IEEE P802.11  
Wireless LANs

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| CID 2217 Proposed Comment Resolution related to an EBCS addressing scheme | | | | |
| Date: 2022-02-08 | | | | |
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Abstract

This submission proposes a resolution to TGbc CID 2217 related to Draft P802.11bc D2.0.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| 2217 | 9.3.2.1.4 | 23.39 | Given that EBCS frames are available to STAs beyond the BSS and may be transmitted by multiple APs, they should be addressed independently of the BSS. | Provide an L2 addressing scheme that will allow EBCS traffic to be differentiated from WLAN BSS traffic. Consider the proposal in https://mentor.ieee.org/802.11/dcn/21/11-21-1540-00-00bc-topology-and-address-mapping.pptx. .The commenter is willing to collaborate to create a submission to address this comment. | Revised:  Suggested changes are provided in document <https://mentor.ieee.org/802.11/dcn/22/11-22-00xx-00-00bc-cid-2217-addressing-scheme.docx> under Proposed Resolution for CID 2217. |

***Discussion***

The proposal documented in <https://mentor.ieee.org/802.11/dcn/21/11-21-1540-01-00bc-topology-and-address-mapping.pptx> was reviewed by the TG and the changes described under “Proposed Resolution” implement the changes in the TGbc draft. Alternative 7 was the addressing scheme in the agreed approach (with terminology used in this contribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Direction** | **A1 (RA)** | **A2 (TA)** | **A3 (DA)** | **ToDS** | **FromDS** |
| UL | BC/MC | STA | EBCS | 0 | 0 |
| DL | EBCS | TA=BSSID | BC/MC (MCAST assigned by content server) | 0 | 0 |

Requirements:

* Downlink:
  + The RA is set to the EBCS address
  + The EBCS Address: 01-0F-AC-00-00-zz, where zz is derived based on the content ID.
  + The DA is set to the multicast address for the stream.
  + ToDS is set to 0 and FromDS is set to 1.
* Uplink:
  + The RA is set to the multicast address for the stream.
  + The DA is set to the EBCS address with xx-yy-zz set to a value to be associated with the uplink transmission
  + ToDS is set to 0 and FromDS is set to 0.

What is the address for an EBCS info frame. We could use:

A1 = BC

A2 = BSSID

A3 = EBCS = 01-0F-AC-00-00-00 (or use a base address and identify streams by the content ID)

***Proposed Resolution based on D2.1***

***TGbc Editor: Please add the following subclause with the shown changes to the TGbc draft:***

**3.2 Definitions specific to IEEE Std 802.11**

***Insert the following definitions maintaining alphabetical order:***

**enhanced broadcast services (EBCS):** A service that enables the relaying of uplink broadcast traffic to a specified destination and enhances downlink broadcast traffic. It additionally provides means for protecting broadcast traffic, protecting the privacy of the stations receiving that traffic, and verifying the authenticity of the origin of the traffic.

**EBCS Data frame:** A Data frame used to carry data for an EBCS downlink traffic stream.

**EBCS downlink (DL) content server:** An entity reachable via the DS that is a source of an EBCS DL traffic stream

**EBCS Info MAC address:** The MAC address used in the header for an EBCS Info frame. See 11.55.1a

**EBCS Content MAC address:** The MAC address used in the header for EBCS DL or EBCS UL frames. See 11.55.1a.

**EBCS receiver:** A station (STA) that performs EBCS reception.

**EBCS service period:** A period of time during which an enhanced broadcast services (EBCS) access point (AP) intends to conduct EBCS transmissions associated with a content identifier (ID).

**EBCS transmitter:** A station (STA) that performs EBCS transmission.

* (PV0) Management frames
* Format of (PV0) Management frames

The format of a Management frame is defined in Figure 9-120 (Management frame format). The Frame Control, Duration, Address 1, Address 2, Address 3, and Sequence Control fields are present in all management frame subtypes. (#564)The maximum size of an MMPDU that is not carried in a VHT or S1G PPDU is defined in Table 9-34 (Maximum data unit sizes (in octets) and durations (in microseconds)). The presence of the HT Control field is determined by the setting of the +HTC subfield of the Frame Control field (see 9.2.4.1.10 (+HTC subfield). (#564)The maximum size of an MMPDU that is carried in one or more VHT or S1G PPDUs (in whole or in part) is the maximum MPDU size supported by the recipient or, if there is more than one recipient, the smallest of the maximum MPDU sizes supported by the recipients less the shortest Management frame MAC header and FCS.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octets: | 2 | 2 | 6 | 6 | 6 | 2 | 0 or 4 | variable | 4 |
|  | Frame Control | Duration | Address 1 | Address 2 | Address 3 | Sequence Control | HT Control | Frame Body | FCS |
|  | MAC header | | | | | | |  |  |
| * Management frame format | | | | | | | | | |

NOTE 1—In an MMPDU carried in one or more PPDUs, all of which are VHT or S1G PPDUs, the presence of encryption overhead (i.e., the MMPDU is transmitted in protected robust Management frames) or an HT Control field might cause an MMPDU to be fragmented that would not otherwise need to be fragmented.

A STA uses the contents of the Address 1 field to perform the address matching for receive decisions. In the case where the Address 1 field contains a group address and the frame subtype is other than Beacon or the frame subtype Action, Category Multihop Action (Multihop Action frame), the Address 3 field also is validated to verify that the group addressed frame originated from a STA in the BSS of which the receiving STA is a member or from a mesh STA to which mesh peering is maintained. Details of addressing and forwarding of the group addressed frame in an MBSS are defined in 10.38.4 (Addressing and forwarding of group addressed mesh Data frames). When the Address 1 field contains a group address and the frame subtype is either Probe Request or Action with Category Public, a wildcard BSSID value matches all receiving STA’s BSSIDs. If the frame subtype is Beacon, other address matching rules apply, as specified in 11.1.3.7 (Beacon reception). Frames of subtype Probe Request are additionally processed as described in 11.1.4.3.2 (Active scanning procedure for a non-DMG STA) for non-DMG STAs and 11.1.4.3.3 (Active scanning procedure for a DMG STA) for DMG STAs. If the frame subtype is Action, the Category is Public, and the Action is 20/40 BSS Coexistence Management, then additional address matching rules for receive decisions apply as specified in 11.15 (20/40 MHz BSS operation) and 11.16 (20/40 BSS Coexistence Management frame usage).

The address fields for all Management frames except Multihop Action frames are as follows:

* The Address 1 field of the Management frame is the RA (=DA) and is the destination of the frame.
* The Address 2 field of the Management frame is the TA (=SA) and is the address of the STA transmitting the frame.
* If the STA is an AP with dot11MultiBSSDImplemented set to false, then this address is the BSSID.
* If the STA is an AP with dot11MultiBSSIDImplemented set to true and the Address 1 field is not set to the broadcast address, then this address is the BSSID of the AP’s BSS (which is either the transmitted BSSID or a nontransmitted BSSID).
* If the STA is an AP with dot11MultiBSSIDImplemented set to true and the Address 1 field is set to the broadcast address, then this address is the transmitted BSSID.
* The Address 3 field of the Management frame is set and determined as follows:
* In Probe Request frames, the Address 3 field can be the wildcard BSSID as defined in the procedures specified in 11.1.4 (Acquiring synchronization, scanning). If Address 3 is not the wildcard BSSID, then it is (for a nonmesh STA) the BSSID of the BSS of the intended recipient(s), or (for a mesh STA) the MAC address of the intended recipient.

NOTE 2—Per 11.1.4.3.4 (Criteria for sending a response), a mesh STA does not examine the Address 3 field in Probe Request frames it receives. Using an individual address, however, might prevent unwanted responses from other STAs.

* In Public Action frames, the Address 3 field is the BSSID. The BSSID value is set according to 11.17 (Public Action frame addressing).
* If dot11OCBActivated is true, the Address 3 field is the wildcard BSSID.
* Otherwise:
* If the STA is an AP or PCP, the Address 3 field is the same as the Address 2 field.
* If the STA is transmitting the Management frame to an AP that is not in a multiple BSSID set or to a PCP, the Address 3 field is the BSSID, irrespective of whether the STA is associated with that AP or PCP.
* If the STA is transmitting the Management frame to an AP that is in a multiple BSSID set, the Address 3 field is the BSSID of the AP’s BSS (which is either the transmitted BSSID or a nontransmitted BSSID), irrespective of whether the STA is associated with that AP.
* If the STA is transmitting the Management frame to one or more IBSS STAs, the Address 3 field is the BSSID.
* If the STA is a mesh STA, the Address 3 field is the TA.
* If the STA is a TDLS STA transmitting the Management frame to a TDLS peer STA, and the AP to which they are associated is not in a multiple BSSID set, the Address 3 field is the BSSID.
* If the STA is a TDLS STA transmitting the Management frame to a TDLS peer STA, and the AP to which they are associated is in a multiple BSSID set, the Address 3 field is the BSSID of the AP’s BSS (which is either the transmitted BSSID or a nontransmitted BSSID).
* If the STA is transmitting an EBCS UL, the Address 3 field is set to the EBCS Content MAC address. See 11.55.3.
* If the STA is transmitting an EBCS Info frame, the Address 3 field is set to the EBCS Content MAC Info address. See 11.55.2.

The address fields for (#573)Multihop Action frames are described in 9.3.5 (Frame addressing in an MBSS).

Within all Management frames sent by the QoS STA, the Duration field contains a duration value as defined in 9.2.5 (Duration/ID field (QoS STA)). Within all Management frames sent by non-QoS STAs, the Duration field is set according to the fol-lowing rules:

* If the DA field contains a group address, the Duration field is set to 0.
* If the More Fragments bit is 0 in the Frame Control field of a frame and the DA field contains an individual address, the Duration field is set to the time, in microseconds, required to transmit one Ack frame, plus one SIFS.
* If the More Fragments bit is 1 in the Frame Control field of a frame, and the DA field contains an individual address, the Duration field is set to the time, in microseconds, required to transmit the next fragment of this Management frame, plus two Ack frames, plus three SIFSs.

The Duration field calculation for the Management frame is based on the rules in 10.6 (Multirate support) that determine the data rate at which the Control frames in the frame exchange sequence are transmitted. If the calculated duration includes a fractional microsecond, that value is rounded up to the next higher integer. All STAs process Duration field values less than or equal to 32 767 from valid Management frames to update their NAV set-tings as appropriate under the coordination function rules.

The HT Control field is defined in 9.2.4.6 (HT Control field). The presence of the HT Control field is determined by the +HTC subfield of the Frame Control field, as specified in 9.2.4.1.10 (+HTC subfield).

A Management frame is an EBCS Info frame when the Address 3 field is set to the EBCS Info MAC address.

A Management frame is an EBCS UL frame when the Address 3 field is set to the EBCS Content MAC address.

A Management frame is an IQMF when both

* The RA of the Management frame corresponds to an individual MAC address; and
* The To DS subfield is set to 1 and the From DS subfield of the Frame Control field is set to 0.

A Management frame is a GQMF when both

* The RA of the Management frame corresponds to a group MAC address; and
* The To DS subfield is set to 1 and the From DS subfield of the Frame Control field is set to 0.

The frame body consists of fields and elements as defined for each management frame subtype. All fields and elements are mandatory unless stated otherwise. Fields and elements appear in the specified, relative order, skipping fields or elements that are not present. STAs that encounter an element ID they do not recognize in the frame body of a received Management frame ignore that element and continue to parse the remainder of the management frame body (if any) for additional elements with recognizable element IDs. See 10.28.7 (Vendor specific element parsing).

***TGbc Editor: Please add the following subclause with the shown changes to the TGbc draft:***

* MAC data service

The MAC data service provides the transport of MSDUs between MAC peer entities as characterized in 5.1.1 (Data service).

(#114)The transmission process is started by the MAC’s receipt of one or more MA-UNITDATA.request primitives, each containing an MSDU and its associated parameters. This might cause one or more Data frames, containing the MSDU(s), to be transmitted.

(#114)The reception process is started by the MAC’s receipt of one or more Data frames containing one or more MSDUs. This might cause one or more MA-UNITDATA.indication primitives, each containing an MSDU and its associated parameters, to be issued.

When dot11SSPNInterfaceActivated is true, an AP shall distribute the group addressed message into the BSS only if dot11NonAPStationAuthSourceMulticast in the dot11InterworkingEntry identified by the source MAC address in the received message is true. When dot11SSPNInterfaceActivated is false, an AP shall distribute the group addressed message into the BSS, except when dot11RelayAPOperationActivated is true and the group addressed message is received from a STA. In that case, the group addressed message shall not be distributed into the BSS, and it shall be forwarded to the S1G relay STA in the same relay. The S1G relay STA shall send the group addressed message to the associated AP as an individually addressed frame using either a four address frame format (PV0 or PV1) or an A-MSDU format as specified in 10.54.4 (Addressing and forwarding of group addressed relay frames).

Unless the MPDU is delivered via DMS, the STA originating the message receives the message as a group addressed message (prior to any filtering). Therefore, a STA shall filter out group addressed messages that contain their address as the source address; the point at which such filtering occurs in the processing of received frames is an implementation choice. When dot11SSPNInterfaceActivated is false, group addressed MSDUs shall be propagated throughout the ESS. When dot11SSPNInterfaceActivated is true, group addressed MSDUs shall be propagated throughout the ESS only if dot11NonAPStationAuthSourceMulticast in the dot11InterworkingEntry identified by the source MAC address in the received message is true.

A STA transmitting on a general link also uses the addressing rules described in 10.65 (Addressing of GLK Data frame transmission).

A MAC not contained within an S1G relay performs address filtering on the Address 1 field in each MPDU contained in a PPDU and, for non-GLK non-AP STAs, on the DA of each MSDU within an A‑MSDU. In the case of a non-GLK STA receiver, when the Address 1 field or DA field contains a group address, address filtering is performed by comparing the value in the Address 1 field or DA field to all values in the dot11GroupAddressesTable, and the STA also validates the BSSID to verify either that the group addressed frame originated from a STA in the BSS of which the receiving STA is a member, or that it contains the wildcard BSSID value, indicating a Data frame sent outside the context of a BSS (dot11OCBActivated is true in the transmitting STA). Address 1 filtering is as specified in 10.65 (Addressing of GLK Data frame transmission) when Address 1 is a SYNRA. A GLK AP does not perform any DA filtering for MPDUs received over a non-general link; all MSDUs so received are passed to the DS for further processing. A GLK STA does not perform DA filtering for MPDUs received over a general link; all MSDUs so received are passed to the GLK convergence function and from there to the bridge for further processing.

A mesh STA also uses the address matching rules described in 10.38.3 (Addressing and forwarding of individually addressed mesh Data frames), when it receives an individually addressed frame. When a mesh STA receives a frame with the Address 1 field equal to a group address, the mesh STA also checks the TA to determine whether the group addressed frame originated from one of its peer mesh STAs; if there is no match, the STA shall discard the frame. A mesh STA also uses the address matching rules described in 10.38.4 (Addressing and forwarding of group addressed mesh Data frames).

If the Address 1 field of an MPDU carrying an A‑MSDU does not match any address at a receiving STA, then the entire A‑MSDU is discarded.

In a QoS STA, the TID parameter of the MA-UNITDATA.request primitive results in a TID being specified for the transmitted MSDU. This TID associates the MSDU with the AC or TS queue for the indicated traffic.

An EBCS STA follows the procedures defined in 11.55 for the transmission and reception of EBCS traffic.

***TGbc Editor: Please make the shown changes in the TGbc draft:***

**11.55.1 General**

EBCS DL operation is enabled in an EBCS AP if the len This subclause describes EBCS procedures that are used for EBCS STAs. EBCS is supported both where there

is an association between the transmitter(s) and the receiver(s) in an infrastructure BSS and in cases where

there is no association between transmitter(s) and receiver(s).

EBCS can be instantiated as a downlink (EBCS DL) or uplink (EBCS UL) service, where EBCS DL means

broadcast from an EBCS AP to EBCS non-AP STAs (see 11.55.2 (EBCS DL procedures)) and EBCS UL

means broadcast from an EBCS non-AP STA to one or more EBCS APs, for subsequent delivery to a specified

destination (see 11.55.3 (EBCS UL Procedure)).

NOTE—EBCS UL might not operate with DMG.

**11.55.1a EBCS Addressing**

EBCS MSDUs can be identified using an EBCS Content MAC address or EBCS Info MAC address in the frame header. Both the EBCS Content MAC address and EBCS Info MAC address are multicast addresses with the first three octets set to 01-0F-AC, and the remaining octets generated depending on the type of stream and the content ID.

The EBCS Info MAC address used for EBCS Info frames shall be set to 01-0F-AC-00-00-00.

The EBCS Content MAC address for EBCS UL or EBCS DL frames shall be set to 01-0F-AC-xx-yy-zz,

For EBCS DL frames,

– octet zz is set to the Content ID

– octets xx and yy are configured by the Content Stream Mapper and applied to all EBCS broadcast streams.

For EBCS UL frames,

– octets xx, yy and zz are configured by the EBCS non-AP STA

NOTE – The octets xx and yy for EBCS DL traffic must be set to a combination of values that are unique to the coverage area where the content is being broadcast. The octets xx, yy, and zz for EBCS UL traffic must be set to values that are unique to the UL traffic stream. EBCS UL and EBCS DL frames can be differentiated because the EBCS UL frame is a Management frame while the EBCS DL frame is a Data frame.

**11.55.2.2 EBCS DL operation at an EBCS AP**

EBCS DL operation is enabled in an EBCS AP if the length of the dot11EBCSContentList greater than 0. The EBCS traffic streams to be transmitted are specified in dot11EBCSContentList. The EBCS traffic streams are handled differently than other traffic. An EBCS content ID and EBCS Content MAC address 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 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 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, 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, 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.

— PKFA (12.14.2 (EBCS public key frame authentication (PKFA)))

— HCFA (12.14.3 (EBCS hash chain frame authentication (HCFA)))

— HLSA (12.14.4 (No frame authentication with mandatory higher layer source authentication (HLSA)))

EBCS traffic streams are carried by EBCS Data frames. The EBCS AP shall set the RA of the EBCS Data frame to the EBCS Content MAC address for the EBCS traffic stream as described in 11.55.1a. The EBCS AP shall set the SA to its MAC address and the DA to the address of the traffic stream (typically a broadcast or multicast address).

NOTE—The DA is a group address assigned by the EBCS DL content server according to the HLP destination address~~, and the AP uses it as the RA~~.

An EBCS AP generates a PHY-TXSTART.request primitive with the transmission rate information specified by the dot11EBCSContentList for each MPDU according to the EBCS content ID.

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.

NOTE—The TIM element has only 1 bit for signaling buffered group addressed frames and so cannot differentiate between different streams of traffic. If an EBCS AP were to use the TIM element, an associated non-AP STA that does not subscribe to any EBCS traffic stream would stay awake for the EBCS traffic streams. This would cause unnecessary power consumption at the STA. Similarly, using a TIM element would cause an unassociated non-AP STA that subscribes to an EBCS traffic stream to stay awake for any non-EBCS group addressed traffic.

The frame sequence of the EBCS DL is shown in Figure 11-61f (EBCS DL frame sequence).

Table

Description automatically generated

**Figure 11-61f— EBCS DL frame sequence**

NOTE—An EBCS AP might transmit EBCS Info frames and EBCS Data frames that contain the same Frame Body field multiple times consecutively to increase redundancy.

***TGbc Editor: Please make the shown changes in the TGbc draft:***

**11.55.2.3 EBCS DL operation at an EBCS receiver**

An EBCS receiver finds an EBCS capable AP by receiving Beacon frames, Probe Response frames, EBCS Info frames or by receiving an Enhanced Broadcast Services ANQP-element. To validate the source of an EBCS traffic stream, an EBCS receiver shall use the content of received EBCS Info frames. An EBCS receiver is able to know when the next EBCS Info frame is transmitted by inspecting the EBCS Parameters element in Beacon frames and Probe Response frames. An EBCS receiver may select the EBCS traffic streams to receive and consume. Details of the usage of the EBCS Info frame is described in 11.55.2.4 (EBCS Info frame generation and usage).

The SME of an EBCS receiver obtains an EBCS content list from the EBCS Info frame or Enhanced Broadcast Services ANQP-element. The SME selects one or more EBCS contents to receive and configures ~~its dot11GroupAddressesTable~~ the MAC to filter on the EBCS Content MAC addresses corresponding to the content of interest. If the HLP destination address is an IPv4 address or an IPv6 address, the DA is assumed to be mapped according to IETF RFC 1112 and IETF RFC 2464 respectively.

An EBCS receiver shall authenticate all EBCS Info frames and EBCS Data frames by the authentication mechanism specified in the EBCS Info Authentication Algorithm subfield in the EBCS Info Control field for the EBCS Info frame and the Content Authentication Algorithm subfield in the Content Information field for the EBCS Data frames, in the EBCS Info frame. Details of frame authentication procedures are described in 12.14 (Frame authentication for EBCS).

Authenticated MSDUs shall be forwarded to a higher layer via the EBCS filter. The EBCS filter shall be configured by the SME to filter out the undesired MSDUs if they do not have the corresponding ~~source address~~ EBCS Content MAC address and the corresponding EBCS content ID. An EBCS traffic stream shall pass through the IEEE 802.1X Controlled Port even if the IEEE 802.1X Controlled Port is blocked (e.g. because the STA is not associated).

If an EBCS receiver receives an EBCS traffic stream that is transmitted from multiple APs with the same AP certificate and the same content ID, the EBCS receiver may forward the EBCS traffic stream received from multiple APs to a higher layer.

**11.55.2.4 EBCS Info frame gereration and usage**

An EBCS AP that is not in a multiple BSSID set shall transmit an EBCS Info frame every dot11EBCSInfoInterval beacon periods with the Addess 1 field set to the broadcast address, the Address 2 field set to the transmitting AP’s MAC address, and the Address 3 field set to the EBCS Info MAC address. In a multiple BSSID set, only the AP corresponding to the transmitted BSSID may have EBCS DL enabled and, if enabled, shall transmit ~~(i.e., TA field and BSSID field set to the transmitted BSSID)~~ an EBCS Info frame, with the Address 1 set to the broadcast address, the Address 2 field set to the transmitted BSSID, and the Address 3 field set to the EBCS Info MAC address, every dot11EBCSInfoInterval beacon periods. The other APs in the multiple BSSID set shall not transmit EBCS Info frames. In a co-hosted BSSID set, at most one AP may have EBCS DL enabled and, if enabled, shall transmit an EBCS Info frame every dot11EBCSInfoInterval beacon periods. The other APs in the co-hosted BSSID set shall not have EBCS DL enabled and shall not transmit an EBCS Info frame. ~~The RA of the EBCS Info frame shall be the broadcast address.~~

The EBCS Info Sequence Number subfield in the first EBCS Info frame shall be set to a random number and shall be incremented by 1 for each subsequent EBCS Info frame transmission. If the field value overflows, it shall be set to 0.

If all EBCS traffic streams use HLSA, the EBCS Info Authentication Algorithm subfield in the EBCS Info frame may indicate None, otherwise it shall not indicate None.

On reception of an EBCS Info frame, an EBCS receiver shall check the integrity of the EBCS Info frame as described in 12.14.2.2 (Authentication of an EBCS Info frame) if the EBCS Info Authentication Algorithm subfield in the EBCS Info frame does not indicate None.

If the integrity of the EBCS Info frame is verified, the EBCS receiver shall process each Content Information field according to the value of the Content Authentication Algorithm subfield:

The following processes are common in all authentication algorithms:

— The EBCS receiver shall cache the values of the Content Information List field.

— The EBCS receiver shall notify the SME of the cached information (see 6.3.126.3 (MLMEEBCSINFO. indication).

In the PKFA case,

— If the Vendor Specific Data subfield is present in the Content Information field, the EBCS receiver shall forward the MSDU in the Vendor Specific Data subfield to a higher layer and shall cache the certificate in the EBCS Info frame to authenticate PFKA MPDUs.

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**11.55.3.3 EBCS UL operation at an EBCS non-AP STA**

An EBCS non-AP STA may request relaying of an HLP payload to a specific destination by transmitting an EBCS UL frame. The frame carries the URI of the intended destination. ~~The Address 1 and Address 3 fields of the frame shall be set to the broadcast address.~~ The Address 1 field of the frame shall be set to the group address. The Address 2 field shall be set to the MAC address of the non-AP STA. The Address 3 field shall be set to the EBCS Content MAC address as described in 11.55.1a.

NOTE – The group address value of the Address 1 field can be assigned to differentiate different types of EBCS UL traffic. For example, an EBCS non-AP STA could transmit different EBCS UL frames, each carrying a different EBCS UL traffic and having the Address 1 field set to a different group address value. The EBCS Content MAC Address would be the same for all cases.

An EBCS non-AP STA should include a STA certificate in an EBCS UL frame to help authenticate it (see 12.14.2.6 (Authentication of an EBCS UL frame)).

An EBCS non-AP STA should include the Frame Count field in an EBCS UL frame that it transmits to reduce the possibility of a successful replay attack. When the STA has time information, the Frame Tx Time Present subfield in the Control field shall be set to 1 and the Frame Tx Time field shall indicate the time when the frame is queued for transmission; otherwise the Frame Tx Time Present subfield of the Control field shall be set to 0 and the Frame Tx Time field is not present in the frame. When the STA provides a frame count, the Frame Count Present subfield of the Control field shall be set to 1 and the Frame Count field shall carry a value that shall be set to 1 in the firs t EBCS UL frame that the STA transmits and shall be incremented for each subsequent transmission of an EBCS UL frame; otherwise the Frame Count Present subfield of the Control field shall be set to 0 and the Frame Count field is not present in the frame.

NOTE—How an EBCS non-AP STA obtains time information is out of scope of this standard.

The Frame Signature field, if present in the EBCS UL frame, shall carry be computed as defined in 12.14.2.5

(Signature of the EBCS UL frame).

An EBCS non-AP STA is not required to monitor the WM and may transmit an EBCS UL frame without discovering nearby EBCS APs that provide access to the relaying service.