IEEE P802.11
Wireless LANs

|  |
| --- |
| CR for setup parameters related CIDs |
| Date: 2023-05-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dibakar Das | Intel |  |  | Dibakar.das@intel.com |
|  |  |  |  |  |

Abstract

This document proposes resolution to following CIDs relative to 11bf draft 1.0:

2285 1111 1112 1113 1114 1317 1118 1694 1494 2273 2188 1954 2022 1695 1547 1696 1648 2060 2144 1813 2279 1366 1033 1084 1552 1554 2274 1553 1087 2276 2190 2277 2275 1091 1529 1709 1088 1528 1530 1090 2193 1098 1100 1711 1099 1710 2194 1115 1714 1347 2195 1432 1109 2243 2244 1110 1040 1564 1955 1720 1539

Rev0: initial draft

Rev2: some changes following telecon discussion on 05/23/23. Incorporated suggestions from Claudio, Ali, Mahmoud.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 2285 | 9.4.2.319 | 109.60 | Does unassociated STA know AP's other capability/info besides BSS color, before it can send measurement report in a TB PPDU? e.g. AP's max MPDU length for segmentation of the report, TSF[31:0]If unassociated STA must get beacon or probe response before measurement setup, why BSS color information is needed in sensing measurement parameters field? | remove BSS color information | **Reject.**An unassociated STA needs to know the BSS Color information so that it can set the BSS Color subfield in the HE SIG-A field of the Ranging NDP and HE TB Ranging NDP ,that it sends to the unassociated AP, to the same value.  |
| 1111 | 9.4.2.319 | 110.40 | It doesn't make sense for the sensing initiator define "...the maximum number of HE-LTF repetitions that the sensing responder uses in the reception of an SI2SR or SR2SR NDP..." The maximum number of HE-LTF repetitions that a STA supports is defined in its capability. As long as the initiator chooses a value that is smaller than or equal to this value, the receiver can support it. | Delete the Max RX HE-LTF Repetition subfield. Modify Clause 11 accordingly. | **Revised.** The Max Rx HE-LTF Repetition parameter in the Sensing Measurement Parameters element is intended to be a nominal value that the initiator STA is expected to use for that sensing measurement agreement. As such it provides an additional value to the responder. For clarity, we rename this instead by dropping “Max”. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1111  |
| 1112 | 9.4.2.319 | 110.35 | It doesn't make sense for the sensing initiator define "...the maximum number of HE-LTF repetitions that the sensing responder uses in the reception of an SI2SR or SR2SR NDP..." The maximum number of HE-LTF repetitions that a STA supports is defined in its capability. Instead, this subfield should be used for the initiator indicate what repetition value it wants - obviously, this value shall be smaller than or equal to the value indicated in the responder's capabilities. | Replace the Max TX HE-LTF Repetition subfield with a new one, "Requested TX HE-LTF Repetition subfield". Modify Clause 11 accordingly. | **Revised.**The Max Tx HE-LTF Repetition parameter in the Sensing Measurement Parameters element is intended to be a nominal value that the responder STA is expected to use in tx for that sensing measurement agreement. The current text captures the intent that in some instances the number of LTF repretitions could be smaller than what was signaled, depenging on instanteous resource availability, scheduling etc. . For clarity though, we rename this by dropping “Max” since the normative section already captures this intent. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1112   |
| 1113 | 9.4.2.319 | 110.45 | It doesn't make sense for the sensing initiator define "...the maximum number of space-time streams that the sensing responder uses in the transmission of an SR2SI or SR2SR NDP..." The maximum number of space-time streams that a STA supports is defined in its capability. Instead, this subfield should be used for the initiator indicate what value it wants - obviously, this value shall be smaller than or equal to the value indicated in the responder's capabilities. | Replace the Max TX STS subfield with a new one, "Requested TX STS subfield". Modify Clause 11 accordingly. | **Revised**The Max Tx STS parameter in the Sensing Measurement Parameters element is intended to be a nominal value that the responder STA is expected to use in tx for that sensing measurement agreement. The current wording captures the intent that in some instances the number of Tx STS could be smaller than what was signaled, depenging on instanteous resource availability, scheduling etc. For clarity though, we rename this by dropping “Max” since the normative section already captures this intent. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1113  |
| 1114 | 9.4.2.319 | 110.50 | It doesn't make sense for the sensing initiator define "...the (maximum?) number of space-time streams that the sensing responder uses in the reception of an SR2SI or SR2SR NDP..." The maximum number of space-time streams that a STA supports is defined in its capability. Instead, this subfield should be used for the initiator indicate what value it wants - obviously, this value shall be smaller than or equal to the value indicated in the responder's capabilities. | Replace the Max RX STS subfield with a new one, "Requested RX STS subfield". Modify Clause 11 accordingly. | **Revised.** The Max Rx STS parameter in the Sensing Measurement Parameters element is intended to be a nominal value that the initiator STA is expected to use in tx for that sensing measurement agreement. The current wording captures the intent that in some instances the number of STS used in transmission could be smaller than what was signaled, depenging on instanteous resource availability, scheduling etc. For clarity though, we rename this by dropping “Max” since the normative section already captures this intent. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1114  |
| 1317 | 9.4.2.319 | 110.51 | The Max RX STS subfield should indicates the maximun number of space-time streams rather than the number of space-time streams. | As in comment | **Revised.** Revised this to clarify that this is also a requested parameter. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1317 |
| 1118 | 9.4.2.319 | 111.10 | This paragraph could be combined with the one (two, actually) below. | As suggested. Paragraphs in 111.11-22 could easily be modified to include 111.1-10. | **Revised.** **Agree in principle.** **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1118 |
| 1694 | 9.4.2.319 | 111.21 | The text "If the Sensing Measurement Report Requested subfield is set to 1,-- the Nb subfield indicates the number of bits used in the encoding of each CSI value reported in a Sensing Measurement Report frame. It is set to 1 to indicate that 10 bits are used for each encoded CSI value, and is set to 0 to indicate that 8 bits are used for each encoded CSI value.-- the INg subfield indicates the subcarrier grouping used in a Sensing Measurement Report frame. It is set to 1 to indicate a subcarrier grouping of 16; otherwise, it is set to 0.The Nb and INg subfields are reserved if the Sensing Measurement Report Requested subfield is set to 0." should be combined with the text between L1-9 on the same page as it include the related parameters together and it would read better. | As per comment | **Revised.** **Agree in principle.** **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1118 |
| 1494 | 9.4.2.319 | 111.28 | Clarify the transmitter AP | Change "transmitter AP" to "transmitter AP STA" | **Reject.** AP is defined as “An entity that contains one station (STA) and provides access to the distribution systemservices, via the wireless medium (WM) for associated STAs. An AP comprises a STA and a distributionsystem access function (DSAF).” That is, by definition, an AP contains a STA and, for this reason, “AP STA” is not used in the baseline. |
| 2273 | 9.4.2.319 | 111.31 | "The Sensing subelements field contains one or more subelements." 11bf responder should ignore the subelement that is not the 1st subelement because either TB or non-TB subelements can be present but not both | as in comment | **Reject.** For SBP case it is possible for initiator STA to include both the SBP Specific subelement and TB Sensing Specific subelement.  |
| 2188 | 9.4.2.319 | 111.37 | Sensing subelement may make readers think this is a subelement in the Sensing element. Please change the name of this subelement or Sensing element to differentiate the two. | As in the comment | **Reject.**The Sensing subelements field is only defined in the Sensing Measurement Parameters element which is sufficiently differentiated from Sensing element defined in the next section.  |
| 1954 | 9.4.2.319 | 111.48 | The following text indicates that only a non-AP STA may setup a non-TB measurement instance. However, an AP STA should be able to do so as well."If the sensing initiator 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 sensing initiator assigns for the sensing measurement setup." | Modify the text to read:"If the sensing initiator chooses to initiate a non-TB measurement instance, it shall only include a non-TB Sensing Specific subelement in the Sensing Measurement Request frame to describe the set of parameters that the sensing initiator assigns for the sensing measurement setup." | **Reject**See explanation below under Discussion for CID 1949. <https://mentor.ieee.org/802.11/dcn/21/11-23-0553-03-00bf-LB272-comment-resolution-for-INSTANCE-category>.docx |
| 2022 | 9.4.2.319 | 111.64 | "Min Time Between Measurements field". No need to abbreviate "Min". Change to "Minimum Time Between Measurements". | See comment | **Reject.** “Min” as abbreviation of “Minimum” in the name of a parameter is used in several places in REVme (e.g., “SRG OBSS PD Min”, “Min Delta FTM”).  |
| 1695 | 9.4.2.319 | 112.18 | Change the text "which is assigned by the sensing initiator to identify the sensing responder" to | which is assigned by the sensing initiator to identify the sensing responder, and has the same length as the AID. | **Revised.**Made changes along the lines suggested.**TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1695 |
| 1547 | 9.4.2.319 | 112.21 | The Poll Assigned field is not always in the Sensing Measurement Setup Request frame. It is included only if the sensing initiator includes a TB Sensing Specific subelement as indicated explicitly in P174L54 | Change the text to "The Poll Assigned field is set to 1 ... " | **Accept.**  |
| 1696 | 9.4.2.319 | 112.21 | Change the text "The Poll Assigned field in the Sensing Measurement Setup Request frame is set to 1 to indicate that the sensing initiator polls the sensing receiver in each sensing measurement instance; and it is set to 0 otherwise" to | The Poll Assigned field in the Sensing Measurement Setup Request frame is set to 1 to indicate that the sensing initiator (i.e. AP) polls the sensing receiver in each sensing measurement instance; and it is set to 0 otherwise | **Reject**This field is carried in a TB Sensing Specific subelement which is only transmitted by a sensing initiator that is an AP: “If the sensing initiator is an AP, it includes a TB Sensing Specific subelement…”. Hence, further clarification is not needed.  |
| 1648 | 9.4.2.319 | 112.22 | In "...that the sensing initiator polls the sensing receiver in each sensing measurement instance", sensing receiver" should be changed to "sensing responder" | As in comment | **Revised.** Clarified that is indeed a sensing responder. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1648 |
| 2060 | 9.4.2.319 | 112.23 | ... that the sensing initiator will poll the sensing receiver in each ...' should be '... that the sensing initiator will poll the sensing responder in each ...' | As in comment. | **Revised.** Clarified that is indeed a sensing responder. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1648 |
| 2144 | 9.4.2.319 | 113.01 | SR2SR sounding is a variant of TF sounding phase. | Replace "SR2SR sounding phase" with "SR2SR variant of TF sounding phase" | **Accept.** |
| 1813 | 9.4.2.320 | 113.11 | The sensing element is to "advertise optional sensing capabilities and sensing operation Information". No one of the fields defined in Figure 9-1002bb--(Sensing field format) is referred in the normative text as the condition to perform a feature or as parameter of a function. | Provide normative definitions of how to use those parameters | **Reject.** The usage of these fields are described in normative section 11.55.1.4 (see P171L58 in draft 1.0) |
| 2279 | 9.4.2.320 | 113.30 | Missing Max TX EHT-LTF total and Max TX/RX EHT-LTF repetitions in sensing element | Add these fields in sensing element and corresponding requirements | **Reject.**EHT-LTFs are relevant only for 320 MHz PPDUs which in turn is only possible for a DL NDP in TF Sensing instance. Hence, there is no need to signal Max Tx EHT-LTF Total and repletion fields.  |
| 1366 | 9.4.2.320 | 113.32 | It is not clear how the responders needed field is used by the STAs that receives it. There is no clause 11 text the describes the behavior | Either remove the field and its description or provide clause 11 text to descirbe its use. | **Revised**Agree with the commenter in principle.TGbf editor to make the changes shown in https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx under all headings that include CID 1082. |
| 1033 | 9.4.2.320 | 113.38 | Figure 9-1002bb has an 1-bit field called as "Device Class". However, in 802.11 baseline spec, 11me/D2.0, there is another different definition of "Device Class" field in Section "9.4.4.2.2 Device Class". | Please resolve the issue of two different definitions of "Device Class" field. | **Reject.** Its already clarified that the two fields contain the same information. Please see P114L54 in draft 1.0: “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).” |
|  |  |  |  |  |  |
| 1084 | 9.4.2.320 | 113.53 | Subfield is not reserved only when sent within a Probe Response frame. | Complete definition of the subfield. | ***Revised***Agree with the commenter in principle.*TGbf editor to make the changes shown in* [*Https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx*](https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx) *under all headings that include CID 1083* |
| 1552 | 9.4.2.320 | 113.53 | It is not specified how non-AP STAs will set the Responders Needed subfield in the Sensing field in the Sensing element in the Probe Request, Association Request, and Reassociation Request frames | Specify how non-AP STAs will set the Responders Needed subfield in the Sensing field in the Sensing element in the Probe Request, Association Request, and Reassociation Request frames | ***Revised***Agree with the commenter in principle.*TGbf editor to make the changes shown in* [*Https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx*](https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx) *under all headings that include CID 1083* |
| 1554 | 9.4.2.320 | 113.54 | How the non-AP STAs should behave if the Responders Needed subfield is set to 0? | Specify the behavior of the non-AP STAs if the Responders Needed subfield is set to 0 | ***Revised***Agree with the commenter in principle.*TGbf editor to make the changes shown in* [*Https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx*](https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx) *under all headings that include CID 1082* |
| 2274 | 9.4.2.320 | 113.54 | There should be some behavior associated with the "Responder Needed" subfield and whether the non-AP can set this field to 1 | as in comment | ***Revised***Agree with the commenter in principle.*TGbf editor to make the changes shown in* [*Https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx*](https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx) *under all headings that include CID 1082* |
| 1553 | 9.6.7.53 | 148.52 | It is not specified how unassociated non-AP STAs will set the Responders Needed subfield in the Sensing field in the Sensing element in the Sensing Measurement Setup Query frame | Specify how the unassociated non-AP STAs will set the Responders Needed subfield in the Sensing field in the Sensing element in the Sensing Measurement Setup Query frame | ***Revised***Agree with the commenter in principle.*TGbf editor to make the changes shown in* [*Https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx*](https://mentor.ieee.org/802.11/dcn/23/11-23-0476-03-00bf-lb272-ost-misc.docx) *under all headings that include CID 1083* |
| 1087 | 9.4.2.320 | 113.57 | 9.4.2.320 has multiple "transmitting STA"s. The word transmitting in all such cases is not necessary as the info contained in the field is obviously related to the STA that sends the frame. | Delete the word transmitting from 113.57, and make the same change throughout 9.4.2.320. | ***Accept.***  |
| 2276  | 9.4.2.320 | 114.54 | Some capability fields in sensing element related to TB measurement instance should be indicated as reserved if transmitted by AP, such as Poll required, Threshold-based reporting, Device Class | as in comment | **Revised.** For, Device Class the reserved case is handled by definition of Device Class in REVme . We clarify that for Poll Required, the field is reserved when sent by AP. For threshold-based Reporting, the field is not reserved when sent by AP. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #2276 |
| 2190 | 9.4.2.320 | 114.59 | TGbf needs to specify what it means when Max Number of Supported Setups as Responder subfield value is set to 0. | As in the comment | **Revised**Agree with the commenter in principle.**TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #2190 |
| 2277 | 9.4.2.320 | 114.59 | There should be an AP behavior associated with Max number of supported Setups as Responder | Add AP behavior as as in comment | **Reject.** The behavior associated on reception of this field is at the initiator side which is described in P172L57 of draft 1.0.“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.” |
| 2275 | 9.4.2.320 | 115.13 | SR2SR Support is reserved when transmitted by AP because AP is the initiator of TB measurement instance and the sender of SR2SR sounding TF | as in comment | **Reject.**Support of the SR2SR feature is also optional at AP.  |
| 1091 | 11.55.1.3 | 171.58 | The text in 171.58 - 172.33 does not define all subfields of 9-1002bb. | Add definition missing subfields. | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. Instead we replace this with normative text about when this element shall be included. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1529 | 11.55.1.3 | 171.58 | In this paragraph, only a subset of the Sensing element subfields are mandated to be indicated. What about the remaining subfields? Is it mandatory to set them? How the subfields mandated in this paragraph will be set if the Sensing element is sent by AP, associated non-AP, or unassociated non-AP? How the remaining subfields of the Sensing element will be set if the Sensing element is sent by AP, associated non-AP, or unassociated non-AP? | Specify how all the Sensing element subfields will be set and specialize the setting of the subfields for the AP, the associated non-AP STAs and the unassociated non-AP STAs | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1709 | 11.55.1.3 | 171.58 | Change the text "the Sensing field" to | the Sensing field (see 9.4.2.320 (Sensing element)) | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1088 | 11.55.1.3 | 171.61 | Must specify that it is the maximum supported bandwidth in the transmission of SI2SR, SR2SI, or SR2SR NDPs. | Add "in the transmission of SI2SR, SR2SI, or SR2SR NDPs". Note this is already defined in 9.4.2.320. | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1528 | 11.55.1.3 | 61.61 | It is not stated explicitly if the maximum supported bandwidth in the Sensing element is the maximum supported bandwidth of the BSS or it may be different for the sensing purpose | Change the text to "Maximum supported sensing bandwidth in the BW subfield." | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1530 | 11.55.1.3 | 171.61 | The bullets order is not consistent with the order of the subfields in the Sensing element. | Reorder the bullets to be consistent with the order of the subfields in the Sensing element | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 1090 | 11.55.1.3 | 171.64 | Add the word "either" in "...that is \*either\* an HE Ranging NDP or an HE TB Ranging NDP..." | As suggested. Perform the same change from 171.58 to 172.34. | **Revised.** We delete this paragraph since it contains same information as the description of the referred fields in 9.4.2.320 Sensing element. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1091 |
| 2193 | 11.55.1.3 | 172.33 | The descriptions of other subfields are missing from the text, such as max number of setups, SR2SR support. | Add normative texts for those missing subfields in Sensing element. | **Reject.** **The normative text for** Max number of Supported Setups is in P172L57. **The normative text for** SR2SR is in P174L60. |
| 1098 | 11.55.1.3 | 172.35 | Wrong frame name | Add "Sensing" to "Measurement Setup Query frame". | **Accept** |
| 1100 | 11.55.1.3 | 172.35 | Move the two paragraphs to 11.55.1.4 | As suggested. | **Reject**These two paragraphs belong in this section since they both deal with sensing capability exchange.   |
| 1711 | 11.55.1.3 | 172.36 | Delete the text "An unassociated non-AP STA shall set the Poll Required subfield in the Sensing element to 1 in any Measurement Setup Query frame that it transmits" since there's normative text for AP to assign polling for unassociated STA (see text in P173 L54-56? | As per comment | **Reject.****The text in P173 is about the Poll Assigned subfield.**  |
| 1099 | 11.55.1.3 | 172.39 | Wrong frame name | Add "Sensing" to "Measurement Setup Query frame". | **Accept** |
| 1710 | 11.55.1.3 | 172.41 | Change the text "TB sensing" to | TB sensing measurement instance | **Accept** |
| 2194 | 11.55.1.4 | 172.57 | The subfield name is not consistent with Sensing element. | Change "Max number of Supported Setups subfield" to "Max Number of Supported Setups as Responder subfield" | **Accept** |
|  |  |  |  |  |  |
| 1115 | 11.55.1.4 | 174.40 | To match the order in which subfields/subelements are present in the Sensing Measurement Parameters element, move the text in 174.40-175.2 to after the text in 175.5-175.60. | As suggested. | **Accept** |
| 1714 | 11.55.1.4 | 174.40 | Change the text "If 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 shall be 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.If 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.If 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. | If the sensing initiator is an AP and it intends to assign sensing measurement parameters to a sensing responder it shall include a TB Sensing Specific subelement as part of the Sensing Measurement Parameter element in a Sensing Measurement Setup Request frame and shall assign the following:-the 12bit AID/USID field-the Poll Assigned field set to 1 if the Poll Required subfield in the last Sensing element received from the sensing responder is set to 1, or it intends to poll the non-AP STA in the TB sensing measurement instance-the CSI Variation threshold field set to the range between 0 to 10 if the sensing responder is to be part of Threshold-based reporting and set to 15 if the sensing responder is to be part of basic reporting-the SR2SR field set to 1 only if the SR2SR subfield in the last Sensing element received from the sensing responder is set to 1 -the RSTA Availability Information field in the RSTA Availability Window element containing exactly one Availability Window Information field. The Availability Window Broadcast Format subfield in the Header subfield in the RSTA Availability Information field in this RSTA Availability Window element shall be set to 0 (see 9.4.2.297 (RSTA Availability Window element)). The assigned availability window for the unassociated sensing responder shall overlap with a 10 TU interval signaled by the ISTA Availability Window element (see 9.4.2.296 (ISTA Availability Window element)) in the Sensing Measurement Setup Query frame. | **Revised.** **Agree in principle.****TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1714 |
| 1347 | 11.55.1.4 | 174.42 | what is "RSTA"? Have I missed it? It doesn't seem to be included in the Abbreviations | as in comment | **Reject**RSTA is defined in 11az draft 7.0 section 3.4 (Abbreviations and acronyms). |
| 2195 | 11.55.1.4 | 174.47 | AP assigns availability window to the unassociated STA, not requests the window from the unassociated STA. | Change "request" to "assign" | **Revised.** **Agree in principle.** **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1714 |
| 1432 | 11.55.1.4 | 174.49 | The 10 TU interval limits the maximum WLAN sensing sounding frequency to be less than 100Hz. But there are considerable applications that need higher sounding frequency. | Support sounding frequency up to 1000Hz by allowing an option of 1 TU interval. | **Reject.** 1 TU interval (i.e, ~ 1ms) is too short to be supported by current wifi devices operating in sub-7 GHz unlicensed medium after accounting for channel access, PPDU overhead.  |
| 1109 | 11.55.1.4 | 175.05 | Normative text must be included that defines when a Sensing Measurement Parameters Element is/is not included in a SM Setup Request frame. | As suggested. | **Revised.**This has been added in draft 1.1. **TGbf editor:** no further action needed |
| 2243 | 11.5.1.4 | 175.11 | What does the bandwidth refer to ? It refers to the bw used for transmitting NDP or transmitting the sensing results ? | clarify the bandwidth | **Revised.** Clarified that it is the bandwidth for NDP transmissions.**TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #2243 |
| 2244 | 11.5.1.4 | 175.44 | "the sensing responder is capable of using" is an incomplete expression. Does it refers to "is capable of of receiving NDP" or "capable of transmitting NDP"? | Please complete the sentence | **Revised.** Clarified that it is referring to reception of NDPs.**TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #2244 |
| 1110 | 11.55.1.4 | 175.50 | Text does not cover all subfields within the Sensing Measurement Parameters field. | Extend the text to include missing subfields. | **Reject** The usage of those fields are described in remainder of 11.55.1.4. |
| 1040 | 11.55.1.4 | 175.56 | What is "the negotiation"? Cannot find its clear meaning in the context. Does it mean that the sensing responder agrees the sensing parameter settings in the Sensing Measurement Setup Request frame sent by the sensing initiator? If so, please say so clearly. If so, please specify what is "the negotiation" and how "the negotiation" has been don. | Please clearly specify what "the negotiation" is and how it is done. | **Revised.** Clarified that it is indeed the sensing measurement negotiation. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1040 |
| 1564 | 11.55.1.4 | 175.56 | The negotiation is for the sensing measurement setups not for the sensing measurement instances (TB or non-TB) as stated in the sentence. | Change the text to " If the negotiation is successful in the sensing measurement setup, the corresponding Sensing Measurement Setup Response frame from the sensing responder shall not .... " OR to " If the negotiation is successful in the TB sensing measurement setup or the non-TB sensing measurement setup, the corresponding Sensing Measurement Setup Response frame from the sensing responder shall not .... " | **Revised.** We revised that sentence so that the word “negotiation” no longer appears. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1040 |
| 1955 | 11.55.1.4 | 175.56 | There is no normative text to state that when performing a TB measurement setup, only a TB Sensing Specific subelement shall be included in the Sensing Measurement Parameters element.There is also no normative text to state that when performing a non-TB measurement setup, only a Non-TB Sensing Specific subelement shall be included in the Sensing Measurement Parameters element.For reference, on page 111 lines 31-34 states "The Sensing subelements field contains one or more subelements" which implies that an initiator may include both TB and non-TB measurement instance specific parameters. Since this is used in the measurement setup, it would allow the setup of both a TB and non-TB instance. | Add text as follows:"If the measurement setup is for a TB sensing measurement instance, then only a single TB Sensing Specific subelement shall be present in the Sensing Measurement Parameters element. If the measurement setup is for a non-TB measurement instance, then only a single Non-TB Sensing Specific subelement shall be present in the Sensing Measurement Parameters element." | **Reject.** There are normative text stating that for TB Sensing the initiator is an AP while for NTB sensing the initiator is a non-AP STA. So, the combination mentioned by commenter is not possible.  |
| 1720 | 11.55.1.4 | 175.58 | Change the text "from the sensing responder shall not include a Sensing Parameters element" to | from the sensing responder shall include the status code SUCCESS and shall not include a Sensing Parameters element | **Revised.** We revised the text along the lines suggested in the comment. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1040 |
| 1539 | 11.55.1.4 | 175.59 | There is no element with the name Sensing Parameters | Change 'Sensing Parameters element' to 'Sensing Measurement Parameters element' | **Revised.** We revised the text along the lines suggested in the comment. **TGbf editor:** please implement changes as shown in doc 11-23/0777r2 tagged as #1539 |
|  |  |  |  |  |  |

***TGbf editor: Please revise 9.4.2.319 and 9.4.2.320*** *in draft 1.0* ***as follows:***

9.4.2.319 Sensing Measurement Parameters element

The Sensing Measurement Parameters element indicates operational parameters associated with sensing measurement instance(s). The format of the Sensing Measurement Parameters element is defined in Figure 9-1002aw (Sensing Measurement Parameters element format).

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

Octets: 1 1 1 5 variable

**Figure 9-1002aw— Sensing Measurement Parameters element format**

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).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sensing Transmitter | Sensing Receiver | Sensing Measurement Report Requested | Measurement Setup Expiry Exponent | BW |  (#1112) TX HE-LTF Repetition | Rx HE-LTF Repetition (#1111) |

Bits: 1 1 1 4 3 3 3

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  (#1113) TX STS | RX STS | Number of Rx Antennas | Report Timestamp | Nb | INg | BSS Color Information | Reserved |

 Bits: 3 3 3 1 1 1 8 4

 **Figure 9-1002ax—Sensing Measurement Parameters field format**

The Sensing Transmitter subfield is set to 1 to indicate a sensing transmitter role for the sensing responder; and is set to 0 otherwise.

The Sensing Receiver subfield is set to 1 to indicate a sensing receiver role for the sensing responder; and is set to 0 otherwise.

The Sensing Transmitter and the Sensing Receiver subfields cannot both be set to 0.

The Sensing Measurement Report Requested subfield is reserved if the Sensing Receiver subfield is set to 0. If the Sensing Receiver subfield is set to 1,

— the Sensing Measurement Report Requested 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 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 sensing measurement setup is terminated, if there are no frame exchange sequences (see 11.55.1.6 (Sensing measurement setup termination)(#51, #175, #568, #569).

The BW subfield indicates the requested (#1111) bandwidth used to transmit the SI2SR, SR2SI, or SR2SR NDP as part of a TB or non-TB sensing measurement instance. The encoding of this subfield is given in Table 9- 127i (BW field format).

The TX HE-LTF Repetition subfield is set to the requested (#1112) number of HE-LTF repetitions that the sensing responder uses in the transmission of an SR2SI or SR2SR NDP that is a HE Ranging NDP or a HE TB Ranging NDP. The subfield is set to the number of HE-LTF repetitions minus 1.

The RX HE-LTF Repetition subfield is set to the requested (#1111) number of HE-LTF repetitions that the sensing responder uses in the reception of an SI2SR or SR2SR NDP that is a HE Ranging NDP or a HE TB Ranging NDP. The subfield is set to the number of HE-LTF repetitions minus 1.

The (#1113) TX STS subfield indicates for bandwidths less than or equal to the value signaled in the BW field, the requested number of space-time streams that the sensing responder uses in the transmission of an SR2SI or SR2SR NDP in TB or non-TB sensing measurement instances minus 1.

The (#1114) RX STS subfield indicates for bandwidths less than or equal the value signaled in the BW field, the requested (#1317) number of space-time streams that the sensing responder uses in the reception of an SI2SR or SR2SR NDP in TB or non-TB sensing measurement instances minus 1.

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

The (#1112) TX HE-LTF Repetition and (#1113)TX STS subfields are reserved if the Sensing Transmitter field is set to 0.

The (#1111) RX HE-LTF Repetition, (#1114) RX STS, and Number of RX Antennas subfields are reserved if the Sensing Receiver field is set to 0.

The Report Timestamp subfield is reserved if the Sensing Receiver subfield is set to 0, or if the Sensing Measurement Report Requested subfield is set to 0. If the Sensing Receiver subfield is set to 1 and the Sensing Measurement Report Requested subfield is set to 1,

* the Report Timestamp subfield is set to 1 to indicate that the Reference Timestamp is to be included in the Sensing Measurement Report Control field.
* the Report Timestamp subfield is set to 0 to indicate that the Reference Timestamp is not to be included in the Sensing Measurement Report Control field.(# 1118)the  subfield indicates the number of bits used in the encoding of each CSI value reported in a Sensing Measurement Report frame. It is set to 1 to indicate that 10 bits are used for each encoded CSI value, and is set to 0 to indicate that 8 bits are used for each encoded CSI value.
* the  subfield indicates the subcarrier grouping used in a Sensing Measurement Report frame. It is set to 1 to indicate a subcarrier grouping of 16; otherwise, it is set to 0.

The  and  subfields are reserved if the Sensing Measurement Report Requested subfield is set to 0.

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 Setup Request frame or Sensing Measurement Setup 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 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 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 sensing initiator assigns for the sensing 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 indicates the minimum time between two consecutive non-TB sensing measurement instances in units of 100 µs.

If the sensing initiator is an AP, it includes a TB Sensing Specific subelement in the Sensing Measurement Request frame. The format of the TB Sensing Specific subelement is as shown in Figure 9-1002az (TB Sensing Specific subelement format).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Subelement ID | Length | AID/USID | Poll Assigned | CSI Variation Threshold | SR2SR | Reserved | Availability Window |
| Bits: | 8 | 8 | 16 | 1 | 4 | 1 | 2 | 64 |
| * TB Sensing 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 and has the same length as the AID(#1695).

The Poll Assigned field (#1547) is set to 1 to indicate that the sensing initiator polls the sensing responder(#1648) in each sensing measurement instance; and it is set to 0 otherwise(#737).

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

|  |
| --- |
| * 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)If the Threshold-based Reporting subfield is set to 1 in the Sensing element (see 9.4.2.320 (Sensing element)), the CSI Variation Threshold subfield value between 0 and 10 indicates that threshold-based reporting is used in the corresponding TB sensing measurement instances, and indicates the corresponding CSI variation threshold value set by the sensing initiator. The CSI Variation Threshold subfield value equal to 15 indicates that basic reporting (see 11.55.1.5.2.6.1 (Basic reporting phase)) is used in the corresponding TB sensing measurement instances.

The SR2SR subfield is set to 1 to indicate that the TB sensing measurement instance includes an SR2SR variant of TF (#2144) sounding phase; and it is set to 0 otherwise.

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

* 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).



The Responders Needed subfield is set to 1 to indicate the need for new sensing responders, and is set to 0 to indicate that new sensing responders are not needed.

The BW subfield indicates the maximum bandwidth supported by the STA for SI2SR, SR2SI, or SR2SR NDP exchange as part of TB and non-TB sensing measurement instances. The encoding of this subfield is given in Table 9-127i (BW field format).

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 the STA supports in the transmission of an SI2SR, SR2SI, or SR2SR NDP in TB and non-TB sensing measurement instances minus 1.

The Max TX STS = 160 MHz subfield indicates for bandwidth equal to 160 MHz the maximum number of space-time streams that the STA supports in the transmission of an SI2SR, SR2SI, or SR2SR NDP in TB and non-TB sensing measurement instances minus 1. 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 the STA supports in the transmission of an SI2SR NDP in TB sensing measurement instances minus 1. This subfield is reserved if the value of the BW subfield is not 4.

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 the STA supports in the reception of an SI2SR, SR2SI, or SR2SR NDP in TB and non-TB sensing measurement instances minus 1.

The Max RX STS = 160 MHz subfield indicates for bandwidth equal to 160 MHz the maximum number of space-time streams that the STA supports in the reception of an SI2SR, SR2SI, or SR2SR NDP in TB and non-TB sensing measurement instances minus 1. 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 the STA supports in the reception of an SI2SR NDP in TB sensing measurement instances minus 1. This subfield is reserved if the value of the BW subfield is not 4.

The Max TX HE-LTF Repetition subfield is set to the maximum number of HE-LTF repetitions that the STA supports in the transmission of an SI2SR, SR2SI, or SR2SR NDP that is either an HE Ranging NDP or an 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 the STA supports in reception of an SI2SR, SR2SI, or SR2SR NDP that is either an HE Ranging NDP or an HE TB Ranging NDP, the subfield is set to the number of HE-LTF repetitions minus 1.

The Max TX HE-LTF Total subfield and the Max RX HE-LTF Total subfield indicates the maximum number of HE-LTFs that the STA supports in the transmission and the reception, respectively, of an SI2SR, SR2SI, or SR2SR NDP that is either an HE Ranging NDP or an HE TB Ranging NDP. The encoding of the Max TX HE-LTF Total and the 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 an HE Ranging NDP and an HE TB Ranging NDP.

The Max RX EHT-LTF Total subfield indicates the maximum number of EHT-LTFs that the STA supports in the reception of an SI2SR NDP that is an EHT sounding NDP. The Max RX EHT-LTF Total subfield has the same format as the Maximum Number Of Supported EHT-LTFs field within the EHT Capabilities element (see 9.4.2.213 (EHT Capabilities element)).

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 corresponds to the maximum number of simultaneous measurement setups that the transmitting STA is capable of supporting as a sensing responder(#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 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 by a non-AP STA to indicate that the STA requires to be polled for any TB measurement instance that it participates as a sensing responder; and is set to 0 otherwise. The field is reserved in a frame sent by an AP (#2276).

The Threshold-based Reporting subfield is set to 1 to indicate that the STA supports threshold-based reporting for any TB measurement instance that it participates (#2276); and it is set to 0 otherwise(#890).

The  subfield is set to 1 to indicate that subcarrier grouping of 16 is supported in the Sensing Measurement Report frame; and it is set to 0 otherwise.

The SR2SR Support subfield is set to 1 to indicate that the STA supports SR2SR sounding (see 11.55.1.5.2.5 (TF sounding phase - SR2SR variant)); and it is set to 0 otherwise.

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

***TGbf editor: Please revise 11.55.1.4*** *in draft 1.0* ***as follows:***

**11.55.1.3 Sensing session setup**

In the sensing session setup of a WLAN sensing procedure, a sensing session is established, and the sensing capabilities (see 9.4.2.26 (Extended Capabilities element) and 9.4.2.320 (Sensing element)) of an AP and a non-AP STA are exchanged.

To accelerate the sensing capability discovery between APs and STAs, an AP transmits a Beacon or Probe Response frame carrying one or more of its neighboring APs’ sensing capabilities shall include in the frame a Neighbor Report element. Neighboring AP’s sensing capability is indicated in the BSSID Information field (see Figure 9-398 (BSSID Information field format)) in the Neighbor Report element.

An AP may set the Responder Needed subfield in the Sensing element within 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.

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

Initially a sensing session between an unassociated non-AP STA and an AP is inactive.

Following a successful sensing measurement setup initiated by either an AP or an unassociated non-AP STA, the sensing session between the unassociated non-AP STA and the AP becomes active, and both sides shall start an unassociated STA activity timer for this sensing session. The unassociated STA activity timer shall be set to the Unassociated STA Sensing Session Timeout value (see Table 11-29a (Sensing timeout values)).

When the sensing session between an unassociated non-AP STA and an AP is active, both sides shall reset the unassociated STA activity timer for this sensing session in any of the following conditions:

— The unassociated non-AP STA and the AP successfully establish a sensing measurement setup as

specified in 11.55.1.4 (Sensing measurement setup).

 — The unassociated non-AP STA participates in a sensing measurement instance (see 11.55.1.6 (Sensing measurement setup termination)).

An active sensing session becomes inactive following an unassociated STA sensing session timeout detected at the unassociated non-AP STA or the AP of the sensing session when the corresponding unassociated STA activity timer expires.

A typical sensing state machine implementation of unassociated non-AP STA is provided in Figure 11-74b (Unassociated non-AP STA sensing state machine diagram).

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

— the AID of the associated non-AP STA, or

— the USID of the non-AP STA if the non-AP STA is unassociated with the AP and is assigned to be a

sensing responder, or

— the MAC address of the non-AP STA if the non-AP STA is unassociated with the AP and is a sensing initiator.

In a sensing session, the AP may participate in multiple concurrent sensing measurement setups either as a sensing initiator or as a sensing responder. Correspondingly, the non-AP STA may participate in multiple concurrent sensing measurement setups either as a sensing responder or as a sensing initiator.

An AP may maintain multiple concurrent sensing sessions, each established with a different non-AP STA, to fulfill the requirements of a WLAN sensing procedure. A non-AP STA may maintain multiple concurrent sensing sessions, each established with a different AP, to initiate or participate in different sensing measurement setups.

To enable sensing session setup the sensing element (**see 9.4.2.320 Sensing element)** shall be included in following frames;

* Probe response, (Re)Association Response frame sent by an AP.
* Association Request frame sent by an associated non-AP STA.
* Measurement Query frame sent by an unassociated non-AP STA.

 (#1091)

An unassociated non-AP STA shall set the Poll Required subfield in the Sensing element to 1 in any Measurement Setup Query frame that it transmits.

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 preferred periodicity. The periodicity of the availability windows preferred 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.

**11.55.1.4 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) of a given Measurement Setup ID.

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. 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.

NOTE- A sensing initiator does not attempt to initiate any sensing measurement setup with a STA if the latest Sensing element received from that STA sets the Max number of Supported Setups subfield value to 0 (#2190).

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 that transmits the frame is a sensing initiator

— the AP is a sensing initiator and transmits the frame to a sensing responder associated with the AP.

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 Table 11-29a (Sensing timeout values)) 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 SUCCESS, the measurement setup of the granted Measurement Setup ID shall not be resumed and is 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 the 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 from one of the unassociated non-AP STAs in this TB sensing measurement instance to participate in 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 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).

If a sensing initiator assigns in a Sensing Measurement Setup Request frame only the role of sensing receiver to the sensing responder and sets the Sensing Measurement Report Requested subfield to 0, the sensing initiator shall also assign the sensing responder to be polled in the TB sensing measurement instance by setting the Poll Assigned subfield of the Sensing Measurement Parameters field within the Sensing Measurement Setup Request frame to 1(#153, #154).

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.

If the sensing initiator is an AP and it intends to assign sensing measurement parameters to a sensing responder it shall include a TB Sensing Specific subelement in the Sensing Measurement Parameters element in a Sensing Measurement Setup Request frame and shall assign the following:

-the 12bit AID/USID field

-the Poll Assigned field set to 1 if the Poll Required subfield in the last Sensing element received from the sensing responder is set to 1, or it intends to poll the non-AP STA in the TB sensing measurement instance

-the CSI Variation threshold field set to the range between 0 to 10 if the sensing responder is to be part of Threshold-based reporting and set to 15 if the sensing responder is to be part of basic reporting

-the SR2SR field set to 1 only if the SR2SR subfield in the last Sensing element received from the sensing responder is set to 1

 -the RSTA Availability Information field in the RSTA Availability Window element containing exactly one Availability Window Information field. The Availability Window Broadcast Format subfield in the Header subfield in the RSTA Availability Information field in this RSTA Availability Window element shall be set to 0 (see 9.4.2.297 (RSTA Availability Window element)). The assigned availability window for the unassociated sensing responder shall overlap with a 10 TU interval signaled by the ISTA Availability Window element (see 9.4.2.296 (ISTA Availability Window element)) in the Sensing Measurement Setup Query frame.

 #1714)If 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.

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

* The requested bandwidth to be used for transmission of SI2SR, SR2SI, or SR2SR NDPs (#2243) in TB and non-TB sensing measurement instances. This value shall not be greater than the maximum bandwidth the sensing responder supports for sensing. This value is referred to as Sensing Bandwidth.
* The requested number of HE-LTF repetitions that the sensing responder transmits in an SR2SI or SR2SR NDP that is either a HE Ranging NDP or a HE TB Ranging NDP in the (#1112) TX HE-LTF Repetition subfield. This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of transmitting. This value is referred to as Sensing Assigned SR2SI Rep.
* The requested number of HE-LTF repetitions that the sensing responder receives in an SI2SR or SR2SR NDP that is either a HE Ranging NDP in the (#1111) RX HE-LTF Repetition subfield. This value shall not be greater than the maximum number of HE-LTF repetitions that the sensing responder is capable of receiving. This value is referred to as Sensing Assigned SI2SR Rep.
* The requested number of space-time streams the sensing responder receives in an SR2SI or SR2SR NDP in the (#1114) RX STS subfield. This value shall not be greater than the maximum number of space-streams that the sensing responder is capable of receiving for all bandwidths smaller than or equal to the maximum bandwidth used in TB and non-TB sensing measurement instances. This value is referred to as Sensing Assigned SI2SR STS.
* The requested number of space-time streams the sensing responder transmits in an SI2SR or SR2SR NDP in the (#1113) TX STS subfield. This value shall not be greater than the maximum number of space-streams that the sensing responder is capable of transmitting for all bandwidths smaller than or equal to the maximum bandwidth used in TB and non-TB sensing measurement instances. This value is referred to as Sensing Assigned SR2SI STS.
* The requested number of antennas to be used in the reception of SI2SR and SR2SR NDPs by the sensing responder. This value shall not be greater than the maximum number of antennas the sensing responder is capable of using in reception of SI2SR and SR2SR NDPs (#2244).
* The number of bits used in the encoding of each CSI value reported in a Sensing Measurement Report frame by the sensing responder in the  subfield. This value shall be 10 bits when the  subfield is set to 1. And this value shall be 8 bits when the  subfield is set to 0.
* The subcarrier grouping to be used in a Sensing Measurement Report frame by sensing responder in the  subfield. This value shall be 16 when the  subfield is set to 1. And this value shall be either 4 or 8 when the  subfield is set to 0 (see 9.4.1.75.3 (Sensing Measurement Report Control field)).

A Sensing Measurement Setup Response frame from a sensing responder in which the Status Code field is set to SUCCESS shall not include a Sensing Measurement (#1539) Parameters element (#1040).