IEEE P802.11  
Wireless LANs

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| --- | --- | --- | --- | --- |
| CR for Misc CIDs | | | | |
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Abstract

This submission addressed the following CIDs relative to 11bf draft 0.5: 5 61 62 63 64 118 507 897 898 374 738 741 792 793 165 799 798 797 780 762 775 740 794

# Measurement setup related CIDs

| **CID** | **Page** | | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
| 5 | | 33.06 | 9.4.2.317 | Sensing measurement parameters' subfield do not specify parameters that are to be included for sensing. | Operation attributes of the corresponding measurment instsance needs to be added as part of 'sensning measurment parameters' subfield. | **Revised.**  We add some operational parameters (R2R) and clarify their (R2R, BW) usage during operation.  **TGbf editor:** Apply the changes tagged with #5 in this document |
| 61 | | 33.16 | 9.4.2.317 | Field length should not be TBD. | Field shall have a numerical length or Variable | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 62 | | 33.13 | 9.4.2.317 | Field name should not be TBD | Field shall have a descriptive name or Reserved. | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 63 | | 33.32 | 9.4.2.317 | Field length should not be TBD. | Field shall have a numerical length or Variable | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 64 | | 33.29 | 9.4.2.317 | Field name should not be TBD | Field shall have a descriptive name or Reserved. | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 118 | | 33.13 | 9.4.2.317 | Figure 9-1002au. Remove "TBD" subfield with "TBD" length. This is literally undefined. Add subfields as needed when agreements are reached.  See also Figure 9-1002av. | See comment | **Revised.**  The two TBDs have been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 507 | | 33.13 | 9.4.2.317 | It seems to look unnecessary to include the TBD field. if the specific field is decided to be included in this element, we can add it later if it needs.  So, delete the TBD field in this element. | Delete the TBD field in the Figure 9-1002au | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 897 | | 33.18 | 9.4.2.317 | What does TBD (after Sensing Measurement Parameters field) mean in Figure 9-1002au? Does it allow for one more subfield or more than one subfield? | Specify the TBD field(s) and the length of the Sensing Measurement Parameters field | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 898 | | 33.34 | 9.4.2.317 | What does TBD (after Sensing Measurement Parameters field) mean in Figure 9-1002av? Does it allow for one more subfield or more than one subfield? | Specify the TBD field(s) and the length of the Measurement Report Type field | **Revised.**  The TBD has been removed as part of resolution of CID 735, 736 in 1577r3.  **TGbf editor:** no further action needed. |
| 374 | | 33.03 | 9.4.2.317 | We need to include some sensing parameters in the sensing measurement parameters IE (e.g., BW, stream) which should be determined before measurement instance(s). In additiioin, the parameteres may be different in terms of TB and non-TB for which can separate TB/non-TB parameters, e.g., as the type of subelements | As in the comment. | **Revised.**  Some parameters were added in draft 0.5. We add some additional operational parameters (R2R) and clarify their (R2R, BW) usage during operation in doc:1998.  **TGbf editor:** Apply the changes tagged with #5 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 | **Reject.**  The group reached consensus that immediate/delayed reporting is implicitly conveyed in the measurement report without need for any capability signaling. |
| 741 | | 33.28 | 9.4.2.317 | Add a capability bit to indicate as to whether the initiator obtains more than one measurement report from a receiver responder supporting more than one delayed reporting during TB measurement instance. | As per comment | **Reject (?)** |
| 792 | | 69.64 | 11.21.18.6.2 | What is the bandwidth, NSS, LTF repititions etc. used for NDPA Sounding relative to the parameters exchanged during setup ? | Clarify. | **Revised.**  We add some text to clarify how those fields are set during operation.  **TGbf editor:** Apply the changes tagged with #5 in this document |
| 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. | **Reject.**  The channel bandwidth set in each phase follows the baseline rules a TXOP holder follows while sending multiple PPDUs in the same TXOP. As such no additional rule is needed. |
| 165 | | 70.59 | 11.21.18.6.2 | The format of the Sensing NDPA frame is not defined | Define the Sensing NDPA frame format | **Revised.**  The Sensing NDP A frame format has already been clarified in 11bf draft 0.5. However, we further clarify its usaged during measurement setup.  **TGbf editor:** Apply the changes tagged with #5 in this document |
| 799 | | 72.44 | 11.21.18.8 | For a TB sensing measurement session, the AP and non-AP STA may want to change some operational parameters (e.g., the avaialbility period) without terminating that setup. | Define signaling for the initiator/responder to modify parameters for a measurement setup without necessarily terminating it. | **Rejected.**  Since the need to modify measurement parameters is likely to happen infrequently, there is no significant overhead to simply terminate a measurement setup and setting up a new one with the modified parameters. |
| 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.**  This has already been resolved in draft 0.5 with the “Min Time Between Measurements” subfield in the Sensing element.  **TGbf editor: no further changes needed.** |
| 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. | **Revised.**  This has already been resolved in draft 0.5 (See P66L10).  **TGbf editor: no further changes needed.** |
| 780 | | 67.07 | 11.21.18.4 | Clarify what constitutes those "operational attributes" and how they are signaled in the Sensing Measurement Setup Request/Response frames. | As in comment. | **Revised.**  Some parameters were added in draft 0.5. We further clarify their usage in doc:1998.  **TGbf editor:** Apply the changes tagged with #5 in this document. |
| 762 | | 69.65 | 11.21.18.6.2 | Define NDPA format | As per comment | **Revised.**  The Sensing NDPA frame format has already been clarified in 11bf draft 0.5. However, we further clarify its usaged during measurement setup.  **TGbf editor:** Apply the changes tagged with #5 in this document |
| 775 | | 64.43 | 11.21.18 | No need to repeat "sensing" | Delete "sensing". | **Revised.**  The corresponding sentence has been revised in draft 0.5.  **TGbf editor: no further changes needed.** |
| 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 | **Rejected.**  The group did not find a compelling technical need for aggregating measurement reports, |

***TGbf editor: revise the following section in P88 of 11bf draft 0.5 as:***

* **Sensing element(#299, #308, #316, #481)**

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 9-1002ba (Sensing element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Sensing |
| Octets: | 1 | 1 | 1 | 9 |
| * **Sensing 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 9-1002bb (Sensing field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Responders Needed | BW | Max Tx STS ≤ 80 MHz | Max Tx STS = 160 MHz | Max Tx STS = 320 MHz |

Bits: 1 3 3 3 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Max Rx STS ≤ 80 MHz | Max Rx STS = 160 MHz | Max Rx STS =320 MHz | Max Tx HE-LTF Repetition | Max Rx HE-LTF Repetition |

Bits: 3 3 3 3 3

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

Bits: 2 2 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Device Class | Full Bandwidth UL MU-MIMO | Max number of Supported Setups as Responder | MinTIme between measurements | Poll Required | Threshold-based Reporting |

Bits: 1 1 4 23 1 1

|  |  |  |
| --- | --- | --- |
| SR2SR Support | Maximum Number of Rx Antennas | Reserved |

Bits: 1 3 2

Figure 9-1002bb—Sensing field format (#5)

The Responders Neededsubfield is set to 1 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 transmitting STA for the SI2SR, SR2SR, or SR2SI(#5) NDP exchange as part of the non-TB or TB sensing measurement instances. The encoding of this subfield is given in Table 9-401t (BW subfield).

|  |  |
| --- | --- |
| * 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 HE-LTF Repetition subfield is set to the maximum number of HE-LTF repetitions that a STA supports in the transmission of an SR2SI, SR2SR(#5) 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 HE-LTF Repetition subfield is set to the maximum number of HE-LTF repetitions that a STA supports in reception of an SR2SI, SR2SR(#5) 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, SR2SR(#5) or a SI2SR NDP in the non-TB or TB sensing measurement instances minus 1(#5).

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, SR2SR(#5) or a SI2SR NDP in the non-TB or TB sensing measurement instances minus 1(#5). This subfield is reserved if the value of the BW subfield is not 3 or 4.

The Max Tx STS = 320 MHz subfield indicates for bandwidth equal to 320 MHz the maximum number of space-time streams that a STA supports in the transmission of an SI2SR NDP in the TB sensing measurement instances minus 1(#5). This subfield is reserved if the value of the BW subfield is not 4.

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, SR2SR(#5) 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).

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 EHT-LTF Total subfield indicates the maximum number of EHT-LTFs that a STA supports in reception in an SI2SR NDP that is a EHT sounding NDP. The Max Rx EHT-LTF Total subfield has the same format as in the Maximum Number Of Supported EHT-LTFs field in the EHT Capabilities element.

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, SR2SR(#5) or a SI2SR NDP in the non-TB or TB sensing measurement instances minus 1(#5).

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, SR2SR(#5) or a SI2SR NDP in the non-TB or TB sensing measurement instances minus 1(#5). This subfield is reserved if the value of the BW subfield is not 3 or 4.

The Max Rx STS = 320 MHz subfield indicates for bandwidth equal to 320 MHz the maximum number of space-time streams that a STA supports in the reception of an SI2SR NDP in the TB sensing measurement instances minus 1(#5). This subfield is reserved if the value of the BW subfield is not 4.

The Device Class and Full Bandwidth UL MU-MIMO subfields correspond to the Device Class and Full Bandwidth UL MU-MIMO fields defined in Table 9-366 (Subfields of the HE PHY Capabilities Information field).

The Max Number of Supported Setups as Responder subfield correspond to the maximum number of simultaneous measurement setups that the transmitting STA is capable of performing with another STA as a responder (#5) (#739).

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

The Poll Required subfield is set to 1 to indicate the transmitting STA requires to be polled for any TB measurement instance that it participates as a sensing responder (i.e., non-AP) and is set to 0 otherwise.

The Threshold-based Reporting subfield is set to 1 to indicate the threshold-based reporting is supported by the transmitting STA, and is set to 0 to indicate the threshold-based reporting is not supported by the transmitting STA(#890).

The SR2SR Support subfield is set to 1 to indicate that the transmitting STA supports SR2SR sounding (see 11.55.1.2.x SR2SR sounding phase) and is set to 0 otherwise (#5).

The Maximum Number of Rx Antennas subfield signals the maximum number of antennas the transmitting STA supports in the reception of an SR2SI, SR2SR or a SI2SR NDP in the non-TB or TB sensing measurement instances minus 1(#5).

***TGbf editor: revise the following section in P84 of 11bf draft 0.5 as:***

* 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 9-1002aw (Sensing Measurement Parameters element format(#7, #470, #509)).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Sensing Measurement Parameters | Sensing subelements |
| Octets: | 1 | 1 | 1 | 5 | variable |
| * 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 9-1002ax (Sensing Measurement Parameters field format(#224, #255, #587, #837, #902, #488, #7, #470, #509, #51, #175, #568, #569, #559)).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sensing Transmitter | Sensing Receiver | Sensing Measurement Report Requested | Measurement  Setup Expiry  Exponent | BW |

Bits: 1 1 1 4 3

|  |  |  |
| --- | --- | --- |
| Max Tx HE-LTF Repetition | Max Rx HE-LTF Repetition | Max Tx STS |

Bits: 3 3 3

|  |  |  |  |
| --- | --- | --- | --- |
| Max Rx STS | Number of Rx Antennas | Reserved | BSS Color Information |

Bits: 3 3 7 8

Figure 9-1002ax—Sensing Measurement Parameters field format (#5)

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 Transmitter and the Sensing Receiver subfields cannot both be set to 0(#181).

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 Measurement Setup Expiry Exponent subfield contains an unsigned integer. It is encoded according to the conventions in 9.2.2 (Conventions). The Measurement Setup Expiry value is equal to  ms. It is a time after which the Measurement setup is terminated, if there are no frame exchange sequences (see 11.55.1.6 (Sensing measurement setup termination(#132))(#51, #175, #568, #569).

The BW subfield indicates the maximum bandwidth used to transmit the SI2SR, SR2SI or SR2SR NDP as part of a non-TB sensing, or TB sensing instance. The encoding of this subfield is given in Table 9-401t (BW subfield).

The Max Tx HE-LTF Repetition subfield is set to the maximum number of HE-LTF repetitions that the sensing responder STA uses in the transmission of an SR2SI, SR2SR 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(#5).

The Max Rx HE-LTF Repetition subfield is set to the maximum number of HE-LTF repetitions that the sensing responder STA uses in the reception of the preamble of an SR2SR or 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(#5).

The Max Tx STS subfield indicates for bandwidths less than or equal to the value signaled in the BW field, the maximum number of space-time streams that the sensing responder STA uses in the transmission of an SR2SI, SR2SR NDP in the TB or non-TB sensing measurement instances minus 1(#5).

The Max Rx STS subfield indicates for bandwidths less than or equal the value signaled in the BW field, the number of space-time streams that the sensing responder STA uses in the reception of an SR2SR or SI2SR NDP in the TB or non-TB sensing measurement instances minus 1(#5).

The Number of Rx Antennas subfield indicates the number of antennas that the sensing responder uses in the reception of an SR2SR or a SI2SR NDP in the TB or non-TB sensing measurement instances minus 1(#5).

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 Max Tx HE-LTF Repetition,Max Tx STS subfields are reserved if the Sensing Transmitter field is set to 0.

The Max Rx HE-LTF Repetition, Max (#5) Rx STS and Number of Rx Antennas (#5) subfields are reserved if the Sensing Receiver 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 9-401r (Sensing subelement IDS for Sensing Parameters).

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

If the sensing initiator is an AP then it includes a TB Sensing Specific subelement and if the sensing initator is a non-AP STA it includes a non-TB Sensing Specific subelement in the Sensing Measurement Request frame to describe the set of parameters that the initiator assigns for that ~~agreement~~ the measurement setup.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Subelement ID | Length | Min Time Between Measurements | Reserved |
| Bits: | 8 | 8 | 23 | 9 |
| * Non-TB Sensing Specific subelement format | | | | |

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

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

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Subelement ID | | Length | AID/USID | Poll Assigned | CSI Variation Threshold | SR2SR | Reserved | Availability Window |
| Bits: | 8 | | 8 | 16 | 1 | 4 | 1(#5) | 2 | 64 |
|  | | * TB Sensing Specific subelement format (#5) | | | | | | | |

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 (i.e., the AP), the AID/USID field is set to the USID, which is assigned by the sensing initiator (i.e., the AP) to identify the sensing responder.

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

(#559)The CSI Variation Threshold subfield values are defined in Table 9-401s (CSI Variation Threshold subfield definition(#559)).

|  |  |
| --- | --- |
| * CSI Variation Threshold subfield definition(#559) | |
| Value | Meaning |
| 0 | CSI variation threshold = 0 |
| 1 | CSI variation threshold = 0.1 |
| 2 | CSI variation threshold = 0.2 |
| 3 | CSI variation threshold = 0.3 |
| 4 | CSI variation threshold = 0.4 |
| 5 | CSI variation threshold = 0.5 |
| 6 | CSI variation threshold = 0.6 |
| 7 | CSI variation threshold = 0.7 |
| 8 | CSI variation threshold = 0.8 |
| 9 | CSI variation threshold = 0.9 |
| 10 | CSI variation threshold = 1 |
| 11-14 | Reserved |
| 15 | Basic reporting |

(#559)The CSI Variation Threshold subfield value between 0 and 10 indicates that the threshold-based reporting phase is used in the corresponding TB sensing measurement instances, and indicates the corresponding CSI variation threshold value set by the sensing initiator (i.e, AP). The CSI Variation Threshold subfield value equal to 15 indicates that the basic reporting subphase (see 11.55.1.5.2.5.1 (Basic reporting phase(#282))) is used in the corresponding TB sensing measurement instances.

The SR2SR subfield is set to 1 to indicate that the TB sensing measurement instance ~~will~~ includes an SR2SR sounding phase and is set to 0 otherwise (#5).

The Availability Window field contains a RSTA Availability Window element (see 9.4.2.297 RSTA Availability Window element).

* Sensing session setup

*TGbf editor: revise the following paragraph in P144L54 of 11bf draft 0.5 as:*

An AP may set the Responders Needed subfield of the Sensing element in a Probe  
Response frame to 1 to indicate the need for new sensing responders and may set to 0 to indicate new sensing responders are not needed(#93, #141, #145, #430, #611, #774, #5).

***TGbf editor: revise the following paragraph in P144L54 of 11bf draft 0.5 as (#5):***

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

* Maximum supported bandwidth in the BW subfield.
* Maximum number of HE-LTF repetitions it is capable of receiving in the preamble of an SR2SI, SR2SR(#5) or SI2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP, in the Max Rx HE-LTF Repetition subfield.
* Maximum number of HE-LTF repetitions it is capable of transmitting in the preamble of an SR2SI, SR2SR(#5) or SI2SR NDP that is a HE Ranging NDP or a HE TB Ranging NDP, in the Max Tx HE-LTF Repetition subfield.
* Maximum number of space-time streams it is capable of receiving in an SR2SI, SR2SR(#5) 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 an SR2SI, SR2SR(#5) 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 SI2SR NDP for bandwidth equal to 320 MHz, in the Max Rx STS = 320 MHz subfield.
* Maximum number of space-time streams it is capable of transmitting in an SI2SR, SR2SR(#5) 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 an SR2SI, SR2SR(#5) 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 an (#5) SI2SR NDP for bandwidth equal to 320 MHz, in the Max Tx STS = 320 MHz subfield.
* Maximum number of HE-LTFs in total it is capable of receiving, including all repetitions, in a SR2SI, SR2SR(#5) 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 an 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 an SR2SI, SR2SR(#5) or SI2SR NDP that is a HE Ranging NDP, in the Max Tx HE-LTF Total subfield.
* Maximum number of antennas it is capable of using in reception of an SR2SI, SR2SR or a SI2SR NDP in the Maximum Number of Rx Antennas subfield (#5).

***TGbf editor: revise the following section in P145L44 of 11bf draft 0.5 as:***

* **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 Setups subfield in the last Sensing element received from the sensing responder.

The Comeback subfield of the Sensing Comeback Info field within the Sensing Measurement Setup Request frame shall be set to 0 if any of the following is true:

* the non-AP STA is a sensing initiator
* the non-AP STA is associated with the AP and is a sensing responder(#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 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.
* If the sensing responder declines the requested sensing measurement setup parameters in the received Sensing Measurement Setup Request frame(#535) and provides its preferred sensing measurement parameters in the Sensing Measurement Setup Response frame, it shall set the Status Code field to REJECTED\_WITH\_SUGGESTED\_CHANGES(#664, #816, #905, #242, #895, #279) in the Sensing Measurement Setup Response frame(#880).
* If the sensing responder declines the requested sensing measurement setup parameters in the received Sensing Measurement Setup Request frame without providing its preferred sensing measurement parameters in the Sensing Measurement Setup Response frame, it shall set the Status Code field to REQUEST\_DECLINED in the Sensing Measurement Setup Response frame(#880).

The sensing responder should transmit the Sensing Measurement Setup Response frame within a sensing frame exchange timeout (see 11.55.1.1 (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 after the time specified as Unassociated STA Comeback After value (see Table 11-29a (Sensing timeout values)) and before time specified as Unassociated STA Comeback Before value (see Table 11-29a (Sensing timeout values)), to solicit a Sensing Measurement Setup Request frame from the AP. Both sides start a corresponding unassociated STA comeback timer when the exchange of the Sensing Measurement Setup Query frame and the Sensing Measurement Setup Request frame with the Comeback subfield 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 timeout values)) indicated in the Sensing Measurement Setup Request frame(#93, #141, #145, #430, #611, #774).

If an AP intends to request 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 corresponding User Info field in the Sensing Polling Trigger frame in a TB sensing measurement instance to 1(#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 subfield of the Sensing Measurement Parameters 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).

During a sensing measurement setup, the sensing initiator shall assign(#810) the role(s) of a sensing responder as one of following (see 9.4.2.319 (Sensing Measurement Parameters element)):

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

If a sensing initiator assigns in a Sensing Measurement Setup Request frame the role of sensing receiver to the sensing responder and also sets the Sensing Measurement Report Requested subfield to 1, the sensing responder shall send Sensing Measurement Report frames in sensing measurement instances that result from the sensing measurement setup(#754).

In non-TB sensing measurement instances, if a sensing initiator assigns in a Sensing Measurement Setup Request frame the role of sensing receiver to the sensing responder and also sets the Sensing Measurement Report Requested subfield to 0, the sensing responder shall not send Sensing Measurement Report frames in sensing measurement instances that result from the sensing measurement setup(#754).

In TB sensing measurement instances, the sensing initiator shall not assign any RU to a sensing responder in a Sensing Report Trigger frame if the sensing initiator assigns in a Sensing Measurement Setup Request frame the role of sensing receiver to the sensing responder and also sets the Sensing Measurement Report Requested subfield to 0(#754).

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 the sensing initiator includes a TB Sensing 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 (see 9.4.2.297 RSTA Availability Window element). 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 (see 9.4.2.296 ISTA Availability Window element) in the Sensing Measurement Setup Query frame.

When the sensing initiator includes a TB Sensing specific subelement in a Sensing Measurement Setup Request frame, the Poll Assigned field is set to 1 if the Poll Required subfield in the last Sensing element received from the sensing responder is set to 1.

When the sensing initiator includes a TB Sensing specific subelement in a Sensing Measurement Setup Request frame, the SR2SR field is set to 1 only if the SR2SR subfield in the last Sensing element received from the sensing responder is set to 1 (#5).

When the sensing initiator includes a non-TB Sensing 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 (i.e., AP).

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 TB or non-TB measurement instances (referred to as Sensing Assigned Max Bandwidth)(#5). This value shall not be greater than the maximum bandwidth the sensing responder supports for sensing.
* The maximum number of HE-LTF repetitions that the sensing responder transmits in the preamble of 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 subfield (referred to as Sensing Assigned SR2SI Rep)(#5). This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of transmitting.
* The maximum number of HE-LTF repetitions that the sensing responder receives in the preamble of an SI2SR or SR2SR NDP that is a HE Ranging NDP, in the Max Rx HE-LTF Repetition subfield (referred to as Sensing Assigned SI2SR Rep) (#5). This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of receiving.
* The maximum number of space-time streams the sensing responder receives in anSR2SR or SI2SR NDP, in the Max Rx STS subfield (referred to as Sensing Assigned SI2SR STS). This value shall not be greater 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 TB or non-TB measurement instances.
* The maximum number of space-time streams the sensing responder transmits in an SR2SI or SR2SR NDP, in the Max Tx STS subfield (referred to as Sensing Assigned SR2SI STS). This value shall not be greater 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 TB and non-TB measurement instances.
* The number of antennas to be used for reception of an SR2SR or SI2SR NDP by the responder STA. This value shall not be greater than the maximum number of antennas the responder STA is capable of using in reception.
* ~~The maximum number of HE-LTF repetitions that it solicits in the preamble of an SR2SI, SR2SR or SI2SR NDP, in the Max Rx HE-LTF 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 maximum number of space-time streams it solicits in the preamble of an SR2SI, SR2SR or SI2SR NDP, in the Max Rx STS subfield. This value shall not be higher than the maximum number of space-time 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 (#5).~~
* ~~The maximum number of HE-LTF repetitions another non-AP STA transmits in the preamble of a~~

~~SR2SI, SR2SR or SI2SR NDP, in the Max Tx HE-LTF 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 maximum number of space-time streams another non-AP STA transmits in the preamble of an SR2SR NDP, in the Max Tx STS subfield. This value shall not be higher than the maximum number of space-time 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.

* TB sensing measurement instance
* General(#288)

***TGbf editor: revise the following section in P51L61 of 11bf draft 0.5 as (#5):***

11.55.1.5.2.3 NDPA sounding phase

In the NDPA sounding phase, the AP, which is a sensing transmitter, sends an SI2SR NDP, on which one or more STAs perform sensing measurements(#123, #309, #862). The NDPA sounding phase shall be present in a TB sensing measurement instance if at least one STA that is a sensing receiver in this NDPA sounding phase and that is not assigned to be polled or has responded in the polling phase(#761).

The AP shall transmit a Sensing NDP Announcement frame to one or more STAs that are sensing receivers in this NDPA sounding phase and that are not assigned to be polled or have responded in the polling phase, followed by a SIFS and SI2SR NDP transmission. The STA Info fields within the Sensing NDP Announcement frame specify STAs that shall perform sensing measurements on the SI2SR NDP sent by the AP(#763, #476, #621, #125, #863).

When the PPDU bandwidth of the Sensing NDP Announcement frame is less than or equal to 160 MHz, the format of the SI2SR NDP shall be a HE Ranging NDP, as described in 27.3.18a.1 (HE Ranging NDP)(Motion 189).

When the PPDU bandwidth of the Sensing NDP Announcement frame is equal to 320 MHz, the format of SI2SR NDP shall be an EHT sounding NDP, as described in 36.3.18 (EHT sounding NDP). The EHT LTF symbol shall use the 2x LTF with 1.6 µs GI EHT-LTF and all the EHT puncturing patterns shall be supported(Motion 189).

When an SI2SR NDP bandwidth is equal to 320 MHz, for transmission of EHT-STFs and EHT-LTFs, if , the spatial mapping matrix, Q matrix, shall be an Identity matrix, and if , the Q matrix shall be based on an antenna selection matrix with no antenna swapping. The Q matrix be-comes an Identity matrix when all 0 rows are removed(Motion 191).

The AP shall select a bandwidth value for the NDPA sounding ~~and the TF sounding~~ phase that is less than or equal to the Sensing Assigned Max Bandwidth of each of the STAs addressed in this phase . When transmitting a Sensing NDP Announcement frame and

SI2SR NDP, the AP shall set the TXVECTOR parameter CH\_BANDWIDTH to that same

Bandwidth.

In the Sensing NDP Announcement frame, the AP shall set the value of SI2SR NSTS subfield

and SI2SR Rep subfield of the STA Info fields, corresponding to each of the STAs addressed by that

frame, to be less than or equal to the value of the *Sensing Assigned SI2SR STS* and *Sensing Assigned SI2SR Rep* respectively. The combination of the values of the SI2SR NSTS and the SI2SR Rep shall not lead to a total

number of HE-LTFs transmitted as part of the HE Ranging NDP transmission, that exceeds the total number of HE-LTFs the corresponding STA is capable of receiving, as signaled in the Sensing element.

***TGbf editor: insert the following paragraph at the end of following section in 11bf draft 0.5 as (#5):***

* TF sounding phase

In the Sensing Sounding Trigger frame, the AP shall set the SS Allocation subfield and the SR2SI Rep

subfield of the User Info fields corresponding to each of the STAs triggered by the Trigger frame

as following:

— The Number of Spatial Streams to be included in each SS Allocation subfield shall be less than or equal to the value of *Sensing Assigned SR2SI STS* for the corresponding non-AP STA.

— All the SR2SI Rep subfields in the User Info fields of the Sensing Sounding Trigger frame shall be set

to the same value. This value indicates the number of HE-LTF repetitions in the SR2SI NDP preamble and shall not exceed any of the *Sensing Assigned SR2SI Rep* for the corresponding non-AP STA(s) triggered by this Sensing Sounding Trigger frame.

— The product of the number of HE-LTF repetitions, indicated in each of the SR2SI Rep subfields

of the User Info fields, and the number of HE-LTF symbols, indicated in the Number Of

HE-LTF Symbols And Midamble Periodicity subfield in the Common Info field, shall not

exceed the total number of HE-LTFs for the corresponding non-AP STA that is capable of transmitting, as signaled in the Sensing element.

The AP shall set the TXVECTOR parameter CH\_BANDWIDTH of the Sensing Sounding Trigger frame to a bandwidth that is less than or equal to the *Sensing Assigned Max Bandwidth* of each of the STAs addressed in this Trigger frame and use the same value for the UL BW subfield of the Common Info field of said Trigger frame.

The uplink power control, timing and frequency synchronization requirements of unassociated STAs performing TB measurement instance shall follow the same rules as those of associated HE STAs.

* Non-TB sensing measurement instance

***TGbf editor: revise the following section in P55L51 of 11bf draft 0.5 as (#5):***

Measurement sounding phase

A non-AP STA, acting as a sensing initiator, shall initiate a non-TB sensing measurement instance by transmitting a Sensing NDP Announcement frame addressed to the AP, followed by an SI2SR NDP after SIFS. The non-AP STA shall transmit the SI2SR NDP with the same bandwidth as the PPDU carrying the Sensing NDP Announcement frame(#564). In response to the correctly received Sensing NDP Announcement frame addressed to itself, SIFS after the SI2SR NDP, the AP shall transmit an SR2SI NDP to the non-AP STA. The AP shall transmit the SR2SI NDP with the same bandwidth as the PPDU carrying the Sensing NDP Announcement frame(#564).

The non-AP STA transmitting the SI2SR NDP shall set the TXVECTOR parameter CH\_BANDWIDTH to the same value as the TXVECTOR parameter CH\_BANDWIDTH in the preceding Sensing NDP Announcement frame. An AP transmitting an SR2SI NDP shall set the TXVECTOR parameter CH\_BANDWIDTH to the bandwidth of the Sensing NDP Announcement frame and/or the SI2SR NDP; which are obtained from the RXVECTOR parameter CH\_BANDWIDTH of the Sensing NDP Announcement frame or the SI2SR NDP respectively. For the Sensing NDP Announcement frame, when not received in an HE/VHT/HT PPDU, the bandwidth is obtained from the RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT when the Sensing NDP Announcement frame is received in a non-HT duplicate PPDU and is 20 MHz when the Sensing NDP Announcement frame is received in a non-HT PPDU. The allowed bandwidths for the Sensing NDP Announcement frames, SI2SR NDP and SR2SI NDP, shall be less than or equal to the *Sensing Assigned Max Bandwidth*(#5).

If the non-AP STA is only the sensing transmitter, the Sensing NDP Announcement frame should configure the SR2SI NDP to be transmitted with minimum possible length with one LTF symbol. If the non-AP STA is only the sensing receiver, the Sensing NDP Announcement frame should configure the SI2SR NDP to be transmitted with minimum possible length with one LTF symbol.

When the bandwidth of the PPDU carrying the sensing NDP Annoucnement frame is less than or equal to 160 MHz, the format of both the SI2SR NDP and SR2SI NDP shall be a HE Ranging NDP, as described in 27.3.18a.1 (HE Ranging NDP)(Motion 189). If the non-AP STA is a sensing transmitter, the STA shall set the SI2SR NSTS subffield and the SI2SR Rep subfield in the STA Info field of the Sensing NDP Announcement frame to be less than or equal to the value of *Sensing Assigned SI2SR STS* and *Sensing Assigned SI2SR Rep* respectively. If the non-AP STA is a sensing receiver, the STA shall set the SR2SI NSTS subfield and the SR2SI Rep subfield in the STA Info field of the Sensing NDP Announcement frame to be less than or equal to the value of *Sensing Assigned SR2SI STS* and *Sensing Assigned SR2SI Rep* respectively.

NOTE—In non-TB sensing measurement instance, 320 MHz operation is not supported(Motion 189).

***TGbf editor: insert the following section (#5):***

**11.55.1.5.2.x SR2SR sounding phase**

The AP shall set the parameters of the Sensing SR2SR Sounding Trigger frame as follows:

— The Number of Spatial Streams in the SS Allocation subfield of the Transmitter User Info field shall be less than or equal to the value of the *Sensing Assigned SI2SR STS* for the STA addressed by the AID12/USID12 subfield in each Receiver User Info field and shall be less than or equal to the value of the *Sensing Assigned SR2SI STS* for the STA addressed by the AID12/USID12 subfield in the Transmitter User Info field.

— The SR2SR Rep subfield in the Transmitter User Info field of the Sensing Sounding Trigger frame shall be set to less than or equal to the value of the *Sensing Assigned SI2SR Rep* for the STA addressed by the AID12/USID12 subfield in each Receiver User Info field and shall be set to less than or equal to the value of the *Sensing Assigned SR2SI Rep* for the STA addressed by the AID12/USID12 subfield in the Transmitter User Info field.

— The product of the number of LTF repetitions, indicated in the SR2SR Rep subfield

of the Transmitter User Info field, and the number of HE-LTF symbols, indicated in the Number Of

HE-LTF Symbols And Midamble Periodicity subfield in the Common Info field, shall not

exceed the total number of LTFs the STA addressed by the AID12/USID12 subfield in each Receiver User Info field is capable of receiving, as signaled in the Sensing element, and shall not

exceed the total number of LTFs the STA addressed by the AID12/USID12 subfield in the Transmitter User Info field is capable of transmitting, as signaled in the Sensing element.

***TGbf editor: insert the following section (#5):***

**11.55.1.5.4 Common rules**

The sensing receiver shall use the same ordered set of antennas with no antenna swappingfor reception of an SI2SR, SR2SI or SR2SR NDP in all measurement instances associated with the measurement setup. If the CSI measurement at a receive antenna is invalid, then all CSI values associated with that antenna shall be set to 0 in the MLME interface and corresponding in the Sensing Measurement Report frame, if required.

The sensing transmitter shall use the same ordered set of antennas with no antenna swapping, for transmission of an SI2SR, SR2SI or SR2SR NDP in all measurement instances associated with that measurement setup. If any of the transmit antennas is not available the transmitter shall not transmit the SI2SR, SR2SI or SR2SR NDP for that measurement instance.

NOTE: sensing transmitter needs to terminate the measurement setup if any of its transmit antennas is no longer available for the sensing measurements.

NOTE: sensing transmitter continues to use the same ordered set of antennas with no antenna swapping even if it is included in the TF sounding phase with UL MU MIMO transmission with different assigned SS allocation in different instances.

The sensing transmitter should use same transmit power for transmitting a SI2SR, SR2SI or SR2SR NDP to a given sensing receiver in all measurement instances.

The bandwidth of frames transmitted in a TB or non-TB sensing measurement instance shall follow the rules of multiple frame transmission in an EDCA TXOP, see 10.23.2.8 (Multiple frame transmission in an EDCA TXOP).

# Time sync related CIDs

| **CID** | **Page** | | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
| 794 | | 70.16 | 11.21.18.6.3 | Its possible that due to clock drift an unassociated STA loses sync with an AP with which its performing TB sensing over time. Re-syncing based on beacon frames may be more power consuming | Reuse the mechanism in 11az to allow a STA regain synchnronization information using the Sensing Poll TF and the NDP A frames. | **Revised.**  While the 11az approach works when the NDPA sounding phase is present in the TB Sensing instance, there are cases where only TF sounding phase may be present. Hence, we propose to add this information in a Sensing Sounding Triger frame.  **TGbf editor:** Apply the changes tagged with #794 in this document |

* + - 1. HT/HE/Ranging/Sensing/EHT NDP Announcement frame format

***Change the text from page 45.33 to 46.9 of IEEE P802.11az/D7.0 as follows(#794):***

The format of the STA Info field in a Ranging and Sensing NDP Announcement frame if the AID11 subfield is

equal to 2044 as is shown in Figure 9-61dc (STA Info field format in a Ranging and Sensing NDP

Announcement frame (if the AID11 subfield is 2044)).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| B0           B10 | B11     B26 | B27 | B28 | B29 B31 |
| AID11 | Partial TSF | Disambiguation | Reserved | Token |
| 11 | 16 | 1 | 1 | 3 |
| **Figure 9-61dc—STA Info field format in a Ranging and Sensing NDP Announcement frame (if the AID11 subfield is equal to 2044)** | | | | | |

The STA Info field, with AID11 subfield equal to 2044, is present in Ranging and Sensing NDP Announcement

frames when part of the TB ranging measurement exchange and TB sensing measurement instance respectively. It is used to carry the Partial TSF subfield. When used as part of the TB ranging measurement exchange the Partial TSF subfield contains 16 bits of the RSTA’s TSF time, TSF[21:6], when the RSTA transmitted the TF Ranging Poll that preceded the Ranging NDP Announcement frame, carrying this STA Info field with AID subfield equal to 2044. When used as part of the TB sensing measurement instance the Partial TSF subfield contains 16 bits of the AP’s TSF time, TSF[21:6], when the AP transmitted the Sensing Poll Trigger frame that preceded the Sensing NDP Announcement frame, carrying this STA Info field with AID subfield equal to 2044.

The Token subfield is set to the value of the Token subfield of the TF Ranging Poll or the Sensing Poll Trigger frame whose partial transmission TSF time is carried.

9.3.1.22 Trigger frame format

**9.3.1.22.14 Sensing Trigger variant**

***Tgbf editor: Revise the text in P65L17 of 11bf draft 0.5 as follows(#794):***

The format of the Trigger Dependent Common Info field for the Sensing Poll, Sensing Sounding, and Sensing Report subvariants of the Sensing Trigger frame is shown in Figure 9-98a (Trigger Dependent Common Info subfield for the Sensing Trigger variant).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0                    B3 | B4 | B5           B7 |
|  | Sensing Trigger Subtype | Sensing | Token |

|  |  |  |  |
| --- | --- | --- | --- |
| Bits: | 4 | 1 | 3 |
| * Trigger Dependent Common Info subfield for the Sensing Trigger variant | | | |

The Token field in the Trigger Dependent Common Info subfield is used in a Sensing Poll Trigger frame to match it with the partial TSF time in a following Sensing NDP Announcement frame or a Sensing Sounding Trigger frame. It is reserved in all other Sensing Trigger subvariants.

***Tgbf editor: Revise the text in P66L47 of 11bf draft 0.5 as follows(#794):***

* **Sensing Sounding Trigger frame**

The format of the User Info field in the Sensing Sounding Trigger frame, when the AID12/USID12 field is not set to 2008, is defined in Figure 9-98c (User Info field for Sensing Sounding Trigger frame (if the AID12/UID12 subfield is not 2008)).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 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 |
| * **User Info field for Sensing Sounding Trigger frame** (if the AID12/UID12 subfield is not 2008) | | | | | |

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 format of the User Info field in the Sensing Sounding Trigger frame, when the AID12 field is set to 2008, is defined in Figure 9-xx (User Info field for Sensing Sounding Trigger frame (if the AID12/UID12 subfield is 2008)).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0           B11 | B12     B27 | B28           B30 | B31 | B39 |
|  | AID12 | Partial TSF | Token | Reserved | |
| Bits: | 12 | 16 | 3 |  | 9 |
| **Figure 9-xx User Info field for Sensing Sounding Trigger frame** (if the AID12/UID12 subfield is 2008) | | | | | |

The User Info field, with AID12 subfield equal to 2008, is used to carry the Partial TSF subfield. The Partial TSF subfield contains 16 bits of the AP’s TSF time, TSF[21:6], when the AP transmitted the Sensing Poll Trigger frame that preceded the Sensing Sounding Trigger frame carrying this User Info field.

The Token subfield is set to the value of the Token subfield of the Sensing Poll Trigger frame whose partial transmission TSF time is carried.

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

***Tgbf editor: Insert the following paragraphs in P150L57 of 11bf draft 0.5 as follows(#794):***

**11.55.1.5.2.2 Polling phase**

To aid in synchronizing the TSF time at the unassociated sensing responders, the AP maintains a trigger poll counter. Before transmitting a Sensing Poll Trigger frame, the AP shall increase the trigger poll counter by one (modulo 8) and set the Token subfield of the Trigger Dependent Common Info subfield to the value of the trigger poll counter.

***Tgbf editor: Insert the following paragraphs in P153L6 of 11bf draft 0.5 as follows(#794):***

* TF sounding phase

When transmitting a Sensing Sounding Trigger frame as part of the TB sensing measurement instance, an AP shall include a value in the Partial TSF subfield in the User Info field with the AID12/USID12 subfield equal to 2008, that equals to the AP’s TSF[21:6] at the time of transmission of the preceding Sensing Poll Trigger frame in that measurement instance. Specifically, the time that the first data symbol of the PSDU of said frame was transmitted to the PHY plus the AP’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. Additionally, the AP shall set the Token subfield in the User Info field with the AID12/USID12 subfield equal to 2008 in the Sensing Sounding Trigger frame to the same trigger poll counter value as the Token subfield in the Sensing Poll Trigger frame whose partial TSF time is carried in the Sensing Sounding Trigger frame.

11.55.1.5.2.3 NDPA sounding phase

When transmitting a Sensing NDP Announcement frame as part of the TB sensing measurement instance, an AP shall include a value in the Partial TSF subfield in the STA Info field with theAID11 subfield equal to 2044, that equals to the AP’s TSF[21:6] at the time of transmission of the preceding Sensing Poll Trigger frame. Specifically, the time that the first data symbol of the PSDU of said frame was transmitted to the PHY plus the AP’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. Additionally, the AP shall set the Token subfield in the STA Info field with the AID11 subfield equal to 2044 in the Sensing NDP Announcement frame to the same trigger poll counter value as the Token subfield in the Sensing Poll Trigger frame whose partial TSF time is carried in the Sensing NDP Announcement frame.

**11.55.1.5.2.x SR2SR sounding phase**

When transmitting a Sensing Sounding Trigger frame as part of the TB sensing measurement instance, an AP shall include a value in the Partial TSF subfield in the User Info field with the AID12/USID12 subfield equal to 2008, that equals to the AP’s TSF[21:6] at the time of transmission of the preceding Sensing Poll Trigger frame in that measurement instance. Specifically, the time that the first data symbol of the PSDU of said frame was transmitted to the PHY plus the AP’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. Additionally, the AP shall set the Token subfield in the User Info field with the AID12/USID12 subfield equal to 2008 in the Sensing Sounding Trigger frame to the same trigger poll counter value as the Token subfield in the Sensing Poll Trigger frame whose partial TSF time is carried in the Sensing Sounding Trigger frame.