IEEE P802.11  
Wireless LANs

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| Proposed resolution to 11ay related CIDs | | | | |
| Date: 2017-06-21 | | | | |
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Abstract

This submission proposes a resolution to several CIDs submitted on the 11ay draft text.

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

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 122 | 10.38.9.5.3 | 78.41 | To make it symmetric, we should also add that "The second EDMG BRP packet sent in a BRP TXSS procedure shall not include a TRN field" | As in comment |

**Proposed resolution**: Revised

*Change the second paragraph in 10.38.9.5.3as follows*

An initiator starts a BRP TXSS procedure by sending a BRP frame with the TXSS-REQ field in the EDMG BRP Request element set to 1 and the TXSS-SECTORS field set to indicate the total number of transmit sectors the initiator uses in the BRP TXSS procedure combined over all of its DMG antennas. The FBCK-REQ subfield in the DMG Beam Refinement element carried within the BRP frame shall be set to 10001 (binary). ~~The first EDMG BRP packet sent in a BRP TXSS procedure shall not include a TRN field.~~

*Add the following paragraph after the third paragraph in 10.38.9.5.3*

The BRP frame sent by the initiator to initiate a BRP TXSS procedure and the BRP frame sent by the responder to confirm the BRP TXSS execution shall not include a TRN field.

*Add the following paragraph after the third paragraph in 10.38.9.5.4*

The BRP frame with feedback sent by the responder shall not include a TRN field.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 123 | 10.38.9.5.3 | 78.36 | What if the first EDMG BRP packet sent in a BRP TXSS procedure is not received? What should the initiator do? If it retransmits the frame, is it still the "first" and it shall not include a TRN field? | Please clarify |

**Discussion:** This comment (CID 123) is resolved with the changes proposed in response to CID 122.

**Proposed resolution**: Revised

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 401 | 10.38.9.5.3 | 78.36 | It is not clear what "The first EDMG BRP packet sent in a BRP TXSS procedure shall not include a TRN field" means.  Currently BRP packet (by definition in 20.10.2.2.1) must have TRN field | change to: The PPDU contains the first BRP frame sent by the initiator or the responder shall not include a TRN field |

**Discussion:** This comment (CID 401) is resolved with the changes proposed in response to CID 122.

**Proposed resolution**: Revised

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 73 | 30.9.2.2.1 | 115.05 | "M TRN sequences" - these are subfields | Replace with subfields, also in next paragraph |

**Proposed resolution**: Revised

*Replace the first paragraph (including bullet list) of 30.9.2.2.1 with the following*

EDMG BRP packets are EDMG PPDUs that contain a TRN field and enable antenna configuration training for transmission and/or reception. ~~are used to train the receiver and transmitter antenna as part of the beam refinement procedure~~. There are three types of EDMG BRP packets: EDMG BRP-RX packets, EDMG BRP-TX packets, and EDMG BRP-RX/TX packets:

* EDMG BRP-RX packets are ~~packets that have TRN training subfields appended to them. These packets enable receiver antenna weight vector training.~~ used for receive AWV training. All TRN subfields of an EDMG BRP-RX packet are transmitted with the same AWV.
* EDMG BRP-TX packets are ~~packets that have TRN training subfields appended to them~~ used for transmit AWV training. The ~~transmitting STA~~ transmitter may change the ~~antenna configuration~~ AWV used in the transmission of each of the last M TRN ~~sequences~~ subfields in ~~a~~ each TRN-Unit present in the TRN field. The ~~receiving STA~~ receiver performs measurements during the reception of the EDMG BRP-TX packet ~~on these TRN sequences~~ and sends feedback to the STA that ~~transmits~~ transmitted the ~~EDMG BRP-TX~~ packet.
* [*Note: In this bullet, I used the text present in D0.4 as reference.*] EDMG BRP-RX/TX packets are ~~packets that have TRN training subfields appended to them~~ used for simultaneous training of the transmitter’s transmit AWV and the receiver’s receive AWV. To enable ~~RX and TX~~ simultaneous receive and transmit training using the same EDMG BRP-RX/TX packet ~~frame~~, ~~different from an EDMG BRP-TX packet, the transmitting STA~~ the transmitter sends a number of consecutive TRN-Units in which the last M TRN subfields of each TRN-Unit are transmitted with the same AWV configuration ~~in an EDMG BRP-RX/TX packet. The repeated transmission of TRN-Units with the same AWV configuration enables receiver AWV training.~~

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 89 | 30.9.2.2.4 | 156.17 | Why should the minimum duration of the Data field of an EDMG BRP packet when sent in an EDMG SC mode be aBRPminSCblock? This could make BRP packets unnecessarily long. | Remove this line |

**Discussion:** It is necessary to define a minimum length for thedata field to give a STA enough time to process the EDMG-Header-A of a received BRP packet, determine the configuration used in the TRN field, and configure itself to process the TRN field. It should be noted that the group is currently considering making aBRPminSCblock variable (as opposed to having a fixed value as in 11ad) and defining it as part of the STA’s capability.

**Proposed resolution**: Rejected

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 75 | 30.9.2.2.7 | 156.07 | "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, if any" This is MAC behavior, L-RX is not available to the PHY. | Move to clause 10.38 |

**Discussion:** The 11ad equivalent to the sentence under discussion (“The value N in the Training Length field of a BRP-RX packet is equal to the value of the L-RX field requested by the intended receiver of the BRP-RX packet at a previously received BRP Request field (see 9.5.4)”) is found in Clause 20 (20.10.2.2.3 – BRP packet header fields). Since the goal of this statement is to define a value in the PPDU header, it can be argued that it belongs in the new PHY clause. At the same time, we should connect this sentence with the BRP Request Field (EDMG BRP Request Element), as done in 11ad.

**Proposed resolution**: Revised

*Change the last paragraph of 30.9.2.2.3 (EDMG BRP packet header fields) as follows*

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~~, if any~~ (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~~, if any~~ (see 9.4.2.255).

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 262 | 30.3.3.3.2.3 | 111 | Table 16 EDMG TRN\_Unit M The definition is ambigous. If the TRN is allowed to change only at the start of la the last M TRN units it means that all M TRN have the sam AWV as N TRNs. M and N are redundant | Delete either EDMG TRN-Unit M or N from all its occurrences in the text |

**Discussion:** M and N correspond to different features of a TRN-Unit and are not equivalent. A total of M/N AWVs may be used/trained in the transmission of a TRN-Unit, where M is the number of TRN subfields in the TRN-Unit used for BF training and N is the number of consecutive TRN subfields used for BF training that are transmitted with the same AWV. Please refer to Figure 102 of D0.3 and to slide 6 of IEEE 802.11-17/0007r1 for illustrations of the TRN field that includes these two parameters.

**Proposed resolution**: Rejected

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| 263 | 30.3.3.3.2.4 | 114 | Table 19 EDMG TRN\_Unit M The definition is ambigous. If the TRN is allowed to change only at the start of la the last M TRN units it means that all M TRN have the sam AWV as N TRNs. M and N are redundant | Delete either EDMG TRN-Unit M or N from all its occurrences in the text |

**Discussion:** Please refer to CID 262.

**Proposed resolution**: Rejected

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 296 | 30.9.2.2.5 | 156.22 | 11ay removed AGC field of 11ad in EDMG BRP packet, which part of EDMG BRP packet will take the function of AGC field in 11ad is not clear , M repetitions or P repetition of a TRN-Unit. How to do when P=0 case. | Add more text to clarify the function of TRN field to implement AGC function. |

**Discussion:** As discussed inIEEE 802.11-17/0007r1, the decision to not include an AGC field in EDMG BRP packets came in part from the fact that various 11ad implementations do not use the AGC field for AGC. Existing 11ad implementations demonstrate that it is possible to set the AGC when processing the TRN field by not using the AGC field.

**Proposed resolution**: Revised

*Add the following note at the end of 30.9.2.2.5*

NOTE – When processing the TRN field of an EDMG BRP packet, the repeated transmission of TRN subfields with the same AWV, which could be obtained by setting the EDMG TRN-Unit P field and/or EDMG TRN-Unit N field in the EDMG-Header-A to values greater than 0, may be used for AGC.

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| 298 | 30.9.2.2.6 | 157.16 | For pairs of Golay complementary sequences, the number is 3. For Goaly sequences ,the number is 6. "6 Golay complentary sequences Gai N and Gbi N " is not proper. | Replace "6 Golay complentary sequences Gai N and Gbi N " by" 3 pairs of Golay complementary sequences ( Gai N , Gbi N )"  or "6 Golay sequences Gai N or Gbi N " |

**Proposed resolution**: Revised

*Replace the first sentence of 30.9.2.2.6 with the following*

The basic TRN subfield for the *i*th spatial stream, TRNibasic, is composed of a pair of Golay complementary sequences, GaiN and GbiN, arranged as TRNibasic = [GaiN, -GbiN, GaiN, GbiN, GaiN, -GbiN], where

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 409 | 30.2.2 | 97.01 | EDMG\_TRN\_LEN values not defined in value column. | define possible values for parameter |

**Discussion:** The maximum number of TRN-Units hasn’t been discussed by the group yet. In the resolution below, I assumed it to be equal to the maximum value possible to be represented in the EDMG-Header-A (8 bits). Given that a TRN-Unit may be as short as one TRN subfield, it makes sense to keep the maximum number of TRN-Units to be the maximum allowable in the EDMG-Header-A. Other constraints that may impose a lower limit to the maximum number of TRN-Units (for example, depending on the configuration of the TRN-Unit) could be defined.

**Proposed resolution**: Revised

*Add the following as value for EDMG\_TRN\_LEN*

Indicates the number of TRN-Units in the training field. Values are in the range 0–255 (see 30.9.2.2.5).

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 410 | 30.2.2 | 97.01 | RX\_TRN\_PER\_TX\_TRN values not defined in value column. | define possible values for parameter |

**Proposed resolution**: Revised

*Add the following entry to Table 7 (TXVECTOR and RXVECTOR parameters)*

| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| --- | --- | --- | --- | --- |
| EDMG\_PACKET\_TYPE | FORMAT is EDMG | Enumerated Type:  — EDMG-TRN-R-PACKET indicates either a packet whose data field is followed by one or more TRN subfields, all of which are transmitted with the same AWV, or a packet that is requesting TRN subfields to be appended to a future response packet, all of which will be transmitted with the same AWV.  — EDMG-TRN-T-PACKET indicates a packet whose data field is followed by one or more TRN subfields. The transmitter may change the AWV used in the transmission of each of the last M TRN subfields in each TRN-Unit present in the TRN field.  — EDMG-TRN-R/T-PACKET indicates a packet whose data field is followed by one or more TRN subfields. The transmitter sends a number of consecutive TRN-Units in which the same AWV is used in the transmission of the last M TRN subfields of each TRN-Unit.  This parameter is reserved if EDMG\_TRN\_LEN is 0. | Y | Y |

*Add the following as value for RX\_TRN\_PER\_TX\_TRN*

Indicates the number of consecutive TRN-Units in which the same AWV is used in the transmission of the last M TRN subfields of each TRN-Unit. Values are in the range 0–255.

The parameter is valid only when the EDMG\_PACKET\_TYPE is TRN-R/T-PACKET and EDMG\_TRN\_LEN is greater than 0.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 411 | 30.2.2 | 97.01 | EDMG\_TRN\_P values not defined in value column. | define possible values for parameter |

**Proposed resolution**: Revised

*Add the following as value for EDMG\_TRN\_P*

Indicates the number of TRN subfields at the beginning of a TRN-Unit which are transmitted with the same AWV. Values are in the range 0 to 3.

The parameter is reserved if TRN-LEN is 0. The parameter is reserved if EDMG\_PACKET\_TYPE is TRN-R-PACKET.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 412 | 30.2.2 | 97.01 | EDMG\_TRN\_M values not defined in value column. | define possible values for parameter |

**Proposed resolution**: Revised

*Add the following as value for EDMG\_TRN\_M*

If EDMG\_PACKET\_TYPE is TRN-T-PACKET, indicates the number of TRN subfields in a TRN-Unit in which the transmitter may change AWV at the beginning of each TRN subfield transmission. If EDMG\_PACKET\_TYPE is TRN-R/T-PACKET, indicates the number of TRN subfields in a TRN-Unit transmitted with the same AWV following a possible AWV change. Values are in the range 0 to 15.

The parameter is reserved if TRN-LEN is 0. The parameter is reserved if EDMG\_PACKET\_TYPE is TRN-R-PACKET.

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| 413 | 30.2.2 | 97.01 | EDMG\_TRN\_N values not defined in value column. | define possible values for parameter |

**Proposed resolution**: Revised

*Add the following as value for EDMG\_TRN\_N*

Indicates the number of consecutive TRN subfields within the EDMG TRN-Unit M of a TRN-Unit which are transmitted using the same AWV. Values are in the range 0 to 3.

The parameter is valid only when the EDMG\_PACKET\_TYPE is TRN-T-PACKET and EDMG\_TRN\_LEN is greater than 0.

**References:**