element (optional) |

Bits: 1 1 2 23 variable

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

The Invitation Of Responder For Sensing subfield is set to 1 in a Probe Response frame to indicate the need for new sensing responders and is set to 0 to indicate new sensing responders are not needed.

The BW subfield indicates the maximum bandwidth supported by the transmitter STA for the SI2SR/R2I NDP exchange as part of the non-TB sensing, or TB sensing exchange. The encoding of this subfield is given in

Table 9-1002xx (BW subfield).

**Table 9-1002xx BW subfield**

|  |  |
| --- | --- |
| **BW subfield value** | **Description** |
| 0 | 20 MHz |
| 1 | 40 MHz |
| 2 | 80 MHz |
| 3 | 160 MHz |
| 4 | 320 MHz |
| 5-7 | Reserved |

The Max Tx Repetition subfield is set to the maximum number of HE-LTF repetitions that a STA supports in the transmission of an SR2SI or a SI2SR NDP that is a HE Ranging NDP or HE TB Ranging NDP, the subfield is set to the number of HE-LTF repetitions minus 1.

The Max Rx Repetition subfield is set to the maximum number of HE-LTF repetitions that a STA supports in reception of an SR2SI or a SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, the subfield is set to the number of HE-LTF repetitions minus 1.

The Max Tx STS ≤ 80 MHz subfield indicates for bandwidths less than or equal to 80 MHz the maximum

number of space-time streams that a STA supports in the transmission of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Max Tx STS = 160 MHz subfield indicates for bandwidth equal to 160 MHz the

maximum number of space-time streams that a STA supports in the transmission of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Max Tx STS > 160 MHz subfield indicates for bandwidths greater than 160 MHz the

Maximum number of space-time streams that a STA supports in the transmission of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Max Tx HE-LTF Total subfield and the Max Rx HE-LTF Total subfield indicates the maximum number of HE-  
LTFs that a STA supports in transmission or reception respectively of an SR2SI or SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP. The encoding of Max Tx HE-LTF Total and Max Rx HE-LTF Total subfields is given in Table 9-322h23fc Max R2I/I2R LTF Total subfields.

The Max Tx EHT-LTF Total subfield and the Max Rx EHT-LTF Total subfield indicates the maximum number of EHT-  
LTFs that a STA supports in transmission and reception respectively in an SR2SI or SI2SR NDP that is a EHT sounding NDP. The Max Tx EHT-LTF Total and Max Rx EHT-LTF Total subfields have the same format as in the Maximum Number

Of Supported EHT-LTFs field in the EHT Capabilities element.

NOTE- The maximum number of HE-LTFs limits the allowed combinations of number of space-time streams and HE-LTF repetitions in a HE Ranging NDP and HE TB Ranging NDP.

The Max Rx STS ≤ 80 MHz subfield indicates for bandwidths less than or equal to 80 MHz the

maximum number of space-time streams that a STA supports in the reception of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Max Rx STS = 160 MHz subfield indicates for bandwidth equal to 160 MHz the

maximum number of space-time streams that a STA supports in the reception of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Max Rx STS > 160 MHz subfield indicates for bandwidths greater than 160 MHz the

maximum number of space-time streams that a STA supports in the reception of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Device Class and Full Bandwidth UL MU-MIMO fields correspond to the Device Class and  
Full Bandwidth UL MU-MIMO fields defined in Table 9-321b (Subfields of the HE PHY  
Capabilities Information field) ***(#735,736)***.

The Max Number of supported MS Setups field correspond to the maximum number of simultaneous measurement setups that the transmitter STA is capable of performing with another STA.

The Min Time Between Measurements field indicates the minimum time between two consecutive non-TB sensing measurement instances, in units of 100 µs, that the transmitter STA supports. This field is reserved when sent in a Probe Request, Association Request or Measurement Setup Query frame.

The Availability Window Element field is contains a single ISTA Availability Window element frame indicating the transmitter STA’s availability for TB sensing as well as a prefered periodicity. The field is present in a Measurement Setup Query frame.

***TGbf editor: Revise the section starting at P45L24 of 11bf draft 0.3 as(#735, 736):***

9.4.2.317 Sensing Measurement Parameters element

The Sensing Measurement Parameters element indicates operational parameters associated with sensing measurement instance(s)(#216, #180, #584, #835, #429, #665, #848, #852, #853, #854, #856, #858, #859, #841). The format of the Sensing Measurement Parameters element is defined in Figure 9-1002au (Sensing Measurement Parameters element format(#7, #470, #509)).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element ID | Length | Element ID Extension | Measurement Sensing Parameters | Sensing subelements |

Octets: 1 1 1 variable   
**Figure 9-1002au— Sensing Measurement Parameters element format(#7, #470, #509)**

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

The format of the Sensing Measurement Parameters field is defined in Figure 9-1002av (Sensing Measurement Parameters field format(#224, #255, #587, #837, #902, #488, #7, #470, #509)).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sensing Transmitter | Sensing Receiver | Sensing Measurement Report Requested | Sensing Measurement Report Type | BW |

Bits: 1 1 1 3 3

|  |  |  |
| --- | --- | --- |
| Tx Repetition | Rx Repetition | Tx STS |

Bits: 3 3 3

|  |  |  |
| --- | --- | --- |
| Rx STS | Reserved | BSS Color Information |

Bits: 3 1 8

**Figure 9-1002av— Sensing Measurement Parameters field format(#224, #255, #587, #837,  
#902, #488, #7, #470, #509)**

The Sensing Transmitter subfield is set to 1 to indicate a sensing transmitter role for the sensing

responder(#217, #392, #393); and is set to 0 otherwise.

The Sensing Receiver subfield is set to 1 to indicate a sensing receiver role for the sensing responder(#217,#392, #393); and is set to 0 otherwise.

The Sensing Measurement Report Requested(#183) subfield is reserved if the Sensing Receiver subfield is set to 0(#199). If the Sensing Receiver subfield is set to 1,(#199)

— the Sensing Measurement Report Requested(#183) subfield is set to 1 to indicate that the sensing

responder sends Sensing Measurement Report frames in sensing measurement instances that result

from the sensing measurement setup.

— the Sensing Measurement Report Requested(#183) subfield is set to 0 to indicate that the sensing

responder does not send Sensing Measurement Report frames in sensing measurement instances that

result from the sensing measurement setup.

The Sensing Measurement Report Type subfield is set to a number that identifies the type of sensing measurement report being requested. The types of sensing measurement report that have been allocated are defined in Table 9-401s (Sensing Measurement Report Type field definition(#7, #470, #509))(#217, #255, #587, #837, #902, #488). If the sensing initiator is a sensing receiver, the Sensing Measurement Report Type subfield is reserved(#667).

The BW subfield indicates the nominal bandwidth used to transmit the SI2SR/R2I NDP exchange as part of the non-TB sensing, or TB sensing exchange. The encoding of this subfield is given in

Table 9-1002xx (BW subfield).

The Tx Repetition subfield is set to the number of HE-LTF repetitions that a STA uses in the transmission of an SR2SI or a SI2SR NDP that is a HE Ranging NDP or HE TB Ranging NDP, the subfield is set to the number of HE-LTF repetitions minus 1.

The Rx Repetition subfield is set to the number of HE-LTF repetitions that a STA uses in the preamble of an SR2SI or a SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, the subfield is set to the number of HE-LTF repetitions minus 1.

The Tx STS subfield indicates for bandwidths less than or equal to the value signaled in the BW field, the

number of space-time streams that a STA uses in the transmission of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The Rx STS subfield indicates for bandwidths less than or equal the value signaled in the BW field, the

number of space-time streams that a STA uses in the reception of an SR2SI or a SI2SR NDP in the sensing measurement instances.

The BSS Color Information subfield has the same format as in the BSS Color Information field in

the HE Operation element. The BSS Color Information subfield is reserved in a Sensing Measurement Request or Sensing Measurement Response frame if the transmitter of the frame is a non-AP STA. Otherwise, each subfield of the BSS Color Information field is set to the same

value, as in the HE Operation element transmitted by the transmitter AP.

The Tx Repetition, Tx STS subfields are reserved in a Sensing Measurement Request frame if the Sensing Receiver field is set to 0.

The Rx Repetition, Rx STS subfields are reserved in a Sensing Measurement Request frame if the Sensing Transmitter field is set to 0.

The Sensing subelements field contains one or more subelements. The subelement format and

ordering of the subelements are defined in 9.4.3 (Subelements). The Subelement ID field values

for the defined subelements are shown in Table 9-1002xy (Sensing subelement IDs for Sensing Parameters).

**Table 9-1002xy- Sensing Subelement IDs for Sensing Parameters**

|  |  |  |
| --- | --- | --- |
| **Subelement ID** | **Name** | **Extensible** |
| 0 | Non-TB Specific subelement | Yes |
| 1 | TB Specific subelement | Yes |
| 2-255 | Reserved |  |

If the sensing initiator and the responder negotiate a non-TB sensing measurement agreement or TB sensing measurement, then the Non-TB Specific subelement or the TB specific subelement respectively is included in the Sensing Measurement Request frame to describe the set of parameters that the initiator assigns for that agreement.

The format of the Non-TB Specific subelement is as shown in Figure 9-1002xx (Non-TB Specific

subelement format).

|  |  |  |  |
| --- | --- | --- | --- |
| Subelement ID | Length | Min Time Between Measurements | Reserved |

Bits: 8 8 23 9

**Figure 9-1002xx Non-TB Specific subelement format**

The Min Time Between Measurements field is requested by the sensing inititator in the Sensing Measurement Request frame and assigned by the sensing responder in the Sensing Measurement Response frame which indicate the minimum time between two consecutive non-TB sensing measurement instances, in units of 100 µs.

The format of the TB Specific subelement is as shown in Figure 9-1002yy (TB Specific subelement  
format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subelement ID | Length | AID/USID | Poll Required | Reserved | Availability Window |

Bits: 8 8 16 1 7 64

**Figure 9-1002yy TB Specific subelement format**

The AID/USID field contains an identifier for the sensing responder for the duration of the sensing session. If the sensing responder is associated with the sensing initiator the value is set to the sensing responder’s AID. If the sensing responder is not associated with the sensing initiator, the AID/USID field is set to the USID, which is assigned by the sensing initiator to identify the sensing responder.

The Poll Required field in the Sensing Measurement Setup Request frame is set to 1 to indicate that the sensing intiator will poll the sensing receiver in each sensing measurement instance and is set to 0 otherwise. (#737).

The Availability Window field contains a RSTA Avaialbility Window element.

***Modify the text in Section* 9.4.2.29 *of 11az document draft 6.0 starting on P73L20 as (#735, 736):***

9.4.2.297 RSTA Availability Window element

The Partial TSF Timer subfield is derived as described in 9.4.2.167 (FTM Parameter element) and

indicates the TSF timer of the ~~RSTA~~ transmitter at the start of first availability window.

***Modify the text in Section* 9.4.2.296 *of 11az document draft 6.0 starting on P72L7 as(#735, 736):***

When included in an IFTMR frame e~~E~~ach Availability Bit in the Availability Bitmap subfield indicates the ISTA’s availability for TBranging with the recipient RSTA. When included in a Sensing Measurement Query frame each Availability Bit in the Availability Bitmap subfield indicates the transmitter non-AP STA’s availability for TBsensing with the recipient AP. The value indicated by each bit in the Availability Bitmap is inunits of 10 TUs. When included in an IFTMR frame b~~B~~it Bk (where 0 ≤ k ≤ count-1) represents the ISTA’s periodic availability for TBranging with the RSTA in the interval [tstart,k , tend,k] repeated every N TUs; see Equation (9-3ca):

tstart,*k*= tstart,0 + 10*k* TU,

tend,*k*= tstart,0 + 10(*k+1*) TU,

tstart,0 = time 0 per RSTA’s TSF

N = 10\*Count. (9-3ca)

When included in a Sensing Measurement Query frame bit Bk (where 0 ≤ k ≤ count-1) represents the transmitter non-AP STA’s availability’s periodic availability for TB sensing with the recepient in the interval [tstart,k , tend,k] repeated every N TUs where tstart,*k*  and tend,k are defined by setting tstart,0 in Equation (9-3ca) to time 0 per recipient AP’s TSF.

A value of 1 in an Availability Bit indicates the ~~ISTA’s~~transmitter STA’s availability at time tstart,k for a duration of 10  
TUs, while a value of 0 indicates the transmitter STA~~ISTA~~’s unavailability at time tstart,k for a duration of 10 TUs.

***TGbf editor: Revise the section starting at P87L59 of 11bf draft 0.3 as(#735, 736):***

11.21.18.4 Sensing measurement setup

Sensing measurement setup allows for a sensing initiator and a sensing responder to exchange and agree on operational parameters associated with sensing measurement instance(s)(#429, #665, #848, #852, #853, #854, #856, #858, #859, #841) of a given Measurement Setup ID(#191).

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). A sensing initiator shall not attempt to initiate more sensing measurement setup than the value of the Max number of supported MS Setups subfield in the last Sensing elements received from the sensing responder.

After receiving the Sensing Measurement Setup Request frame, 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 DECLINED\_SENSING\_MEASUREMENT\_SETUP or PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED in the Sensing Measurement Setup Response frame(#613). If the Status Code field is set to

PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED(#148, #522), the sensing responder shall provide its preferred sensing measurement parameters in the Sensing Measurement Setup Response frame(#613).

The sensing responder should transmit the Sensing Measurement Setup Response frame within TBD ms 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).

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).

During a sensing measurement setup, the role(s) of a sensing responder shall be determined by a sensing initiator as one of following (see 9.4.2.317 (Sensing Measurement Parameters element)):

— Sensing receiver

— Sensing transmitter

— Sensing transmitter and sensing receiver

If a Sensing Measurement Setup Request frame assigns the role of sensing receiver to the sensing responder, it also defines whether the sensing responder shall send or shall not send Sensing Measurement Report frames in sensing measurement instances that result from the sensing measurement setup(#881, #753, #475).

The assignment of sensing transmitter and/or sensing receiver role(s) of a STA corresponding to a Measurement Setup ID(#217) shall be fixed until the sensing measurement setup is terminated.

The assignment of measurement report type of a sensing responder as a sensing receiver corresponding to a Measurement Setup ID(#217) shall be fixed until the sensing measurement setup is terminated.

When a Sensing element is included in a frame, the transmitter shall indicate the following parameters in the Sensing field:

* Maximum supported bandwidth in the BW subfield.
* Maximum number of LTF repetitions it is capable of receiving in the preamble of a SR2SI or SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, in the Max Rx Repetition subfield.
* Maximum number of LTF repetitions it is capable of transmitting in the preamble of the

a SR2SI or SI2SR NDP that is a HE Ranging NDP or a HE TB Ranging NDP, in the Max Tx Repetition subfield.

* Maximum number of space-time streams it is capable of receiving in a SR2SI or SI2SR NDP for

bandwidths less than or equal to 80 MHz, in the Max Rx STS ≤ 80 MHz subfield.

* Maximum number of space-time streams it is capable of receiving in a SR2SI or SI2SR NDP for

bandwidth equal to 160 MHz, in the Max Rx STS = 160 MHz subfield.

* Maximum number of space-time streams it is capable of receiving in a SR2SI or SI2SR NDP for

bandwidth greater than 160 MHz, in the Max Rx STS > 160 MHz subfield.

* Maximum number of space-time streams it is capable of transmitting in the SI2SR NDP for

bandwidths less than or equal to 80 MHz, in the Max Tx STS ≤ 80 MHz subfield.

* Maximum number of space-time streams it is capable of transmitting in a SR2SI or SI2SR NDP for bandwidth equal to 160 MHz, in the Max Tx STS = 160 MHz subfield.
* Maximum number of space-time streams it is capable of transmitting in a SR2SI or SI2SR NDP for

bandwidth greater than 160 MHz, in the Max Tx STS > 160 MHz subfield.

* Maximum number of HE-LTFs in total it is capable of receiving, including all repetitions, in

a SR2SI or SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, in the Max Rx HE-LTF Total subfield.

* Maximum number of EHT-LTFs in total it is capable of receiving, including all repetitions, in

a SR2SI or SI2SR NDP that is a EHT sounding NDP, in the Max Rx EHT-LTF Total subfield.

* Maximum number of HE-LTFs in total it is capable of transmitting, including all repetitions,

in a SR2SI or SI2SR NDP that is a HE Ranging NDP, in the Max Tx HE-LTF Total subfield.

* Maximum number of EHT-LTFs in total it is capable of transmitting, including all repetitions,

in a SR2SI or SI2SR NDP that is an EHT sounding NDP, in the Max Tx EHT-LTF Total subfield.

A non-AP STA shall include one ISTA Availability Window element in any Measurement Setup Query frame indicating its availability for TB sensing as well as a prefered periodicity. The

periodicity of the availability windows prefered by the STA is expressed in units of 10 TUs in

the Count subfield in the ISTA Availability Information field of the ISTA Availability Window

element. The value of the Count subfield in the ISTA Availability Information field of the ISTA

Availability Window element shall be a multiple of the Beacon Interval of the recipient AP in units of 10

TUs.

When the sensing initiator includes a TB-specific subelement in a Sensing Measurement Setup 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 Setup Request frame represents the availability window assigned by the sensing initiator. The Availability Window Broadcast Format subfield in the Header subfield in the RSTA Availability Information field in this RSTA Availability Window element is set to 0. A sensing initiator shall only request an 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 in the Sensing Measurement Setup Query frame.

When the sensing initiator includes a TB-specific subelement in a Sensing Measurement Setup Request frame, the value contained in the Min Time Between

Measurements shall not be lower than the value of the Min Time Between

Measurements field in the last Sensing element or Sensing Parameters element received from the sensing responder.

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

* The maximum bandwidth to be used for the measurement instances. This value shall not be greater than the maximum bandwidth the sensing responder supports for sensing.
* The number of LTF repetitions that it receives in the preamble of a SR2SI NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, in the Rx Repetition subfield. This value shall not be higher than the maximum number of HE-LTF repetitions that the sensing responder is capable of transmitting.
* The number of LTF repetitions it transmits in the preamble of a

SI2SR NDP that is a HE Ranging NDP, in the Tx Repetition subfield. This value shall not be higher than the maximum number of HE-LTF repetitions that the sensing responder is capable of receiving.

* The number of space-time streams it receives in the SR2SI NDP, in the Rx STS subfield. This value shall not be higher than the maximum number of space-streams that the sensing responder is capable of transmitting for all bandwidth smaller than or equal to the maximum bandwidth used for the measurement instances.
* The number of space-time streams it transmits in the SI2SR NDP, in the Tx STS subfield. This value shall not be higher than the maximum number of space-streams that the sensing responder is capable of receiving for all bandwidth smaller than or equal to the maximum bandwidth used for the measurement instances.

When the negotiation is successful for TB sensing and non-TB sensing, the corresponding Sensing Measurement Setup Response frame from the sensing responder shall not include a Sensing Parameters element.

11.21.18.6.4 TF sounding phase