IEEE P802.11
Wireless LANs

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| CIDs for LOS Determination 11-18-1894-03-00ay |
| Date: 2018-11-14 |
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Abstract

This document proposes text for CIDs regarding the BF LOS determination.

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| **CID** | **Clause Number(C)** | **Page(C)** | **Line(C)** | **Comment** | **Proposed Change** | **Resolution** |
| 3056 | 10.43.9.7 | 289 | 27 | Please resolve the Editor's Note regarding the "brokeness" of the normative text in the paragraphs included between lines 20 and 26 | Please resolve the Editor's Note regarding the "brokeness" of the normative text in the paragraphs included between lines 20 and 26 | 　Revised as in the proposed text 11-18-0xxx-00-00ay |
| 3057 | 10.43.9.7 | 289 | 34 | Please resolve the Editor's Note regarding the "brokeness" of the normative text in the paragraph included between lines 28 and 33 | Please resolve the Editor's Note regarding the "brokeness" of the normative text in the paragraph included between lines 28 and 33 | 　 |
| 3238 | 10.43.9.7 | 289 | 20 | "To request dual polarization TRN beamforming training" - this text should be joined with the text in lines 12-13 to have a single definition of the initiating PPDU | Move the text and combine the sentences in a sensible manneer (submission may be provided) | 　 |
| 3239 | 10.43.9.7 | 289 | 12 | Add that when the respodner received the packet defined in lines 12-18, it swithces polarity as described in 29.9.2.2.5 | as in comment | 　 |
| 3240 | 10.43.9.7 | 289 | 20 | Add that the PPDU that the respodner sends have the tx vector conditions as the one sent by the initiator (lines 14-18) | as in comment | 　 |
| 3241 | 10.43.9.7 | 289 | 25 | "with the Dual Polarization TRN field in the EDMG BRP Request element." What is this field set to? | add that this field is set to 0 | 　 |
| 3305 | 10.43.9.7 Dual polarization TRN beamforming traini | 289 | 27 | The editors note points out a flaw and the technical/protocol issues need to be corrected. | Correct the potential technical issues and add the subsequent text to correct or clarify. The Editors satisafaction for the correct change/additions would change my "Must Be Satisfied" to a "No". | 　 |
| 3306 | 10.43.9.7 Dual polarization TRN beamforming traini | 289 | 34 | The editors note points out a flaw and the technical/protocol issues need to be corrected. | Correct the potential technical issues and add the subsequent text to correct or clarify. The Editors satisafaction for the correct change/additions would change my "Must Be Satisfied" to a "No". | 　 |
| 3363 | 10.43.9.7 | 289 | 27 | There are Editor Notes stating some issue with the normative behavior described in 10.43.9.7. They need to be clarified before moving to the sponsor ballot. | Please fix broken part of the protocol. | 　 |

### Discussion:

The editor is correct that the text is confusing and needs to be revised.

### Resolution: Revised

### Replace the text:

“An EDMG STA initiates a dual polarization TRN beamforming training by sending a PPDU with the 12 following TXVECTOR parameters setting:

* DUAL POL\_TRAINING set to 1; and
* EDMG\_PACKET\_TYPE set to either EDMG-TRN-T-PACKET or EDMG-TRN-R/T-PACKET; 15 and
* EDMG\_TRN\_LEN set to a value greater than 0; and
* EDMG-TRN-N set to either 1 or 3

To request dual polarization TRN beamforming training, an intiating STA shall transmit a frame to a responding STA that includes an EDMG BRP Request element with the Dual Polarization TRN subfield set to 1 and the L-RX subfield set to a value greater than or equal to 0.

The responding STA responds to this request with an EDMG BRP-TX or EDMG BRP-RX/TX PPDU that includes a BRP frame with DMG Channel Measurement Feedback element and EDMG Channel Measurement Feedback element with the Dual Polarization TRN field in the EDMG BRP Request element. The initiator changes polarization on a TRN subfields basis as described in 29.9.2.2.5.

***Editor Note: this normative behavior does not make sense. This protocol is broken.***

If, in addition to the TXVECTOR parameters specified above in this subclause, the initiator sets the FIRST\_PATH\_TRAINING parameter to 1 and the First Path Training field of the EDMG BRP Request element to 1, the responder shall perform the measurement on the first arrival path and respond with a BRP frame with DMG Channel Measurement Feedback element and EDMG Channel Measurement Feedback element with the Dual Polarization TRN field and First Path Training field in the EDMG BRP Request element set to 1.

***Editor Note: this normative behavior does not make sense. This protocol is broken.***

The initiator may use the taps of the channel measurement feedback and measurements on different polarizations to estimate whether the measured path was a line-of-sight path or not. If the initiator sets the L-RX subfield in the EDMG BRP Request element to a value greater than 0, the responder shall append a TRN field to the PPDU. In the TRN field the responder changes polarization every *N* TRN subfields as described in 29.9.2.2.5 where *N* is the value of the EDMG\_TRN\_N parameter in the TXVECTOR. If the initiator and responder have performed first path beamforming training (see 10.43.9.6) before the initiator initiated this exchange, the responder shall use the first path AWV for transmitting the response PPDU and the TRN field.”

with

### Proposed Text:

“.



Figure xx 1

Dual polarization TRN beamforming shall include at least a setup phase that consists of BRP frame from the initiator and a BRP frame from the responder, which is followed by a TRN training phase and the responder’s channel measurement feedback as shown in Fig xx1.

In the setup phase, to request dual polarization TRN beamforming training, an intiating STA shall transmit a BRP frame to a responding STA that includes an EDMG BRP Request element with the following field setting:

* Dual PolarizationTraining set to 1;
* TXSS-initiator Set to 1; and
* TXSS-Repeat >0

To conclude the setup phase the responder shall repond in a SIFS following the reception of the BRP frame from the initiator, with a frame that contains an EDMG BRP Request element with the following field setting:

* Dual PolarizationTraining set to 1; and
* TXSS-initiator Set to 0;

During the dual polarization transmit training phase the initiator sends PPDUs with TRN fields at switching polarization as described in 29.9.2.2.5, with the following TXVECTOR (Table 43) parameters setting:

* DUAL\_POL\_TRAINING set to 1; and
* EDMG\_PACKET\_TYPE set to either EDMG-TRN-T-PACKET or EDMG-TRN-R/T-PACKET; and
* EDMG\_TRN\_LEN set to a value greater than 0; and
* EDMG\_TRN-Unit N set to either 1 or 3 (for EDMG\_TRN-Unit N=1 two consecutive TRN subfields have alternate polarization e.g. Horizontal Vertical (HV) or VH, and for EDMG\_TRN-Unit N=3 the polarization changes after two consecutive TRN subfields e.g. HHVV or VVHH)

In the TRN training phase, when changing polarizations the initiator shall change the TRN subfileds polarizations with a 90 degrees rotation in the clockwise, e.g. for Horizontal- Vertical the polarization changes from TRN Horizontal polarization direction to Vertical polarization direction via a 90 degrees clockwise rotation. As the responder receives the PPDUs in the dual polarization transmit training phase, it switches polarization while receiving the TRN field as described in 29.9.2.2.5.

In the feedback phase the responder responds with a BRP frame with the Channel Measurement Feedback element and EDMG Channel Measurement Feedback element that includes the Dual Polarization TRN Measurement field.

The initiator may use the received feedback to estimate if the communication is NLOS or LOS.

If, in addition to the TXVECTOR parameters specified above in this subclause for the dual polarization transmit training phase, the initiator sets the FIRST\_PATH\_TRAINING parameter to 1 and the First Path Training field of the EDMG BRP Request element to 1, the responder shall perform the measurement on the first arrival path and respond with a BRP frame with Channel Measurement Feedback element and EDMG Channel Measurement Feedback element with the Dual Polarization TRN field and First Path Training fields in the EDMG BRP Request element set to 1.

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CID 3402

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| --- | --- | --- | --- | --- | --- | --- |
| 3402 | 9.5.7 | 161 | 8 | Dual polarization TRN is not defined in the EDMG BRP field. It also seems short BRP cannot request/receive feedback for channel aggregation | add bits in this field and in 9.5.8 to support these | Revised |

Discussion: There viewer is correct that Dual Polarization TRN is not defined in the EDMG BRP field such signalling is not present and needs to be added. We also note that In the page 123 line 9 says that EDMG BRP Request element when present overrides the EDMG BRP field, however in the page 167 in the definition of the of the BRP frame Action field the EDMG BRP Request element and EDMG BRP field cannot appear together (Table 31 and Table 9-459). The editor was informed about this issue.

Resolution: Revised

Proposed Text:

*Replace at page 161 line 7*



With:

B58 B60 B61 B62 B64 B65 B66 B71 B72 B79 B80 B81 B82 B87

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TXSS- PACKETS | Short SSW Packet Used | TXSS- REPEAT | TXSS- MIMO | BRP CDOWN | TX Antenna Mask | First Path Training | Dual Polarization TRN | Reserved |

Bits 3 1 3 1 6 8 1 1 6

*Replace at page 161 lines 13-16:*

“The L-RX, TX Sector ID, L-TX-RX, Requested EDMG TRN-Unit P, Requested EDMG TRN-Unit M, Requested EDMG TRN-Unit N, BRP-TXSS, TXSS-INITIATOR, TXSS-PACKETS, TXSS-REPEAT, TXSS-MIMO, BRP CDOWN, TX Antenna Mask and First Path Training subfields are defined in subclause 9.4.2.255.”

With

“The L-RX, TX Sector ID, L-TX-RX, Requested EDMG TRN-Unit P, Requested EDMG TRN-Unit M, Requested EDMG TRN-Unit N, BRP-TXSS, TXSS-INITIATOR, TXSS-PACKETS, TXSS-REPEAT, TXSS-MIMO, BRP CDOWN, TX Antenna Mask, First Path Training and Dual Polarization TRN subfields are defined in subclause 9.4.2.255.”

Instruct the Editor in page 123 line 9 replace: “when present overrides the EDMG BRP field ”with when present overrides the BRP Request field”

CID 3527

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| 3527 | 9.4.2.2.53 | 234 | 2 | Dual polarization TRN Measurement is missing description in the text | Place description of Dual Polarization TRN Measurement in the text | Reject |

Discussion:

The Dual Polarization TRN Measurement filed is described in the 9.4.2.253 EDMG Channel Measurement Feedback element section page 117 lines 30-36.

Resolution: Reject

CID 3711

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| --- | --- | --- | --- | --- | --- | --- |
| 3711 | 29.9.2.2.5 | 534 | 28 | When the transmitter changes the antenna polarization at the end of each group of N/2 TRN fields, unmanaged interference is created. Imagine two BSS operating at two different polarizations and in SISO mode. If in one of these BSSs a dual polarization field is sent the other BSS suffers interference without prior notice | One way to mitigate interference would be to allow dual polarization TRN only as part of a MIMO transmission. | Reject |

Discussion:

The situation described is unlikely to appear in the real world, and it is not different than any possible interference during the TRN field transmission.

Resolution: Reject