IEEE P802.11
Wireless LANs

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| Proposed Draft Text for SBP Setup |
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Abstract

This document includes proposed draft text on SBP setup that aims to resolve the following comments received in CC40: 47, 204, 276, 459, 493, 525, 573, 576, 595, 743, 81, 277

The technical content of this document is based on the following two SPs in 22/1203r1 that were unanimously supported by TGbf:

“SBP Request frame shall include

* One field used to request a total number of sensing responders
	+ One bit used to indicate if the request shall be rejected or may be accepted if the total number of sensing responders can’t be supported.
* One optional element that defines a Sensing Responder List used to indicate the identities of sensing responders requested by the SBP initiator
	+ The element includes a list of MAC addresses of the preferred sensing responders
	+ One bit used to indicate if only sensing responders in the provided list shall be used or not.”

“The SBP Request frame shall include one Sensing Measurement Parameters element, as defined in 9.4.2.317 (Sensing Measurement Parameters element), that is used to request operational parameters to be used in sensing measurement instances that result from the SBP request.

The SBP Request frame may also include other SBP-specific operational parameter fields/elements, such as one used to indicate whether the SBP initiator requests to participate in the WLAN sensing procedure as a sensing responder.”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 47 | 9.6.7.53 | 60.26 | STA may indicate its preferred sensing measurement accuracy and report type in the TBD field of SBP Request frame. | As in comment. |
| 204 | 11.21.19.2 | 73.03 | In the SBP Request frame, the SBP initiator should be able to provide either a list of intended responders or a list of sensing requirements (sensing bandwidth, number of spatial streams, etc.) based on which the SBP responder should use to select sensing responders in the corresponding sensing measurement setup in response to the SBP request. The former is useful when the SBP initiator somehow already knows some other non-AP STAs in the environment, whereas the latter is useful when the SBP initiator does not know any non-AP STAs in the environment but have specific requirements on sensing measurements. | As in comment. |
| 276 | 11.21.19.2 | 73.24 | how does the SBP responder know that the SBP initiator participants the sensing measurement, please clarify | as in comment |
| 459 | 9.6.7.53 | 60.01 | Request parameters are TBD. | Request parameters must be defined. Possibly re-use the Sensing Measurement Parameters element. Contribution will be provided. |
| 493 | 9.6.7.53 | 60.09 | A SBP initiator (Non-AP STA) can attend to the sensing procedure that the SBP responder (AP) initiates as one of responders, so required information may need to be indicated to the SBP responder when the SBP Request frame is transmitted, e.g., by specifying TBD field in the frame. | As in comment. |
| 525 | 9.6.7.53 | 60.26 | Delete the "TBD" and define the subfield that should be included in this frame. for exampel, SBP request indication and feedback type can be inlcuded. | As in comment |
| 573 | 11.21.19.2 | 73.19 | The current definition of the SBP Request frame format does not include any field for the sensing parameter. However, the text in P73L17 described that operational parameters are derived from the SBP request frame. to clarify the operational parameters, define the sensing measurement parameters in the SBP request frame. | As in Comment. |
| 576 | 11.21.19.3 | 73.36 | As described in the Editor's note, feedback reporting is determined by using the SBP request and response frame. so, to indicate whether feedback reporting needs or not, add the feedback report field in the SBP request and response frame. | Add the feedback report field in the SBP request and response frame. |
| 595 | 9.6.7.53 | 60.26 | Detailed SBP parameters are required. | Add accuracy requirement, report interval, minimum number of responders, required specific responders, role of the SBP initiator. |
| 743 | 9.6.7.53 | 60.27 | Need to define set of parameters that provides constraints given by SPB initiator to SBP responder to be used to select responders for the TB measurement intance. We could use sensing measurement parameter element plus fields for number of non-AP STAs, etc. The parameters would need to be discussed by the group before selection. | As per comment |
| 81 | 9.6.7.53 | 60.10 | Field name should not be TBD | Field shall have a descriptive name or Reserved. |
| 277 | 11.21.19.2 | 73.13 | need to clarify that the SBP response frame is tramitted by an SBP responder capable AP after or before the AP have completed the measurement setup with more than one STAs per the demand of SBP request frame transmitted by SBP initiator. | as in comment |

**Proposed resolution**: Revised

**Modifications**: Editor – Change 9.6.7.53 (SBP Request frame format) as follows

**9.6.7.53 SBP Request frame format**

The SBP Request frame allows a non-AP STA to invoke an SBP procedure (11.21.19 (SBP procedure)). The format of the SBP Request frame Action field is defined in Figure 9-1139g (SBP Request frame Action field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  Category | Public Action | Dialog Token | SBP Parameters element | Sensing Measurement Parameters element | ~~TBD~~ |
| Octets: | 1 | 1 | 1 | variable | TBD | ~~TBD~~ |

**Figure 9-1139g—** **SBP Request frame Action field format**

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

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

The Dialog Token field is set to a nonzero value chosen by the STA sending the SBP request to identify the request/response transaction.

The SBP Parameters element is defined in 9.4.2.330 (SBP Parameters element).

The Sensing Measurement Parameters element is defined in 9.4.2.317 (Sensing Measurement Parameters element).

~~Other fields are TBD.~~

**Modifications**: Editor – Change 9.6.7.54 (SBP Response frame format) as follows

**9.6.7.54 SBP Response frame format**

The SBP Response frame is transmitted by an AP STA to accept or reject a request for an SBP procedure (11.21.19 (SBP procedure))(#709, #710, #843, #844). The format of the SBP Response frame Action field is defined in Figure 9-1139h (SBP Response frame Action field format(#75, #260, #378, #515, #76, #261, #518)).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  Category | Public Action | Dialog Token | Status Code | Measurement Setup ID | SBP Parameters element | Sensing Measurement Parameters element | ~~TBD~~ |
| Octets: | 1 | 1 | 1 | 2 | 0 or 1 | 0 or variable | 0 or TBD | ~~TBD~~ |

**Figure 9-1139g—** **SBP Response frame Action field format**

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

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

The Dialog Token field is set to the same value as the Dialog Token field of the corresponding SBP Request frame.

The Status Code field is defined in 9.4.1.9 (Status Code field). If the AP STA accepts the request, the Status Code field is set to SUCCESS (see 9.4.1.9 (Status Code field)). Otherwise,(#711) if the AP STA rejects the request, the Status Code field is set to either REQUEST\_DECLINED(#177) or PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED.

The Measurement Setup ID field is present if the Status Code field is equal to SUCCESS. Otherwise, the Measurement Setup ID is not present. The Measurement Setup ID field is set to the Measurement Setup ID value corresponding to the sensing measurement setup(#861) initiated by the AP that accepts the corresponding SBP request. ~~The Measurement Setup ID field is present in an SBP Response frame only if the Status Code field is equal to SUCCESS.~~

The SBP Parameters element is present if the Status Code field is equal to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED. Otherwise, the SBP Parameters element is not present. The SBP Parameters element is defined in 9.4.2.330 (SBP Parameters element).

The Sensing Measurement Parameters element is present if the Status Code field is equal to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED. Otherwise, the Sensing Measurement Parameters element is not present. The Sensing Measurement Parameters element is defined in 9.4.2.317 (Sensing Measurement Parameters element).

~~Other fields are TBD.~~

**Modifications**: Editor – Insert the following subclause at the end of 9.4.2 (Elements)

**9.4.2.330 SBP Parameters element**

The SBP Parameters element indicates operational parameters associated with a requested SBP procedure. The format of the SBP Parameters element is defined in Figure 9-1002ci (SBP Parameters element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | SBP Parameters |
| Octets: | 1 | 1 | 1 | variable |

**Figure 9-1002ci—SBP Parameters element format**

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

The format of the SBP Parameters field is defined in Figure 9-11139cj (SBP Parameters field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Sensing Responder | Number of Sensing Responders | Mandatory Number Responders | Preferred Responder List | Mandatory Responder List | Sensing Responder Addresses |
| Bits: | 1 | 4 | 1 | 1 | 1 | 0 or $8×\left(n×6\right)$ |

**Figure 9-1139cj—SBP Parameters field format**

The Sensing Responder subfield set to 1 indicates that the SBP initiator requests to participate as a sensing responder in the WLAN sensing procedure used by the SBP responder to satisfy the SBP request. The Sensing Responder subfield set to 0 indicates that the SBP initiator requests to not participate in the WLAN sensing procedure used by the SBP responder to satisfy the SBP request.

The value of the Number of Sensing Responders subfield plus one indicates the requested number of sensing responders to participate in the WLAN sensing procedure used by the SBP responder to satisfy the SBP request. If the Sensing Responder subfield is set to 1, the value indicated in the Number of Sensing Responders subfield includes the SBP initiator.

The Mandatory Number Responders subfield indicates whether the requested number of sensing responders indicated in the Number of Sensing Responders subfield is interpreted as mandatory by the SBP responder. A value of 0 indicates that the requested number of sensing responders is a maximum number, and the SBP initiator accepts measurements taken with a smaller number of sensing responders. A value of 1 indicates that the requested number of sensing responders is a mandatory number.

The Preferred Responder List subfield set to 1 indicates that the SBP initiator provides a set of preferred sensing responders for which the SBP responder is requested to include in the WLAN sensing procedure used to satisfy the SBP request. Otherwise, the Preferred Responder List subfield is set to 0.

If the Sensing Responder subfield and the Preferred Responder List subfields are both set to 1, the MAC address of the SBP initiator is included in the Sensing Responder Addresses field within the SBP Request frame.

The Mandatory Responder List subfield is reserved if the Preferred Responder List subfield is 0. If the Preferred Responder List subfield is 1, the Mandatory Responder List subfield indicates whether the set of preferred sensing responders is interpreted as mandatory by the SBP responder. A value of 1 indicates that the SBP responder is requested to only include STAs listed in the Sensing Responder Addresses field within the SBP Request frame in the WLAN sensing procedure used to satisfy the SBP request. A value of 0 indicates that the SBP responder may include STAs that are not listed in the Sensing Responder Addresses field within the SBP Request frame in the WLAN sensing procedure used to satisfy the SBP request.

In an SBP Request frame, the Sensing Responder Addresses subfield is not present if the Preferred Responder List subfield is set to 0. If the Preferred Responder List subfield is set to 1, the Sensing Responder Addresses subfield is present and contains one or more MAC addresses to indicate the set of preferred sensing responders to include in the WLAN sensing procedure used by the SBP responder to satisfy the request. The length of the Sensing Responder Addresses field is *n* × 6 octets, where *n* is the number of MAC addresses that are in the field and is specified in the Number of Sensing Responders subfield.

In an SBP Response frame, the Sensing Responder Addresses subfield is not present.

**Modifications**: Editor – Change 11.21.19.2 (SBP procedure setup) as follows

**11.21.19.2 SBP procedure setup**

~~To establish an SBP procedure, the SBP initiator shall send an SBP Request frame to an SBP responder capable AP. Upon receipt of an SBP Request frame, the SBP responder either:~~

~~— Accepts the SBP procedure request, in which case the SBP responder shall send an SBP Response frame with status code SUCCESS; or~~

~~— Rejects the SBP procedure request, in which case the SBP responder shall send an SBP Response frame with status code REQUEST\_REJECTED.~~

~~The SBP responder should transmit an SBP Response frame within TBD in response to the SBP Request frame. If no SBP Response frame is received within this time period, or if an SBP Response frame is received with a status code equal to REQUEST\_REJECTED, the SBP procedure setup is terminated.~~

~~An SBP responder that sends an SBP Response frame with status code SUCCESS should initiate WLAN sensing procedure(s) with one or more non-AP STAs using operational parameters derived from those indicated within the SBP Request frame that requested the SBP procedure. The SBP responder shall be the sensing initiator of the WLAN sensing procedure.~~

If dot11SBPImplemented is true, to establish an SBP procedure, the SME of a non-AP STA (SBP initiator) shall issue an MLME-SBP.request primitive with PeerSTAAddress parameter equal to the intended SBP responder’s MAC address. The MLME-SBP.request primitive shall include valid SBPParameters and SensingMeasurementParameter parameters. The MLME-SBP.request primitive may include a SensingResponderAddresses parameter to indicate a set of preferred sensing responders.

On receiving an SBP Request frame, if dot11SBPImplemented is true, the SBP responder shall validate the frame and issue an MLME-SBP.indication primitive. If the SME of an SBP responder receives an MLME-SBP.indication primitive, it shall issue an MLME-SBP.response primitive with PeerSTAAddress parameter equal to the SBP initiator’s MAC address within TBD ms. The StatusCode parameter within the MLME-SBP.response primitive should be set to SUCCESS to indicate that the SBP procedure request is accepted if the SBP responder is able to satisfy the SBP request with parameters indicated in the MLME-SBP.indication primitive. The StatusCode parameter within the MLME-SBP.response primitive shall be set to REQUEST\_REJECTED or to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED to indicate that the SBP procedure request is rejected if the SBP responder is not able to satisfy the SBP request with parameters indicated in the MLME-SBP.indication primitive.

If the StatusCode parameter within the MLME-SBP.response primitive is set to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED, the MLME-SBP.response primitive shall include SensingMeasurementParameter and SBPParameters parameters that specify preferred SBP and measurement setup parameters, respectively.

If the StatusCode parameter within the MLME-SBP.response primitive is set to SUCCESS, the MLME-SBP.response primitive shall include a MeasurementSetupID parameter that specifies the Measurement Setup ID assigned for the SBP setup.

On receiving an SBP Response frame, the SBP initiator shall validate the SBP Response frame by ensuring its fields are valid. If the SME of an SBP initiator receives an MLME-SBP.confirm primitive with StatusCode parameter equal to REQUEST\_REJECTED or PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED, or if it does not receive a MLME-SBP.confirm primitive with StatusCode parameter equal to SUCCESS within TBD ms of issuing the corresponding MLME-SBP.request primitive, the SBP procedure setup is defined to be unsuccessful.

The SensingMeasurementParameter parameter within the MLME-SENSMSMTSETUP.request primitive issued to initiate a WLAN sensing procedure used to satisfy a SBP request shall be identical to the SensingMeasurementParameter parameter within the corresponding MLME-SBP.request primitive. The MeasurementSetupID parameter within the MLME-SENSMSMTSETUP.request primitive issued to initiate a WLAN sensing procedure used to satisfy a SBP request shall be identical to the MeasurementSetupID parameter within the corresponding MLME-SBP.response primitive.

The SBP responder shall issue an MLME-SBP.response primitive with StatusCode parameter set to

REQUEST\_REJECTED if the Mandatory Number Responders subfield within the SBPParameters parameter of the corresponding MLME-SBP.indication primitive is set to 1 and the SBP responder is not able to satisfy the requested number of sensing responders indicated in the Number of Sensing Responders subfield within the SBPParameters parameter. If the Mandatory Number Responders subfield within the SBPParameters parameter is set to 0, the SBP responder should issue an MLME-SBP.response primitive with StatusCode parameter set to SUCCESS even if the requested number of sensing responders indicated in the Number of Sensing Responders within the SBPParameters parameter cannot be satisfied.

If the Sensing Responder subfield within the SBPParameters parameter of the corresponding MLME-SBP.indication primitive is set to 0, the SBP responder shall not use a WLAN sensing procedure initiated with the issue of an MLME-SENSMSMTSETUP.request primitive with PeerSTAAddress parameter equal to the SBP initiator’s MAC address to satisfy the SBP request. Otherwise, if the Sensing Responder subfield is set to 1, the SBP responder shall use a WLAN sensing procedure initiated with the issue of an MLME-SENSMSMTSETUP.request primitive with PeerSTAAddress parameter equal to the SBP initiator’s MAC address to satisfy the SBP request.

If the Preferred Responder List subfield within the SBPParameters parameter of the corresponding MLME-SBP.indication primitive is set to 0, the SBP responder may include any STA in the WLAN sensing procedure used to satisfy the SBP request that allows for measurements to be obtained with the operational parameters specified in the MLME-SBP.request primitive.

If the Preferred Responder List subfield and the Mandatory Responder List subfield within the SBPParameters parameter of the MLME-SBP.indication primitive are both set to 1, the PeerSTAAddress parameter within the MLME-SENSMSMTSETUP.request primitive of a WLAN sensing procedure used by the SBP responder shall be equal to one of the MAC addresses listed in the Sensing Responder Addresses field within the corresponding MLME-SBP.request primitive.

If the Preferred Responder List subfield and the Mandatory Responder List subfield within the SBPParameters parameter of the MLME-SBP.indication primitive are set to 1 and 0, respectively, the SBP responder may use a WLAN sensing procedure initiated with the issue of an MLME-SENSMSMTSETUP.request primitive with PeerSTAAddress parameter not equal to one of the MAC addresses listed in the Sensing Responder Addresses field within the corresponding MLME-SBP.request primitive if a WLAN sensing procedure cannot be established with one or more STAs with MAC addresses listed in the SensingResponderAddresses parameter.

NOTE–The method used by an SBP responder to select STAs to include in the WLAN sensing procedure used in response to an MLME-SBP.request primitive in which the Preferred Responder List subfield within the SBPParameters parameter is equal to 0 or in which the Preferred Responder List subfield and the Mandatory Responder List subfield within the SBPParameters parameter are set to 1 and 0, respectively, is implementation dependent.

~~The SBP initiator may participate in the WLAN sensing procedure as a sensing responder.~~

Editor’s Note: An SBP initiator may request the SBP responder to initiate a WLAN sensing procedure that may allow for a sensing responder to perform sensing measurement using an NDP transmitted by another sensing responder.

**Modifications**: Editor – Insert the following paragraph into 11.21.19.4 (SBP procedure termination) as follows:

If the SBP responder of an SBP request that has resulted in an MLME-SBP.response primitive being issued with StatusCode parameter set to SUCCESS is not able to satisfy required parameters specified in the corresponding MLME-SBP.indication primitive after the MLME-SBP.response primitive was issued, it shall issue an MLME-SBPTERMINATION.request primitive with PeerSTAAddress parameter equal to the SBP initiator’s MAC address within TBD ms. The MeasurementSetupID parameter within the MLME-SBPTERMINATION.request primitive issued by the SBP responder shall be identical to the MeasurementSetupID within the corresponding MLME-SBP.response primitive.

**Modifications**: Editor – Insert the following primitive parameters into 6.3.134.2 (MLME-SENSMSMTSETUP.request)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| SensingMeasurementParameter | Sensing Measurement Parameter element | As defined in 9.4.2.317 | Specifies parameters within the Sensing Measurement Parameter element to be included in a Sensing Measurement Setup Request frame, as described in 11.21.18. |
| MeasurementSetupID | Integer | Any valid ID | Specifies the Measurement Setup ID assigned for the Sensing Measurement setup. |

**Modifications**: Editor – Insert the following primitive parameters into 6.3.135.2 (MLME-SBP.request)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| SensingMeasurementParameter | Sensing Measurement Parameter element | As defined in 9.4.2.317 | Specifies parameters within the Sensing Measurement Parameter element to be included in an SBP Request frame, as described in 11.21.19. |
| SBPParameters | SBP Parameters element | As defined in 9.4.2.330 | Specifies parameters within the SBP Parameters element to be included in an SBP Request frame, as described in 11.21.19. |
| SensingResponderAddresses | MAC address | Any valid MAC address | Zero or more MAC addresses that correspond to the set of preferred sensing responders in the WLAN sensing procedure used to satisfy the SBP request. |

**Modifications**: Editor – Insert the following primitive parameters into 6.3.135.3 (MLME-SBP.indication)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| SensingMeasurementParameter | Sensing Measurement Parameter element | As defined in 9.4.2.317 | Specifies parameters within the Sensing Measurement Parameter element of the received SBP Request frame, as described in 11.21.19. |
| SBPParameters | SBP Parameters element | As defined in 9.4.2.330 | Specifies parameters within the SBP Parameters element of the received SBP Request frame, as described in 11.21.19. |
| SensingResponderAddresses | MAC address | Any valid MAC address | Zero or more MAC addresses that correspond to the set of preferred sensing responders in the WLAN sensing procedure used to satisfy the SBP request. |

**Modifications**: Editor – Insert the following primitive parameters into 6.3.135.4 (MLME-SBP.response)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| SensingMeasurementParameter | Sensing Measurement Parameter element | As defined in 9.4.2.317 | The parameter is present if the StatusCode parameter is PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED; otherwise, it isnot present.Specifies parameters within the SBP Parameters element to be included in an SBP Response frame, as described in 11.21.19. |
| SBPParameters | SBP Parameters element | As defined in 9.4.2.330 | The parameter is present if the StatusCode parameter is PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED; otherwise, it isnot present.Specifies parameters within the SBP Parameters element to be included in an SBP Response frame, as described in 11.21.19. |

**Modifications**: Editor – Insert the following primitive parameters into 6.3.135.5 (MLME-SBP.confirm)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| SensingMeasurementParameter | Sensing Measurement Parameter element | As defined in 9.4.2.317 | The parameter is present if the StatusCode parameter is PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED; otherwise, it isnot present.Specifies parameters within the Sensing Measurement Parameter element of the received SBP Response frame, as described in 11.21.19. |
| SBPParameters | SBP Parameters element | As defined in 9.4.2.330 | The parameter is present if the StatusCode parameter is PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED; otherwise, it isnot present.Specifies parameters within the SBP Parameters element of the received SBP Response frame, as described in 11.21.19. |

**Modifications**: Editor – Change 11.21.19.3 (SBP procedure reporting) as follows

**11.21.19.3 SBP procedure reporting**

TBD

~~Editor’s Note: An SBP initiator defines in the SBP Request frame whether sensing receiver(s) in the~~

~~requested WLAN sensing procedure shall send or not send Sensing Measurement Report frames.~~

**Modifications**: Editor – Insert the following new row in Table 9-128 (Element IDs):

**Table 9-128—Element IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** | **Fragmentable** |
| SBP Parameters (see 9.4.2.330 (SBP Parameters element)) | 255 | <ANA> | Yes | No |