IEEE P802.22  
Wireless RANs

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| TGb LB1 CID 225/226 Comment Resolution Implementation | | | | |
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|  |  |  |  |  |

Abstract

Implementation of resolution for Comment ID 225 & 226, as listed in the TGb Letter Ballot 1 comment database, DCN: 22-13/158r0 (or latest revision). The proposed resolution is outlined in DCN: 22-14/5r1.

R0: Initial version of this contribution, concerning implementation of a resolution for CID 225 and 226.

R1: Second version of this contribution. Additional text provided to address CID 221.

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**Introduction**

This document describes the implementation to the resolution of CID 225/226 in the TGb LB1 ballot. The agreed upon resolution is documented in DCN 22-14/5r1. Further discussion and review of the intial version of this contribution, also developed additional text that address the resolution of CID 221. The comment database is located in DCN: 22-13/158r0 (or latest revision) and is listed as follows:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 221 | Ranga Reddy | Self | 7 | 7.7.2.1.1 | 1 | 40 | 24 | TR | We have 13 unused/reserved DIUCs reserved in the base standard, is there any way to make use of them to specify the newer coding methods, FEC rates, and constellations. We also have an extended DIUC that was specified to handle this flexibility in specifying flexiblity for future capability |
| 225 | Ranga Reddy | Self | 7 | 7.7.2.2 | 1 | 44 | 40 | T | Why is a new AZ DS-MAP IE defined (see Table G1). How is different than the DS-MAP IE as defined in 7.7.2.1 of IEEE Std. 802.22-2011 |
| 226 | Ranga Reddy | Self | 7 | 7.7.2.4 | 1 | 45 | 44 | T | Why is a new DRZ DS-MAP IE defined (see Table I1). How is different than the DS-MAP IE as defined in 7.7.2.1 of IEEE Std. 802.22-2011 |

**Proposed Resolution**

The proposed resolution to this comment is discussed in 22-14/5r1. Proposed modifications entail mostly editorial changes to make sure the new IEs that are handled by Advanced CPEs, or only processed through the DS as Extended DIUC IEs, and through the US as Extended UIUC IEs.

**Proposed Text Modifcations to draft**

***Modify Table 26 in base standard as follows***

Table 26 – DS-MAP information elements

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Decription** |
| DS-MAP IE () { |  |  |
| DIUC | 6 bits | 7.7.2.1.1 |
| If (DIUC == 12) |  |  |
| Extended DIUC value | 6 bits | 7.7.2.1.1.1 |
| If(DIUC == 62) |  |  |
| ~~Extended DIUC Dependent IE~~ DS-MAP Extended DIUC IE | Variable |  |
| Else { |  |  |
| SID | 9 bits | Station ID of CPE or multicast group |
| } |  |  |
| Length | 12 bits | Number of OFDM slots linearly allocated to the DS burst specified by this IE. |
| Boosting | 3 bits | 111: +9dB  110: +6dB  101: +3dB  100: 0dB, normal (not boosted)  011: -3dB  010: -6dB  001: -9dB  000: -12dB |
| } |  |  |

***Modify Table 27 in the base standard as follows***

Table 27 - DIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| DIUC | Usage | | |
| 0 - 11~~12~~ | Reserved | | |
| 12 | Extended DIUC value | | |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| 62 | DS-MAP Extended DIUC IE | | |
| 63 | End of MAP |  |  |

***Add a new section after 7.7.2.1.1, 7.7.2.1.1 “Extended DIUC allocations”***

7.7.2.1.1.1 Extended DIUC allocations

Table xx – Extended DIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| **Extended DIUC** | **Usage** | | |
| 0 | Convolutional Code | FEC rate = 1/2 | 256-QAM |
| 1 | Convolutional Code | FEC rate = 2/3 | 256-QAM |
| 2 | Convolutional Code | FEC rate = 3/4 | 256-QAM |
| 3 | Convolutional Code | FEC rate = 5/6 | 256-QAM |
| 4 | Convolutional Code | FEC rate = 7/8 | 256-QAM |
| 5 | Convolutional Code | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 6 | Convolutional Code | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 7 | CTC | FEC rate = 1/2 | 256-QAM |
| 8 | CTC | FEC rate = 2/3 | 256-QAM |
| 9 | CTC | FEC rate = 3/4 | 256-QAM |
| 10 | CTC | FEC rate = 5/6 | 256-QAM |
| 11 | CTC | FEC rate = 7/8 | 256-QAM |
| 12 | CTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 13 | CTC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 14 | LDPC | FEC rate = 1/2 | 256-QAM |
| 15 | LDPC | FEC rate = 2/3 | 256-QAM |
| 16 | LDPC | FEC rate = 3/4 | 256-QAM |
| 17 | LDPC | FEC rate = 5/6 | 256-QAM |
| 18 | LDPC | FEC rate = 7/8 | 256-QAM |
| 19 | LDPC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 20 | LDPC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 21 | SBTC | FEC rate = 1/2 | 256-QAM |
| 22 | SBTC | FEC rate = 2/3 | 256-QAM |
| 23 | SBTC | FEC rate = 3/4 | 256-QAM |
| 24 | SBTC | FEC rate = 5/6 | 256-QAM |
| 25 | SBTC | FEC rate = 7/8 | 256-QAM |
| 26 | SBTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 27 |  | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 28 - 63 | reserved | | |

***Remove the new entrys added to Table 27 in the draft starting line 27/pg 40 to line 47/pg 41***

***Modify Table 28 in section 7.7.2.1.2 “DS-MAP Extended DIUC IE” of the draft as follows***

**Table 28 – DS-MAP Extended DIUC IE general format**

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| ~~DS\_Extended\_IE()~~ DS-MAP Extended DIUC IE(){ |  |  |
| Extended DIUC IE Type | 8 bits | Type of Extended DIUC IE as specifed in Table 28a. |
| ~~Extended DIUC~~ | ~~6 bits~~ |  |
| Length | 8 bits | Length of IE data in ~~bits~~bytes |
| Unspecified Data | Variable |  |
| } |  |  |

***Modify Table 28a in draft as follows***

|  |  |
| --- | --- |
| **Extended DIUC IE Type** | **Usage** |
| 0x00 | DS-MAP Dummy Extended IE |
| 0x01 | DS Multi-Zone Configuration IE |
| 0x02 | AZDS-MAP IE |
| 0x03 | CRZDS-MAP IE |
| 0x04 | DRZDS-MAP IE |
| 0x05 | DRZDS-MAP GRA IE |
| 0x06-0xFF | Reserved |

***Modify Table 29 “DS-MAP Dummy Extended IE format” in the base standard as follows. We need to allow the dummy IE to be able to use the DIUCs in Table 27 and the new Extended DIUC in 7.7.2.1.1.1***

**Table 29 – DS-MAP Dummy Extended IE format**

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| DS\_Dummy \_IE(){ |  |  |
| ~~Extended~~ DIUC | 6 bits | ~~0x00DIUC values as defined~~ |
| If(DIUC==12) |  |  |
| Extended DIUC Value | 6 bits | See 7.7.2.1.1.1 |
| Length | 8 bits | Length of IE data in ~~bits~~bytes |
| Unspecified Data | Variable |  |
| } |  |  |

***Include text of section 7.7.2.1.2.2 “DS Multi-Zone Configuration IE” after Table 29. Remove the “Type” and “Length” fields of Table F1, as they are redundant with “Extended DIUC Type” and “Length” as handled in the updated version of Table 28***

***Change # of section 7.7.2.2, titled “Access Relay Zone DS-MAP IE (AZDS-MAP IE)” to 7.7.2.1.2.3 and move the text to be after section 7.7.2.1.2.2. Remove “Type” field from Table G1, as it’s rendundant with specification of “Extended DIUC Type” as handled in the updated version of Table 28***

***Change # of section 7.7.2.3, titled “Centralized Zone DS-MAP IE (CRZDS-MAP IE)” to 7.7.2.1.2.4 and move the text to be after section 7.7.2.1.2.3. Remove “Type” field from Table H1, as it’s rendundant with specification of “Extended DIUC Type” as handled in the updated version of Table 28***

***Change # of section 7.7.2.4, titled “Distributed Relay Zone DS-MAP IE (DRZDS-MAP IE)” to 7.7.2.1.2.5 and move the text to be after section 7.7.2.1.2.4. Remove “Type” field from Table I1, as it’s rendundant with specification of “Extended DIUC Type” as handled in the updated version of Table 28***

***Change # & title of section 7.7.2.5 “DRZDS-MAP GRA IE” to 7.7.2.1.2.6 “Distributed Relay Zone DS-MAP Group Resource Allocation (DRZDS-MAP GRA IE) and move the text to be after section 7.7.2.1.2.5.***

***Modify Table 36 in the base standard as follows***

Table 36 - UIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| UIUC | Usage | | |
|  |  | | |
| 10 - 11~~12~~ | Reserved | | |
| 12 | Extended UIUC value | | |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| 62 | US-MAP Extended UIUC IE | | |
| 63 | End of MAP |  |  |

***Add a new section after 7.7.4.1.1, 7.7.4.1.1.1 “Extended UIUC allocations”***

7.7.4.1.1.1 Extended UIUC allocations

Table xx – Extended UIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| **Extended UIUC** | **Usage** | | |
| 0 | Convolutional Code | FEC rate = 1/2 | 256-QAM |
| 1 | Convolutional Code | FEC rate = 2/3 | 256-QAM |
| 2 | Convolutional Code | FEC rate = 3/4 | 256-QAM |
| 3 | Convolutional Code | FEC rate = 5/6 | 256-QAM |
| 4 | Convolutional Code | FEC rate = 7/8 | 256-QAM |
| 5 | Convolutional Code | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 6 | Convolutional Code | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 7 | CTC | FEC rate = 1/2 | 256-QAM |
| 8 | CTC | FEC rate = 2/3 | 256-QAM |
| 9 | CTC | FEC rate = 3/4 | 256-QAM |
| 10 | CTC | FEC rate = 5/6 | 256-QAM |
| 11 | CTC | FEC rate = 7/8 | 256-QAM |
| 12 | CTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 13 | CTC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 14 | LDPC | FEC rate = 1/2 | 256-QAM |
| 15 | LDPC | FEC rate = 2/3 | 256-QAM |
| 16 | LDPC | FEC rate = 3/4 | 256-QAM |
| 17 | LDPC | FEC rate = 5/6 | 256-QAM |
| 18 | LDPC | FEC rate = 7/8 | 256-QAM |
| 19 | LDPC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 20 | LDPC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 21 | SBTC | FEC rate = 1/2 | 256-QAM |
| 22 | SBTC | FEC rate = 2/3 | 256-QAM |
| 23 | SBTC | FEC rate = 3/4 | 256-QAM |
| 24 | SBTC | FEC rate = 5/6 | 256-QAM |
| 25 | SBTC | FEC rate = 7/8 | 256-QAM |
| 26 | SBTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 27 |  | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 28 - 63 | reserved | | |

***Remove the new entrys added to Table 36 in the draft starting line 23/pg 53 to line 47/pg 54***

***Add the following two rows after row 4 in Table 35***

|  |  |  |
| --- | --- | --- |
| If (UIUC == 12) |  |  |
| Extended UIUC value | 6 bits | 7.7.4.1.1.1 |

***Modify rows 25 and 26 in Table 35 as follows***

|  |  |  |
| --- | --- | --- |
| } else if (UIUC == 62) |  |  |
| ~~US Extended IE ()~~  US-MAP Extended UIUC IE | Variable | 7.7.4.1.1.4 |

***Modify Table 39 in section 7.7.4.1.4 “US-MAP Extended UIUC IE” of the draft as follows***

**Table 39 – US-MAP ~~e~~Extended UIUC IE general format**

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| ~~US\_Extended\_IE()~~US-MAP Extended DIUC IE(){ |  |  |
| Extended UIUC IE Type | 8 bits | Type of Extended UIUC IE as specifed in Table 39a. |
| ~~Extended UIUC~~ | ~~6 bits~~ |  |
| Length | 8 bits | Length of IE data in ~~bits~~bytes |
| Unspecified Data | Variable |  |
| } |  |  |

***Modify Table 39a in draft as follows***

|  |  |
| --- | --- |
| **Extended UIUC IEType** | **Usage** |
| 0x00 | US-MAP Dummy Extended IE |
| 0x01 | US Multi-Zone Configuration IE |
| 0x02 | AZUS-MAP IE |
| 0x03 | CRZUS-MAP IE |
| 0x04 | DRZUS-MAP IE |
| 0x05 | DRZUS-MAP GRA IE |
| 0x06-0xFF | Reserved |

***Modify Table 40 “US-MAP Dummy Extended IE format” in the base standard as follows. We need to allow the dummy IE to be able to use the UIUCs in Table 36 and the new Extended UIUC in 7.7.2.4.1.1***

**Table 40 – US-MAP Dummy Extended IE format**

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| US\_Dummy \_IE(){ |  |  |
| ~~Extended~~ UIUC | 6 bits | ~~0x00~~UIUC values as defined in Table 36 |
| If(UIUC==12) |  |  |
| Extended UIUC Value | 6 bits | See 7.7.4.1.1.1 |
| Length | 8 bits | Length of IE data in ~~bits~~bytes |
| Unspecified Data | Variable |  |
| } |  |  |

***Include text of section 7.7.4.1.4.2 “US Multi-Zone Configuration IE” from the draft after Table 40. Remove the “Type” and “Length” fields of Table K1, as they are redundant with “Extended UIUC Type” and “Length” as handled in the updated version of Table 39***

***Change # of section 7.7.4.2, titled “Access Relay Zone US-MAP IE (AZUS-MAP IE)” to 7.7.4.1.4.3 and move the text to be after section 7.7.4.1.4.2.***

***Change # of section 7.7.4.3, titled “Centralized Zone US-MAP IE (CRZUS-MAP IE)” to 7.7.4.1.4.4 and move the text to be after section 7.7.4.1.4.3.***

***Change # of section 7.7.4.4, titled “Distributed Relay Zone US-MAP IE (DRZUS-MAP IE)” to 7.7.4.1.4.5 and move the text to be after section 7.7.4.1.4.4.***

***Change # & title of section 7.7.4.5 “DRZUS-MAP GRA IE” to 7.7.4.1.4.6 “Distributed Relay Zone D=US-MAP Group Resource Allocation (DRZUS-MAP GRA IE) and move the text to be after section 7.7.4.1.4.5.***

**References:**

[1] IEEE P802.22b WRAN Amendment: Enhancement for broadband services and monitoring applications Draft 1.0 WG Letter Ballot Template, DCN 22-13/158r2, <https://mentor.ieee.org/802.22/dcn/13/22-13-0158-02-000b-802-22b-letter-ballot-1-comment-database.xls>

[2] Comment Resolution related to MAC Frame (CID 225, 225), DCN 22-14/5r1, <https://mentor.ieee.org/802.22/dcn/14/22-14-0005-00-000b-comment-resolution-cid225-226.pptx>