ATIS-0700045

ATIS Standard on -

Commercial Mobile Service Provider (CMSP) Gateway to Cell Broadcast Center (CBC) Interface Specification

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ATIS Standard on

Commercial Mobile Service Provider (CMSP) Gateway to Cell Broadcast Center (CBC) Interface Specification

Alliance for Telecommunications Industry Solutions

Approved April 25, 2022

Abstract

This Standard defines the interface and message transfer protocol between a Commercial Mobile Service Provider (CMSP) Gateway and a Cell Broadcast Center (CBC) to support WEA. This Standard supports the requirements of the FCC Report & Order 16-127 and the FCC Order on Reconsideration 17-143.

Foreword

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Wireless Technologies and Systems Committee (WTSC) develops and recommends standards and technical reports related to wireless and/or mobile services and systems, including service descriptions and wireless technologies. WTSC develops and recommends positions on related subjects under consideration in other North American, regional, and international standards bodies.

The mandatory requirements are designated by the word shall and recommendations by the word should. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word may denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, WTSC 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, WTSC, which was responsible for its development, had the following leadership:

M. Younge, WTSC Chair (T-Mobile US)

T. Brooks, WTSC SN Chair (T-Mobile US)

P. Musgrove, WTSC SN Vice Chair (AT&T)

P. Sanders, Technical Editor (one2many)

The Systems and Networks (SN) subcommittee was responsible for the development of this document.

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1 Scope, Purpose, & Application

1.1 Scope

The scope of this Standard is the definition of the interface and message transfer protocol between a Commercial Mobile Service Provider (CMSP) Gateway and a Cell Broadcast Center (CBC) to support Wireless Emergency Alert (WEA) services.

1.2 Purpose

The purpose of this Standard is to define a message transfer protocol on the interface between the CMSP Gateway and CBC; to identify the requirements on the CMSP Gateway and CBC to support the interface; and to identify requirements to support assumptions made in other specifications, such as the 3GPP specifications (e.g., 3GPP TS 23.041 [Ref 1]).

In the 5G System the CBC is called Cell Broadcast Center Function (CBCF). The remainder of the present standard uses the term CBC, but it is to be understood that the term CBC also applies to the CBCF.

1.3 Application

This specification is applicable to the "D" interface between a CMSP Gateway and a CBC for the support of WEA services.

ATIS-0700008 [Ref 17] applies to the generic CBE to CBC interface specification. See also Annex B.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this ATIS Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this ATIS Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

[Ref 1] 3GPP TS 23.041, *Technical realization of Cell Broadcast Service (CBS)*.[1]

[Ref 2] IETF RFC 3629, *UTF-8, A transformation format of ISO 10646*.[2]

[Ref 3] 3GPP TS 21.905, *Vocabulary for 3GPP Specifications*.[1]

[Ref 4] INCITS 31-2009, *Codes for the Identification of Counties and Equivalent Areas of the United States, Puerto Rico, and the Insular Areas*.[3]

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[1] This document is available from the Third Generation Partnership Project (3GPP). < http://www.3gpp.org/ >

[2] This document is available from the Internet Engineering Task Force (IETF). < http://www.ietf.org >

[3] This document is available from the International Committee for Information Technology Standards (INCITS) at < https://standards.incits.org/apps/group_public/project/details.php?project_id=204 >.

[Ref 5] WGS-84, National Geospatial Intelligence Agency, Department of Defense World Geodetic 103 System 1984, *NGA Technical 104 Report TR8350.2.*[4]

[Ref 6] IETF RFC 793, *Transmission Control Protocol.*[2]

[Ref 7] 3GPP TS 23.038, *Alphabets and language-specific information.*[1]

[Ref 8] IETF RFC 7230, *Hypertext Transfer Protocol (HTTP/1.1)*: Message Syntax and Routing.[5]

[Ref 9] IETF RFC 7231, *Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content.*[1]

[Ref 10] IETF RFC 1122, *Requirements for Internet Hosts – Communication Layers*[2]

[Ref 11] IETF STD 5 (RFC 792), *Internet Control Message Protocol*[2]

[Ref 12] IETF STD 5 (RFC 791), *Internet Protocol (IPv4) Specification*[2]

[Ref 13] IETF RFC 8200, *Internet Protocol, Version 6 (IPv6) Specification*[1]

[Ref 14] IETF RFC 4291, *IP Version 6 Addressing Architecture*[1]

[Ref 15] IETF RFC 4648, *The Base16, Base32, and Base64 Data Encodings*[2]

[Ref 16] ATIS-0700041, *Wireless Emergency Alert (WEA) 3.0 Device-Based Geo-Fencing*[6]

[Ref 17] ATIS-0700008, *Cell Broadcast Entity (CBE)-to-Cell Broadcast Center (CBC) Interface Specification*[6]

[Ref 18] ATIS-0700010, *Wireless Emergency Alert (WEA) 3.0 via EPS Public Warning System Specification*[6]

3 Definitions, Acronyms, & Abbreviations

For a list of common communications terms and definitions, visit the ATIS Telecom Glossary, which is located at < https://glossary.atis.org >. This clause identifies definitions, acronyms, and abbreviations used in this document. Additional information may be found in 3GPP TR 21.905, *Vocabulary for 3GPP Specifications* [Ref 3].

3.1 Definitions

Cell Broadcast Area: The Cell Broadcast Area is the geographical area for the broadcast of the CBS message. Cell Broadcast Areas may be comprised of one or more cells up to the entire wireless operator network. Individual CBS messages will be assigned their own Cell Broadcast Areas.

Cell Broadcast Service (CBS): The CBS permits a number of unacknowledged general CBS messages to be broadcast to all receivers within a particular region. CBS messages are broadcast to defined geographical areas known as Cell Broadcast Areas.

3.2 Acronyms & Abbreviations

ATIS	Alliance for Telecommunications Industry Solutions
CBC	Cell Broadcast Center
CBCF	Cell Broadcast Center Function
CBE	Cell Broadcast Entity
CBEM	Cell Broadcast Entity Message

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[4] This document is available at < http://earth-info.nga.mil/GandG/publications/tr8350.2/tr8350_2.html >.

[5] This document is available from the Internet Engineering Task Force (IETF) at: < http://www.ietf.org >.

[6] This document is available from The Alliance for Telecommunication Industry Solutions (ATIS) at: < http://www.atis.org >.

CBS	Cell Broadcast Service
CMSP	Commercial Mobile Service Provider
FIPS	Federal Information Processing Series
INCITS	International Committee for Information Technology Standards
GNIS	Geographic Names Information System
GSM	Global System for Mobile communications
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
LTE	Long Term Evolution
MME	Mobility Management Entity
SAME	Specific Area Message Encoding
TCP	Transmission Control Protocol
UMTS	Universal Mobile Telecommunications System
WGS	World Geodetic System
XML	eXtensible Markup Language

4 Functional Architecture

The CMSP Gateway to CBC network architecture is as follows:
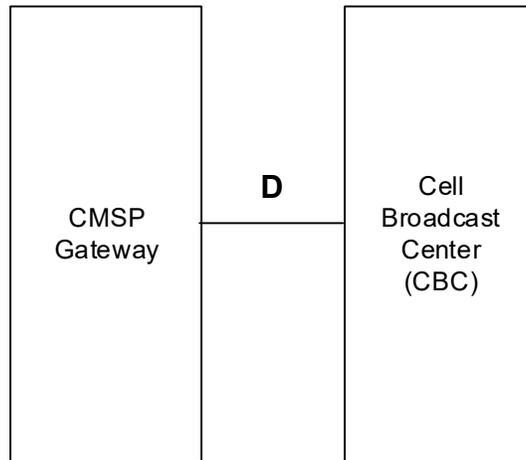
Figure 4.1: CMSP Gateway to CBC Network Architecture

The messages/parameters between a CMSP Gateway and the CBC are referred to as *Cell Broadcast Entity Message* (*CBEM) messages/parameters*.

This standard provides an eXtensible Markup Language (XML)-based protocol for the support of messages transfer on the interface (shown as D in Figure 4.1) between the CMSP Gateway and the CBC.

> NOTE: The term Cell Broadcast Entity, as specified in ATIS-0700008 [Ref 17], is used to designate the logical entity that provides the Cell Broadcast related information to the CBC. Depending on the Cell Broadcast application, a specific platform may take the role of a CBE while interfacing to the CBC. For WEA services the CMSP Gateway takes the role of CBE.

5   Requirements

This clause identifies requirements specific to the message transfer on the interface between the CMSP Gateway and CBC. The requirements of CMSP GW and CBC are described in ATIS-0700010 [Ref 18]. The generic interface requirements between a CBE and CBC are described in ATIS-0700008 [Ref 17].

[CBS-D-RQMT-0010] The CBC shall apply the entire Cell Broadcast Area generated for the referenced CBS message for a Cancel CBS Request message. A Cancel CBS Request message does not include the CBEM_CBS_Geotargeting_Info segment information.

[CBS-D-RQMT-0020] Each possible radio access network (i.e., GSM, UMTS, LTE, and/or 5G) shall be selected at most once for message broadcast per CBEM message.

[CBS-D-RQMT-0030] When the Initial CBS Request corresponds to a WHAM, the CBEM_data_coding_scheme shall be set to "Uncompressed 8 bit data".

[CBS-D-RQMT-0040] The CBC shall be responsible for all aspects of formatting CBS messages sent downstream.

[CBS-D-RQMT-0050] The CBC that receives an Initial CBS Request message from the CMSP Gateway shall broadcast the message immediately.

[CBS-D-RQMT-0060] The CBC shall use the CBEM_network to determine which radio access network the CBS message is broadcast. In case, CBS message is sent to multiple radio access networks, the CBC shall send the message for broadcast via the indicated radio access networks (GSM, UMTS, LTE, and/or 5G) while keeping the serial number identical across those radio access networks.

[CBS-D-RQMT-0070] The CMSP Gateway shall determine and pass on to the CBC all the parameters that are necessary to identify a CBS message.

[CBS-D-RQMT-0080] The CMSP Gateway shall indicate to the CBC the radio access networks (GSM, UMTS LTE, 5G) on which the CBS message shall be broadcast. For each indicated radio access network type, the CMSP Gateway shall include the message elements as applicable within the Initial CBS Request.

6   Call Flows

This clause provides the following call flows for the CMSP Gateway to CBC interface:

- Valid (Initial or Cancel) CBS Request message call flow.
- Invalid (Initial or Cancel) CBS Request message call flow.
- Transmission Control message call flows.

6.1   Valid CMSP Gateway to CBC Request Message Call Flow

The following is the call flow for a valid Initial CBS Request message or a valid Cancel CBS Request message:
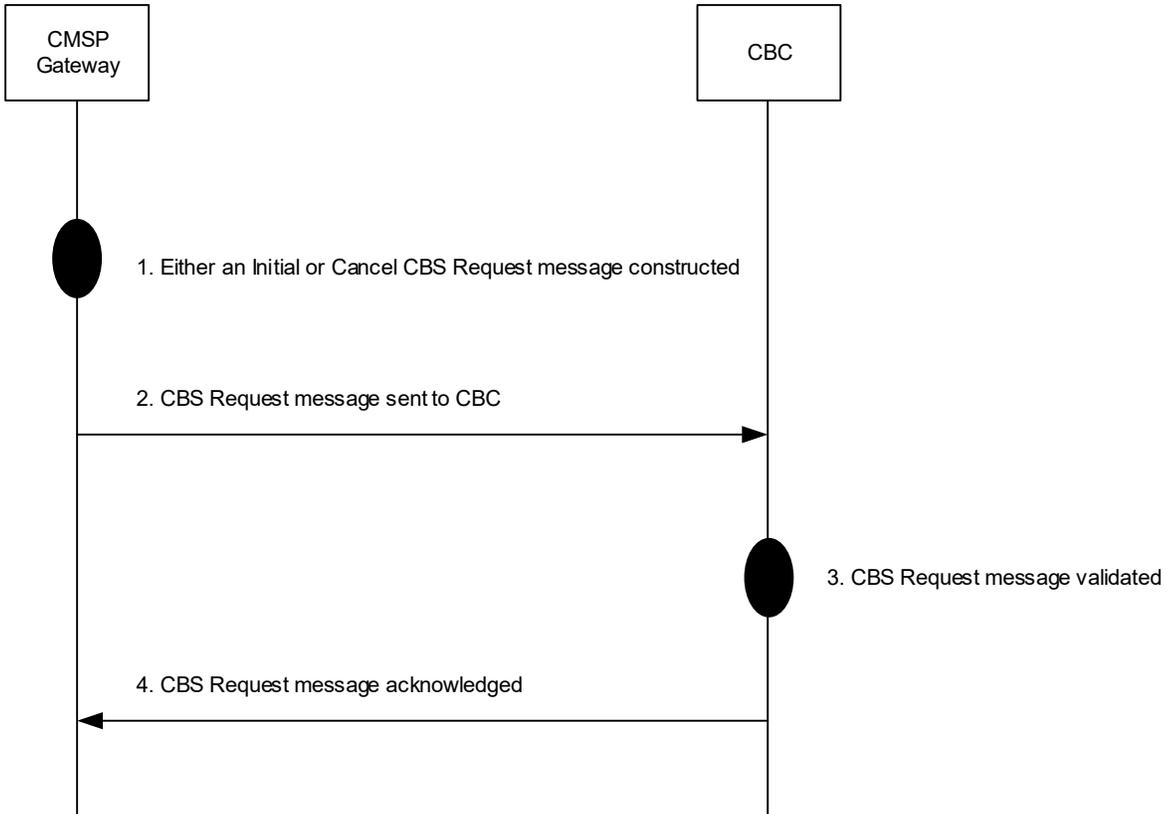
Figure 6.1: Valid CMSP Gateway to CBC Request message Flow

1. The CMSP Gateway constructs either an Initial CBS Request message or a Cancel CBS Request message.

2. The CMSP Gateway sends to the constructed Initial CBS Request or Cancel CBS Request message to the CBC.

3. The CBC validates the received Initial CBS Request or Cancel CBS Request message.

4. The CBC sends an acknowledgement to the CMSP Gateway for the Initial CBS Request or Cancel CBS Request message.

6.2 Invalid CMSP Gateway to CBC Request Message Flow

The following is the call flow for an invalid Initial CBS Request message or an invalid Cancel CBS Request message:
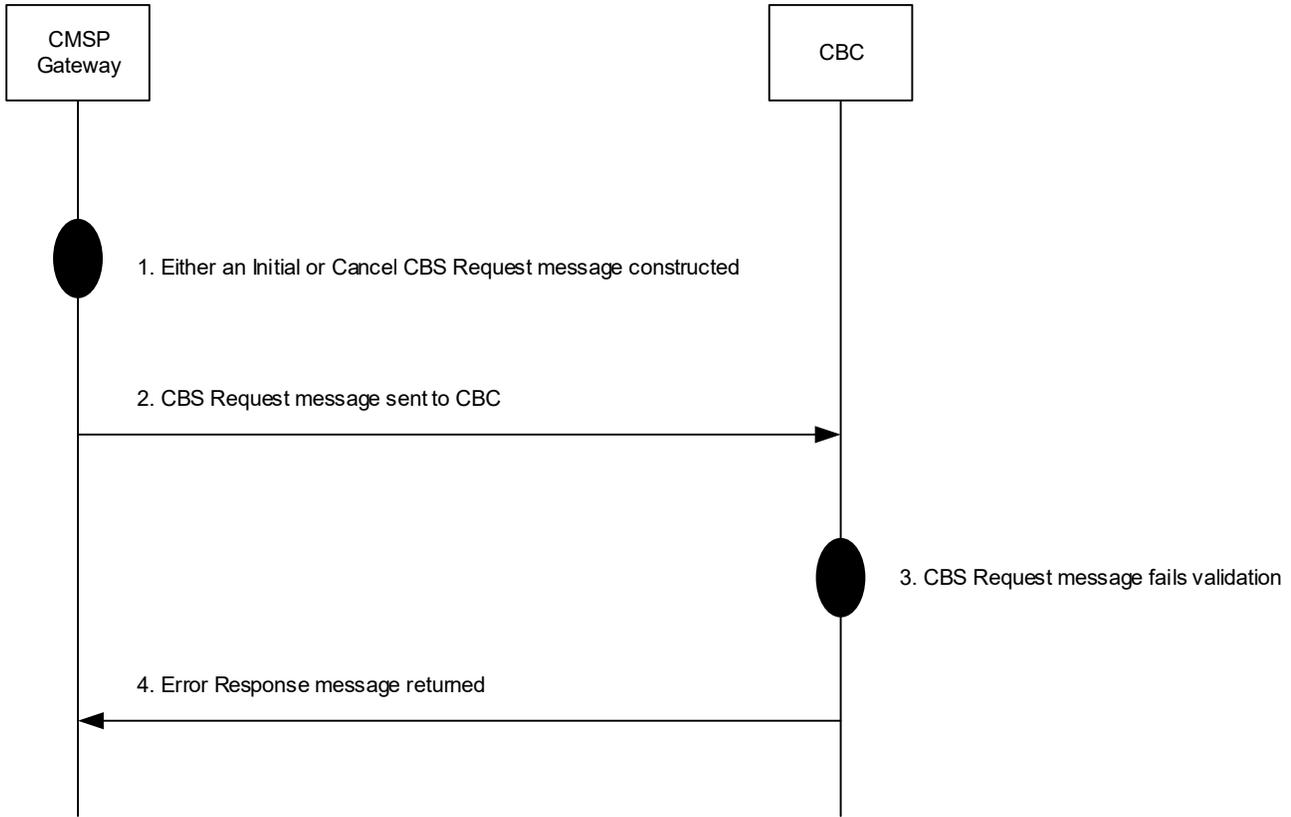
Figure 6.2: Invalid CMSP Gateway to CBC Request message Flow

1. The CMSP Gateway constructs either an Initial CBS Request message or a Cancel CBS Request message.

2. The CMSP Gateway sends the message which was constructed in the previous step to the CBC.

3. The CBC validates the received message and the received message fails validation.

4. The CBC sends an error response to the CMSP Gateway for the CMSP Gateway to CBC Request message.

6.3 Transmission Control Message Call Flows

The CBC may request message traffic on the CMSP Gateway to CBC Interface destined for the CBC be ceased or resumed due to a maintenance condition on the CBC or internal error processing. This clause provides the following transmission control call flows:

- Cease transmissions call flow.
- Resume transmissions call flow.

6.3.1 Cease Transmissions Call Flow

The CBC may request transmissions of all messages destined for the CBC be ceased due to a maintenance condition on the CBC or internal error processing.

The following figure with its descriptions of the associated call flow steps defines the call flow for a Transmission Control - Cease message sent from the CBC to the CMSP Gateway over the CMSP Gateway to CBC Interface:
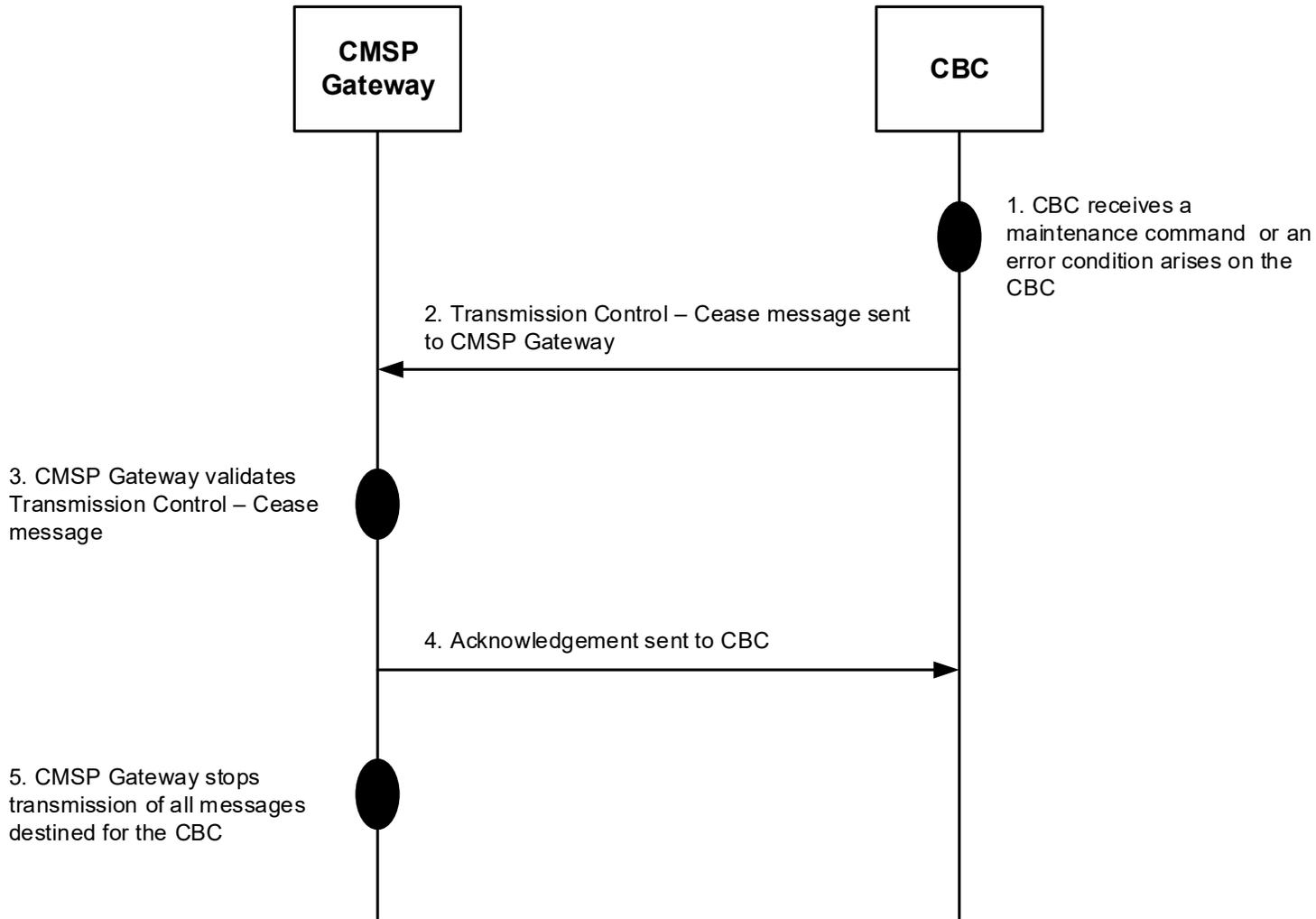
Figure 6.3: Transmission Control – Cease Flow

1. The CBC receives a maintenance command to request the CMSP Gateway to stop transmissions of all messages destined for the CBC or an error condition arises, which prevents the CBC from processing any further messages from the CMSP Gateway.

2. The CBC sends the Transmission Control - Cease message to the CMSP Gateway via the CMSP Gateway to CBC Interface.

3. The CMSP Gateway validates the received Transmission Control – Cease message from the CBC.

4. The CMSP Gateway sends an Acknowledge Response back to the CBC.

> NOTE: The CBC may choose to ignore the acknowledgement response.

5. The CMSP Gateway stops transmissions of all messages destined for the CBC.

6.3.2 Resume Transmissions Flow

Once the maintenance or error condition that triggered the stop of message transmission over the CMSP Gateway to CBC Interface is cleared, the CBC informs the CMSP Gateway that transmission of messages may resume. The following figure with its descriptions of the associated call flow steps defines the call flow for a Transmission Control – Resume message sent from the CBC to the CMSP Gateway over the CMSP Gateway to CBC Interface:
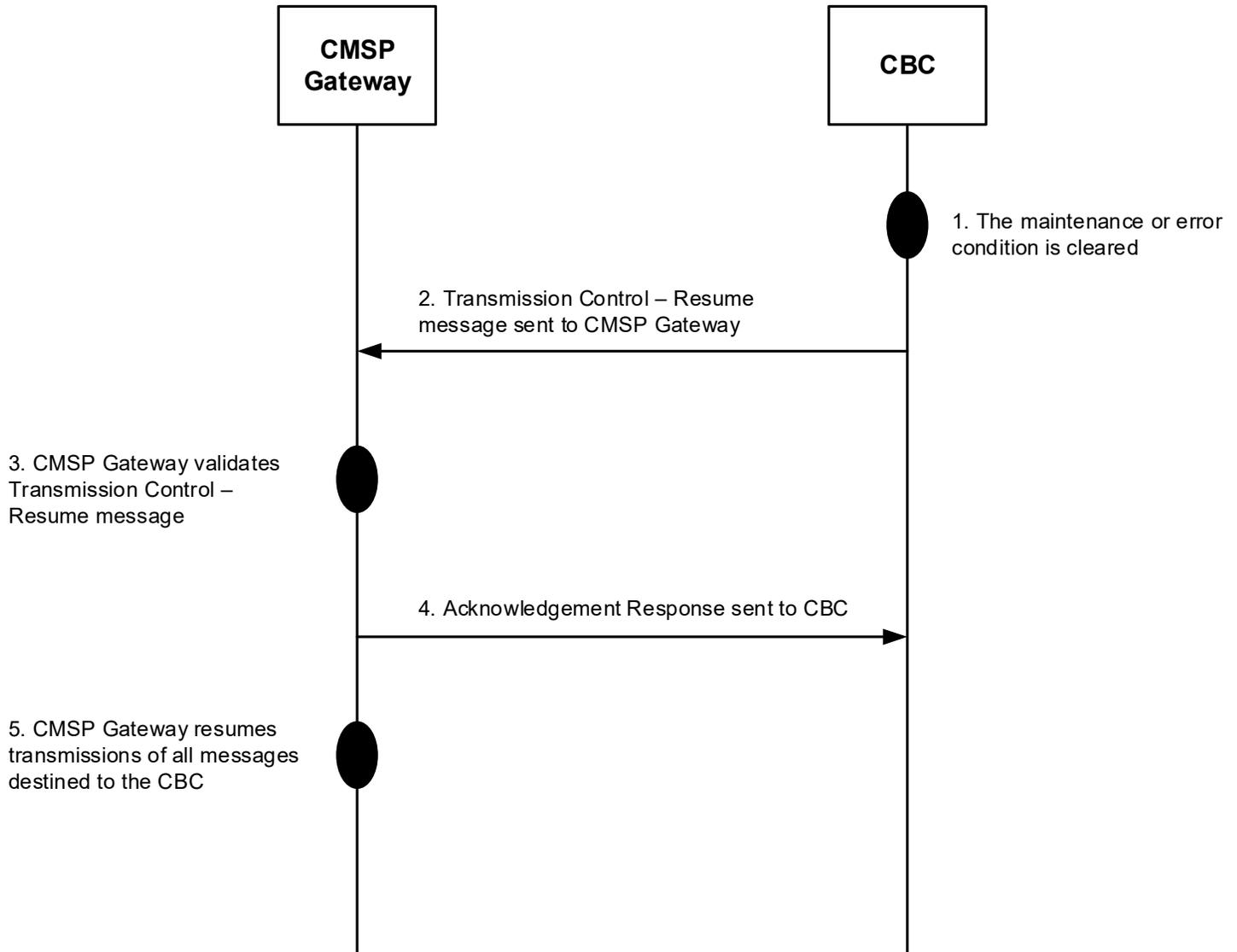
Figure 6.4: Transmission Control – Resume Flow

1. The maintenance or error condition that triggered the message transmission to cease over the CMSP Gateway to CBC Interface is cleared.

2. The CBC sends the Transmission Control – Resume message to the CMSP Gateway via the CMSP Gateway to CBC Interface.

3. The CMSP Gateway validates the received Transmission Control – Resume message from the CBC.

4. The CMSP Gateway sends an Acknowledge Response back to the CBC.

5. The CMSP Gateway may resume transmission of messages destined to the CBC.

7   CMSP Gateway to CBC Protocol Requirements & Definition

The Reference Point "D" protocol supports delivery and acknowledgement of initial or cancelled cell broadcast messages between the CMSP Gateway and the CBC. The protocol also enables transmission control.

7.1 Application Layer

7.1.1 Hypertext Transfer Protocol (HTTP)

HTTP will be the application level protocol used by the CMSP Gateway and the CBC to exchange CBEM. The HTTP is a request/response protocol. The HTTP methods will be limited to POST. The HTTP POST method will be used by CMSP Gateway (client) to send all messages in the CBEM protocol to the CBC (server), except Ack and Error messages. Similarly, the CBC (client) will use the HTTP POST method to send all messages in the CBEM protocol to the CMSP Gateway (server), except Ack and Error messages. Ack and Error messages will be sent in the CBEM protocol XML in HTTP responses to the HTTP POSTs. HTTP 200 OK response status code is used for all CBEM level responses (Ack and Error). The following describes the use of specific HTTP response status codes:

- 200 OK response status code indicates the CBEM message recipient has successfully received the CBEM message in the HTTP POST. Details of CBEM processing will be indicated in the CBEM level response (Ack or Error) in the response body.

- 400 Bad Request status code indicates that CBEM message validation has failed and the validation results prevent a valid CBEM Error response from being created.

- All other HTTP response status codes indicate a HTTP-level error.

[CBS-D-RQMT-0300] HTTP communications shall be per RFC 7230 [Ref 8] and RFC 7231 [Ref 9].

[CBS-D-RQMT-0310] HTTP communications carrying CBEM messages shall be to port TCP 8080.

[CBS-D-RQMT-0320] HTTP methods shall be limited to POST when CBEM Initial, Update, and Cancel messages are sent over HTTP.

[CBS-D-RQMT-0330] The HTTP POST method shall use "CMSPGW" as the Request_URI.

[CBS-D-RQMT-0340] All CBEM Ack and Error messages shall be sent in HTTP 200 OK response messages.

7.2 Transport Protocol

Transmission Control Protocol (TCP) [Ref 6] is the transport protocol used to transmit CBEM message between the CMSP Gateway and the CBC on the Reference Point "D" interface.

TCP and Internet Protocol (IP) will be implemented as detailed in the following requirements. Each CMSP Gateway to CBC connection will be defined by a unique socket pair, consisting of the source IP address, source port number, destination IP address, and destination port number, where the source and destination IP addresses are obtained from the IP address or Fully Qualified Domain Name.

[CBS-D-RQMT-0400] The CMSP Gateway to CBC interface shall be in accordance with RFC 1122 [Ref 10].

7.2.1 Transmission Control Protocol (TCP)

TCP will be the transport level protocol used by the CMSP Gateway and the CBC to exchange messages. TCP is a connection-oriented protocol and thus requires establishment of a connection to another system to facilitate data transfer. The interface will use persistent connections. A CMSP Gateway or CBC will close a connection only after providing notification to the other Gateway.

[CBS-D-RQMT-0410] TCP shall be implemented for the transport layer in accordance with RFC 793 [Ref 6].

[CBS-D-RQMT-0420] TCP connections shall be persistent.

7.2.2 Internet Protocol (IP)

IP Version 4 (IPv4) and IP Version 6 (IPv6) will be supported.

[CBS-D-RQMT-0430] The interface shall support IP Version 4 for the network layer in accordance with IETF STD 5 (RFC 791) [Ref 12].

[CBS-D-RQMT-0440] The network layer shall support Internet Control Message Protocol (ICMP) in accordance with IETF STD 5 (RFC 792) for IP Version 4 [Ref 11].

[CBS-D-RQMT-0450] The interface shall support IP Version 6 for the network layer in accordance with RFC 8200 [Ref 13] and RFC 4291 [Ref 14].

7.3 Error Handling

7.3.1 TCP/IP Error Handling

This interface uses the reliable TCP protocol to correct any transmission errors that occur at IP or lower layers. Using TCP isolates such errors from HTTP and CBEM protocol layers. TCP uses a retransmission mechanism to correct any errors in received packets.

[CBS-D-RQMT-0500] Any packets received in error shall be discarded at TCP level by the receiving gateway.

[CBS-D-RQMT-0510] When a packet is received in error, a correct packet shall be retransmitted by the sending gateway per TCP protocol.

[CBS-D-RQMT-0520] The CMSP Gateway that fails to establish a TCP session to the CBC shall log such failures.

[CBS-D-RQMT-0530] The CBC that fails to establish an IP tunnel to the CBC shall log such failures.

7.3.2 HTTP Level Error Handling

As only the HTTP POST method will be used on this interface, all other HTTP methods are to be rejected.

[CBS-D-RQMT-0540] The CMSP Gateway shall reject all HTTP methods other than POST with a 4xx Client Error response when the CBC sends a CBEM message.

[CBS-D-RQMT-0550] The CBC shall reject all HTTP methods other than POST with a 4xx Client Error response.

8   CMSP Gateway to CBC Interface Message Structure

This clause describes the structure of the message between the CMSP Gateway and the CBC. The description of this message structure contains the following:

- Definition of the object model between CMSP Gateway and CBC.
- Description of the elements and associated values of the CMSP Gateway to CBC Message (CBEM).
- Definition of the XML Schema for the CBEM message.
- Definition of the response codes and response descriptions for the messages between the CMSP Gateway and the CBC.

8.1 CBEM Document Object Model

The following figure portrays the CBEM document object model:
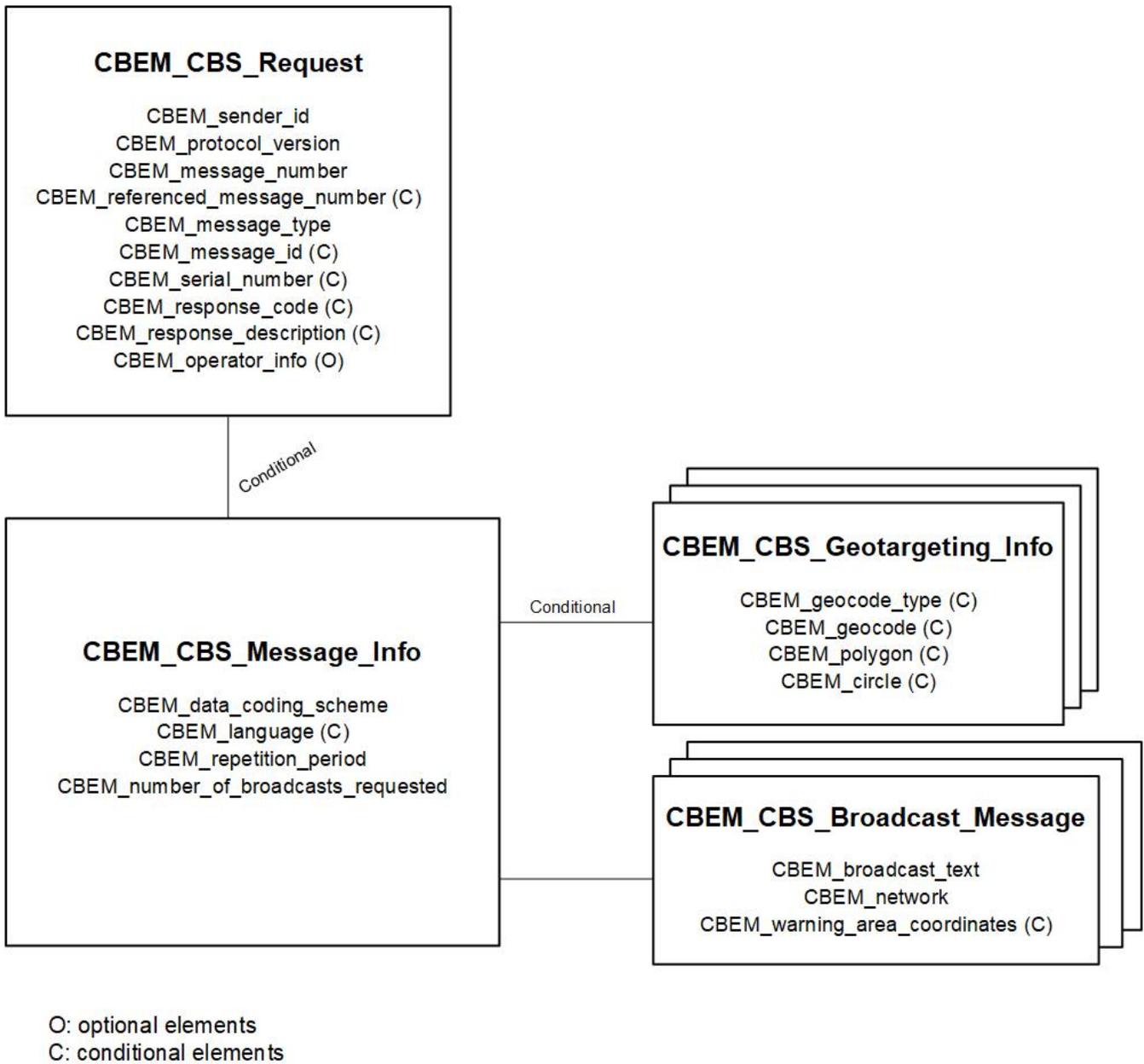
Figure 8.1: CBEM Document Object Model

8.2 CBEM Message Types

The CBEM messages transmitted between the CMSP Gateway and the CBC can contain various segments. The following table defines the segments for each type of CBEM message:

Table 8.1: CBEM Message Segments

CBEM Message	CBEM Message Segments
Initial CBS Request	one <CBEM_CBS_Request> segment one <CBEM_CBS_Message_Info> segment one or more <CBEM_CBS_Geotargeting_Info> segments one or more <CBEM_CBS_Broadcast_Message> segments

CBEM Message	CBEM Message Segments
Cancel CBS Request	one <CBEM_CBS_Request> segment
Acknowledgement Response	one <CBEM_CBS_Request> segment
Error Response	one <CBEM_CBS_Request> segment
Transmission Control – Cease	one <CBEM_CBS_Request> segment
Transmission Control - Resume	one <CBEM_CBS_Request> segment

8.3 Elements of CMSP Gateway to CBC Message

The definitions of Mandatory, Optional, and Conditional used in the element definition tables within this clause are as follows:

- Mandatory (M): This element is required when the associated segment is included in the CBEM message.

- Optional (O): This element may be included in the segment. The entry in the Definition column defines when the element is optional and the interpretation of the missing optional element.

- Conditional (C): This element may be required in the segment depending on the contents of other elements. The entry in the Definition column for this conditional element defines the conditions and values for this conditional element.

8.3.1 CBEM_CBS_Request Segment Element Definition

The following table contains the definition of the elements of the CBEM_CBS_Request segment:

Table 8.2: CBEM_CBS_Request Segment Element Definition

CBEM Element	Mandatory/ Optional/ Conditional	Definition
CBEM_CBS_Request	M	Identifies the segment with elements described in the following rows of this table. (1) Surrounds CBEM CBS Request segment sub-elements. (2) Must include the xmlns attribute referencing the CBEM URN as the namespace, e.g.,: <cbem:CBEM_CBS_Request xmlns:cbem="urn:xxx:xxxxx:xx:cbem:2.0"> [sub-elements] </cbem:CBEM_CBS_Request> (3) In addition to the specified sub-elements, may contain one <CBEM_CBS_Message_Info> block and zero or more of <CBEM_CBS_Geotargeting_Info> segments and one or more [CBEM_CBS_Broadcast_Message] segments.
CBEM_protocol_version	M	The version of the CBEM protocol. Used by the CMSP Gateway and the CBC to identify the protocol version of the CBEM protocol. The value of the CBEM_protocol_version element for this version of the standard shall be 2.0.
CBEM_sender_id	M	URI or IP address of the entity sending the CBEM message.

CBEM Element	Mandatory/ Optional/ Conditional	Definition
CBEM_message_number	M	Identifies the unique message number of the message. This may also be used by the CBC to generate specific CBS parameters, such as the Serial Number parameter. CBEM_message_number is a string uniquely identifying the message. The CBEM_message_number is assigned by the CMSP Gateway for request messages initiated by the CMSP Gateway. The CBEM_message_number is assigned by the CBC for messages initiated by the CBC. When the value is assigned by the CMSP Gateway it may follow the format: <CMSP Gateway Identifier>- <message number> where <CMSP Gateway Identifier> is a unique string defined by the CMSP Gateway and <message number> is the number assigned by the CMSP Gateway to this message. When the value is assigned by the CBC, it may follow the format: <CBC Identifier> - <message number> where <CBC Identifier> is a unique string defined by the CBC and <message number> is the number assigned by the CBC to this message. The CBC shall be responsible for generating and required mapping of the CBEM_message_number to any CBS parameters, such as the Serial Number parameter.
CBEM_referenced_message_number	C	Identifies the referenced message number. This is used in CBEM message types of Cancel CBS Request, Ack, and Error. For Cancel CBS Request message types, this is used to associate the message with the previous message to be cancelled. For Ack and Error message types, this is used to associate the Ack and Error to the message received from the sending entity (Initial CBS Request, Cancel CBS Request, Transmission Control – Cease, or Transmission Control – Resume). CBEM_referenced_message_number is a string uniquely identifying the message. When the value is assigned by the CMSP Gateway, it may follow the format: <CMSP Gateway Identifier>- <message number> where <CMSP Gateway Identifier> is a unique string defined by the CMSP Gateway and <message number> is the number assigned by the CMSP Gateway to this message. When the value is assigned by the CBC, it may follow the format: <CBC Identifier>- <message number> where <CBC Identifier> is a unique string defined by the CBC and <message number> is the number assigned by the CBC to this message.

CBEM Element	Mandatory/ Optional/ Conditional	Definition
CBEM_message_type	M	This element identifies the message type for the request to the CBC. Code Values: "**Initial CBS Request**" – A request to initiate a cell broadcast message with the information contained in the CBEM_CBS_Message_Info segment. "**Cancel CBS Request**" – Cancels the earlier message(s) identified in <CBEM_ referenced_ message_ identifier>. "**Ack**" – Acknowledges receipt and acceptance of the message(s) identified in <CBEM_referenced_message_number>. "**Error**" indicates rejection of the message(s) identified in <CBEM_referenced_message_number>; explanation should appear in <CBEM_response_description>. "**Transmission Control – Cease**" indicates the far end is to cease transmission. "**Transmission Control – Resume**" indicates the far end may resume transmission.
CBEM_CBS_message_id	C	Required for Initial CBS Request or Cancel CBS Request message type. Identifies the Cell Broadcast message id of the CBEM message. Code values are defined in 3GPP TS 23.041 [Ref 1].
CBEM_CBS_message_serial_number	C	Required only for the Ack message type returned by a CBC. Identifies the Serial Number assigned by the CBC to the Initial CBS Request message. The format is defined in 3GPP TS 23.041 [Ref 1].
CBEM_response_code	C	This element contains the CBEM Response Codes (see Clause 8.5, *Definition of CBEM Response Codes*) that may be returned from the CBC to the CMSP Gateway in response to a received CBS Initial Request message or from the CMSP Gateway to CBC in response to a received Transmission Control message via the CMSP Gateway to CBC interface. This element is included when necessary, based upon specific use case. Multiple instances may occur within a single <CBEM_CBS_Request> block. Each occurrence of the CBEM_response_code element should have a corresponding occurrence of the CBEM_response_description element.
CBEM_response_description	C	The CMSP Gateway or CBC may use the CBEM_response_description element to populate this element on response messages (see Clause 8.5, *Definition of CBEM Response Codes*). Multiple instances may occur within a single <CBEM_CBS_Request> block. Each occurrence of the CBEM_response_description element should have a corresponding occurrence of the CBEM_response_code element.
CBEM_operator_info	O	This element includes operator specific information for the bi-directional exchange of information between the CMSP Gateway and CBC. Multiple instances may occur within a single <CBEM_CBS_Request> block. The content, format, and structure of this element is out of scope of this Standard.

8.3.2 CBEM_CBS_Message_Info Segment Element Definition

The following table contains the definition of the elements of the CBEM_CBS_Message_Info segment:

Table 8.3: CBEM_CBS_Message_Info Segment Element Definition

CBEM Element	Mandatory/ Optional/ Conditional	Definition
CBEM_CBS_Message_Info	M	Identifies the segment with elements described in the following rows of this table. (1) Surrounds CBEM_CBS_Message_Info segment sub-elements. (2) Only a single occurrence is permitted within a single <CBEM_CBS_Request>. (3) Required for a CBEM_message_type of Initial CBS Request.
CBEM_data_coding_scheme	M	Identifies the alphabet or coding employed for the message characters. Code Values in accordance with 3GPP TS 23.038 [Ref 7]: "**GSM_7_Bit_Coding**" - Mobile device specific handling of messages using the GSM 7 bit default alphabet. "**Uncompressed 8 bit data**" - For a WHAM message (value 69).
CBEM_language	C	Identifies the language of the information in the CBS broadcast messages when CBEM_data_coding_scheme has a value of "**GSM_7_Bit_Coding**". Code Values: "**English**" "**Spanish**"
CBEM_repetition_period	M	This specifies the repetition period for the CBS message. This indicates the period of time in seconds after which broadcast of the CBS message should be repeated. The CBC will map the value of the repetition period into the repetition parameters of the associated air interface technology. See 3GPP TS 23.041 [Ref 1] for additional information.
CBEM_number_of_broadcasts_requested	M	This specifies the number of times the broadcast of CBS message is to be repeated. See 3GPP TS 23.041 [Ref 1] for additional information.

8.3.3 CBEM_CBS_Geotargeting_Info Segment Element Definition

The following table contains the definition of the elements of the CBEM_CBS_Geotargeting_Info segment:

Table 8.4: CBEM_CBS_Geotargeting_Info Segment Element Definition

CBEM Element	Mandatory/ Optional/ Conditional	CBEM Definition
CBEM_CBS_Geotargeting_Info	M	Identifies the segment with elements described in the following rows of this table. (1) Surrounds CBEM_CBS_Geotargeting_Info segment sub-elements. (2) Multiple instances are permitted within a single \<CBEM_CBS_Message_Info>, in which case the broadcast area is the union of all the included \<CBEM_CBS_Geotargeting_Info> blocks. (3) Required for a CBEM_message_type of Initial CBS Request. (4) At least one of the \<CBEM_geocode>, \<CBEM_polygon>, or \<CBEM_circle>elements must be included. If multiple \<CBEM_geocode> elements are included, the area described by this \<CBEM_CBS_Geotargeting_Info> is the union of the \<CBEM_geocode> elements. Optionally, a CMSP may use the \<CBEM_geocode>, the \<CBEM_polygon>, and/or the \<CBEM_circle> elements, depending on the targeting policies of the CMSP. The CMSP targeting policies are beyond the scope of this Standard.
CBEM_geocode_type	C	Required if CBEM_geocode element is included. Defines the type of encoding for the associated CBEM_geocode element. Code Values: "**SAME**" – NOAA National Weather Service (NWS) Specific Area Message Encoding (SAME) code. Other Code Values are not used in the current version of this standard.
CBEM_geocode	C	Required if CBEM_geocode_type element is included. The geographic code delineating the Cell Broadcast Area using the encoding type as defined in the CBEM_geocode_type element. Geocode values for a geocode type of **SAME** are defined at https://www.weather.gov/source/nwr/SameCode.txt
CBEM_polygon	C	The paired values of points defining a polygon that delineates the Cell Broadcast Area. Code Values: The code values of the geographic polygon are represented by a whitespace-delimited list of WGS-84 [Ref 5] coordinate pairs. The first and last pairs of coordinates must be the same. It is recommended that the maximum number of coordinate pairs be limited to 100.
CBEM_circle	C	The paired values of a point and radius delineating the Cell Broadcast Area. Code Values: The circular area is represented by a central point given as a WGS-84 [Ref 5] coordinates pair followed by a space character and a radius value in kilometers.

8.3.4 CBEM_CBS_Broadcast_Message Segment Element Definition

The following table contains the definition of the elements of the CBEM_CBS_Broadcast_Message segment:

Table 8.5: CBEM_CBS_Broadcast_Message Segment Element Definition

CBEM Element	Mandatory/ Optional/ Conditional	CBEM Definition
CBEM_CBS_Broadcast_Message	M	Identifies the segment with elements described in the following rows of this table. (1) Surrounds CBEM_CBS_Broadcast_Message segment sub-elements. (2) One instance is required but multiple instances are permitted within a single <CBEM_CBS_Message_Info> segment. (3) Only one instance for each network type specified by <CBEM_network> can be included.
CBEM_broadcast_text	M	Identifies the message that that shall be broadcast via the network(s) indicated by the CBEM_network element.

CBEM_network	M	Identifies the radio access network(s) on which the CBEM_broadcast_message shall be broadcast.
		Codes Values:
		  "**GSM**"
		  "**UMTS**"
		  "**LTE**"
		  "**5G**"
		Each radio access network listed above can only be selected at most once per CBEM message.

CBEM_warning_area_coordinates	O	Contains the Warning Area Coordinates to be included in the CBS message broadcast. This element shall be coded in Base64 [Ref 15] and the format shall be according to ATIS-0700041 [Ref 16].

8.4 Definition of CBEM Message XML Schema

The XML definition of the CBEM message XML Schema is provided in normative Annex A.

8.5 Definition of CBEM Response Codes

The following table defines the response codes and the response descriptions that may be returned from the CBC to the CMSP Gateway in the CBEM_response_code and CBEM_response_description elements in response to a message received via the CMSP Gateway to CBC interface:

Table 8.6: Definition of CBEM Response Codes

Response Code	Response Description included in CBEM_response_description Element	Notes
100	invalid-sender-id	The sender identifier is not valid.
101	protocol – version-not-supported	The CMSP Gateway/CBC does not support the indicated protocol version.
102	server-error	General error in the CMSP Gateway/CBC server.
103	invalid-format	The received XML has an invalid format.
104	invalid-element XXX	XXX identifies the name of the invalid element.
105	missing-element XXX	XXX identifies the name of the missing element.
106	operation-not-allowed	The requested operation is not allowed.

Response Code	Response Description included in CBEM_response_description Element	Notes
107	missing-geo-targeting-area	No geo-targeting information element provided in the CBEM geo-targeting segment.

9   CBEM Message Types & Examples

This clause describes the message types of the CMSP Gateway to CBC messages. The description for each message type includes the message elements, message XML Schema, and example XML message. The following message types are described in this clause:

- Initial CBS Request message
- Cancel CBS Request message
- Acknowledgement Response
- Error Response
- CBC-to-CMSP Gateway Transmission Control – Cease message
- CBC-to-CMSP Gateway Transmission Control – Resume message

9.1   Initial CBS Request Message

An Initial CBS Request message shall consist of a CBEM message containing one CBEM_CBS_Request segment, one CBEM_CBS_Message_Info segment, one or more CBEM_CBS_Geotargeting_Info segments, and one or more CBEM_CBS_Broadcast_Message segments.

The following table summarizes the CBEM elements that may be included in the CBEM_CBS_Request segment for an Initial CBS Request message from the CMSP Gateway to the CBC:

Table 9.1: Elements of CBEM_CBS_Request Segment for Initial CBS Request Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the CMSP Gateway which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_message_type	Value of "Initial CBS Request".
CBEM_CBS_message_id	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_operator_info	Inclusion based upon operator policy per Table 8.2: CBEM_CBS_Request Segment Element Definition:.

The following table summarizes the CBEM elements that may be included in the CBEM_CBS_Message_Info segment for an Initial CBS Request message from the CMSP Gateway to the CBC:

Table 9.2: Elements of CBEM_CBS_Message_Info Segment for Initial CBS Request Message

CBEM Element	Value
CBEM_data_coding_scheme	Per Table 8.3: CBEM_CBS_Message_Info Segment Element Definition.
CBEM_language	Per Table 8.3: CBEM_CBS_Message_Info Segment Element Definition.
CBEM_repetition_period	Per Table 8.3: CBEM_CBS_Message_Info Segment Element Definition.
CBEM_number_of_broadcasts_requested	Per Table 8.3: CBEM_CBS_Message_Info Segment Element Definition.

The following table summarizes the CBEM elements that may be present in the CBEM_CBS_Geotargeting_Info segment for an Initial CBS Request message from the CMSP Gateway to the CBC:

Table 9.3: Elements of CBEM_CBS_Geotargeting_Info Segment for Initial CBS Request Message

CBEM Element	Value
CBEM_geocode_type	Per Table 8.4: CBEM_CBS_Geotargeting_Info Segment Element Definition.
CBEM_geocode	Per Table 8.4: CBEM_CBS_Geotargeting_Info Segment Element Definition.
CBEM_polygon	Per Table 8.4: CBEM_CBS_Geotargeting_Info Segment Element Definition.
CBEM_circle	Per Table 8.4: CBEM_CBS_Geotargeting_Info Segment Element Definition.

The following table summarizes the required CBEM elements of the CBEM_CBS_Broadcast_Message segment for a Initial CBS Request message from the CMSP Gateway to the CBC:

Table 9.4: Elements of CBEM_CBS_Broadcast_Message Segment for Initial CBS Request Message

CBEM Element	Value
CBEM_broadcast_text	Per Table 8.5: CBEM_CBS_Broadcast_Message Segment Element Definition.
CBEM_network	Per Table 8.5: CBEM_CBS_Broadcast_Message Segment Element Definition.
CBEM_warning_area_coordinates	Per Table 8.5: CBEM_CBS_Broadcast_Message Segment Element Definition.

The following is an example Initial CBS Request message from the CMSP Gateway to the CBC in XML format:

```xml
<?xml version = "1.0" encoding = "UTF-8"?>
<CBEM_CBS_Request xmlns="cbem:2.0">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cmsp_gateway.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CMSP-Gateway-2021-1056</CBEM_message_number>
    <CBEM_message_type>Initial CBS Request</CBEM_message_type>
    <CBEM_CBS_message_id>4373</CBEM_CBS_message_id>
    <CBEM_CBS_Message_Info>
        <CBEM_data_coding_scheme>GSM_7_Bit_Coding</CBEM_data_coding_scheme>
        <CBEM_language>English</CBEM_language>
        <CBEM_repetition_period>500</CBEM_repetition_period>
        <CBEM_number_of_broadcasts_requested>50</CBEM_number_of_broadcasts_requested>
        <CBEM_CBS_Geotargeting_Info>
            <CBEM_geocode_type>SAME</CBEM_geocode_type>
            <CBEM_geocode>004005</CBEM_geocode>
            <CBEM_polygon>47.786287,-123.032167 47.242667,-122.141755 47.610228,-
            121.819798 47.786287,-123.032167</CBEM_polygon>
        </CBEM_CBS_Geotargeting_Info>
        <CBEM_CBS_Broadcast_Message>
            <CBEM_broadcast_text>Severe Weather Warning in this area until 4:15pm
                MST
                NWS
            </CBEM_broadcast_text>
            <CBEM_network>GSM UMTS</CBEM_network>
        </CBEM_CBS_Broadcast_Message>
        <CBEM_CBS_Broadcast_Message>
            <CBEM_broadcast_text>
                Severe Weather Warning in this area until 4:15pm
                MST. Stay
                indoors and
```

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```
                close doors and windows. NWS
            </CBEM_broadcast_text>
                            <CBEM_network>5G LTE</CBEM_network>
            <CBEM_warning_area_coordinates>
                IGDD9nSICrwzCIpJMcO2XKV9jD9nSICr</CBEM_warning_area_coordinates>
            </CBEM_CBS_Broadcast_Message>
        </CBEM_CBS_Message_Info>
    </CBEM_CBS_Request>
```

NOTE: The CBEM_warning_area_coordinates element is constructed from the coordinates of CBEM_Polygon (as shown above) based on the formulae defined in ATIS-0700041 [Ref 16].

9.2 Cancel CBS Request Message

A Cancel CBS Request message shall consist of a CBEM message containing one CBEM_CBS_Request segment.

The following table summarizes the required CBEM elements of the CBEM_CBS_Request segment:

Table 9.5: Elements of CBEM_CBS_Request Segment for Cancel CBS Request Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the CMSP Gateway which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_referenced_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition. Specifies the number of the message to be cancelled.
CBEM_message_type	Value of "Cancel CBS Request".
CBEM_CBS_message_id	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_operator_info	Inclusion based upon operator policy per Table 8.2: CBEM_CBS_Request Segment Element Definition.

The following is an example Cancel CBS message from the CMSP Gateway to the CBC in XML format:

```
<?xml version = "1.0" encoding = "UTF-8"?>
<CBEM_CBS_Request xmlns="cbem:2.0">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cmsp_gateway.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CMSP-Gateway-2021-1088</CBEM_message_number>
    <CBEM_referenced_message_number>ATT-CMSP-Gateway-2021-1056
    </CBEM_referenced_message_number>
    <CBEM_message_type>Cancel CBS Request</CBEM_message_type>
    <CBEM_CBS_message_id>4373</CBEM_CBS_message_id>
</CBEM_CBS_Request>
```

9.3 Acknowledgement Response

An acknowledgement message sent on the CBEM Message interface shall consist of a CBEM message containing one CBEM_CBS_Request segment.

The following table summarizes the CBEM elements that may be present in the CBEM_CBS_Request segment:

Table 9.6: Elements of CBEM_CBS_Request Segment for Acknowledgement Response Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the entity which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_CBS_message_serial_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_referenced_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition. Specifies the number of the message to be acknowledged.
CBEM_message_type	Value of "Ack".
CBEM_operator_info	Inclusion based upon operator policy per Table 8.2: CBEM_CBS_Request Segment Element Definition.

The following is an example acknowledgement response message from the CBC to the CMSP Gateway in XML format:

```
<?xml version = "1.0" encoding = "UTF-8"?>
<CBEM_CBS_Request xmlns="cbem:2.0">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cell_broadcast_center.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CBC-2021-1095</CBEM_message_number>
    <CBEM_CBS_message_serial_number>16752</CBEM_CBS_message_serial_number>
    <CBEM_referenced_message_number>ATT-CMSP-Gateway-2021-1056
               </CBEM_referenced_message_number>
    <CBEM_message_type>Ack</CBEM_message_type>
</CBEM_CBS_Request>
```

9.4 Error Response

An error response message sent from on the CBEM message interface shall consist of a CBEM message containing one CBEM_CBS_Request segment.

The following table summarizes the required CBEM elements of the CBEM_CBS_Request segment:

Table 9.7: Elements of CBEM_CBS_Request Segment for Error Response Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the entity which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_referenced_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition. Specifies the number of the message containing the error.
CBEM_message_type	Value of "Error".
CBEM_response_code	Per Table 8.6: Definition of CBEM Response Codes.
CBEM_response_description	Per Table 8.6: Definition of CBEM Response Codes.
CBEM_operator_info	Inclusion based upon operator policy per Table 8.2: CBEM_CBS_Request Segment Element Definition.

The following is an example error response message from the CBC to the CMSP Gateway in XML format:

```
<?xml version = "1.0" encoding = "UTF-8"?>
```

```
<CBEM_CBS_Request xmlns="cbem:2.0">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cell_broadcast_center.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CMSP-Gateway-2021-1097</CBEM_message_number>
    <CBEM_referenced_message_number>ATT-CMSP-Gateway-2021-1056
    </CBEM_referenced_message_number>
    <CBEM_message_type>Error</CBEM_message_type>
    <CBEM_response>
          <CBEM_response_code>103</CBEM_response_code>
          <CBEM_response_description>invalid-format</CBEM_response_description>
    </CBEM_response>
</CBEM_CBS_Request>
```

9.5 CBC-to-CMSP Gateway Transmission Control – Cease Message

The CBC may have a mechanism to inform the CMSP Gateway of maintenance or other error situations during which period the CBC cannot receive any messages from the CMSP Gateway.

Mechanism for requesting this action may include:

- Sending a Transmission Control - Cease message as a result of an error or other condition at the CBC.
- CBC may request transmissions be ceased via a maintenance command on the CBC or internal error processing, whereby the CBC shall have the capability to initiate a message to the CMSP Gateway to cease transmissions.

A Transmission Control - Cease message sent from the CBC to the CMSP Gateway shall consist of a CBEM message containing one CBEM_CBS_Request segment. The following table summarizes the required CBEM elements of the CBEM_CBS_Request segment:

Table 9.8: Elements of CBEM_CBS_Request Segment for Transmission Control - Cease Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the CBC which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_message_type	Value of "Transmission Control - Cease".

The following is an example Transmission Control - Cease message from the CBC to the CMSP Gateway in XML format:

```
<?xml version = "1.0" encoding = "UTF-8"?>
<CBEM_CBS_Request xmlns="cbem:2.0">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cell_broadcast_center.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CMSP-Gateway-2021-1077</CBEM_message_number>
    <CBEM_message_type>Transmission Control - Cease</CBEM_message_type>
</CBEM_CBS_Request>
```

Upon receipt of the CBC-initiated Transmission Control – Cease message, the CMSP Gateway shall validate the received transmission control message and shall send an Acknowledgement Response (see Clause 9.33) back to the CBC. The CBC may choose to ignore that Acknowledgement Response message for a Transmission Control – Cease request.

9.6 CBC-to-CMSP Gateway Transmission Control – Resume Message

If the optional transmission control mechanism is supported, once the maintenance or error condition is cleared, the CBC shall inform the CMSP Gateway that transmission of messages may resume using a Transmission Control - Resume message.

A Transmission Control - Resume message sent from the CBC to the CMSP Gateway shall consist of a CBEM message containing one CBEM_CBS_Request segment. The following table summarizes the required CBEM elements of the CBEM_CBS_Request segment:

Table 9.9: Elements of CBEM_CBS_Request Segment for Transmission Control - Resume Message

CBEM Element	Value
CBEM_protocol_version	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_sender_id	Identifies the CBC which initiated the CBEM message.
CBEM_message_number	Per Table 8.2: CBEM_CBS_Request Segment Element Definition.
CBEM_message_type	Value of "Transmission Control - Resume".

The following is an example Transmission Control - Resume message from the CBC to the CMSP Gateway in XML format:

```xml
<?xml version = "1.0" encoding = "UTF-8"?>
<CBEM_CBS_Request xmlns="cbem:2.0" xmlns:test="test">
    <CBEM_protocol_version>2.0</CBEM_protocol_version>
    <CBEM_sender_id>http://att_cell_broadcast_center.com</CBEM_sender_id>
    <CBEM_message_number>ATT-CMSP-Gateway-2021-1078</CBEM_message_number>
    <CBEM_message_type>Transmission Control - Resume</CBEM_message_type>
</CBEM_CBS_Request>
```

Upon receipt of the CBC-initiated Transmission Control – Resume message, the CMSP Gateway shall validate the received transmission control message and shall send an Acknowledgement Response (see Clause 9.33) back to the CBC.

A   CBEM Message XML Schema

This normative annex provides the XML Schema definition for the CBEM message.

```xml
<?xml version = "1.0" encoding = "UTF-8"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema" targetNamespace="cbem:2.0"
    xmlns:cbem="cbem:2.0" xmlns:xs="http://www.w3.org/2001/XMLSchema"
    elementFormDefault="qualified" attributeFormDefault="unqualified">

    <simpleType name="CBEM_network">
        <restriction base="string">
            <enumeration value="GSM" />
            <enumeration value="UMTS" />
            <enumeration value="LTE" />
            <enumeration value="5G" />
        </restriction>
    </simpleType>

    <element name="CBEM_CBS_Request">
        <annotation>
            <documentation>CBEM CBS Request (version 2.0)</documentation>
        </annotation>
        <complexType>
            <sequence>
                <element name="CBEM_protocol_version" type="string" />
                <element name="CBEM_sender_id" type="anyURI" />
                <element name="CBEM_message_number" type="string" />
                <element name="CBEM_referenced_message_number" type="string"
                    minOccurs="0" />
                <element name="CBEM_message_type">
                    <simpleType>
                        <restriction base="string">
                            <enumeration value="Initial CBS Request" />
                            <enumeration value="Cancel CBS Request" />
                            <enumeration value="Ack" />
                            <enumeration value="Error" />
                            <enumeration value="Transmission Control - Cease" />
                            <enumeration value="Transmission Control - Resume" />
                        </restriction>
                    </simpleType>
                </element>
                <element name="CBEM_CBS_message_id" type="string" minOccurs="0" />
                <element name="CBEM_CBS_message_serial_number" type="string" minOccurs="0" />
                <element name="CBEM_response" minOccurs="0" maxOccurs="unbounded">
                    <complexType>
                        <sequence>
                            <element name="CBEM_response_code" type="integer" />
                            <element name="CBEM_response_description" type="string"
                                minOccurs="0" maxOccurs="unbounded" />
                        </sequence>
                    </complexType>
```

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```
</element>
<element name="CBEM_operator_info" minOccurs="0" maxOccurs="unbounded">
        <complexType>
                <sequence minOccurs="0" maxOccurs="unbounded">
                        <any minOccurs="0" maxOccurs="unbounded" />
                </sequence>
        </complexType>
</element>
<element name="CBEM_CBS_Message_Info" minOccurs="0">
        <complexType>
                <sequence>
                        <element name="CBEM_data_coding_scheme">
                                <simpleType>
                                        <restriction base="string">
                                                <enumeration value="GSM_7_Bit_Coding" />
                                        </restriction>
                                </simpleType>
                        </element>
                        <element name="CBEM_language" minOccurs="0">
                                <simpleType>
                                        <restriction base="string">
                                                <enumeration value="English" />
                                                <enumeration value="Spanish" />
                                        </restriction>
                                </simpleType>
                        </element>
                        <element name="CBEM_repetition_period">
                                <simpleType>
                                        <restriction base="integer">
                                                <minInclusive value="0" />
                                                <maxInclusive value="131071" />
                                        </restriction>
                                </simpleType>
                        </element>
                        <element name="CBEM_number_of_broadcasts_requested">
                                <simpleType>
                                        <restriction base="integer">
                                                <minInclusive value="0" />
                                                <maxInclusive value="65535" />
                                        </restriction>
                                </simpleType>
                        </element>
                        <element name="CBEM_CBS_Geotargeting_Info" minOccurs="0"
                                maxOccurs="unbounded">
                                <complexType>
                                        <sequence>
                                                <element name="CBEM_geocode_type" minOccurs="0"
                                                        maxOccurs="unbounded">
```

```
                                    <simpleType>
                                            <restriction base="string">
                                                    <enumeration value="SAME" />
                                            </restriction>
                                    </simpleType>
                            </element>
                            <element name="CBEM_geocode" type="string" minOccurs="0"
                                    maxOccurs="unbounded" />
                            <element name="CBEM_polygon" type="string" minOccurs="0"
                                    maxOccurs="unbounded" />
                            <element name="CBEM_circle" type="string" minOccurs="0"
                                    maxOccurs="unbounded" />
                    </sequence>
            </complexType>
    </element>
    <element name="CBEM_CBS_Broadcast_Message" maxOccurs="unbounded">
            <complexType>
                    <sequence>
                            <element name="CBEM_broadcast_text" type="string" />
                            <element name="CBEM_warning_area_coordinates" minOccurs="0"
type ="string" />

                            <element name="CBEM_network">
                                    <simpleType>
                                            <list itemType="cbem:CBEM_network" />
                                    </simpleType>
                            </element>
                    </sequence>
            </complexType>
    </element>
                    </sequence>
            </complexType>
    </element>
            </sequence>
        </complexType>
    </element>
</schema>
```

B   CBE – CBC vs CMSP GW – CBC Protocol Compared

ATIS-0700008 [Ref 17] specifies the generic CBE – CBC interface protocol while the present specification specifies the WEA specific CMSP Gateway – CBC interface protocol. A CMSP Gateway is an instantiation of a CBE. The following differences occur when comparing the CBE – CBC interface protocol specification with the CMSP Gateway – CBC interface protocol specification.

The CMSP Gateway – CBC protocol does not support:

- the CBEM_message_type code value "Update CBS Request";
- any CBEM_data_coding_scheme code value except the value "GSM_7_Bit_Coding" and "Uncompressed 8 bit data";
- any CBEM_language code value except the values "English" and "Spanish";
- ahe CBEM_displaymode element;
- the CBEM_gnis element;
- any CBEM_geocode code value except the value "SAME";
- the CBEM_start_date_time element.

The CBE – CBC interface specification ATIS-0700008 [Ref 17] does not support:

- the CBEM_operator_info element;
- the CBEM_network element;
- the CBEM_CBS_message_serial_number element;
- the CBEM_warning_area_coordinates element.