IEEE P802.11
Wireless LANs

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| Proposed resolution to BF PHY and BRP TXSS related CIDs |
| Date: 2017-09-11 |
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Abstract

This submission proposes a resolution to several CIDs submitted on the 11ay draft text related to BF PHY and to the BRP TXSS procedure.

The discussion is in reference to Draft IEEE P802.11ay/D0.3.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 53 | 10.38.9.4.2 | 77.22 | "The TRN field of EDMG BRP-TX packets used in 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" This limitting to a single antenna - should allow multi-antenna | Repalce with "The TRN field of EDMG BRP-TX packets used in BRP TXSS may be transmitted with a different DMG antennas than the ones used in the transmission of the remaining fields of the same EDMG BRP-TX packet |

**Proposed resolution**: Revised

*Discussion:* The intent of this comment, according to its author, was to address the transmission of TRN subfields used for CE for the case when an antenna switch happens during the first TRN-Unit. The issue identified by the commenter was addressed in a motion approved in the July 2017 plenary (#252, based on the draft text proposed in 17/1042r1) that, among other contributions, defined various mandatory TRN-Unit configuration modes with P = 0. No further changes to the draft are necessary.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 403 | 10.38.9.5.3 | 79.06 | TRN-Unit RX Pattern setting of the BRP-TX packet is different for the case TXSS-REQ-RECIPROCAL=0 and 1. This setting should be included in the procedure | add procedure to set TXVECTOR TRN\_RX\_PATTERN |

**Proposed resolution**: Revised

*Discussion:* Among the text changes proposed in the document 17/1181r0 presented in TGay’s teleconference call on August 2nd, 2017, the following sentences were included that address the comment under consideration:

* “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.”
* “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-Unit RX Pattern field in the EDMG-Header-A of EDMG BRP-TX packets used in the procedure shall be set to 0.”
* “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.”

The SP to the question “Do you agree to include the text proposed in 17/1181r0 into the 802.11ay draft spec?” passed unanimously. The SP was converted into a motion, which will be considered by the group in the September 2017 Interim Session.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 125 | 10.38.9.5.3 | 79.15 | What should be the responder's behavior if BRP-TX packets are not completed within the SP allocation or TXOP? | Please clarify |

**Proposed resolution**: Revised

*Discussion:* If the BRP TXSS does not complete within the allocation in which it was initiated, it is unsuccessful. In this case, if appropriate, a new BRP TXSS may be initiated. Among the text changes proposed in the document 17/1181r0 presented in TGay’s teleconference call on August 2nd, 2017, the sentence pointed out by the commenter was deleted and the statement “A BRP TXSS shall complete within the CBAP or SP in which it was initiated” was added to 10.38.9.5.3 (BRP TXSS execution).

The SP to the question “Do you agree to include the text proposed in 17/1181r0 into the 802.11ay draft spec?” passed unanimously. The SP was converted into a motion, which will be considered by the group in the September 2017 Interim Session.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 291 | 10.38.9.5.2 | 77.32 | please distinguish between TX DMG antenna and RX DMG antenna for calculating the total number of AWV combinations. | please fix it |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS setup procedure was modified in order to allow the responder and initiator to explicitly request a given number of packets to be used in the procedure. As part of this change, the field TXSS-SECTORS previously used to indicate the number of AWVs to be used was removed and the ambiguity pointed out by the commenter no longer exists in the draft.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 402 | 10.38.9.5.3 | 78.36 | How does responder know N\_init,TX? | Include a procedure that responder can convert TXSS-SECTORS to N\_init,TX |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS setup procedure was modified in order to allow the responder and initiator to explicitly request a given number of packets to be used in the procedure. As part of this change, the field TXSS-SECTORS previously used to indicate the number of AWVs to be trained was removed.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 404 | 10.38.9.5.1 | 76.23 | "all possible combinations" phase out the possibility of a sub-optimal training with a subset of combinations | Modify to enable sub-optimal training using a subset of combination |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS setup procedure was modified in order to allow the responder and initiator to explicitly request a given number of packets to be used in the procedure. The number of antennas used/trained in the procedure is no longer defined by the number of antennas of the initiator and the responder (as indicated in its capabilities). As a result, it is now possible to train a subset of antennas/AWVs combinations.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 397 | 10.38.9.5.1 | 76.28 | It is not clear how does initiator know N\_resp, RX. Is it based in STA capability 'Number of RX DMG antennas'? However, that number may not account for the responder listening on multiple rx antennas | clarify N\_resp, RX |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS setup procedure was modified in order to allow the responder and initiator to explicitly request a given number of packets to be used in the procedure. Therefore, the responder is now able to specify a desired number of packets/repetitions based on its implementation/capabilities – including the case in which it is possible to listen/process multiple antennas simultaneously.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 190 | 10.38.9.5 | 78.02 | It should not be imposed that the training is sequential for the receive antennas. | relax condition and provide framework to allow parallel training. |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS setup procedure was modified in order to allow the responder and initiator to explicitly request a given number of packets to be used in the procedure. Therefore, the responder is now able to specify a desired number of packets/repetitions based on its implementation/capabilities – including the case in which it is possible to listen/process multiple antennas simultaneously.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 551 | 10.38.9.5.1 | 76.21 | Beam refinement protocol transmit sector sweep (BRP TXSS) is an alternative way of the sector sweeping by SSW/short SSW. But it is not clear wheather it can replace the SLS in SISO subphase of SU MIMO and MU MIMO. | Need to state wheather BRP TXSS can replace the SLS in SISO subphase of SU MIMO and MU MIMO. |

**Proposed resolution**: Revised

*Discussion:* As part of contribution 17/1297r0, the BRP TXSS procedure was modified in order to be used in the SISO phase of SU-MIMO BF training. Changes include: (1) Defining that when TXSS-MIMO is equal to 1, the procedure includes a Responder BRP TXSS; (2) Defining that when TXSS-MIMO is equal to 1, the MIMO phase of the SU-MIMO BF training shall start MBIFS after the end of the BRP TXSS’s feedback phase; and (3) Including BRP CDOWN. Also, as part of contribution 17/1234r0 (CR on SISO phase of MIMO BF), the SISO phase of SU MIMO BF training “…comprises either a MIMO BRP TXSS procedure or a SISO feedback procedure.” That is, if transmit training is performed in the SISO phase of SU MIMO BF training, it uses BRP TXSS. BRP TXSS may not be used in MU MIMO BF training.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 433 | 30.9.2.2.4 | 156.20 | Editor's note not addressed "Editor Note: need to define padding and include table containing values of NCWmin for each MCS necessary to compute the padding." | Address editors note as written. |

**Proposed resolution**: Revised

*Discussion:* In 11ad, the required $N\_{CWmin}$ value necessary to meet the minimum data field length requirement for BRP packets of aBRPminSCblocks (=18) SC blocks in Table 20-24 for all SC MCS values (802.11-2016). In 11ay, “(t)he minimum duration of the Data field of an EDMG BRP packet when sent in an EDMG SC mode shall be equal to the value of the Requested BRP SC Blocks field within a responder’s EDMG Capabilities element.” For this reason, together with the fact that we have a large number of $L\_{CW}$ , $N\_{CBPB}$ (modulation orders and GIs), and $N\_{CB}$ combinations, the minimum data field length requirement for EDMG BRP packets is now expressed in terms of $N\_{BLKSmin}$ and not $N\_{CWmin}$ (as in 11ad). This change can be found in the different encoding procedures already found in the draft. See, for example, the draft text proposed in 11-17/0880r1, which was approved in the July 2017 plenary (#259) and defines the padding procedure.

*Delete the Editor note in 30.9.2.2.4 (EDMG BRP packet duration)*

~~Editor Note: need to define padding and include table containing values of NCWmin for each MCS necessary to compute the padding.~~

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 91 | 30.9.2.2.4 | 156.15 | How can the Requested BRP SC block field not be included in the EDMG Capabilities element? There does not seem to be much of a choice. | Remove the sentence beginning in line 15. |

**Proposed resolution**: Rejected

*Discussion*: The “Requested BRP SC Blocks field” is defined within the “Beamforming field,” which is an Extended Capabilities field. As defined in 9.4.2.250 (EDMG Capabilities element), “(i)f an Extended Capabilities field corresponding to a Capability ID is not present in a transmitted EDMG Capabilities element, the transmitting STA does not support any of the mechanisms defined for the Capability ID.”

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 432 | 30.9.2.2.3 | 156.09 | "A value in the RX TRN-Units per Each TX TRN-Unit field of an EDMG BRP10RX/TX packet shall be equal to the value of the L-TX-RX field requested by the intended receiver of the11 EDMG BRP-RX/TX packet in the last received EDMG BRP Request element, if any.". If none, does this default to 1. If so if should be mentioned. | Add sentence. "if none, then the value in the RX TRN-Units per Each TX TRN-Unit shall be set to zero". |

**Proposed resolution**: Revised

*Discussion*: This comment is related to CID 75, which has already been closed (17/0919r1) and has resulted in the following paragraph: “A value in the EDMG TRN Length field of an EDMG BRP-RX packet shall be equal to the value of the L-RX field requested by the intended receiver of the EDMG BRP-RX packet in the last received EDMG BRP Request element (see 9.4.2.255). A value in the RX TRN-Units per Each TX TRN-Unit field of an EDMG BRP-RX/TX packet shall be equal to the value of the L-TX-RX field requested by the intended receiver of the EDMG BRP-RX/TX packet in the last received EDMG BRP Request element (see 9.4.2.255).” (Modifications include deleting the “if any”s that caused confusion, and including a reference to 9.4.2.255.) In summary, it is not necessary to define a default value for “RX TRN-Units per Each TX TRN-Unit” since a STA shall not send an EDMG BRP-RX/TX packet to a peer without knowing its requested configuration. This can be seen, for example, in the MIMO BF training flow.

Do you accept the resolutions given in 17/1298r0 to the following CIDs: 53, 91, 125, 190, 291, 397, 402, 403, 404, 432, 433, and 551?