IEEE P802.11
Wireless LANs

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| --- |
| Resolution Text for EBCS TIM Related Comments |
| Date: 2022-01-20 |
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|  |  |  |  |  |

Abstract

This document describes the resolutions related to the EBCS TIM element.

**The baseline is D2.1.**

# Suggested resolution

### 9.3.3.2 Beacon frame format

***Modify Table 9-32 at P42L8 as follows:* [2264, 2007, 2266]**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| [ANA] | EBCS Parameters element | This element is present if dot11EBCSSupportActivated is true, otherwise not present. |
| [ANA] | EBCS TIM | The EBCS TIM element is present if ~~dot11EBCSContentList is larger than 0~~ dot11EBCSSupportActivated is true, dot11EBCSTIMInBeacon is true and one or more EBCS Data frames for an EBCS traffic stream of which dot11EBCSTrafficStreamBuffered is true are buffered; otherwise not present. |

### 9.4.2.297 EBCS TIM element

***Modify the paragraph at P47L6 as follows:* [2065, 2018]**

The EBCS DTIM Period field indicates the number of beacon intervals ~~or short beacon intervals~~ between successive EBCS DTIMs. If all EBCS TIMs are EBCS DTIMs, the EBCS DTIM Period field has the value 1. The EBCS DTIM Period value 0 is reserved. The EBCS DTIM Period field is set to dot11EBCSDTIMPeriod.

***Replace Figure 9-788eg at P47L19 as follows:* [2081]**

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 ~~B3~~ B5 | ~~B4~~ B6 B7 |
|  | Bitmap Mode | Bitmap Offset | Reserved |
| Bits: | 1 | ~~3~~ 5 | ~~4~~ 2 |

Figure 9-788eg---Content ID Bitmap Control field format

***Modify the paragraphs starting at P47L28 as follows:***

The EBCS traffic indication virtual bitmap, maintained by the AP ~~or the mesh STA~~ [2019] that generates an EBCS TIM, consists of 256 bits, and is organized into ~~8~~ 32 [2081] octets such that bit number *N* (0 ≤ *N* ≤ 255) in the bitmap corresponds to bit number *N* mod 8 in octet number ~~[~~*~~N~~*~~/8]~~ $\left⌊N/8\right⌋$ [2020] where the low order bit of each octet is bit number 0, and the high order bit is bit number 7. A bit value 1 means the corresponding EBCS traffic stream is buffered at the AP.

If the Bitmap Mode subfield value is 0, the Bitmap Offset subfield is set to 0 and the Content ID Bitmap field contains the Content ID (see 11.55.2.2 (EBCS DL operation at an EBCS AP)) of the EBCS traffic stream buffered at the AP in each octet. [2066, 2067, 2021, 2267]

If the Bitmap Mode subfield value is 1, the Bitmap Offset subfield is set to the starting octet number of the

Content ID Bitmap field. If a bit is not included in the Content ID Bitmap field, the corresponding EBCS

traffic stream is not buffered at the AP.

~~If no EBCS traffic streams are buffered at the AP, the Bitmap Mode field is set to 1 and the length of the Content ID Bitmap field is 0.~~ [2068, 2266]

### 9.6.7.54 EBCS Info frame format

***Replace Figure 9-909am at P64L1 as follows:* [TXTiming]**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category | Public Action | EBCS Info Sequence Number | EBCS Info Timestamp | EBCS Info Control | EBCS Info Authentication Algorithm | EBCS Info Interval |
| Octets: | 1 | 1 | 4 | 8 | 1 | 1 | 1 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | EBCS TIM Length | EBCS TIM | Fragment Hash Values | Certificate Length | Certificate | Content Information Number | Content Information List | Certificate |
| Octets: | 0 or 1 | variable | *n* x 32 | 0 or 2 | variable | 1 | variable | variable |

Figure 9-909am---EBCS Info frame Action field format

***Replace Figure 9-909an at P64L16 as follows:* [TXTiming]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B2 | B3 B5 | B6 | ~~B6~~ B7 |
|  | Number Of Fragments | Fragment Index | EBCS TIM Present | Reserved |
| Bits: | 3 | 3 | 1 | ~~2~~1 |

Figure 9-909an---EBCS Info Control field format

***Insert the following paragraph at P64L32:* [TXTiming]**

The EBCS TIM Present subfield is set to 1 if the EBCS TIM Length field and the EBCS TIM field are present and is set to 0 otherwise.

***Insert the following paragraph at P65L8:* [TXTiming]**

The EBCS TIM Length field indicates the length of the EBCS TIM field.

The EBCS TIM field contains an EBCS TIM element (9.4.2.297 EBCS TIM element) excluding the Element ID field, the Length field and the Element ID Extension field.

***Replace Figure 9-909ap at P65L1 as follows:* [TXTiming]**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 | ~~B5~~B6 B7 |
|  | Time Of Termination Present | Next Tx Schedule Present | Service URL Present | Vendor Specific Data Present | Content With Restriction | Buffered Traffic | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | ~~3~~2 |

Figure 9-909ap---Content Information Control subfield format

***Insert the following paragraph at P66L48:* [TXTiming]**

The Buffered Traffic subfield is set to 1 if the frames for the traffic are buffered at the AP and use the EBCS TIM field in the EBCS Info frame or the EBCS TIM element in the Beacon frame to signal whether the frames are buffered or not. This field is set to 0 otherwise.

### 11.55.2.2 EBCS DL operation at an EBCS AP

***Modify the paragraph at P79L22 as follows:* [TXTiming]**

An EBCS AP shall advertise its EBCS capabilities in the EBCS Support field in the Extended Capabilities element in Beacon frames and Probe Response frames. An EBCS AP that has EBCS DL enabled shall transmit EBCS Info frames periodically in the interval that is specified by dot11EBCSInfoInterval, at the transmission rate that is specified by dot11EBCSInfoTxRate. An EBCS AP shall advertise the timing of the next EBCS Info frame transmission in the EBCS Info Frame TX Countdown field in the EBCS Parameters element and shall not signal the EBCS Info frame in the TIM element (see 9.4.2.5 (TIM element)) in Beacon frames and Probe Response frames. The EBCS Info frame shall be transmitted among the set of group addressed frames transmitted immediately after the Beacon frame identified by the EBCS Parameters element. Details of EBCS Info frame generation are described in 11.55.2.4 (EBCS Info frame generation and usage).

***Replace the paragraph at P79L61 as follows:* [TXTiming]**

~~An EBCS AP shall signal buffered EBCS Data frames via the EBCS TIM element (see Figure 9.4.2.297 (EBCS TIM element)) instead of the TIM element.~~

When dot11EBCSTrafficStreamBuffered for an EBCS traffic stream is true, an EBCS AP shall buffer the EBCS Data frames ~~that contain the~~ for that EBCS traffic stream and shall signal buffered EBCS Data frames via the EBCS TIM element (see 9.4.2.297 (EBCS TIM element)) instead of the TIM element (see 9.4.2.5 (TIM element)). The EBCS AP shall transmit the buffered EBCS Data frames in the EBCS DTIM period specified by the EBCS TIM element. The EBCS AP shall set the More Data subfield in the Frame Control field in the EBCS Data frame to 1 if more EBCS Data frames of the same EBCS traffic stream are ~~scheduled for transmission in the same period~~ buffered at the AP, otherwise the More Data subfield shall be set to 0.

When dot11EBCSTrafficStreamBuffered for an EBCS traffic stream is false, an EBCS AP shall not buffered the EBCS Data frames and shall transmit the EBCS Data frames that contain the EBCS traffic stream as soon as possible and shall not signal via the EBCS TIM element or the TIM element. ~~The EBCS AP shall set the More Data subfield in the Frame Control field in the EBCS Data frame to 0.~~

An EBCS AP shall transmit the EBCS TIM element in Beacons if dot11EBCSTIMInBeacon is true, otherwise in EBCS Info frames.

### C.3 MIB detail

***Insert the following instruction and line at P103L13:* [TXTiming]**

***Add the following entry to the end of the “dot11smt”:***

 -- dot11EBCSTrafficStreamTable ::= { dot11smt <ANA> }

***Remove the following line at P103L19:* [TXTiming]**

 ~~dot11EBCSContentList TruthValue,~~

***Insert the following line at P103L29:* [TXTiming]**

 dot11EBCSRelayingServiceSupported TruthValue,

 dot11EBCSTIMInBeacon TruthValue

}

***Remove the dot11EBCSContentList at P103L47:* [TXTiming]**

~~dot11EBCSContentList OBJECT-TYPE~~

~~SYNTAX OCTET STRING~~

~~MAX-ACCESS read-write~~

~~STATUS current~~

~~DESCRIPTION~~

~~“This is a control variable.~~

~~It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation. This attribute specifies the EBCS traffic streams. This list contains zero or more Enhanced Broadcast Servises Tuple fields as described in 9.4.5.30 (Enhanced Broadcast Service ANQP-element).”~~

~~::= { dot11StationConfigEntry <ANA+10> }~~

***Insert the following element at P105L52:* [TXTiming]**

dot11EBCSTIMInBeacon OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates the EBCS TIM element is included in the Beacon frame instead of in the EBCS Info frame.”

::= { dot11StationConfigEntry <ANA+11> }

***Insert the following instruction and table at P105L52:* [TXTiming]**

***Insert the following table after “dot11WURStationConfig TABLE” section:***

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* dot11EBCSTrafficStreamTable TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

dot11EBCSTrafficStreamTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot11EBCSTrafficStreamEntry

MAX-ACCESS read-write

STATUS current

DESCRIPTION

“This table of attributes is a set of all of the EBCS traffic stream information.”

::= { dot11smt <ANA> }

dot11EBCSTrafficStreamEntry OBJECT-TYPE

SYNTAX Dot11EBCSTrafficStreamEntry

MAX-ACCESS read-write

STATUS current

DESCRIPTION

“An entry in the dot11EBCSTrafficStreamTable.

 ::= {dot11EBCSTrafficStreamTable 1 }

Dot11EBCSTrafficStreamEntry ::=

SEQUENCE {

dot11EBCSTrafficStreamID Unsigned32,

dot11EBCSTrafficStreamAuthenticationAlgorithm INTEGER,

dot11EBCSTrafficStreamAddressType INTEGER,

dot11EBCSTrafficStreamAddress OCTET STRING,

dot11EBCSTrafficStreamTitle OCTET STRING,

dot11EBCSTrafficStreamPHYType Unsigned32,

dot11EBCSTrafficStreamTXRate OCTET STRING,

dot11EBCSTrafficStreamNegotiationMethod INTEGER,

dot11EBCSTrafficStreamNextTXSchedule Unsigned32,

dot11EBCSTrafficStreamTimeToTermination Unsigned32,

dot11EBCSTrafficStreamBuffered TruthValue

 }

dot11EBCSTrafficStreamID OBJECT-TYPE

 SYNTAX Unsigned32 (0..255)

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable is used to identify the EBCS traffic stream.”

 ::= { dot11EBCSTrafficStreamEntry 1 }

dot11EBCSTrafficStreamAuthenticationAlgorithm OBJECT-TYPE

 SYNTAX INTEGER {

 HLSA(0),

 PKFA(1),

 HCFAWithoutInstantAuthentication(2),

 HCFAWithInstantAuthentication(3)

 }

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the authentication algorithm of the EBCS traffic stream. The following values can be used here.

Value = 0: HLSA

Value = 1: PKFA

Value = 2: HCFA without instant authentication

Value = 3: HCFA with instant authentication”

 ::= { dot11EBCSTrafficStreamEntry 2 }

dot11EBCSTrafficStreamAddressType OBJECT-TYPE

 SYNTAX INTEGER {

UDPIPv4(0),

UDPIPv6(1),

MACAddress(2)

 }

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the address type of the dot11EBCSTrafficStreamAddress. The following values can be used here.

Value = 0: UDP/IPv4

Value = 1: UDP/IPv6

Value = 2: MAC address”

 ::= { dot11EBCSTrafficStreamEntry 3 }

dot11EBCSTrafficStreamAddress OBJECT-TYPE

 SYNTAX OCTET STRING (SIZE(10..34))

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the source and destination address of the EBCS traffic stream encoded in the Content Address subfield format in 9.4.5.30 (EBCS ANQP-element).”

 ::= { dot11EBCSTrafficStreamEntry 4 }

dot11EBCSTrafficStreamTitle OBJECT-TYPE

 SYNTAX OCTET STRING (SIZE(0..255))

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the human readable title of the EBCS traffic stream encoded in UTF-8.”

 ::= { dot11EBCSTrafficStreamEntry 5 }

dot11EBCSTrafficStreamPHYType OBJECT-TYPE

 SYNTAX Unsigned32 (0..255)

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the transmission PHY type of the EBCS Data frames of the EBCS traffic stream encoded in the PHY Type subfield value in Table 9-340d (PHY Type subfield). A value of 255 indicates the PHY type is same as the PHY type of the EBCS Info frame.”

 ::= { dot11EBCSTrafficStreamEntry 6 }

dot11EBCSTrafficStreamTXRate OBJECT-TYPE

 SYNTAX OCTET STRING (SIZE(1..3))

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the transmission rate of the EBCS Data frames of the EBCS traffic stream encoded as in the TX Rate subfield format in 9.4.5.30 (EBCS ANQP-element).”

 ::= { dot11EBCSTrafficStreamEntry 7 }

dot11EBCSTrafficStreamNegotiationMethod OBJECT-TYPE

 SYNTAX OCTET STRING (SIZE(1))

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the negotiation method of the EBCS traffic stream encoded as in Table 9-340a (Negotiation Method subfield encoding).”

 ::= { dot11EBCSTrafficStreamEntry 8 }

dot11EBCSTrafficStreamNextTXSchedule OBJECT-TYPE

 SYNTAX Unsigned32 (0..65535)

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the next transmission timing of the EBCS traffic stream in unit of TBTT. A value of 0 indicates that this transmission occurs in the beacon interval that starts at the next TBTT. A value of 1 indicates that it occurs in the beacon interval that follows that beacon interval. A value of 65535 indicates that there is no specific transmission starting time.”

 ::= { dot11EBCSTrafficStreamEntry 9 }

dot11EBCSTrafficStreamTimeToTermination OBJECT-TYPE

 SYNTAX Unsigned32 (0..65535)

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable specifies the transmission termination timing of the EBCS traffic stream in unit of TBTT. A value of 0 indicates that this transmission occurs in the beacon interval that starts at the next TBTT. A value of 1 indicates that it occurs in the beacon interval that follows that beacon interval. A value of 65535 indicates that there is no specific transmission termination time.”

 ::= { dot11EBCSTrafficStreamEntry 10 }

dot11EBCSTrafficStreamBuffered OBJECT-TYPE

 SYNTAX TruthValue

 MAX-ACCESS read-write

 STATUS current

 DESCRIPTION

“This is a control variable.

It is written by an external entity or the SME. Changes take effect as soon as practical in the implementation.

This variable, when true, the EBCS traffic stream is buffered and transmitted in EBCS DTIM period.”

 ::= { dot11EBCSTrafficStreamEntry 11 }

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* End of dot11EBCSTrafficStreamTable TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

***Remove the following line at P105L61:* [TXTiming]**

 ~~dot11EBCSContentList,~~

***Insert the following line at P106L6:* [TXTiming]**

 dot11EBCSRelayingServiceSupported,

 dot11EBCSTIMInBeacon

 }