IEEE P802.11
Wireless LANs

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| --- |
| Resolution Text for EBCS TIM Related Comments |
| Date: 2022-02-15 |
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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 BUs for an EBCS traffic stream for which dot11EBCSTrafficStreamBuffered is true are buffered; otherwise not present. |

### 9.4.2.297 EBCS TIM element

***Modify Figure 9-788ef at P46L54 as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | EBCS DTIM Count | EBCS DTIM Period | Content ID Bitomap Contorl | Content ID Bitmap |
| Octets: | 1 | 1 | 1 | 1 | 1 | 1 | ~~0~~1-32 |

Figure 9-788ef---EBCS TIM element format

***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.

***Modify 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 EBCS 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.~~

~~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 and the Content ID Bitmap field contains a portion of the EBCS traffic indication virtual bitmap starting from that octet number. If a bit is not included in the Content ID Bitmap field, the corresponding EBCS traffic stream is not buffered at the AP.~~

The format of the Content ID Bitmap field is identified by the Bitmap Mode subfield.

If the Bitmap Mode subfield is 0, the Content ID Bitmap field consists of octets numbered $N1$ to $N2$ of the EBCS traffic indication virtual bitmap, where $N1$ is the largest integer such that each of the bits 0 to $(N1×8-1)$ is equal to 0. If such a value does not exist, $N1=0$. Additionally, $N2$ is the smallest integer such that each of the bits $(N2+1)×8$ to 255 is equal to 0. If such a value does not exist, that is, when not all bits in the last octet of the EBCS traffic indication virtual bitmap are equal to 0, $N2=31$. The Bitmap Offset subfield contains $N1$, and the Length field is $N2-N1+4$. [2067, 2021, 2267]

If the Bitmap Mode subfield is 1, the Bitmap Offset subfield is set to 0 and the Content ID Bitmap field contains a set of octets indicating the content IDs of EBCS traffic streams buffered at the AP. [2066, 2267]

~~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:* [2222, 2128, 2038]**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 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:* [2222, 2128, 2038]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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:* [2222, 2128, 2038]**

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:* [2222, 2128, 2038]**

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:* [2222, 2128, 2038]**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 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 | Bufferable 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:* [2222, 2128, 2038]**

The Bufferable Traffic subfield is set to 1 if frames for the EBCS traffic stream are bufferable at the AP. This subfield is set to 0 otherwise.

### 11.55.2.2 EBCS DL operation at an EBCS AP

***Modify the paragraphs starting at P79L14 as follows:* [2222, 2128, 2038]**

EBCS DL operation is enabled in an EBCS AP if the length of the ~~dot11EBCSContentList~~ dot11EBCSTrafficStreamTable is greater than 0. The EBCS traffic streams to be transmitted are specified in ~~dot11EBCSContentList~~ dot11EBCSTrafficStreamTable. The EBCS traffic streams are handled differently than other traffic. An EBCS content ID shall be assigned by the EBCS traffic stream mapper located at the portal to identify each different traffic stream of content. The EBCS traffic stream mapper shall be configured according to the EBCS content list. Each content ID shall be unique to the AP certificate.

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).

In the MAC, MSDUs with a non-null EBCS content ID in the MA-UNITDATA.request shall bypass IEEE 802.1X filtering. The EBCS filter affiliated with the AP (see Figure 5-1 (MAC data plane architecture)) that is configured according to the ~~dot11EBCSContentList~~ dot11EBCSTrafficStreamTable shall filter the MSDU by the destination address and the EBCS content ID in the MA-UNITDATA.request. If the EBCS content ID is not null, and the destination address and the EBCS content ID are specified in the ~~dot11EBCSContentList~~ dot11EBCSTrafficStreamTable, the EBCS filter shall pass the MSDU. If the EBCS content ID is not null, and the destination address or the EBCS content ID is not specified in the ~~dot11EBCSContentList~~ dot11EBCSTrafficStreamTable, the EBCS filter shall discard the MSDU. If the EBCS content ID is null, the EBCS filter shall pass the MSDU as non-EBCS traffic. An MSDU with a non-null EBCS content ID shall have one of the following three frame authentication mechanisms.

***Modify the paragraphs starting at P79L57 as follows:* [2222, 2128, 2038]**

An EBCS AP generates a PHY-TXSTART.request primitive with the transmission rate information specified

by ~~the dot11EBCSContentList~~ dot11EBCSTrafficStreamPHYType and dot11EBCSTrafficStreamTxRate for each MPDU according to the EBCS ~~content~~ traffic stream ID. If dot11EBCSTrafficStreamPHYType is equal to 255, the AP may select a transmission rate following the rules specified in 10.6.5.4 (Rate selection for other group addressed Data and Management frames).

***Replace the paragraph at P79L61 as follows:* [2222, 2128, 2038]**

~~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 dot11EBCSTrafficStreamBufferable for an EBCS traffic stream is true, an EBCS AP shall buffer the EBCS Data frames for that EBCS traffic stream and shall signal buffered EBCS Data frames via the EBCS TIM field or the EBCS TIM element (see 9.4.2.297 (EBCS TIM element)) instead of the TIM element. An EBCS AP shall select the Bitmap Mode value in the EBCS TIM element results in a smaller size of the Content ID Bitmap field. 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 dot11EBCSTrafficStreamBufferable for an EBCS traffic stream is false, an EBCS AP shall not buffer 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

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:* [2222, 2128, 2038]**

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

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

***Remove the following line at P103L19:* [2222, 2128, 2038]**

 ~~dot11EBCSContentList TruthValue,~~

***Insert the following line at P103L29:* [2222, 2128, 2038]**

 dot11EBCSRelayingServiceSupported TruthValue,

 dot11EBCSTIMInBeacon TruthValue

}

***Remove the dot11EBCSContentList at P103L47:* [2222, 2128, 2038]**

~~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:* [2222, 2128, 2038]**

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:* [2222, 2128, 2038]**

***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,

dot11EBCSTrafficStreamBufferable 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 not specified.”

 ::= { 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 }

dot11EBCSTrafficStreamBufferable 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:* [2222, 2128, 2038]**

 ~~dot11EBCSContentList,~~

***Insert the following line at P106L6:* [2222, 2128, 2038]**

 dot11EBCSRelayingServiceSupported,

 dot11EBCSTIMInBeacon

 }

***Replace “content ID” and “EBCS content ID” with “EBCS traffic stream ID” globally.* [2222, 2128, 2038]**