IEEE P802.22  
Wireless RANs

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| Proposed Text for MAC Text for the IEEE 802.22b | | | | |
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Abstract

This document contains the proposed text for MAC text for the IEEE 802.22b.

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* + 1. Downstream Channel Descriptor (DCD)

The format of a DCD message is shown in 328HTable 20. This message shall be transmitted by the BS at a periodic interval (329HTable 273) to define the characteristics of a downstream physical channel.

1. — DCD message format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| DCD\_Message\_Format() { |  |  |
| Management Message Type = 0 | 8 bits |  |
| Configuration Change Count | 8 bits | Incremented by one (modulo 256) by the BS whenever any of the values of this channel descriptor change. If the value of this count in a subsequent DCD remains the same, the CPE can quickly decide that the remaining fields have not changed and may be able to disregard the remainder of the message. This value is also referenced from the DS-MAP messages (see 330HTable 25). |
| DCD Channel Information Elements (IEs) | *Variable in integer number of bytes* | 331HTable 21 |
| Begin PHY Specific Section { |  |  |
| Number of downstream burst profiles: n | 7 bits | Number of burst profiles described in the current DCD message. Its maximum size corresponds to the maximum number of DIUC burst profiles contained in 332HTable 27. |
| *Reserved* | *1 bit* | *The bit shall be set to zero.* |
| for (i = 1; i ≤ n; i++) { |  | “n” is defined as the “Number of downstream burst profiles” to be described in the current DCD message. |
| Downstream\_Burst\_Profile | *Variable* | PHY specific (333HTable 23) |
| } |  |  |
| } |  |  |
| } |  |  |

* + - 1. DCD Channel Information Elements

(no change)

* + - 1. Downstream Burst Profile

1. — Downstream burst profile format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| Downstream\_Burst\_Profile\_Format() { |  |  |
| Type = 1 | 8 bits |  |
| Length | 8 bits |  |
| DIUC | 7 bits | 339H7.7.2.1.1 |
| *Reserved* | *1 bit* | *The bit shall be set to zero* |
| Information Elements (IEs) | *Variable* | 340HTable 24 |
| } |  |  |

1. — Downstream burst profile Information elements

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Element ID**  **(1 byte)** | **Length**  **(bytes)** | **Description** |
| DIUC mandatory exit threshold | 151 | 1 | -64 dB (encoded 0x00) to +63.5 dB (encoded 0xFF)  CINR at or below which this DIUC can no longer be used and where change to a more robust DIUC is required (in 0.5 dB units). |
| DIUC minimum entry threshold | 152 | 1 | –64 dB (encoded 0x00) to +63.5 dB (encoded 0xFF)  The minimum CINR required to start using this DIUC when changing from a more robust DIUC is required (in 0.5 dB units) |

* + 1. Downstream Map (DS-MAP)

(no change)

* + - 1. DS-MAP IE

The format of the DS-MAP IE is shown in 343HTable 26.

1. — DS-MAP information elements

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Description** |
| DS-MAP\_IE() { |  |  |
| DIUC | 7 bits | 344H7.7.2.1.1 |
| If (DIUC == 62) |  |  |
| Extended DIUC Dependent IE | *Variable* | 345H7.7.2.1.2 |
| 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: +9 dB  110: +6 dB  101: +3 dB  100: 0 dB, normal (not boosted)  011: -3 dB  010: -6 dB  001: -9 dB  000: -12 dB |
| } |  |  |
| } |  |  |

* + - * 1. DIUC Allocations

346HTable 27 illustrates the various DIUC values used in the MAC.

1. — DIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| **DIUC** | **Usage** | | |
| 0-12  91-126 | *Reserved* | | |
| 13 | Uncoded | NA | BPSK |
| 14 | Convolutional Code | FEC rate = 1/2 | QPSK |
| 15 | Convolutional Code | FEC rate = 2/3 | QPSK |
| 16 | Convolutional Code | FEC rate = 3/4 | QPSK |
| 17 | Convolutional Code | FEC rate = 5/6 | QPSK |
| 18 | Convolutional Code | FEC rate = 1/2 | 16-QAM |
| 19 | Convolutional Code | FEC rate = 2/3 | 16-QAM |
| 20 | Convolutional Code | FEC rate = 3/4 | 16-QAM |
| 21 | Convolutional Code | FEC rate = 5/6 | 16-QAM |
| 22 | Convolutional Code | FEC rate = 1/2 | 64-QAM |
| 23 | Convolutional Code | FEC rate = 2/3 | 64-QAM |
| 24 | Convolutional Code | FEC rate = 3/4 | 64-QAM |
| 25 | Convolutional Code | FEC rate = 5/6 | 64-QAM |
| 26 | CTC | FEC rate = 1/2 | QPSK |
| 27 | CTC | FEC rate = 2/3 | QPSK |
| 28 | CTC | FEC rate = 3/4 | QPSK |
| 29 | CTC | FEC rate = 5/6 | QPSK |
| 30 | CTC | FEC rate = 1/2 | 16-QAM |
| 31 | CTC | FEC rate = 2/3 | 16-QAM |
| 32 | CTC | FEC rate = 3/4 | 16-QAM |
| 33 | CTC | FEC rate = 5/6 | 16-QAM |
| 34 | CTC | FEC rate = 1/2 | 64-QAM |
| 35 | CTC | FEC rate = 2/3 | 64-QAM |
| 36 | CTC | FEC rate = 3/4 | 64-QAM |
| 37 | CTC | FEC rate = 5/6 | 64-QAM |
| 38 | LDPC | FEC rate = 1/2 | QPSK |
| 39 | LDPC | FEC rate = 2/3 | QPSK |
| 40 | LDPC | FEC rate = 3/4 | QPSK |
| 41 | LDPC | FEC rate = 5/6 | QPSK |
| 42 | LDPC | FEC rate = 1/2 | 16-QAM |
| 43 | LDPC | FEC rate = 2/3 | 16-QAM |
| 44 | LDPC | FEC rate = 3/4 | 16-QAM |
| 45 | LDPC | FEC rate = 5/6 | 16-QAM |
| 46 | LDPC | FEC rate = 1/2 | 64-QAM |
| 47 | LDPC | FEC rate = 2/3 | 64-QAM |
| 48 | LDPC | FEC rate = 3/4 | 64-QAM |
| 49 | LDPC | FEC rate = 5/6 | 64-QAM |
| 50 | SBTC | FEC rate = 1/2 | QPSK |
| 51 | SBTC | FEC rate = 2/3 | QPSK |
| 52 | SBTC | FEC rate = 3/4 | QPSK |
| 53 | SBTC | FEC rate = 5/6 | QPSK |
| 54 | SBTC | FEC rate = 1/2 | 16-QAM |
| 55 | SBTC | FEC rate = 2/3 | 16-QAM |
| 56 | SBTC | FEC rate = 3/4 | 16-QAM |
| 57 | SBTC | FEC rate = 5/6 | 16-QAM |
| 58 | SBTC | FEC rate = 1/2 | 64-QAM |
| 59 | SBTC | FEC rate = 2/3 | 64-QAM |
| 60 | SBTC | FEC rate = 3/4 | 64-QAM |
| 61 | SBTC | FEC rate = 5/6 | 64-QAM |
| 62 | Extended DIUC | | |
| 63 | Convolutional Code | FEC rate = 1/2 | 256-QAM |
| 64 | Convolutional Code | FEC rate = 2/3 | 256-QAM |
| 65 | Convolutional Code | FEC rate = 3/4 | 256-QAM |
| 66 | Convolutional Code | FEC rate = 5/6 | 256-QAM |
| 67 | Convolutional Code | FEC rate = 7/8 | 256-QAM |
| 68 | Convolutional Code | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 69 | Convolutional Code | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 70 | CTC | FEC rate = 1/2 | 256-QAM |
| 71 | CTC | FEC rate = 2/3 | 256-QAM |
| 72 | CTC | FEC rate = 3/4 | 256-QAM |
| 73 | CTC | FEC rate = 5/6 | 256-QAM |
| 74 | CTC | FEC rate = 7/8 | 256-QAM |
| 75 | CTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 76 | CTC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 77 | LDPC | FEC rate = 1/2 | 256-QAM |
| 78 | LDPC | FEC rate = 2/3 | 256-QAM |
| 79 | LDPC | FEC rate = 3/4 | 256-QAM |
| 80 | LDPC | FEC rate = 5/6 | 256-QAM |
| 81 | LDPC | FEC rate = 7/8 | 256-QAM |
| 82 | LDPC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 83 | LDPC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 84 | SBTC | FEC rate = 1/2 | 256-QAM |
| 85 | SBTC | FEC rate = 2/3 | 256-QAM |
| 86 | SBTC | FEC rate = 3/4 | 256-QAM |
| 87 | SBTC | FEC rate = 5/6 | 256-QAM |
| 88 | SBTC | FEC rate = 7/8 | 256-QAM |
| 89 | SBTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 90 |  | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 127 | End of Map | | |
|  |  | | |

* + - * 1. DS-MAP Extended DIUC IE

A DS-MAP IE entry with a DIUC value of 62 indicates that the IE carries special information and conforms to the structure shown in 347HTable 28. A CPE shall ignore an extended IE entry with an extended DIUC value for which the CPE has no knowledge. In the case of a known extended DIUC value but with a length field longer than expected, the CPE shall process information up to the known length and ignore the remainder of the IE.

1. — DS-MAP extended IE general format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| DS\_Extended\_IE() { |  |  |
| Extended DIUC | 7 bits |  |
| Length | 8 bits | Length of this IE in bits. |
| Unspecified Data | *Variable* |  |
| } |  |  |

DS-MAP Dummy Extended IE

A CPE shall be able to decode the DS-MAP Dummy Extended IE. A BS shall not transmit this IE (unless under test). A CPE may skip decoding downlink bursts scheduled after the start time of this IE within the current frame.

1. — DS-MAP Dummy Extended IE format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| Dummy\_IE() { |  |  |
| Extended DIUC | 7 bits | 0x00 |
| Length | 8 bits | Length of this IE in bits. |
| Unspecified Data | *Variable* |  |
| } |  |  |

* + 1. Upstream Channel Descriptor (UCD)

The format of a UCD message is shown in 348HTable 30. This message shall be transmitted by the BS at a periodic interval (349HTable 272) to define the characteristics of an upstream physical channel.

1. — UCD message format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| UCD\_Message\_Format() { |  |  |
| Management Message Type = 2 | 8 bits |  |
| Configuration Change Count | 8 bits | Incremented by one (modulo 256) by the BS whenever any of the values of this channel descriptor change. If the value of this count in a subsequent UCD remains the same, the CPE can quickly decide that the remaining fields have not changed and may be able to disregard the remainder of the message. This value is also referenced from the US-MAP messages (see 350HTable 34). |
| BW Request Backoff Start | 4 bits | Initial backoff window size in units of BW Request opportunity (see 351HTable 31) used by CPEs to contend to send BW requests to the BS, expressed as a power of 2. Values of *n* range 0–15.  Refer in the note to section 6.16 on Contention Resolution.  Include a sub-section that will describe the size and the content of the BW Request US burst and refer to it in the note. |
| BW Request Backoff End | 4 bits | Final backoff window size in units of BW Request opportunity (see Table 39) to contend to send BW requests to the BS, expressed as a power of 2. Values of *n* range 0–15. All declared opportunities for BW request in subsequent frames are concatenated in this potentially large number. |
| UCS Notification Backoff Start | 4 bits | Initial backoff window size in units of UCS Notification opportunity (see 352HTable 31) used by CPEs to contend to send UCS notifications to the BS. This is expressed as a power of 2. Values of *n* range 0–15. |
| UCS Notification Backoff End | 4 bits | Final backoff window size in units of UCS Notification opportunity (see 353HTable 31) used by CPEs to contend to send UCS notifications to the BS. This is expressed as a power of 2. Values of *n* range 0–15. All declared opportunities for UCS Notifications in subsequent frames are concatenated in this potentially large number. |
| Information Elements (IEs) for the overall channel | *Variable* | See 354H7.7.3.1. |
| Begin PHY Specific Section { |  |  |
| Number of upstream burst profiles: n | 7 bits | Number of upstream burst profiles described in the current UCD message. Its maximum size corresponds to the maximum number of UIUC burst profiles contained in 355HTable 36. |
| for (i = 1; i ≤ n; i++) { |  | n = number of upstream burst profiles |
| Upstream\_Burst\_Profile | *Variable* | PHY specific (356HTable 32) |
| } |  |  |
| } |  |  |
| } |  |  |

* + - 1. UCD Channel IEs

(no change)

* + - 1. Upstream Burst Profile

The format of the upstream burst profile is shown in 361HTable 32, and the information elements contained in the upstream burst profiles are defined in 362HTable 33.

1. — Upstream burst profile format

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Syntax** | | **Size** | | **Notes** | |
| Upstream\_Burst\_Profile\_Format() { | |  | |  | |
| Type = 1 | | 8 bits | |  | |
| Length | | 8 bits | |  | |
| UIUC | | 7 bits | | 363HTable 36 | |
| *Reserved* | | *1 bits* | | *All bits shall be set to zero.* | |
| Information Elements (IEs) | | *Variable* | | 364HTable 33 | |
| } | |  | |  | |

1. — Upstream burst profile information elements

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Element ID**  **(1 byte)** | **Length**  **(bytes)** | **Description** |
| Ranging data ratio | 151 | 1 | Reduction factor, in units of 0.5 dB, between the EIRP per subcarrier used for this burst and the EIRP per subcarrier that should be used for CDMA Ranging. |
| Normalized CNR override | 152 | 7 | The first byte shall represent a signed integer which specifies, in dB, the first normalized CNR value in 365HTable 228 (i.e., normalized CNR value corresponding to the CDMA code).  Bytes 2-7: represent a list of numbers, where each number is encoded by one nibble, and is interpreted as a signed integer. The number encoded by each nibble represents the difference, in dB, in normalized CNR relative to the previous line in 366HTable 228. Thus the left most nibble of the second byte corresponds to the difference between the normalized CNR value for QPSK, rate: 1/2, and the normalized CNR value for the CDMA code. |

* + 1. Upstream Map (US-MAP)

(no change)

* + - 1. US-MAP IE

The SID field carried by the US-MAP IE is associated with a unicast address. When specifically addressed to allocate a bandwidth grant, the FID shall be the Basic FID of the CPE. A UIUC shall be used to define the type of upstream access and the upstream burst profile associated with that access. An Upstream\_Burst\_Profile shall be included in the UCD for each UIUC to be used in the US-MAP. The beginning of the upstream subframe is clearly defined by the allocation start time which corresponds to the number of symbols from the first preamble symbol of the current frame (e.g., superframe preamble or frame preamble) plus the width of the TTG (see 370HFigure 12). The end of the upstream subframe is defined either by the SCH in the case of the scheduling of an intra-frame quiet period or by the US-MAP when a SCW is scheduled at the end of the frame by the presence of UIUC’s 0 or 1 in the US-MAP.

The US-MAP IE is shown in 371HTable 35, and is used to define the upstream bandwidth allocations. The first US-MAP IE shall start at the lowest numbered sub-channel on the first non-allocated symbol defined by the allocation start time field of the US-MAP message. These IEs shall represent the number of OFDM slots provided for the allocation. Each allocation IE shall start immediately following the previous allocation and shall advance in the time domain. If the end of the US subframe has been reached, the allocation shall continue on the next sub-channel at the first symbol (defined by the allocation start time field). The US subframe can also be defined in terms of columns as described in 372H7.3.2. A Burst Descriptor shall be specified in the UCD for each UIUC to be used in the US-MAP.

The SID field in this message can also refer to a group of CPEs, e.g., a multicast group. In this case, only UIUC = 0 or 1 shall be allowed to enable configuration of that group of CPEs to use an SCW (see 373H7.17.3 and 374H7.20.1.2).

1. — US-MAP information elements

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Description** |
| US-MAP\_IE() { |  |  |
| SID | 9 bits | Station ID of the CPE. |
| UIUC | 7 bits | 375H7.7.4.1.1 (See 376HTable 36) |
| If ((UIUC ≥ 0) && (UIUC ≤ 1)) { |  |  |
| CBP Frame Number | 4 bits | Frame number where the active or passive CBP action is to take place. If the identified frame falls in the next superframe (e.g., current frame is 9 and the CBP Frame Number is 4), the CPE shall make sure that a SCW is still scheduled for this frame as indicated by the upcoming SCH. If not, the CBP action shall be cancelled. |
| If(UIUC==0) { |  | Active SCW mode (CPE to transmit a CBP burst as requested by the BS.) |
| Timing advance | 16 bits | Signed number in TU corresponding to the advance of the transmission of the CBP burst at the CPE. As the CPE starts to transmit the CBP burst as its fourth symbol before the end of the frame, zero advance corresponds to this signal being received by the BS at the beginning of its fourth symbol before the end of the frame when the CPE is co-located with the BS (see 377HTable 44).. |
| EIRP Density Level | 8 bits | EIRP per transmitted subcarrier (see 378H9.9.4.2). Signed in units of 0.5 dB, ranging from -104 dBm (encoded 0x00) to +23.5 dBm (encoded 0xFF). |
| } |  |  |
| If(UIUC==1) { |  | Passive SCW mode (CPE to receive and demodulate the CBP burst and send content to the BS.) |
| Channel Number | 8 bits | Channel number in which the CPE shall listen to the medium for a coexistence beacon |
| Synchronization mode | 1 bit | = 0 The CPE will capture the CBP burst using its current synchronization (i.e., locked to its BS) for geolocation purposes.  = 1 The CPE will re-synchronize on the received CBP burst using the preamble symbol and optionally pilot carriers to decode the payload for self-coexistence purposes. |
| } else if (UIUC ≥2) && (UIUC ≤ 3) ) { |  |  |
| Number of Sub-channels | 4 bits | Number of sub-channels reserved for the BW Request/UCS Notification opportunistic window. |
| } else if (UIUC ≥4) && (UIUC ≤ 6) ) { |  |  |
| Number of Sub-channels | 4 bits | Number of sub-channels reserved for the CDMA Ranging/BW Request/UCS Notification opportunistic window. Note that in case where UIUC=8 and any UIUC in the range 4 to 6 are allocated to a frame, the largest number of sub-channel specified shall prevail. Note also that when the CDMA ranging burst is to be used for terrestrially-based geolocation (see 379H10.5.2), the number of sub-channels shall be at least 6. |
| Number of symbols | 5 bits | Number of symbols in the US ranging channel reserved for the opportunistic windows carrying either CDMA Periodic Ranging/BW Request/UCS Notification as specified by the respective UIUC. These shall be placed in the ranging channel following the initial ranging window if scheduled and consecutively (see 380HFigure 157). |
| } else if (UIUC == 7) { |  |  |
| CDMA\_ Allocation\_IE () | 20 bits | See 381H7.7.4.1.2. |
| } else if (UIUC == 8) { |  | The first 5 symbols of the upstream subframe shall be reserved for the opportunistic initial ranging burst. |
| Number of Sub-channels | 4 bits | Number of sub-channels reserved for the initial ranging burst. Note that in case where UIUC=8 and any UIUC in the range 4 to 6 are allocated to a frame, the largest number of claimed sub-channels specified shall prevail. |
| } else if (UIUC == 9) { |  | US-MAP EIRP Control IE |
| US-MAP EIRP Control IE | *Variable* | See 382H7.7.4.1.3. |
| } else if (UIUC == 62) { |  |  |
| US\_Extended\_IE() | *Variable* | See 383H7.7.4.1.4. |
| } else { |  |  |
| Burst\_Type | 1 bit | This value specifies the burst type for the burst specified by this US-MAP IE.  0: Bursts are mapped in the time axis over the full width of the upstream subframe before incrementing in the frequency axis;  1: Bursts are mapped in the time axis over segments of 7 symbols before incrementing in the frequency axis and then re-tracing to the lowest unused sub-channel in the next 7 symbol segment. The width of the last segment is to be between 7 and 13 symbols depending on the width of the upstream subframe |
| Duration | 12 bits | Number of OFDM slots linearly allocated to the US burst specified by this IE. (Up to 60 by 30 slots can be allocated to a US burst.) |
| MDP | 1 bit | Measurement Data Preferred  Used by the BS to indicate to the CPE that this upstream allocation is to be preferably used by the CPE for the specific purpose of reporting back any measurement data. The measurement data to be reported is in connection to the specified Transaction ID.  In case the CPE does not have anything to report, it can use this allocation for any other data. This is useful, for example, after a quiet period.  0: Measurement data not required (default)  1: Measurement data preferred |
| MRT | 1 bit | Measurement Report Type  In case MDP == 1, this field indicates which type of report the BS wants the CPE to send back.  0: Detailed (see 384H0 through 385H0)  1: Consolidated (see 386H0) |
| CMRP | 1 bit | Channel Management Response Preferred  Used by the BS to indicate to the CPE that this upstream allocation is to be used for confirming or not the receipt of the channel management command with the Transaction ID specified.  0: Channel management response not required (default)  1: Channel management response required |
| } |  |  |
| } |  |  |

* + - * 1. UIUC Allocations

387HTable 36 specifies the UIUC incorporated into the MAC. In particular, the self-coexistence UIUCs (in both modes) have the same applicability to their DIUC counterpart (see 388H7.7.2.1.1).

1. — UIUC values

|  |  |  |  |
| --- | --- | --- | --- |
| **UIUC** | **Usage** | | |
| 0 | Self-Coexistence (Active Mode) | | |
| 1 | Self-Coexistence (Passive Mode) | | |
| 2 | UCS Notification | | |
| 3 | BW Request | | |
| 4 | CDMA UCS Notification | | |
| 5 | CDMA BW Request | | |
| 6 | CDMA Periodic Ranging | | |
| 7 | CDMA Allocation IE (see 389HTable 37) | | |
| 8 | CDMA Initial Ranging | | |
| 9 | US-MAP EIRP Control IE | | |
| 10~12  91~126 | *Reserved* | | |
| 13 | Uncoded | NA | BPSK |
| 14 | Convolutional Code | FEC rate = 1/2 | QPSK |
| 15 | Convolutional Code | FEC rate = 2/3 | QPSK |
| 16 | Convolutional Code | FEC rate = 3/4 | QPSK |
| 17 | Convolutional Code | FEC rate = 5/6 | QPSK |
| 18 | Convolutional Code | FEC rate = 1/2 | 16-QAM |
| 19 | Convolutional Code | FEC rate = 2/3 | 16-QAM |
| 20 | Convolutional Code | FEC rate = 3/4 | 16-QAM |
| 21 | Convolutional Code | FEC rate = 5/6 | 16-QAM |
| 22 | Convolutional Code | FEC rate = 1/2 | 64-QAM |
| 23 | Convolutional Code | FEC rate = 2/3 | 64-QAM |
| 24 | Convolutional Code | FEC rate = 3/4 | 64-QAM |
| 25 | Convolutional Code | FEC rate = 5/6 | 64-QAM |
| 26 | CTC | FEC rate = 1/2 | QPSK |
| 27 | CTC | FEC rate = 2/3 | QPSK |
| 28 | CTC | FEC rate = 3/4 | QPSK |
| 29 | CTC | FEC rate = 5/6 | QPSK |
| 30 | CTC | FEC rate = 1/2 | 16-QAM |
| 31 | CTC | FEC rate = 2/3 | 16-QAM |
| 32 | CTC | FEC rate = 3/4 | 16-QAM |
| 33 | CTC | FEC rate = 5/6 | 16-QAM |
| 34 | CTC | FEC rate = 1/2 | 64-QAM |
| 35 | CTC | FEC rate = 2/3 | 64-QAM |
| 36 | CTC | FEC rate = 3/4 | 64-QAM |
| 37 | CTC | FEC rate = 5/6 | 64-QAM |
| 38 | LDPC | FEC rate = 1/2 | QPSK |
| 39 | LDPC | FEC rate = 2/3 | QPSK |
| 40 | LDPC | FEC rate = 3/4 | QPSK |
| 41 | LDPC | FEC rate = 5/6 | QPSK |
| 42 | LDPC | FEC rate = 1/2 | 16-QAM |
| 43 | LDPC | FEC rate = 2/3 | 16-QAM |
| 44 | LDPC | FEC rate = 3/4 | 16-QAM |
| 45 | LDPC | FEC rate = 5/6 | 16-QAM |
| 46 | LDPC | FEC rate = 1/2 | 64-QAM |
| 47 | LDPC | FEC rate = 2/3 | 64-QAM |
| 48 | LDPC | FEC rate = 3/4 | 64-QAM |
| 49 | LDPC | FEC rate = 5/6 | 64-QAM |
| 50 | SBTC | FEC rate = 1/2 | QPSK |
| 51 | SBTC | FEC rate = 2/3 | QPSK |
| 52 | SBTC | FEC rate = 3/4 | QPSK |
| 53 | SBTC | FEC rate = 5/6 | QPSK |
| 54 | SBTC | FEC rate = 1/2 | 16-QAM |
| 55 | SBTC | FEC rate = 2/3 | 16-QAM |
| 56 | SBTC | FEC rate = 3/4 | 16-QAM |
| 57 | SBTC | FEC rate = 5/6 | 16-QAM |
| 58 | SBTC | FEC rate = 1/2 | 64-QAM |
| 59 | SBTC | FEC rate = 2/3 | 64-QAM |
| 60 | SBTC | FEC rate = 3/4 | 64-QAM |
| 61 | SBTC | FEC rate = 5/6 | 64-QAM |
| 62 | Extended UIUC | | |
| 63 | Convolutional Code | FEC rate = 1/2 | 256-QAM |
| 64 | Convolutional Code | FEC rate = 2/3 | 256-QAM |
| 65 | Convolutional Code | FEC rate = 3/4 | 256-QAM |
| 66 | Convolutional Code | FEC rate = 5/6 | 256-QAM |
| 67 | Convolutional Code | FEC rate = 7/8 | 256-QAM |
| 68 | Convolutional Code | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 69 | Convolutional Code | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 70 | CTC | FEC rate = 1/2 | 256-QAM |
| 71 | CTC | FEC rate = 2/3 | 256-QAM |
| 72 | CTC | FEC rate = 3/4 | 256-QAM |
| 73 | CTC | FEC rate = 5/6 | 256-QAM |
| 74 | CTC | FEC rate = 7/8 | 256-QAM |
| 75 | CTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 76 | CTC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 77 | LDPC | FEC rate = 1/2 | 256-QAM |
| 78 | LDPC | FEC rate = 2/3 | 256-QAM |
| 79 | LDPC | FEC rate = 3/4 | 256-QAM |
| 80 | LDPC | FEC rate = 5/6 | 256-QAM |
| 81 | LDPC | FEC rate = 7/8 | 256-QAM |
| 82 | LDPC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 83 | LDPC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 84 | SBTC | FEC rate = 1/2 | 256-QAM |
| 85 | SBTC | FEC rate = 2/3 | 256-QAM |
| 86 | SBTC | FEC rate = 3/4 | 256-QAM |
| 87 | SBTC | FEC rate = 5/6 | 256-QAM |
| 88 | SBTC | FEC rate = 7/8 | 256-QAM |
| 89 | SBTC | FEC rate = 10/11 for 2\*2 D symbol | 4D-48TCM |
| 90 | SBTC | FEC rate = 14/15 for 2\*2 D symbol | 4D-192TCM |
| 127 | End of Map | | |

* + - * 1. CDMA Allocation IE

This IE is used by the BS with UIUC= 7 to assign a US bandwidth allocation to a CPE that signaled its wish to either associate through the Initial Ranging CDMA burst, to signal the presence of an incumbent by the CDMA UCS Notification or to request a BW allocation through the CDMA BW Request burst.

1. — CDMA allocation IE format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| CDMA\_Allocation\_IE() { |  |  |
| Code | 8 bits | Indicates the Code sent by the CPE. |
| Duration | 5 bits | Indicates the duration, in OFDMA slots, of the allocation. [Not necessarily on the same sub-channel.] |
| UIUC | 7bits | UIUC to be used by the CPE for this allocation (see 390HTable 36). |
| Usage | 1 bit | If (Code = Incumbent) This field indicates whether the CPE shall transmit only the MAC header with the notification.  1: yes; 0: no |
| } |  |  |

* + - * 1. US-MAP EIRP Control IE

When an EIRP change for the CPE is needed, this UIUC= 9 is used as shown in 391HTable 38. The EIRP control value is an 8-bit signed integer expressing the EIRP per subcarrier (in 0.5 dB units) that the CPE should apply instead of its current transmission EIRP (see 392H9.9.4.2). The current FID used with this IE shall be the Basic FID of the CPE. The EIRP accuracy shall be ± 1.5 dB when the level is at least 10 dB below the maximum regulatory power limit and ±0.5 dB elsewhere.

1. — US-MAP EIRP control IE format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| EIRP\_Control\_IE() { |  |  |
| UIUC | 7 bits | 0x09 |
| EIRP Control | 8 bits | Signed integer that indicates the EIRP per subcarrier that the CPE should apply to correct its current transmission EIRP. Signed in units of 0.5 dB, ranging from -104 dBm (encoded 0x00) to +23.5 dBm (encoded 0xFF). |
| } |  |  |

* + - * 1. US-MAP Extended UIUC IE

A US-MAP IE entry with a UIUC value of 62 indicates that the IE carries special information and conforms to the structure shown in 393HTable 39. A BS/CPE shall ignore an extended IE entry with an extended UIUC value for which it has no knowledge. In the case of a known extended UIUC value but with a length field longer than expected, it shall process information up to the known length and ignore the remainder of the IE.

1. — US-MAP extended IE general format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| US\_Extended\_IE() { |  |  |
| Extended UIUC | 7bits | Values specific to the Extended IE |
| Length | 8 bits | Length of this IE in bits. |
| Unspecified Data | *Variable* |  |
| } |  |  |

US-MAP Dummy Extended IE

A CPE shall be able to decode the US-MAP Dummy Extended IE. A BS shall not transmit this IE (unless under test). The Length field of 394HTable 40 specifies the size of the Unspecified Data Field.

1. — US-MAP Dummy Extended IE format

|  |  |  |
| --- | --- | --- |
| **Syntax** | **Size** | **Notes** |
| Dummy\_IE() { |  |  |
| Extended UIUC | 7 bits | 0x00 |
| Length | 8 bits | Length of this IE in bits. |
| Unspecified Data | *Variable* |  |
| } |  |  |