IEEE P802.11
Wireless LANs

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| Comment resolution for SBP reporting |
| Date: 2022-08-18 |
| Author(s): |
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|  |  |  |  |  |

Abstract

This submission resolves comments of CID 410, 590, 597, 598, 602, 641, 744.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Change in “11.21.19.3 SBP procedure reporting” to reflect that SBP reporting is not a phase of a TB measurement instance.
* Rev 2: SBP reporting may occur as:
	+ 1). at the end of each instance;
	+ 2). one or more separate TXOPs after each instance;
	+ 3). at the end of multiple instances within one TXOP;
	+ 4). one or more separate TXOPs after multiple instances within the AVW.

# Discussion

One SP shows majority support for the proposal in 22/0883r2 “SBP Reporting Procedure”:

* **Straw Poll 1: Do you agree with the following?**
	+ SBP initiator shall indicate the **required measurement periodicity** andmay indicate its **periodic measurement availability window** in SBP request. The detailed signaling is TBD.
	+ If SBP responder accepts the SBP request, it shall **adhere** **to** the periodicity requested by the SBP initiator and indicate the **starting time of the scheduled first measurement instance** of the measurement setup in SBP response. The detailed signaling is TBD.
	+ The SBP reporting shall be added to the measurement instances corresponding to the measurement setup initiated by the SBP procedure.
		- SBP responder may transmit **multiple** SBP report frames sequentially as shown in slide 5.
		- SBP responder may transmit **one or more A-MPDUs,** each carrying multiple SBP report frames as shown in slide 6.
	+ A STA shall use the **same** **approach of PN** for measurement report frame and SBP report frame.

**Result:** the SP is supported unanimously.

# 410

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 410 | Michael Montemurro | 61.36 | Given the Sensing Measurement Setup Request/Response/Termination are defined as Protected Dual of Public Action frames, the equivalent Action frame is not required. Just use Public Action or Action. Same with SBP. | Define all messages as Protected Dual of Public Action frames. Action frames are not required since these frames can be sent pre-association or post-association when an SA is negotiated. | ***Rejected****:* As agreed in motion #61, both protected and public action frames are required. Public action frames would be used in non-RSNA network. |

# 590

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **590** | Chaoming Luo | 57.33 | A row for SBP report request frame and a row for SBP report frame are required. | Insert a row for SBP report request frame and a row for SBP report frame | ***Revised****:* SBP report frame is added.*TGbf editor to make the changes shown in IEEE 802.11-22/0977r2 under all headings that include CID 590.* |

**9.6.7.1 Public Action frames**

*TGbf Editor: Please modify “Table 9-447—Public Action field values” of 11bf D0.2 as following:*

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

|  |  |
| --- | --- |
| **Public Action field value** | **Description** |
| <ANA> | Sensing Measurement Setup Request |
| <ANA> | Sensing Measurement Setup Response |
| <ANA> | Sensing Measurement Report |
| <ANA> | Sensing Measurement Setup Termination |
| <ANA> | SBP Request |
| <ANA> | SBP Response |
| <ANA> | SBP Termination |
| <ANA> | SBP Report (#590) |

# 598

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **598** | Chaoming Luo | 61.62 | A row for SBP report request frame and a row for SBP report frame are required. | Insert a row for SBP report request frame and a row for SBP report frame | ***Revised****:* SBP report frame is added into Protected Sensing frame category.*TGbf editor to make the changes shown in IEEE 802.11-22/0977r2 under all headings that include CID 598.* |

**Discussion:**

Since we agreed that “A STA shall use the same approach of PN for measurement report frame and SBP report frame”, the SBP report frame should belong to Protected Sensing frame instead of Protected Dual of Public Action frame, so we change the Table 9-623k instead of Table 9-487.

**Resolution:**

**9.6.36.1 Protected Sensing Action field**

*TGbf Editor: Please modify “Table 9-623k—Protected Sensing Action field values” of 11bf D0.2 as following:*

**Table 9-623k—Protected Sensing Action field values**

|  |  |
| --- | --- |
| **Value** | **Meaning** |
| 0 | Reserved |
| 1 | Protected Sensing Measurement Report frame. It is carried in a Management Action No Ack frame.  |
| 2 | Protected DMG Sensing Measurement Report frame. It is carried in a Management Action frame.  |
| 3 | Protected SBP Report frame. It is carried in a Management Action No Ack frame. (#598) |
| ~~3~~4-255 | Reserved |

# 602, 744

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **602** | Chaoming Luo | 64.21 | Also add Protected Dual of MS Request/Response/Termination, Protected Dual of SBP report request, Protected Dual of SBP Report | As commented. | ***Rejected****:* Protected SBP Report belongs to Protected Sensing frames, so no modification is needed. |
| **744**  | Alireza Raissinia | 64.22 | Add "Protected Sensing Measurement Setup Request", "Protected Sensing Measurement Setup Response" and Protected Sensing Measurement Setup Termination" as part of Protected Dual of Public Action frame part of class 1a | As per comment | ***Revised****:* Agree with the commenter.*TGbf editor to make the changes shown in IEEE 802.11-22/0977r2 under all headings that include CID 744.* |

**11.3.3 Frame filtering based on STA state**

*TGbf Editor: Please modify the Class 1a frames of 11bf D0.2 as following:*

In an infrastructure BSS when PTKSA from PASN authentication exists.

1) Protected Fine Timing frames (9.6.34)

2) Unicast SA Query (11.13)

3) Protected Sensing frames (9.6.36 (Protected Sensing frame details))

4) Protected Dual of Public Action frame whose Public Action field value is one of the following:

<ANA> (Protected SBP Request), <ANA> (Protected SBP Response), <ANA> (Protected SBP Termination), <ANA> (Protected Sensing Measurement Setup Request), <ANA> (Protected Sensing Measurement Setup Response), <ANA> (Protected Sensing Measurement Setup Termination). (#744)

5) DMG Action frames (9.6.19 (DMG Action frame details))(#341)

# 597

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **597** | Chaoming Luo | 61.01 | Need an SBP report request frame and an SBP report frame | Insert an SBP report request frame and an SBP report frame. | ***Revised****:* SBP report frame is defined. SBP request and response frames are modified accordingly. *TGbf editor to make the changes shown in IEEE 802.11-22/0977r2 under all headings that include CID 597.* |

**Discussion**:

1. As discussed in 22/883r2, AP may send SBP report frames sequentially to the SBP initiator. A ‘last report’ bit indicates there is no more SBP report frame to be sent in the current availability window. There may be multiple measurement instances in one availability window, SBP report frame(s) may be sent SIFS after each TB reporting phase, and also may be sent in a separate TXOP after multiple measurement instances if a longer transmission time is needed. E.g., the time estimation for transmit a CSI report of size 40096 (BW=80, Ntx=8, Nrx=8, Nb=10, Ng=4) with MCS 7 and 3.2 μs GI are as following:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  (26-tone, Nss 1) |  (26-tone, Nss 4) |  (26-tone, Nss 8) | (242-tone, Nss 1) | (242-tone, Nss 4) | (242-tone, Nss 8) |
| Mb/s  | 7.5 | 30 | 60 | 73.1 | 292.5 | 585 |
| transmission time (us) | 42769 | 10692 | 5346 | 4388 | 1097 | 548 |
|  |  |  |  |  |  |  |
|  | (484-tone, Nss 1) | (484-tone, Nss 4) | (484-tone, Nss 8) | (996-tone, Nss 1) | (996-tone, Nss 4) | (996-tone, Nss 8) |
| Mb/s  | 146.3 | 585 | 1 170 | 306.3 | 1 225.0 | 612.5 |
| transmission time (us) | 2193 | 548 | 274 | 1047 | 262 | 524 |

1. As discussed in 22/883r2, AP may send SBP report frames in one or moreA-MPDUs. Identification of different reports in one SBP report frame should be considered.
	1. Consider to reuse and modify the Sensing Measurement Report element appropriately.



* 1. According to D0.1, for delayed reporting, sensing measurement reports of multiple sensing measurement setups of a sensing responder may be included in a single Sensing Measurement Report frame.=> Which means measurement setup ID should be included in sensing measurement report element.
	2. For SBP reporting, measurement reports of one measurement instance from multiple sensing receivers (e.g., reports of TB sounding) and from multiple sensing transmitters (e.g., reports of NDPA sounding) may be aggregated into one A-MPDU by AP. => Which means sensing receiver ID should be included in SBP report, and also sensing transmitter ID and the corresponding timestamp of sensing measurement, to assist the processing of measurement results in SBP initiator.
	3. An HE MMPDU may not be long enough (around 3839 or 7935 octets for 2.4GHz, 3895 or 7991 or 11 454 octets for 5GHz or 6GHz) to carry one CSI report (42 ~ 40416 octets). So, a CSI report may be split to pieces to be carried in multiple MMPDUs. And to assemble the pieces, report ID may be considered as linkage.

**Resolution**:

*TGbf Editor: Please modify the first paragraph of clause 9.4.2.318 in 11bf D0.2 as following:*

**9.4.2.318 Sensing Measurement Report element**

The Sensing Measurement Report element contains a single sensing measurement report. The format of the Sensing Measurement Report element is defined in 9-1002aw (Sensing Measurement Report element format). The Sensing Measurement Report element is included in the Sensing Measurement Report frame, as described in 9.6.7.51 (Sensing Measurement Report frame format), ~~and in~~ the Protected Sensing Measurement Report frame, as described in 9.6.36.2 (Protected Sensing Measurement Report frame), the SBP Report frame, as described in 9.6.7.56 (Sensing by Proxy (SBP) Report frame format), and the Protected SBP Report frame, as described in 9.6.36.4 (Protected Sensing by Proxy (SBP) Report frame format). (#597)

*TGbf Editor: Please modify the Figure 9-1002aw in 11bf D0.2 as following:*



**Figure 9-1002aw— Sensing Measurement Report element format** (#597)

*TGbf Editor: Please modify the Figure 9-1002ax in 11bf D0.2 as following:*



**Figure 9-1002ax— Sensing Measurement Report Control field format** (#597)

*TGbf Editor: Please modify the Table 9-401t in 11bf D0.2 as following:*

**Table 9-401t—Subfields of the Sensing Measurement Report Control field when the Sensing Measurement Report Type field is set to 0** (#597)

|  |  |
| --- | --- |
| **Subfield** | **Description** |
| Last SBP Report | The Last SBP Report subfield is set to 1 in an SBP Report frame sent in the SBP reporting phase of a sensing measurement instance, if there is no more SBP Report frame to be sent in the current sensing availability window. Otherwise, it is set to 0. This subfield is reserved if sent in a Sensing Measurement Report frame. |
| Reserved | The Reserved subfield is set to 0. |

*TGbf Editor: Please insert the following before P46L34 in clause 9.4.2.318 of 11bf D0.2:*

The Sensing Measurement Setup ID Indicator field is set to the Measurement Setup ID value corresponding to the sensing measurement setup, based on which sensing measurement instance that generates the current sensing measurement result is performed. (#597)

The Sensing Measurement Report field is used to report sensing measurements obtained by a sensing

receiver. This field is TBD.

*TGbf Editor: Please insert the following subclause into 11bf D0.2*

**9.6.7.56 Sensing by Proxy (SBP) Report frame format** (#597)

The SBP Report frame is an Action No Ack of category Public transmitted to provide WLAN sensing measurements. The format of the SBP frame Action field is defined in Figure 9-1139i (SBP Report frame Action field format).



**Figure 9-1139i— SBP Report 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 SBP Report field contains one or more of the Sensing Measurement Report elements described in 9.4.2.318 (Sensing Measurement Report element).

*TGbf Editor: Please insert the following subclause into 11bf D0.2*

**9.6.36.4 Protected Sensing by Proxy (SBP) Report frame format** (#597)

The Protected SBP Report frame is an Action No Ack frame of category Protected Sensing transmitted to provide WLAN sensing measurements. The format of the frame after the action field is identical to the format of the SBP Report frame as described in 9.6.7.56 (Sensing by Proxy (SBP) Report frame format).

**9.4.2.296 ISTA Availability Window element**

The format of the ISTA Availability Window element is shown in Figure 9-788eda (ISTA Availability Window element format).



**Figure 9-788eda—ISTA Availability Window element format**

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

The ISTA Availability Information field format is shown in Figure 9-788edb (ISTA Availability Information field format).



**Figure 9-788edb—ISTA Availability Information field format**

*TGbf Editor: Please modify the text after P72L7 in clause 9.4.2.296 11az D5.0 as following:*

The Count subfield in the ISTA Availability Information field indicates the size in bits of the Availability Bitmap subfield. The value of this subfield is denoted as “count”.

Each Availability Bit in the Availability Bitmap subfield indicates the ISTA’s availability for TB ranging with the recipient RSTA. The value indicated by each bit in the Availability Bitmap is in units of 10 TUs. Bit Bk (where 0 ≤ *k ≤* count-1) represents the ISTA’s periodic availability for TB ranging with the RSTA in the interval [tstart,k , tend,k] repeated every N TUs; Each Availability Bit in the Availability Bitmap subfield indicates the SBP initiator’s availability for TB sensing with the recipient SBP responder. The value indicated by each bit in the Availability Bitmap is in units of 10 TUs. Bit Bk (where 0 ≤ *k ≤* count-1) represents the SBP initiator’s periodic availability for TB sensing with the SBP responder in the interval [tstart,k , tend,k] repeated every N TUs; (#597) see Equation (9-3ca):

*TGbf Editor: Please modify the Figure 9-1139f in 11bf D0.2 as following:*

**9.6.7.53 SBP Request frame format**



**Figure 9-1139f— SBP Request frame Action field format** (#597)

*TGbf Editor: Please modify the text after P72L2 in clause 9.6.7.53 11bf D0.2 as following:*

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 ISTA Availability Window element is defined in 9.4.2.296 (ISTA Availability Window element). (#597)

Other fields are TBD.

*TGbf Editor: Please modify the Figure 9-1139g in 11bf D0.2 as following:*

**9.6.7.54 SBP Response frame format**

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**Figure 9-1139g— SBP Response frame Action field format** (#597)

*TGbf Editor: Please modify the text after P72L41 in clause 9.6.7.54 11bf D0.2 as following:*

The RSTA Availability Window element is defined in 9.4.2.297 (RSTA Availability Window element). It is present in an SBP Response frame if the status code is equal to SUCCESS, may be present if the status code is equal to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED, and it is not present otherwise. (#597)

Other fields are TBD.

# 641

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| **641** | Chaoming Luo | 73.33 | The SBP reporting procedure needs to be defined. | A proposal will be submitted. | ***Revised****:* The SBP reporting procedure is defined. *TGbf editor to make the changes shown in IEEE 802.11-22/0977r2 under all headings that include CID 641.* |

*TGbf Editor: Please modify clause 11.21.19.2 of 11bf D0.2 as following:*

**11.21.19.2 SBP procedure setup**

Upon receipt of an MLME-SBP.request primitive, a non-AP STA shall assume the role of SBP initiator, and shall establish an SBP procedure with the SBP responder indicated by the PeerSTAAddress parameter. The MLME of the SBP initiator that receives an MLME-SBP.request primitive shall issue an MLME-SBP.confirm primitive on completion of the setup of the SBP procedure. (#641).

Upon receipt of an SBP Request frame from a STA, an AP shall assume the role of SBP responder, and the MLME of the SBP responder shall issue an MLME-SBP.indication primitive to inform the SME of the SBP request. The SME of the SBP responder shall issue an MLME-SBP.response primitive addressed to the SBP initiator identified by the PeerSTAAddress parameter of the MLME-SBP.indication primitive. If the setup is not successful, the SME of the SBP responder shall indicate a specific reason for the failure to setup in the StatusCode parameter. Upon receipt of the MLME-SBP.response primitive, the MLME of the SBP responder shall transmit an SBP Response frame. (#641).

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 or PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED(#641).

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 or PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED(#641), the SBP procedure setup is terminated.

An SBP responder that sends an SBP Response frame with status code SUCCESS should initiate a WLAN sensing procedure 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.

The SBP initiator shall include one ISTA Availability Window element in the SBP request frame indicating its availability for TB sensing as well as the requested periodicity. The periodicity of the availability windows requested by the SBP initiator 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 SBP responder in units of 10 TUs. The requested sensing measurement periodicity is the same as the requested periodicity of the availability windows. (#641)

An SBP responder that sends an SBP Response frame with status code SUCCESS shall include an RSTA Availability Window element in the SBP response frame. The RSTA Availability Information field in the RSTA Availability Window element shall contain exactly one Availability Window Information field. The Availability Window Information field represents the availability window assigned by the SBP responder to the SBP initiator. The SBP responder shall set the Availability Window Broadcast Format subfield of the Header subfield in the RSTA Availability Information field of the RSTA Availability Window element to 0. (#641)

Figure 9-788edk (Example of a bitmap with 200 TU periodicity signalled in the ISTA Availability Window element), 9-788edl (Example of mapping of ISTA’s availability bitmap to RSTA’s TSF) and 9-788edm (Example of how an RSTA assigns an Availability Window to an ISTA) together also show an example of how an SBP responder assigns an availability window from the received Availability Window element of the SBP initiator. (#641)

An SBP responder shall reject a request for SBP from an SBP initiator if the SBP responder cannot assign the SBP initiator to an availability window that overlaps with a 10 TUs interval in which the SBP initiator is available (as signalled by the ISTA Availability Window element in the SBP request frame). (#641)

If the SBP responder rejects a request for SBP from and SBP initiator by setting the Status Code field in the SBP response frame to PREFERRED\_MEASUREMENT\_SETUP\_PARAMETERS\_SUGGESTED, the SBP responder may include an RSTA Availability Window element in the SBP response frame. The RSTA Availability Information field in the RSTA Availability Window element shall contain one or more Availability Window Information fields. Each Availability Window Information field represents an availability window that the SBP responder can assign to that SBP initiator if requested by the SBP initiator in future. The Availability Window Broadcast Format subfield of the Header subfield in the RSTA Availability Information field of the RSTA Availability Window element shall set to 0. (#641)

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

*TGbf Editor: Please modify the clause 11.21.19.3 in 11bf D0.2 as following*

**11.21.19.3 SBP procedure reporting**

Upon receipt of an MLME-SBPREPORT.request primitive, the SBP responder shall transmit an SBP Report frame to the SBP initiator indicated by the PeerSTAAddress parameter. The SBP responder that receives an MLME-SBPREPORT.request primitive shall issue an MLME-SBPREPORT.confirm primitive on completion of transmission of the SBP Report frame. (#641)

Upon receipt of an SBP Report frame from the SBP responder, the SBP initiator shall issue an MLME- SBPREPORT.indication primitive. (#641)

The SBP reporting procedure may commence SIFS time after the last phase of aTB sensing measurement instance corresponding to the measurement setup initiated by the SBP responder, if the transmission of at least one SBP report frame does not exceed the acquired TXOP. If a longer transmission time is needed, then the approach of the SBP reporting allows the scheduling of one or more link accesses within the assigned sensing availability window to complete the transmission. If the acquired TXOP consists of more than one TB sensing measurement instance corresponding to the measurement setup initiated by the SBP responder, the SBP reporting procedure may commence SIFS time after the last phase of the last one TB sensing measurement instances corresponding to the measurement setup initiated by the SBP responder. If the assigned sensing availability consist of more than one TXOP, then the approach of the SBP reporting allows the scheduling of one or more link accesses within the assigned sensing availability window to complete the transmission. (#641)

In the SBP reporting procedure, the SBP responder may transmit sequentially (i.e., one SIFS separated) multiple SBP report frames to the SBP initiator. An SBP report frame may include one or more Sensing Measurement Report fields to convey to the SBP initiator the sensing measurement reports of the corresponding sensing measurement instance, each of the Sensing Measurement Report fields contains: either a sensing measurement report generated by a sensing receiver corresponding to the sensing measurement instance, or a segment of the measurement report generated by a sensing receiver corresponding to the sensing measurement instance. (#641)

In the SBP reporting procedure, the SBP responder may transmit sequentially (i.e., one SIFS separated) one or more A-MPDUs, each carrying multiple SBP report frames. (#641)

SP:

Do you support resolutions to the following CIDs and incorporate the text changes into the latest TGbf draft: 410, 590, 597, 598, 602, 641, 744 in 11-22/977r2 [7 CIDs]

Y/N/A