IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Changes to the BRP TXSS Procedure | | | | |
| Date: 2017-09-11 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Claudio da Silva | Intel |  |  |  |
| Carlos Cordeiro | Intel |  |  |  |
| Assaf Kasher | Qualcomm |  |  |  |
| Lei Huang | Panasonic |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This document suggests changes to the BRP TXSS procedure in order to address different comments received during the comment collection period.

*Modify 9.4.2.255 (EDMG BRP Request element) as follows*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B15 | B16 B23 | B24 B31 | B32 B39 | B40 B50 | B51 B52 | B53 B56 | B57 B58 |
|  | Element ID | Length | Element ID Extension | L-RX | L-TX-RX | TX Sector ID | EDMG TRN-Unit P | EDMG TRN-Unit M | EDMG TRN-Unit N |
| Bits: | 8 | 8 | 8 | 8 | 8 | 11 | 2 | 4 | 2 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B59 | B60 | B61 B63 | B64 | B65 B67 | B68 | B69 |
|  | BRP-TXSS | TXSS-  INITIATOR | TXSS-PACKETS | TXSS-  RESP-TRN | TXSS-REPEAT | TXSS-  RECIPROCAL | TXSS-  MIMO |
| Bits: | 1 | 1 | 3 | 1 | 3 | 1 | 1 |

The BRP-TXSS field is set to one to indicate either a request to perform BRP TXSS or to acknowledge a request to perform BRP TXSS, as defined in 10.38.9.5. Otherwise, this field is set to zero.

If the BRP-TXSS field is equal to one, the TXSS-INITIATOR field set to one indicates that the transmitter of the BRP frame is the initiator of a BRP TXSS and the TXSS-INITIATOR field set to zero indicates that the transmitter of the BRP frame is the responder of a BRP TXSS. If the BRP-TXSS field is equal to zero, the TXSS-INITIATOR field is reserved.

If the BRP-TXSS field and the TXSS-INITIATOR are both equal to one, the value in the TXSS-PACKETS fields plus one indicates the number of EDMG BRP-TX packets necessary for the initiator to perform transmit training. If the BRP-TXSS field is equal to one and the TXSS-INITIATOR field is equal to zero, the value in the TXSS-PACKETS fields plus one indicates the number of EDMG BRP-TX packets necessary for the responder to perform transmit training if the procedure includes a Responder BRP TXSS (see 10.38.9.5). If the BRP-TXSS field is equal to one and the TXSS-INITIATOR field is equal to zero, the value in the TXSS-PACKETS fields is equal to zero if the procedure does not include a Responder BRP TXSS. If the BRP-TXSS field is equal to zero, the TXSS-PACKETS field is reserved.

If the BRP-TXSS field and the TXSS-INITIATOR field are both equal to one, the TXSS-RESP-TRN field set to one indicates that the requested BRP TXSS includes a Responder BRP TXSS and the TXSS-RESP-TRN field set to zero indicates that the requested BRP TXSS does not include a Responder BRP TXSS. If the BRP-TXSS field and the TXSS-INITIATOR field are not both equal to one, the TXSS-RESP-TRN field is reserved.

If the BRP-TXSS field, the TXSS-INITIATOR field, and the TXSS-RESP-TRN field are all equal to one, the TXSS-REPEAT field plus one indicates the number of times that the EDMG BRP-TX packets transmitted in the Responder BRP TXSS shall be repeated. If the BRP-TXSS field is equal to one and the TXSS-INITIATOR field is equal to zero, the TXSS-REPEAT field plus one indicates the number of times that the EDMG BRP-TX packets transmitted in the Initiator BRP TXSS shall be repeated. Otherwise, the TXSS-REPEAT field is reserved.

If the BRP-TXSS field and the TXSS-INITIATOR field are both equal to one, the TXSS-RECIPROCAL field set to one indicates the request for reciprocal BRP TXSS training (see 10.38.9.5) and the TXSS-RECIPROCAL field set to one indicates that the BRP TXSS does not rely on reciprocity. If the BRP-TXSS field and the TXSS-INITIATOR field are not both equal to one, the TXSS- RECIPROCAL field is reserved.

If the BRP-TXSS field and the TXSS-INITIATOR field are both equal to one, the TXSS-MIMO field set to one indicates that the requested BRP TXSS is a MIMO BRP TXSS (see 10.38.9.5) and the TXSS-MIMO field set to zero indicates that the requested BRP TXSS is a SISO BRP TXSS. If the BRP-TXSS field and the TXSS-INITIATOR field are not both equal to one, the TXSS-MIMO field is reserved.

*Modify 9.4.2.130 (DMG Beam Refinement element) as follows*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B7 | B8 B15 | B16 | B17 | B18 | B19 | B20 | B21 B26 | B27 B28 | B29 B33 |
|  | Element ID | Length | Initiator | TX-train-response | RX-train-response | TX-TRN-OK | TXSS-FBCK-REQ | BS-FBCK | BS-FBCK Antenna ID | FBCK-REQ |
| Bits: | 8 | 8 | 1 | 1 | 1 | 1 | 1 | 6 | 2 | 5 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B34 B51 | B52 | B53 | B54 B55 | B56 B59 | B60 |
|  | FBCK-TYPE | MID Extension | Capability Request | Reserved | BS-FBCK MSB | BS-FBCK Antenna ID MSB |
| Bits: | 18 | 1 | 1 | 2 | 4 | 1 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B61 B64 | B65 | B66 | B67 |  |  | B68 B71 |
|  | Number of Measurements MSB | EDMG Extension Flag | EDMG Channel Measurement Present | Short SSW Packet Used |  |  | Reserved |
| Bits: | 4 | 1 | 1 | 1 |  |  | 4 |

**10.38.9.5 BRP transmit sector sweep (BRP TXSS)**

**10.38.9.5.1 General**

Beam refinement protocol transmit sector sweep (BRP TXSS) is a procedure which makes use of BRP frames to perform transmit training and determine improved antenna configuration for transmission.

In BRP TXSS, the STA that initiates the procedure through the transmission of a BRP frame is referred to as the initiator, and the recipient STA of the BRP frame that participates in a BRP TXSS with the initiator is referred to as the responder.

A BRP TXSS may be comprised of a mandatory setup phase, a mandatory transmit training phase by the initiator, referred to as an Initiator BRP TXSS, an optional transmit training phase by the responder, referred to as a Responder BRP TXSS, and a mandatory feedback phase. An example of BRP TXSS is shown in Figure 62 for the case when the procedure is comprised of a setup phase, an Initiator BRP TXSS, and a feedback phase. In Figure 62 and in the remainder of 10.38.9.5, *Ninit* is the value of the TXSS-PACKETS subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the BRP TXSS, and *Rresp* is the value of the TXSS-REPEAT subfield within the EDMG BRP Request element in the BRP frame sent by the responder to confirm the procedure.

**Figure 62—Example of BRP TXSS**

As shown in Figure 62 and defined in 10.38.9.5.3, the setup phase consists of the transmission of a BRP frame that requests transmit training by the initiator followed by the transmission of a BRP frame that confirms the procedure by the responder. After receiving confirmation of the BRP TXSS request from the responder, the initiator performs an Initiator BRP TXSS. As defined in 10.38.9.5.2, in an Initiator BRP TXSS, the initiator transmits *Ninit* EDMG BRP-TX packets consecutively *Rresp* times, and the same DMG antenna or set of DMG antennas is used by the responder when receiving the TRN field of all *Ninit* EDMG BRP-TX packets within one of the *Rresp* repetitions. If the BRP TXSS does not include a Responder BRP TXSS, the feedback phase consists of the transmission of a BRP frame by the responder with feedback of the measurements performed during the reception of EDMG BRP-TX packets.

If a BRP TXSS includes a Responder BRP TXSS, the Responder BRP TXSS is performed immediately after the Initiator TXSS as shown in Figure 63. In Figure 63 and in the remainder of 10.38.9.5, *Nresp* is the value of the TXSS-PACKETS subfield within the EDMG BRP Request element in the BRP frame sent by the responder to confirm the procedure, and *Rinit* is the value of the TXSS-REPEAT subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the BRP TXSS. In a Responder BRP TXSS, the responder transmits *Nresp* EDMG BRP-TX packets consecutively *Rinit* times, and the same DMG antenna or set of DMG antennas is used by the initiator when receiving the TRN field of all *Nresp* EDMG BRP-TX packets within one of the *Rinit* repetitions. The feedback phase in this case consists of the transmission of a BRP frame by the initiator that contains feedback of the measurements it performed during the reception of EDMG BRP-TX packets sent by the responder, followed by the transmission of a BRP frame by the responder that contains feedback of the measurements it performed during the reception of EDMG BRP-TX packets sent by the initiator.



**Figure 63—Example of BRP TXSS**

As defined in 10.38.9.5.2, if the BRP frames used in a BRP TXSS are sent with a single transmit chain, the TRN field of EDMG BRP-TX packets sent in the procedure may be transmitted with a different DMG antenna than the one used in the setup phase. Also, the TRN field of EDMG BRP-TX packets used in the procedure may be received with a DMG antenna that is not the same one used in the setup phase.

If both initiator and responder of a BRP TXSS are SU-MIMO capable (as defined in 10.38.9.2.3.1), EDMG BRP-TX packets used in a BRP TXSS may be sent using multiple transmit chains simultaneously. As described in 10.38.9.2.3, the procedure in this case corresponds to the SISO phase of SU-MIMO beamforming training, and the MIMO phase of SU-MIMO beamforming training shall be performed after the mandatory feedback phase of BRP TXSS.

As defined in 30.9.2.2.2, the TRN field of EDMG BRP-TX packets sent as part of BRP TXSS is transmitted over the entire channel bandwidth. Therefore, the BRP TXSS allows for transmit training over the entire channel bandwidth when the initiator and responder operate on a 4.32 GHz, 6.48 GHz, or 8.64 GHz channel.

**10.38.9.5.2 DMG antenna and TRN-Unit configuration during BRP TXSS**

A SISO BRP TXSS is a BRP TXSS in which EDMG BRP-TX packets used in the procedure are transmitted using a single transmit chain. A MIMO BRP TXSS is a BRP TXSS in which EDMG BRP-TX packets used in the procedure are transmitted using multiple transmit chains.

If the TXSS-RECIPROCAL field in the EDMG BRP Request element within the BRP frame that starts a BRP TXSS is set to one, the TXSS-MIMO field and the TXSS-RESP-TRN field in the same element shall both be set to zero.

If the TXSS-MIMO field in the EDMG BRP Request element within the BRP frame that starts a BRP TXSS is set to one, the TXSS-RESP-TRN field in the same element shall also be set to one.

**10.38.9.5.2.1 SISO BRP TXSS configuration**

All fields except for the TRN field of EDMG BRP-TX packets used in SISO BRP TXSS shall be transmitted with the same DMG antenna and antenna configuration used in the setup phase. The TRN field of EDMG BRP-TX packets used in SISO BRP TXSS may be transmitted with a different DMG antenna than the one used in the transmission of the remaining fields of the same EDMG BRP-TX packet.

All fields of EDMG BRP-TX packets used in SISO BRP TXSS except for the TRN field shall be received with the same DMG antenna and antenna configuration used in the setup phase. The TRN field of EDMG BRP-TX packets used in SISO BRP TXSS may be received with a DMG antenna that is not the same one used in the reception of the remaining fields of the same EDMG BRP-TX packet.

If the TXSS-RECIPROCAL subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the SISO BRP TXSS is equal to 0, then:

* The TRN-Unit RX Pattern field in the EDMG-Header-A of EDMG BRP-TX packets used in the procedure shall be set to 1.
* The Initiator BRP TXSS shall consist of the transmission of EDMG BRP-TX packets consecutively repeated *Rresp* times. That is,
  + The EDMG-Header-A of the *ith* EDMG BRP-TX packet within each of the *Rresp* repetitions, where , shall have the same value for the fields EDMG TRN Length, EDMG TRN-Unit P, EDMG TRN-Unit M and EDMG TRN-Unit N; and
  + The TRN subfields of the *ith* EDMG BRP-TX packet within each of the *Rresp* repetitions, where , shall be transmitted using the same DMG antenna and the same AWVs.
* Similarly, the Responder BRP TXSS, if present, shall consist of the transmission of *Nresp* EDMG BRP-TX packets consecutively repeated *Rinit* times. That is,
  + The EDMG-Header-A of the *ith* EDMG BRP-TX packet within each of the *Rinit* repetitions, where , shall have the same value for the fields EDMG TRN Length, EDMG TRN-Unit P, EDMG TRN-Unit M and EDMG TRN-Unit N; and
  + The TRN subfields of the *ith* EDMG BRP-TX packet within each of the *Rinit* repetitions, where , shall be transmitted using the same DMG antenna and the same AWVs.

The DMG antenna used when transmitting the TRN field of the *Ninit* EDMG BRP-TX packets within one of the *Rresp* repetitions in an Initiator BRP TXSS should be different. The DMG antenna used when transmitting the TRN field of the *Nresp* EDMG BRP-TX packets within one of the *Rinit* repetitions in a Responder BRP TXSS should be different.

Also when the TXSS-RECIPROCAL subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the SISO BRP TXSS is equal to 0, the receiver may utilize either one DMG antenna or a set of DMG antennas, depending on its capabilities, when performing measurements. For both cases,

* In an Initiator BRP TXSS, the same DMG antenna or set of DMG antennas shall be used by the responder when receiving the TRN field of all *Ninit* EDMG BRP-TX packets within one of the *Rresp* repetitions.
* Similarly, in a Responder BRP TXSS, if present, the same DMG antenna or set of DMG antennas shall be used by the initiator when receiving the TRN field of all *Nresp* EDMG BRP-TX packets within one of the *Rinit* repetitions.

The DMG antenna or set of DMG antennas used when receiving the TRN subfields of EDMG BRP-TX packets of different repetitions should be different.

An example of a BRP TXSS is shown in Figure 64 for a scenario in which the initiator has two DMG antennas, the responder has three DMG antennas, and both the initiator and responder use one DMG antenna when performing measurements. If the responder in this example was capable of processing all of its antennas simultaneously, the duration of the BRP TXSS could be shortened as shown in Figure 65.



**Figure 64—Example of BRP TXSS**



**Figure 65—Example of BRP TXSS**

The TXSS-RECIPROCAL subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the SISO BRP TXSS may be set to 1 only if:

* The Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field of the responder and the Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field of the initiator are both equal to 1.
* The last BRP TXSS performed between the BRP frame transmitter (that is, the initiator in the current BRP TXSS) and the BRP frame receiver (that is, the responder in the current BRP TXSS) was performed with the BRP frame transmitter in the role of responder and the BRP frame receiver in the role of initiator.

If the TXSS-RECIPROCAL subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the SISO BRP TXSS is equal to 1, then:

* The TRN field of the EDMG BRP-TX packets used in the procedure shall be transmitted using the DMG antenna corresponding to the best AWV configuration identified in the last BRP TXSS procedure between the two STAs and that was initiated by the responder of the current BRP TXSS procedure.
* The TRN field of the EDMG BRP-TX packets used in the procedure shall be received with the RX AWV configuration corresponding to the best AWV configuration identified in the last BRP TXSS procedure between the two STAs and that was initiated by the responder of the current BRP TXSS procedure.

The first TRN-Unit in an EDMG BRP packet used in a SISO BRP TXSS may be used for the initiator and responder to switch DMG antennas and shall not be processed by the receiver. Therefore, for EDMG BRP-TX packets transmitted during SISO BRP TXSS, the value of the TXVECTOR parameter EDMG\_TRN\_LEN shall be set to *k* + 1, where *k* is the number of TRN-Units used for transmit training.

When transmitting an EDMG BRP-TX packet as part of a SISO BRP TXSS, an EDMG STA may change the DMG antenna used in the transmission of its TRN field during the first TRN-Unit and shall not change DMG antenna during the remaining TRN-Units.

When receiving EDMG BRP-TX packets as part of SISO BRP TXSS, an EDMG STA may change the DMG antenna used in the reception of the TRN field during the first TRN-Unit and shall not change DMG antenna during the remaining TRN-Units.

**10.38.9.5.2.2 MIMO BRP TXSS configuration**

All fields of EDMG BRP-TX packets used in MIMO BRP TXSS shall be transmitted with all transmit chains of the transmitter and use an EDMG PPDU defined for MIMO transmission in Clause 30. The TRN field of EDMG BRP-TX packets used in MIMO BRP TXSS shall consist of *N* orthogonal waveforms, where *N* is the number of transmit chains used in the transmission of the packet, as defined in 30.9.

A STA that is part of a MIMO BRP TXSS and receives EDMG BRP-TX packets shall perform channel measurements using all of its DMG antennas simultaneously and provide feedback for each of its DMG antennas, as defined in 10.38.9.5.4.

The TRN-Unit RX Pattern field in the EDMG-Header-A of EDMG BRP-TX packets used in MIMO BRP TXSS shall be set to 1.

For EDMG BRP-TX packets transmitted in a MIMO BRP TXSS, the value of the TXVECTOR parameter EDMG\_TRN\_LEN shall be set to *k*, where *k* is the number of TRN-Units used in the transmit training.

**10.38.9.5.3 BRP TXSS execution**

A BRP TXSS shall complete within the CBAP or SP in which it was initiated.

The FBCK-REQ subfield in the DMG Beam Refinement element carried within the BRP frame that initiates a BRP TXSS shall be set to 10001 (binary).

Both the BRP frame sent by the initiator to initiate the BRP TXSS and the BRP frame sent by the responder to confirm the BRP TXSS execution shall not include a TRN field. The initiator of the BRP TXSS sends a BRP frame with the BRP-TXSS field and the TXSS-INITIATOR field within the EDMG BRP Request element both set to one and the TXSS-PACKETS field set to indicate the number of EDMG BRP-TX packets necessary for the initiator to perform transmit training. To confirm the BRP TXSS execution, the responder shall respond with a BRP frame MBIFS interval after the reception of the BRP frame sent by the initiator with the BRP-TXSS field within the EDMG BRP Request element set to one, the TXSS-INITIATOR field set to zero, and the TXSS-REPEAT field set to indicate the number of requested repetitions of the EDMG BRP-TX packets sent by the initiator.

The TXSS-RESP-TRN subfield in the EDMG BRP Request element of the BRP frame that initiates the BRP TXSS shall be set to 1 when the procedure includes a Responder BRP TXSS. If the BRP TXSS does not include a Responder BRP TXSS, the TXSS-RESP-TRN subfield shall be set to 0. In the setup phase of a procedure that includes a Responder BRP TXSS, the TXSS-REPEAT field in the BRP frame sent by the initiator shall be set to indicate the number of requested repetitions of the EDMG BRP-TX packets sent by the responder. Also, the TXSS-PACKETS field in the BRP frame sent by the responder shall be set to indicate the number of EDMG BRP-TX packets necessary for the responder to perform transmit training. If the TXSS-RESP-TRN subfield in the EDMG BRP Request element of the BRP frame that initiates the BRP TXSS is set to zero, the TXSS-REPEAT field in the BRP frame sent by the initiator shall be set to zero and the TXSS-PACKETS field in the BRP frame sent by the responder shall be set to zero.

The TXSS-MIMO subfield in the EDMG BRP Request element of the BRP frame that initiates the BRP TXSS shall be set to 1 when the procedure is a MIMO BRP TXSS. If the procedure is a SISO BRP TXSS, the TXSS-MIMO subfield shall be set to 0. Both initiator and responder of a BRP TXSS shall be SU-MIMO capable (as defined in 10.38.9.2.3.1) for the TXSS-MIMO subfield to be set to 1.

The TXSS-RECIPROCAL subfield within the EDMG BRP Request element in the BRP frame sent by the initiator to start the BRP TXSS shall be set to 1 when the procedure relies on antenna pattern reciprocity and on the results of a prior BRP TXSS between the two STAs as described in 10.38.9.5.2. If the BRP TXSS does not rely on reciprocity, the TXSS-RECIPROCAL subfield shall be set to 0.

The initiator shall transmit the first EDMG BRP-TX packet MBIFS interval after the reception of the BRP frame sent by the responder confirming the BRP TXSS execution. The EDMG BRP-TX packets sent by the initiator in a BRP TXSS procedure shall be separated by SIFS interval. If the procedure includes a Responder BRP TXSS, the responder shall send the first EDMG BRP-TX packet MBIFS after the last EDMG BRP-TX packet transmitted by the initiator. The EDMG BRP-TX packets sent by the responder in a BRP TXSS procedure shall be separated by SIFS interval.

In an Initiator BRP TXSS, the BRP CDOWN field within the EDMG BRP Request element in each transmitted EDMG BRP-TX packet shall contain the total number of transmissions remaining until the end of the Initiator BRP TXSS, such that the first EDMG BRP-TX packet transmitted in the Initiator BRP TXSS has the BRP CDOWN field set to and the last packet has the BRP CDOWN field set to 0. The use of BRP CDOWN is illustrated in Figures 64 and 65.

If the BRP TXSS includes a Responder BRP TXSS, the BRP CDOWN field within the EDMG BRP Request element in each transmitted EDMG BRP-TX packet shall contain the total number of transmissions remaining until the end of the Responder BRP TXSS, such that the first EDMG BRP-TX packet transmitted in the Responder BRP TXSS has the BRP CDOWN field set to , and the last packet has the BRP CDOWN field set to 0.

For a MIMO BRP TXSS procedure, the receiver shall obtain channel measurements during the reception of the transmitted EDMG BRP-TX packets using all of its DMG antennas simultaneously, and provide feedback for each of its DMG antennas, as defined in 10.38.9.5.4.

**10.38.9.5.4 BRP TXSS feedback**

BRP frames with feedback exchanged in a BRP TXSS shall not include a TRN field.

If the BRP TXSS does not include a Responder BRP TXSS, the responder shall send a BRP frame to the initiator containing feedback based on measurements it performed during the BRP TXSS. The BRP frame with feedback transmitted by the responder is separated from the last EDMG BRP-TX packet transmitted by the initiator by a BRPIFS interval.

If the BRP TXSS includes a Responder BRP TXSS, the initiator shall send a BRP frame to the responder containing feedback based on measurements it performed. The BRP frame with feedback transmitted by the initiator is separated from the last EDMG BRP-TX packet transmitted by the responder by a BRPIFS interval. The responder shall then send a BRP frame to the initiator containing feedback based on measurements it performed. The BRP frame with feedback sent by the responder is separated from the BRP frame with feedback sent by the initiator by a SIFS interval.

The BRP packet sent by the responder with feedback of a BRP TXSS shall be transmitted with the same DMG antenna and antenna configuration used in the setup phase. The BRP packet sent by the responder with feedback of a BRP TXSS shall be received by the initiator with the same DMG antenna and antenna configuration used in the setup phase.

If the BRP TXSS includes a Responder BRP TXSS, the BRP packet sent by the initiator with feedback shall be transmitted with the same DMG antenna and antenna configuration used in the setup phase. The BRP packet sent by the initiator with feedback shall be received by the responder with the same DMG antenna and antenna configuration used in the setup phase.

A BRP frame with feedback transmitted in a BRP TXSS shall have the SNR Present subfield within the FBCK-TYPE field set to 1, the Sector ID Order subfield set to 1, the EDMG Extension Flag set to 1 and the EDMG Channel Measurement Present set to 1. In the EDMG Sector ID Order subfield the SISO IDs indicate the AWV IDs, TX antennas and RX Antennas of Sectors that were received in the last BRP TXSS. The SNRs subfield in the Channel Measurement Feedback indicates the SNRs with which these sectors have been received. The BRP-CDOWNs associated with each SISO ID indicate the BRP-CDOWN of the packet in which the sector has been received.

The BRP TXSS procedure is completed when the responder transmits the BRP packet containing the feedback.

If the TXSS-MIMO subfield in the EDMG BRP Request element of the BRP frame that initiated the BRP TXSS was set to 1, the initiator shall start the MIMO phase of SU-MIMO beamforming training an MBIFS following the completion of the BRP TXSS.

**SP/M: Do you agree to include the text proposed in 1297r0 (changes to the BRP TXSS procedure) into the 802.11ay draft spec?**