ATIS-0700006.v002

Enhanced Wireless Emergency Alert (eWEA) via GSM/UMTS Cell Broadcast Service Specification

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ATIS Standard on

Enhanced Wireless Emergency Alert (eWEA) via GSM/UMTS Cell Broadcast Service Specification

Alliance for Telecommunications Industry Solutions

Approved February 2018

Abstract

This Standard describes the use of the GSM/UMTS Cell Broadcast Service for the broadcast of WEA messages and includes the mapping of WEA application level messages to the Cell Broadcast Service message structure. 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:

> D. Zelmer, WTSC Chair (AT&T)
> M. Younge, WTSC Vice Chair (T-Mobile)
> P. Musgrove, WTSC SN Chair (AT&T)
> G. Schumacher, WTSC SN Vice Chair (Sprint)
> P. Sanders, Technical Editor (one2many)

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

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Preface

The authority-to-individual emergency alerting capability to mobile devices was originally called Commercial Mobile Alert System (CMAS) in the first three Reports and Orders from the FCC. This standard was originally developed based upon the CMAS terminology and CMAS was operational in April 2012. However, in February 2013, the FCC renamed CMAS to Wireless Emergency Alerts (WEA) with associated updates to the appropriate sections of Part 11 of the 47 CFR. Subsequently, the FCC has issued additional enhancements and rules for this government-to-individual emergency alerting capability to mobile devices, and these are identified as modifications to WEA.

Consequently, this specification may use both the term CMAS and the term WEA. These terms should be considered as equivalent terms, with WEA being the preferred term.

This ATIS specification is based upon the WEA enhancements identified in the September 2016 FCC Report & Order on WEA Enhancements, FCC 16-127 [Ref 5]. This specification supersedes ATIS-0700006, *CMAS via GSM/UMTS Cell Broadcast Service Specification,* and its associated Supplement A. Any assumptions, requirements, and principles from the original published ATIS-0700006 and the associated ATIS-0700006 Supplement A applicable to eWEA are included in this ATIS Standard.

1   Scope, Purpose, & Application

1.1 Scope

The scope of this standard is the support of Enhanced Wireless Emergency Alert (eWEA) via the Global System for Mobile Communications (GSM)/Universal Mobile Telecommunications System (UMTS) Cell Broadcast Service. This standard covers the mapping of eWEA messages onto the 3GPP-defined Cell Broadcast Service.

This standard is not intended to describe an overall end-to-end eWEA or Cell Broadcast architecture and may include clarifications of Cell Broadcast Service that may be lacking in existing 3GPP specifications. The implementation guidelines and best practices for the Cell Broadcast Service are provided in a separate ATIS Standard [Ref 4] which contains clarifications applicable to any application that uses the Cell Broadcast Service and is not necessarily restricted to eWEA.

eWEA does not require modifications to the 3GPP-defined Cell Broadcast Service.

The eWEA interface with the Federal network and the mobile device behavior upon reception of a eWEA alert is specified in separate standards [Ref 8 and 9].

> NOTE: ATIS-0700036, *eWEA Mobile Device Behavior (MDB) Specification (a revised version of J-STD-100)* [Ref 9], also supports the eWEA functionality of this Standard even though this access technology is not explicitly referred in the eWEA mobile device behavior specification.

1.2 Purpose

The purpose of this standard is to describe the use of the GSM/UMTS Cell Broadcast Service for the broadcast of eWEA messages. The standard includes the mapping of eWEA application level messages to the Cell Broadcast Service message structure.

1.3 Application

This standard is applicable to the mapping of eWEA messages to the Cell Broadcast Service on GSM or UMTS networks.

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] FCC 08-99, *Federal Communications Commission First Report and Order In the Matter of The Commercial Mobile Alert System*; April 9, 2008.[1]

[Ref 2] 3GPP TS 23.041, *3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Technical realization of Cell Broadcast Service (CBS).*[2]

[Ref 3] 3GPP TS 25.419, *3rd Generation Partnership Project; Technical Specification Group RAN; UTRAN Iu-BC Interface: Service Area Broadcast Protocol (SABP).*[2]

[Ref 4] ATIS-0700007, *Implementation Guidelines and Best Practices for GSM/UMTS Cell Broadcast Service Specification.*[3]

[Ref 5] FCC 16-127, *Federal Communications Commission Report and Order and Further Notice of Proposed Rulemaking In the Matter of Wireless Emergency Alerts Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System*; September 29, 2016.[1]

[Ref 6] INCITS 31-2009, *Codes for the Identification of Counties and Equivalent Areas of the United States, Puerto Rico, and the Insular Areas;* International Committee for Information Technology Standards (INCITS).[4]

[Ref 7] WARN Act, *Security and Accountability For Every Port Act of 2006 (SAFE Port Act)*, Pub.L. 109-347, *Title VI-Commercial Mobile Service Alerts (WARN Act).*[5]

[Ref 8] ATIS-0700037, *Enhanced Wireless Emergency Alert (eWEA) Federal Alert Gateway to CMSP Gateway Interface Specification (a revised version of J-STD-101).*[3]

[Ref 9] ATIS-0700036, *Enhanced Wireless Emergency Alert (eWEA) Mobile Device Behavior (MDB) Specification (a revised version of J-STD-100).*[3]

[Ref 10] 3GPP TS 23.038, *3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Alphabets and language-specific information.*[2]

[Ref 11] ISO/IEC 10646:2017, *Information technology -- Universal Coded Character Set (UCS).*[6]

[Ref 12] FCC 08-164, *Federal Communications Commission Second Report and Order and Further Notice of Proposed Rulemaking In the Matter of The Commercial Mobile Alert System*; July 8, 2008.[1]

[Ref 13] FCC 08-184, *Federal Communications Commission Third Report and Order and Further Notice of Proposed Rulemaking In the Matter of The Commercial Mobile Alert System*; August 7, 2008.[1]

[Ref 14] FCC 08-166, *Federal Communications Commission Order on Reconsideration and Erratum In the Matter of The Commercial Mobile Alert System*; July 15, 2008.[1]

[Ref 15] 3GPP TS 25.324, *3rd Generation Partnership Project; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Broadcast/Multicast Control (BMC).*[2]

[Ref 16] ATIS-0700008.v002, *Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification.*[3]

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[1] This document is available from the Federal Communications Commission. < http://www.fcc.gov/ >

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

[3] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS). < http://www.atis.org >

[4] 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 >

[5] This document is available from the U.S. Government Printing Office. < http://www.gpo.gov/ >

[6] This document is available from the International Organization for Standardization (ISO). < http://www.iso.org >

[Ref 17] 3GPP TR 25.925, *3rd Generation Partnership Project; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio interface for broadcast/multicast service.*[2]

[Ref 18] 3GPP TS 44.012, *3rd Generation Partnership Project; 3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface.*[2]

[Ref 19] 3GPP TS 48.049, *Base Station Controller - Cell Broadcast Centre (BSC-CBC) interface specification; Cell Broadcast Service Protocol (CBSP).*[2]

[Ref 20] ATIS-0700035, *Enhanced Wireless Emergency Alert (eWEA) Service Description.*[3]

[Ref 21] ATIS-0700010.v002, *Enhanced Wireless Emergency Alert (eWEA) via EPS Public Warning System Specification.*[3]

[Ref 22] IETF RFC 3986, *Uniform Resource Identifiers (URIs).*[7]

3   Definitions, Acronyms, & Abbreviations

3.1 Definitions

The following definitions are taken from the FCC First Report and Order for the Commercial Mobile Alert System [Ref 1], and from the FCC Report and Order on WEA enhancements [Ref 5]:

3.1.1   Alert Message: An Alert Message is a message that is intended to provide the recipient information regarding an emergency, and that meets the requirements for transmission by a Participating Commercial Mobile Service Provider as defined in the FCC First Report and Order for the Commercial Mobile Alert System [Ref 1].

3.1.2   Commercial Mobile Alert System: The Commercial Mobile Alert System (CMAS) refers to the voluntary emergency alerting system defined in the FCC First Report and Order [Ref 1], whereby Commercial Mobile Service Providers may elect to transmit Alert Messages to the public.

3.1.3   Commercial Mobile Service Provider: A Commercial Mobile Service Provider (or CMS Provider) is an FCC licensee providing commercial mobile service as defined in section 332 (d)(1) of the Communications Act of 1934 (47 U.S.C. 332(d)(1)). Section 332(d)(1) defines the term *commercial mobile service* as any mobile service (as defined in 47 U.S.C. 153) that is provided for profit and makes interconnected service available (a) to the public or (b) to such classes of eligible users as to be effectively available to a substantial portion of the public, as specified by regulation by the Federal Communications Commission.

3.1.4   County and County Equivalent: Counties are considered to be the "first-order subdivisions" of each State and statistically equivalent entity, regardless of their local designations (county, parish, borough, etc.). Thus, the following entities are considered to be equivalent to counties for legal and/or statistical purposes: The parishes of Louisiana; the boroughs and census areas of Alaska; the District of Columbia; the independent cities of Maryland, Missouri, Nevada, and Virginia; that part of Yellowstone National Park in Montana; and various entities in the possessions and associated areas. Per the INCITS 31-2009 standard [Ref 6], the FIPS codes for county and county equivalents are maintained by the American National Standards Institute (ANSI) and are publicly available at < https://www.census.gov/geo/reference/codes/cou.html >. As of 30 June 2017, there were 3,235 identified county and county equivalents.

3.1.5   Enhanced Wireless Emergency Alert (eWEA): A continued provision of effective WEA Alert Messages while leveraging advancements in technology to improve WEA's capabilities as defined in the September 29, 2016, FCC Report and Order on WEA Enhancements, FCC 16-127 [Ref 5].

3.1.6   Participating Commercial Mobile Service Provider: A Participating Commercial Mobile Service Provider (or a Participating CMS Provider) is a Commercial Mobile Service Provider that has voluntarily elected to transmit Alert Messages.

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

3.2 Acronyms & Abbreviations

ANSI	American National Standards Institute
ATIS	Alliance for Telecommunications Industry Solutions
BMC	Broadcast/Multicast Control
BSC	Base Station Controller
BTS	Base Transceiver Station
CB	Cell Broadcast
CBC	Cell Broadcast Center
CBCH	Cell Broadcast Channel
CBE	Cell Broadcast Entity
CBEM	Cell Broadcast Entity Message
CBS	Cell Broadcast Service
CMAC	Commercial Mobile Alert for C Interface
CMAM	Commercial Mobile Alert Message
CMAS	Commercial Mobile Alert System
CMSP	Commercial Mobile Service Provider
CTCH	Common Traffic Channel
EOC	Emergency Operations Center
eWEA	Enhanced Wireless Emergency Alert
FCC	Federal Communications Commission
FIPS	Federal Processing Series
GSM	Global System for Mobile Communications
INCITS	International Committee for Information Technology Standards
NCE	Noncommercial Educational Broadcast Television Station
OA&M	Operations, Administration, and Maintenance
PWS	Public Warning System
RMT	Required Monthly Test
RNC	Radio Network Controller
SAME	Specific Area Message Encoding
TIA	Telecommunications Industry Association
UMTS	Universal Mobile Telecommunications System
WARN	Warning, Alert, & Response Network
WEA	Wireless Emergency Alert
XML	eXtensible Markup Language

4 WARN Act

As part of the Security and Accountability For Every Port Act of 2006 (SAFE Port Act), the Warning Alert and Response Network (WARN) Act[8] [Ref 7] was passed by Congress in September 2006 and was signed into law by President Bush on October 13, 2006.

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[8] Security and Accountability For Every Port Act of 2006 (SAFE Port Act), Pub.L. 109-347, Title VI-Commercial Mobile Service Alerts (WARN Act).

Within the WARN Act, Congress defined Commercial Mobile Service Providers (CMSPs) as "*any licensee providing commercial mobile service (as defined in section 332(d)(1) of the Communications Act of 1934 (47 U.S.C. 332(d)(1)))*."[9]

4.1 Key WARN Act Requirements

The following is a summary of requirements in the WARN Act. Note not all requirements may be applicable to this standard, but are listed here for completeness. The requirements stated below are taken from the WARN Act [Ref 7] and the reader should assume that term "commercial mobile service operators" and "commercial mobile service licensee" are synonymous with the term "commercial mobile service provider (CMSP)" defined in clause 3, *Definitions, Acronyms, & Abbreviations*.

1. Commercial mobile service operators may voluntarily elect to transmit emergency alerts.
2. A commercial mobile service operator who elects to transmit emergency alerts agrees to do so in a manner consistent with the technical standards, protocols, procedures, and other technical requirements implemented by the Commission.[10]
3. A commercial mobile service operator who elects to transmit emergency alerts can elect to transmit the emergency alert services in whole or in part.[11]
   > NOTE: The CMSAAC interpreted the definition of "in whole or in part" to be "all or a subset of the mobile operator's service area and/or all or a subset of current and future mobile devices supported by the mobile operator network".
4. A commercial mobile service operator who elects in whole or in part *not* to transmit emergency alerts:
   a. Must provide clear and conspicuous notice at point-of-sale of any devices with which its commercial mobile service is included, that it will not transmit such alerts via the service it provides for the device.[12]
   b. Must provide notification of this decision to its existing subscribers.[13]
   c. Shall not by itself provide a basis for liability against the provider (including its officers, directors, employees, vendors, and agents).[14]
5. Commercial mobile service licensee may not impose a separate or additional charge for such transmission or capability.[15]
6. Any commercial mobile service licensee electing to transmit emergency alerts may offer subscribers the capability of preventing the subscriber's device from receiving such alerts, or classes of such alerts, other than an alert issued by the President.[16]
   a. Based upon the above WARN Act requirement, eWEA is considered to be an opt-out by the subscribers with the initial default configuration being that all emergency alerts are enabled.
7. Commercial mobile service providers who elect to transmit emergency alerts may transmit in languages in addition to English to the extent practical and feasible.[17]
   > NOTE: The FCC superseded this requirement in the FCC First Report and Order [Ref 1]. See clause 4.2.1.
8. Any commercial mobile service provider that transmits emergency alerts and meets it obligations shall not be liable to any subscriber to, or user of, such person's service or equipment for:
   a. Any act or omission related to or any harm resulting from the transmission of, or failure to transmit, an emergency alert.[18]

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[9] WARN Act § 602(b)(1)(A).
[10] WARN Act § 602(b)(2)(B)(ii).
[11] WARN Act § 602(b)(1)(B).
[12] WARN Act § 602(b)(1)(B).
[13] WARN Act § 602(b)(1)(C).
[14] WARN Act § 602(e)(2).
[15] WARN Act § 602(b)(2)(C).
[16] WARN Act § 602(b)(2)(E) and § 603(c)(5).
[17] WARN Act § 602(c)(4).
[18] WARN Act § 602(e)(1)(A).

b. The release to a government agency or entity, public safety, fire service, law enforcement official, emergency medical service, or emergency facility of subscriber information used in connection with delivering such an alert.[19]

4.2 FCC Report & Orders

This clause provides an overview of the FCC First Report and Order [Ref 1], Second Report and Order [Ref 12], Third Report and Order [Ref 13] for the Commercial Mobile Alert System, and the FCC Report & Order on WEA enhancements, FCC 16-127 [Ref 5].

4.2.1 FCC First Report and Order

The FCC released the First Report and Order for the Commercial Mobile Alert System on April 9, 2008 [Ref 1]. This First Report and Order adopts the rules necessary to enable CMS alerting capability for CMS providers who elect to transmit emergency alerts to their subscribers, adopted the architecture for the CMAS (see 4.3, *Full Reference Diagram*), and concluded that a Federal Government entity should aggregate, authenticate, and transmit alerts over the Reference Point "C" interface to the CMS providers.

In addition, the First Report and Order adopts technologically neutral rules governing:

- *CMS provider-controlled elements within the CMAS architecture* (e.g., the CMS Provider Gateway, CMS Provider infrastructure and mobile devices);

- *Emergency alert formatting, classes, and elements*: Participating CMS Providers must transmit three classes of alerts - Presidential, Imminent Threat, and AMBER alerts;

- *Geographic targeting (geo-targeting)*: Participating CMS Providers generally are required to target alerts at the county-level as recommended by the CMSAAC;

- *Accessibility for people with disabilities and the elderly*: Participating CMS Providers must include an audio attention signal and vibration cadence on CMAS-capable handsets;

- *Multi-language Alerting*: Participating CMS Providers will not be required at this time to transmit alerts in languages other than English;

- *Availability of CMAS alerts while roaming*: Subscribers receiving services pursuant to a roaming agreement will receive alert messages on the roamed upon network if the operator of the roamed upon network is a Participating CMS provider and the subscriber's mobile device is configured for and technically capable of receiving alert messages from the roamed upon network; and

- *Preemption of calls in progress*: CMAS alerts may not preempt a voice or data session in progress.

The First Report and Order [Ref 1] specifies rules governing those sections of the eWEA architecture that are within the control of electing CMS providers. These include the CMS Provider Gateway, CMS provider infrastructure, and CMS provider handsets. The rules require each individual CMS Provider Gateway to be able to receive alerts from the Federal Alert Gateway over a secure interface (i.e., Reference Point "C" Interface).

> NOTE: On July 14, 2008, the FCC issued an Order on Reconsideration and Erratum [Ref 14].

4.2.2 FCC Second Report and Order

The FCC released the Second Report and Order for the Commercial Mobile Alert System on July 8, 2008 [Ref 12]. In the Second Report and Order, the FCC developed rules to be in compliance with section 602(c) of the WARN Act, which require non-commercial educational (NCE) and public broadcast television station licensees and permittees "to install necessary equipment and technologies on, or as part of, any broadcast television digital signal transmitter to enable the distribution of geographically targeted alerts by commercial mobile service providers that have elected to transmit emergency alerts…".

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[19] WARN Act § 602(e)(1)(B).

The Second Report and Order also defines rules to implement Section 602(f) of the WARN Act, which requires "technical testing for commercial mobile service providers that elect to transmit emergency alerts and for the devices and equipment used by such providers for transmitting such alerts". This technical testing is defined by the FCC rules to be a "Required Monthly Test" and "Periodic Interface Testing".

The Required Monthly Test (RMT) is initiated by the Federal Alert Gateway Administrator and defines rules for the CMSP to schedule the distribution of the RMT to their WEA coverage area over a 24-hour period, commencing upon receipt of the RMT at the CMSP Gateway. A CMSP may provide mobile devices with the capability of receiving RMT messages.

A Participating CMS Provider may provide mobile devices with the capability of receiving Required Monthly Test (RMT) messages. The FCC does not require that CMS providers make available mobile devices that support reception of the required monthly test. The FCC does, however, allow CMS providers to choose to do so. CMS providers that choose not to make the required monthly test available to subscribers must find alternate methods of ensuring that subscriber handsets will be able to receive WEA alert messages. These alternative methods are beyond the scope of these standards.

The Periodic Interface Testing is a test message between the Federal Alert Gateway and the CMSP Gateway and is intended to ensure the availability/viability of both gateway functions. The Periodic Interface Test is not designed to test the CMSP's infrastructure nor the mobile devices. The CMSP Gateway shall send an acknowledgement to the Federal Alert Gateway upon receipt of such an interface test message.

4.2.3 FCC Third Report and Order

The FCC released the Third Report and Order for the Commercial Mobile Alert System on August 7, 2008 [Ref 13]. In the Third Report and Order, the FCC adopted rules implementing Section 602(b) of the WARN Act. Specifically, the Third Report and Order adopts:

- Notification requirements for CMS providers that elect not to participate, or to participate only in part, with respect to new and existing subscribers;
- Procedures by which CMS providers may elect to transmit emergency alerts and to withdraw such elections;
- A rule governing the provision of alert opt-out capabilities for subscribers; and
- A compliance timeline under which participating CMS providers must begin CMAS deployment.

The rule governing the provision of alert opt-out capabilities for subscribers specifies:

- CMS providers may provide their subscribers with the option to opt out of both, or either, the "Child Abduction Emergency/AMBER Alert" and "Imminent Threat Alert" classes of Alert Messages.
- CMS providers shall provide their subscribers with a clear indication of what each option means, and provide examples of the types of messages the customer may not receive as a result of opting-out.

Requirements and specifications for the subscribers' right to opt out as defined in the Third Report and Order may be found in ATIS-0700036, *eWEA MDB Specification* [Ref 9].

4.2.4 FCC Report and Order on WEA Enhancements

On September 29, 2016, the FCC issued the FCC Report & Order on WEA enhancements, FCC 16-127 [Ref 5]. Listed below are the WEA enhancements which are applicable to the support of eWEA via the GSM/UMTS Public Warning System (PWS). For a summary of all of the eWEA enhancements, see ATIS 0700035, *eWEA Service Description* [Ref 20]:

- *Spanish-language Alerting*: Participating CMS Providers are required to transmit WEA Alert Messages that are issued in the Spanish language or that contain Spanish-language characters.
- *State/Local WEA Tests*: A Participating CMS Provider must support State/Local WEA Tests.
    1) A Participating CMS Provider's Gateway shall support the ability to receive a State/Local WEA Test message.

2) A Participating CMS Provider shall immediately transmit a State/Local WEA Test to the geographic area specified by the alert originator.

3) A Participating CMS Provider may forego a State/Local WEA Test if the State/Local WEA Test is pre-empted by actual alert traffic, or if an unforeseen condition in the CMS Provider infrastructure precludes distribution of the State/Local WEA Test. If a Participating CMS Provider Gateway forgoes a State/Local WEA Test, it shall send a response code to the Federal Alert Gateway indicating the reason.

4) Participating CMS Providers shall provide their subscribers with the option to opt in to receive State/Local WEA Tests.

- A CMS Provider may not forego or delay delivery of a State/Local WEA Test message except when the test is preempted by actual Alert message traffic, or if an unforeseen condition in the Participating CMS Provider infrastructure precludes distribution of the State/Local WEA Test.

- *Classifying Public Safety Messages*: Public Safety Message is defined as "an essential public safety advisory that prescribes one or more actions likely to save lives and/or safeguard property". Public Safety Messages will only be eligible for issuance in connection with an Imminent Threat Alert, an AMBER Alert, or a Presidential Alert. Participating CMS Providers shall provide for their subscribers to receive Public Safety Messages by default, and may provide their subscribers with the option to opt out of receiving Public Safety Messages if they decide that they no longer wish to receive them. Participating CMS Providers are not required to associate a unique attention signal or vibration cadence with Public Safety Messages.

- *Supporting Embedded References and Multimedia*: Participating CMS Providers must support the transmission of embedded URLs and phone numbers in WEA Alert Messages. This amendment removes restriction on embedded references specified in the FCC First Report & Order, FCC 08-099 [Ref 1].

- *WEA Geo-Targeting*: Participating CMS Provider must transmit any Alert Message that is specified by a geocode, circle, or polygon to an area that best approximates the specified geocode, circle, or polygon. If, however, the Participating CMS Provider cannot broadcast the Alert Message to an area that best approximates the specified geocode, circle, or polygon, a Participating CMS Provider may transmit an Alert Message to an area not larger than the propagation area of a single transmission site.

4.3 Full Reference Diagram

The following is the functional reference model diagram from Section III.B.10 of the FCC First Report and Order for the Commercial Mobile Alert System, FCC 08-99 [Ref 1]:
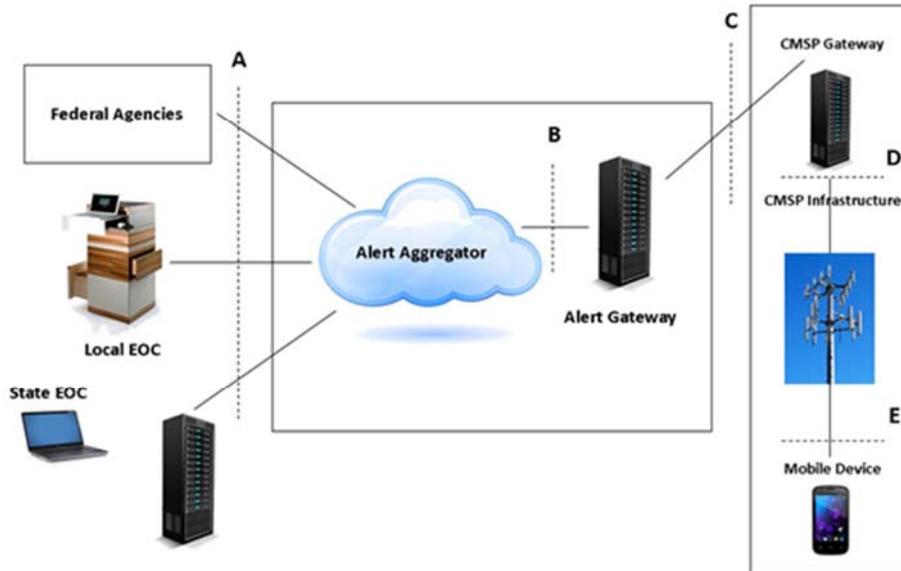
Figure 4.1: WEA Reference Architecture

5 Requirements

The Cell Broadcast Service (CBS) supporting eWEA shall support the technical realization as specified in 3GPP TS 23.041 [Ref 2]. This clause will identify requirements specific to the mapping of the eWEA service to the cell broadcast service that are not evident in existing 3GPP specifications.

5.1 *Cell Broadcast Center (CBC) Requirements*

The general requirements for a CBC are specified in 3GPP TS 23.041 [Ref 2]. The requirements for the CBC interface with the CMSP Gateway are defined in ATIS-0700008, *Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification* [Ref 16].

This clause defines the CBC requirements for the support of eWEA via Cell Broadcast Service:

1. The CBC shall support ATIS-0700008 [Ref 16].

2. The CBC shall retain the information to identify the BSCs/Radio Network Controllers (RNCs) for an Alert until the Alert is cancelled or the Alert expires.

3. The CBC shall determine the set of cells in the target area of the eWEA Alert where the message is to be broadcast as defined in 3GPP TS 23.041 [Ref 2] (e.g., list of cell sites, location areas, service areas) based upon the geo-target information (e.g., geo-code, polygon, circle) provided to the CBC by the CMSP Gateway.

4. A CBC shall have the capability to adjust the CMSP Gateway-requested retransmission frequency and duration depending on network conditions or operator policy.

5. The CBC in conjunction with the capabilities of the GSM and UMTS radio networks shall perform retransmissions of the eWEA alert message based upon the retransmission information provided by the CMSP Gateway.

6. The Cell Broadcast Centers shall have the capability to be deployed in either an active-active or an active-standby server configuration with synchronization of transactional states between the multiple associated Cell Broadcast Centers.

7. It shall not be treated or reported as an error condition or as an invalid eWEA alert message if none of the cell sites serviced by the CBC are within the alert area of the eWEA alert message.

8. The CBC shall manage the generation of the Serial Number for an alert message and the Serial Number shall be unique for a given Message ID per 3GPP TS 23.041 [Ref 2].

9. The CBC shall accept CBS messages which contain the CBS message IDs assigned to eWEA only if that CBS message has been received from an authorized CMSP Gateway.

> NOTE: The method for the CBC to authorize the CMSP Gateway and any associated error handling is beyond the scope of this Standard.

10. The CBC shall send only the short (90 characters maximum) text messages to the downstream nodes for the purpose of broadcasting over GSM and UMTS networks.

11. The CBC shall assign the same Serial Number for the broadcasting of the short (90 characters maximum) message as it assigns for broadcasting the linked long (360 characters maximum) message.

5.2 CMSP Gateway Requirements

The requirements for the CMSP Gateway interface with the Federal Alert Gateway are defined in the ATIS eWEA Federal Alert Gateway to CMSP Gateway Interface Specification [Ref 8]. The requirements for the CMSP Gateway (as CBE) with the CBC are defined in ATIS-0700008 [Ref 16].

This clause defines the CMSP Gateway requirements for the support of Cell Broadcast for eWEA Alerts:

1. The CMSP Gateway shall appear as a Cell Broadcast Entity in the Cell Broadcast Service network architecture and thus shall support the CBE to CBC interface defined in ATIS-0700008 [Ref 16].

2. The CMSP Gateway shall provide the CBC with the geo-target information (e.g., geo-code, polygon, circle) linked to the specified alert. As such, the CMSP Gateway is not required to know the cell sites supported by the CBCs.

3. The CMSP Gateway shall have the capability to send each eWEA alert message to all or some of the CBCs served by the CMSP Gateway.

4. The CMSP Gateway shall be responsible for determining the frequency and duration of the retransmissions of eWEA alert messages. The CMSP Gateway calculation of the eWEA alert message frequency and duration will be based upon CMSP policies and upon the expiration date and time of the eWEA alert message. The CMSP Gateway will provide the retransmission information to the CBC.

5. The CMSP Gateways shall have the capability to be deployed in either an active-active or an active-standby server configuration with synchronization of transactional state between the multiple associated CMSP Gateways.

6. The CMSP Gateway shall generate the Message ID based on the Special Handling, Urgency, Severity, Certainty, and the Text-Language parameters received from the Federal Alert Gateway. The CMSP Gateway links the generated Message ID to the alert message received from the Federal Alert Gateway.

7. The CMSP Gateway shall use the same frequency of retransmissions for both the English and Spanish language messages.

8. When an alert update request is received from the Federal Alert Gateway, the CMSP Gateway shall send requests to cancel the old English and the linked old Spanish message, if present, followed by requests to broadcast the new English message and the new Spanish message, if Spanish message text was provided.

9. Instead of sending FIPS geocode values to the CBC, the CMSP Gateway shall only send SAME geocode values to the CBC.

   a. If the CMSP Gateway receives both the CMAC_cmas_geocode element and the CMAC_cap_geocode element with a SAME geocode value, the CMSP Gateway shall only send the SAME geocode value to the CBC.

   b. If the CMSP Gateway receives only the CMAC_cmas_geocode element, the CMSP Gateway shall convert the FIPS value of the CMAC_cmas_geocode to a SAME geocode value by appending a leading zero to the FIPS value and shall send only the generated SAME geocode value to the CBC.

10. The CMSP Gateway shall maintain the correlation between the English alert message and the equivalent Spanish alert message.

11. When a new alert message is received, the CMSP Gateway shall send requests to the CBC to broadcast the new English message and the new Spanish message, if Spanish message text was provided.

12. The CMSP Gateway shall send requests to the CBC for short (90 characters maximum) text messages for broadcasting on GSM and UMTS networks.

13. Upon the reception of a cancel alert message, the CMSP Gateway shall cancel the English alert message and the linked Spanish message, if present.

14. It is not an error condition for an updated English alert message to not have an equivalent updated Spanish alert message when the original English alert message had a linked Spanish alert message.

15. It is not an error condition for an updated English alert message to have an equivalent updated Spanish alert message when the original English alert message did not have a linked Spanish alert message.

5.2.1 Message Coding

The eWEA alert messages that are received from the Federal Alert Gateway are UTF-8 encoded (per ATIS-0700037 [Ref 8]). The CMSP shall transmit the English and Spanish messages in the default GSM 7-bit alphabet to the mobile device. UTF-8 characters that are not contained in the default GSM 7-bit alphabet may be represented by their closest approximation in the GSM 7-bit alphabet. The algorithm for the mapping of the characters in UTF-8 to characters in the GSM 7-bit alphabet is vendor implementation specific and is beyond the scope of this Standard.

5.2.2 URL Coding

If the Alert Originators include URLs with characters which are not supported by the GSM 7-bit alphabet, these unsupported characters will be removed or replaced which could result in the URLs in the broadcast alert messages not being valid. To avoid this situation, the Alert Originators should not use the characters "{", "}", "|", "\", "^", "~", "[", "]", and "`" in their embedded URLs. See IETF RFC 3986 [Ref 22] regarding unsafe characters.

5.3 Mobile Device Requirements

This clause provides the mobile device requirements for the support of eWEA via GSM/UMTS Cell Broadcast Service (CBS). The requirements for the mobile device behavior upon the receipt of the eWEA alert message are defined in the ATIS eWEA Mobile Device Behavior Specification [Ref 9].

1. The mobile device shall monitor associated channel or channels for eWEA Alerts.

2. Distribution of the eWEA alert messages to the CMSP's subscribers shall be unidirectional from the CMSP network to the mobile device of the subscriber. There shall not be any acknowledgement or confirmation of receipt from the mobile device.

> NOTE: The FCC does not require that legacy mobile devices be supported. eWEA functionality is needed on future mobile devices.

5.4 CBC to BSC/RNC Interface

This clause defines the requirements for the interface between the CBC and the BSC/RNC.

1. CBCs shall be able to interface to all BSCs/RNCs deployed in the CMSP network.

2. The CBC to BSC interface shall follow the existing primitives in the 3GPP TS23.041 [Ref 2] specification; therefore, from an architectural perspective, there shall only be a single interface between each BSC/RNC and multiple CBCs. In other words, when multiple CBCs are deployed for redundancy, they shall appear as one logical CBC from each BSC/RNC perspective.

3. The CBC to RNC interface shall follow the existing primitives in the 3GPP TS25.419 [Ref 3] specification.

5.5 Lawful Interception Requirements

There are no lawful interception requirements for WEA, as all WEA messages are generated by the government and are disseminated to the public. WEA messages are not specific to a target or subject of an interception. No new or existing network Intercept Access Points are expected to intercept WEA messages.

5.6 Discontinuous Reception Requirements

Support of the Cell Broadcast Service Discontinuous Reception (DRX) shall be mandatory for both the network and mobile devices for both GSM and UMTS. In 3GPP TS 23.041 [Ref 2], DRX is optional in GSM and mandatory in the RNC for UMTS; in order to minimize the impact battery life, both GSM and UMTS networks and mobile devices that support WEA shall be required to support the DRX mode.

6 Functional Architecture and Interfaces

Reference Points "D" & "E" are defined in Figure 4.1.

The WEA Reference Point "D" maps to interface 1 for both GSM and UMTS (see 3GPP TS 23.041 [Ref 2] and ATIS-0700008 [Ref 16]).

The WEA Reference Point "E" maps to interface 4 for GSM and Uu for UMTS (see 3GPP TS 23.041 [Ref 2]).

Interface 2 and interface 3 are defined in 3GPP TS 23.041 [Ref 2] and are further explained in ATIS-0700007 [Ref 4].

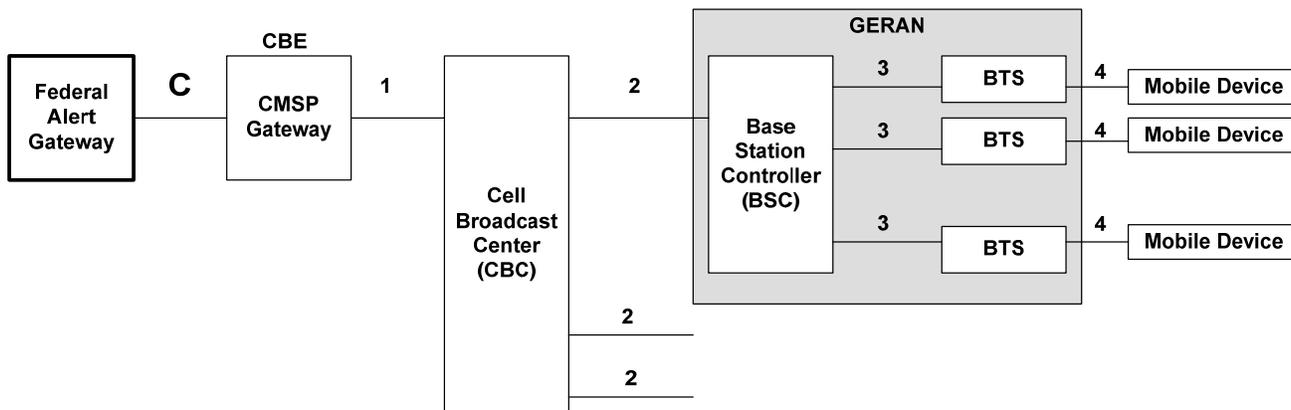The GSM cell broadcast network architecture for support of WEA is as follows:

Figure 6.1: GSM Cell Broadcast Network Architecture for WEA

Similarly, the UMTS cell broadcast network architecture for support of CMAS is as follows:
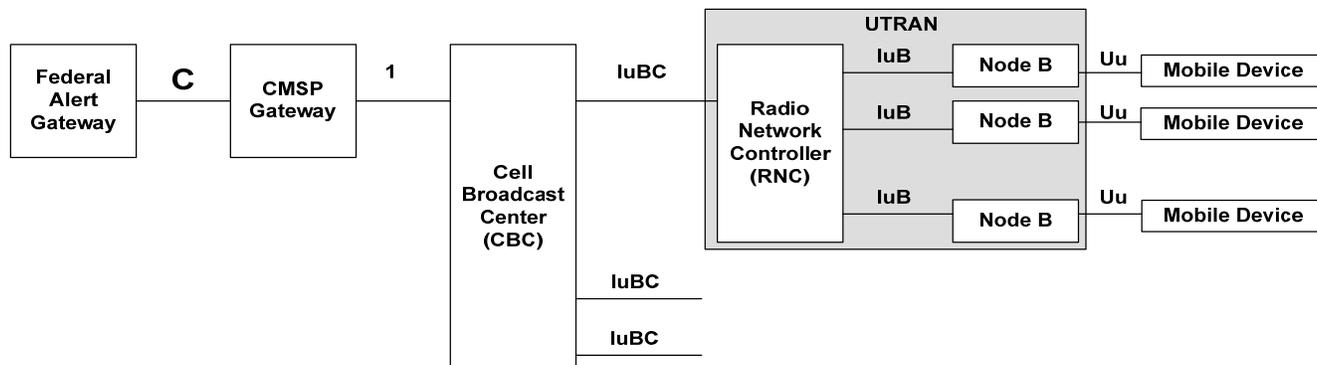
Figure 6.2: UMTS Cell Broadcast Network Architecture for WEA

6.1 CBC to BSC Interface

CBCs shall be able to interface to all BSCs deployed in the CMSP network using the primitives defined in 3GPP TS23.041 [Ref 2] and the call flows in ATIS-0700007 [Ref 4]. In addition, any vendor specific CBC to BSC protocol descriptions not following these specifications may be required by CMSPs, test equipment vendors, and OA&M equipment vendors to verify interoperability.

> NOTE: 3GPP TS 48.049, Base Station Controller – Cell Broadcast Centre (BSC-CBC) interface specification; Cell Broadcast Service Protocol (CBSP) [Ref 19] may be used as the protocol between the CBC and BSC.

6.2 CBC to RNC Interface

For the support of Cell Broadcast via UMTS, 3GPP has defined a mandatory protocol between the CBC and RNC in 3GPP TS 25.419 [Ref 3].

6.3 CMSP Gateway to CBC Interface

The interface between the CMSP Gateway and the CBC is defined in ATIS-0700008 [Ref 16].

7 eWEA Call Flows

This clause provides call flows for the eWEA functionality. These call flows assume that the delivery technology will be Cell Broadcast Service as defined in 3GPP TS 23.041 [Ref 2]. Example call flows for eWEA application using GSM/UMTS Cell Broadcast Service are provided in ATIS-0700007, *Implementation Guidelines and Best Practices for GSM/UMTS Cell Broadcast Service* [Ref 4].

The CMSP Gateway is a Cell Broadcast Entity (CBE) and the interface to the CBC is specified in ATIS-0700008 [Ref 16].

eWEA does not modify the Cell Broadcast functionality as defined in 3GPP TS 23.041 and other referenced 3GPP specifications.

The following eWEA call flows are defined in this clause:

- New eWEA alert message call flow.
- Updated eWEA alert message call flow.
- Cancelled eWEA alert message call flow.
- Invalid eWEA alert message call flow.

7.1 New eWEA Alert Message Call Flow

The following is the call flow for a new eWEA Alert Message:
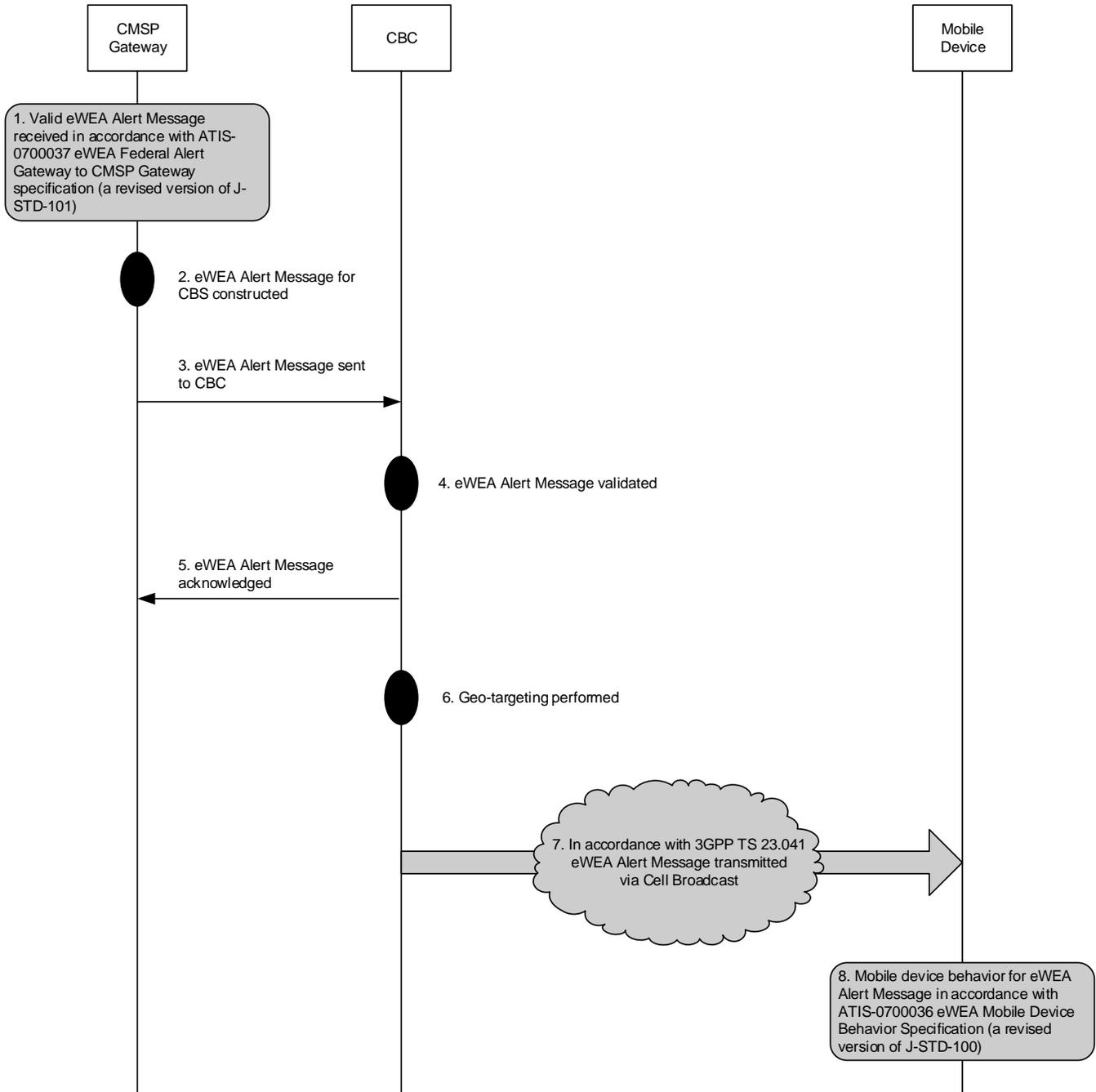

Figure 7.1: New eWEA Alert Call Flow

1. A valid eWEA Alert Message is received in accordance with ATIS-0700037, *eWEA Federal Alert Gateway to CMSP Gateway Interface* Specification [Ref 8].
2. The CMSP Gateway constructs the English language eWEA Alert Message for CBS and, if Spanish text is received from the Federal Alert Gateway, the Spanish language eWEA Alert Message for CBS.

Steps 3 through 8 are repeated for the English language eWEA message and for the Spanish language eWEA message. All of the resulting eWEA Alert Messages for CBS are linked to the eWEA Alert Message received in step 1 by the CMSP Gateway.

3. The CMSP Gateway sends the eWEA Alert Message to the CBC as defined in ATIS-0700008 [Ref 16].
4. The CBC validates the received eWEA Alert Message.
5. The CBC sends an acknowledgement to the CMSP Gateway for the eWEA Alert Message as defined in ATIS-0700008 [Ref 16].
6. The CBC performs geo-targeting to calculate the associated set of cell sites for the received eWEA Alert Message.

   NOTE: If the geo-targeting indicates that no cell sites serviced by this CBC are within the indicated eWEA alert area, no further processing of this new eWEA alert message is required for the CBC.

7. The eWEA Alert Message for CBS is transmitted via Cell Broadcast in accordance with 3GPP TS 23.041 [Ref 2].
8. The mobile device behavior for the transmitted eWEA Alert Message for CBS is in accordance with ATIS-0700036, *eWEA MDB* Specification [Ref 9].

7.2 Updated eWEA Alert Message Call Flow

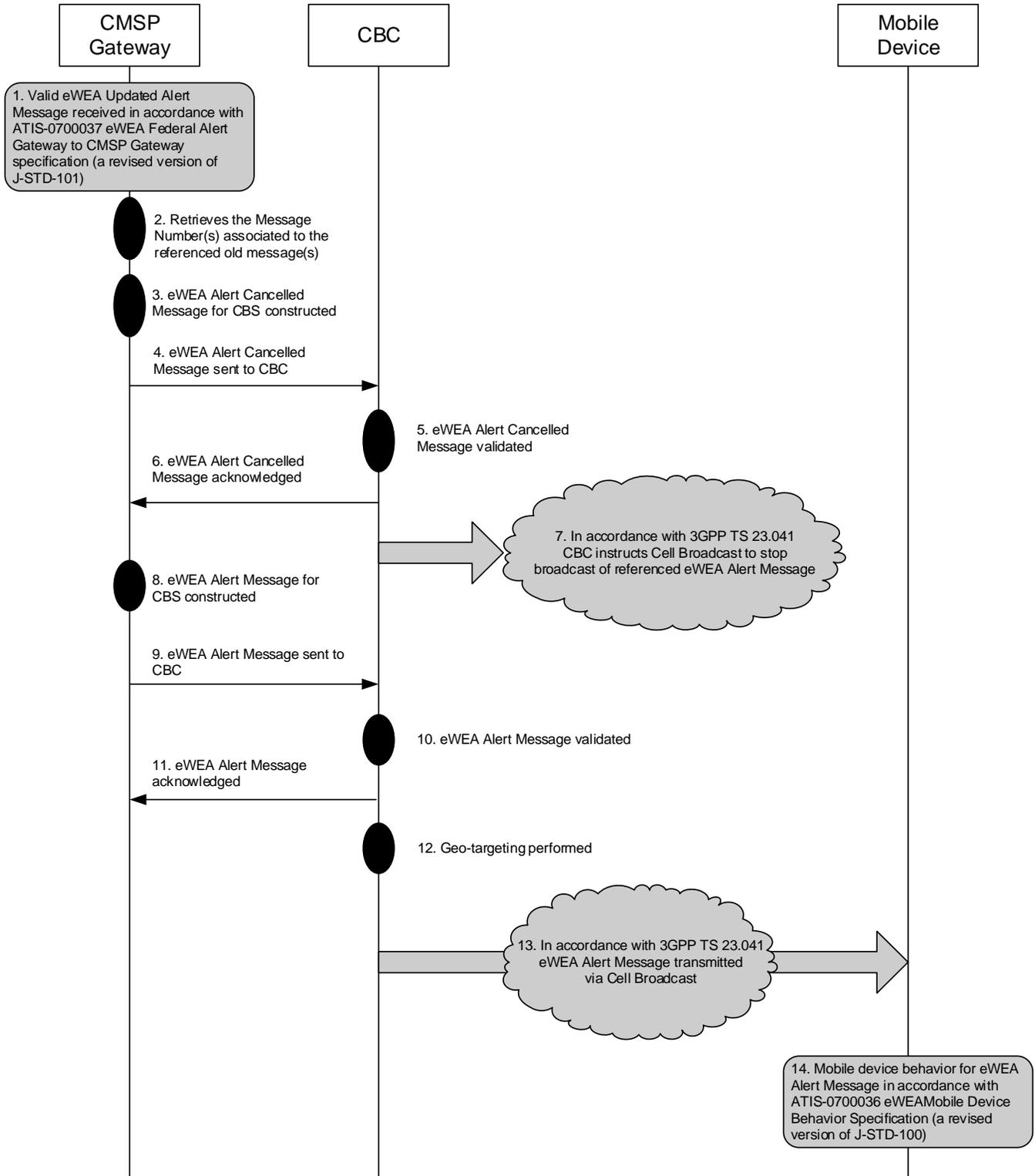The following is the call flow for an updated eWEA Alert Message:

Figure 7.2: Updated eWEA Alert Message Call Flow

1. A valid eWEA Updated Alert Message is received in accordance with ATIS-0700037 [Ref 8].

2.   The CMSP Gateway retrieves the Message Numbers associated to the old referenced messages that have to be updated. The CMSP Gateway handles the Update Request in two stages, first by cancelling the old messages, and then initiating the new messages.

> NOTE: Steps 3 through 7 do not apply if the CMSP Gateway is unable to retrieve the Message Numbers of the old referenced message. This condition may occur if the referenced message did not qualify to be broadcast as an eWEA message or if the referenced message is no longer being broadcast.

3.   The CMSP Gateway constructs the eWEA Alert Cancelled Message for CBS for the English language message and for the Spanish language message if the linked Spanish message broadcast is ongoing.

Steps 4 through 7 are repeated for the English language eWEA message and for the Spanish language eWEA message if associated Spanish message broadcast is ongoing.

4.   The CMSP Gateway sends the eWEA Alert Cancelled Message to the CBC as defined in ATIS-0700008 [Ref 16].
5.   The CBC validates the received eWEA Alert Cancelled Message.
6.   The CBC sends an acknowledgement to the CMSP Gateway for the eWEA Alert Cancelled Message as defined in ATIS-0700008 [Ref 16].
7.   In accordance with 3GPP TS 23.041 [Ref 2], Cell Broadcast is instructed to stop the broadcast of the eWEA Alert Message referenced in the received eWEA Alert Cancelled Message for CBS.
> NOTE: Step 6 and step 7 may occur in any order.

Steps 8 through 14 are repeated for the English language message and also for the Spanish language message if associated Spanish message text was provided.

8.   The CMSP Gateway constructs the eWEA Alert Message for CBS with the new message.
9.   The CMSP Gateway sends the eWEA Alert Message to the CBC as defined in ATIS-0700008 [Ref 16].
10. The CBC validates the received eWEA Alert Message.
11. The CBC sends an acknowledgement to the CMSP Gateway for the eWEA Alert Message as defined in ATIS-0700008 [Ref 16].
12. The CBC performs geo-targeting to calculate the associated set of cell sites for the received eWEA Alert Message.
> NOTE: If the geo-targeting indicates that no cell sites serviced by this CBC are within the indicated eWEA alert area, no further processing of this new eWEA alert message is required for the CBC.
13. The eWEA Alert Message for CBS is transmitted via Cell Broadcast in accordance with 3GPP TS 23.041 [Ref 2].
14. The mobile device behavior for the transmitted eWEA Alert Message for CBS is in accordance with ATIS-0700036, *eWEA MDB Specification* [Ref 9].

7.3 Cancelled eWEA Alert Message Call Flow

The following is the call flow for a cancelled eWEA Alert Message:

Figure 7.3: Cancelled eWEA Alert Message Call Flow

1. A valid eWEA Alert Cancelled Message is received in accordance with ATIS-0700037 [Ref 8].

2. The CMSP Gateway constructs the eWEA Alert Cancelled Message for CBS for the English language message and for the Spanish language message, if associated Spanish message broadcast is ongoing.

Steps 3 through 6 are repeated for the English language eWEA message and for the Spanish language eWEA message if a Spanish language eWEA is being broadcast.

3. The CMSP Gateway sends the eWEA Alert Cancelled Message to the CBC as defined in ATIS-0700008 [Ref 16].

4. The CBC validates the received eWEA Alert Cancelled Message.

5. The CBC sends an acknowledgement to the CMSP Gateway for the eWEA Cancellation Alert Message as defined in ATIS-0700008 [Ref 16].

6. In accordance with 3GPP TS 23.041 [Ref 2], Cell Broadcast is instructed to stop the broadcast of the eWEA Alert Message referenced in the received eWEA Alert cancelled Message for CBS.

7.4 Invalid eWEA Alert Message Call Flow

The following is the call flow for an invalid eWEA Alert Message:
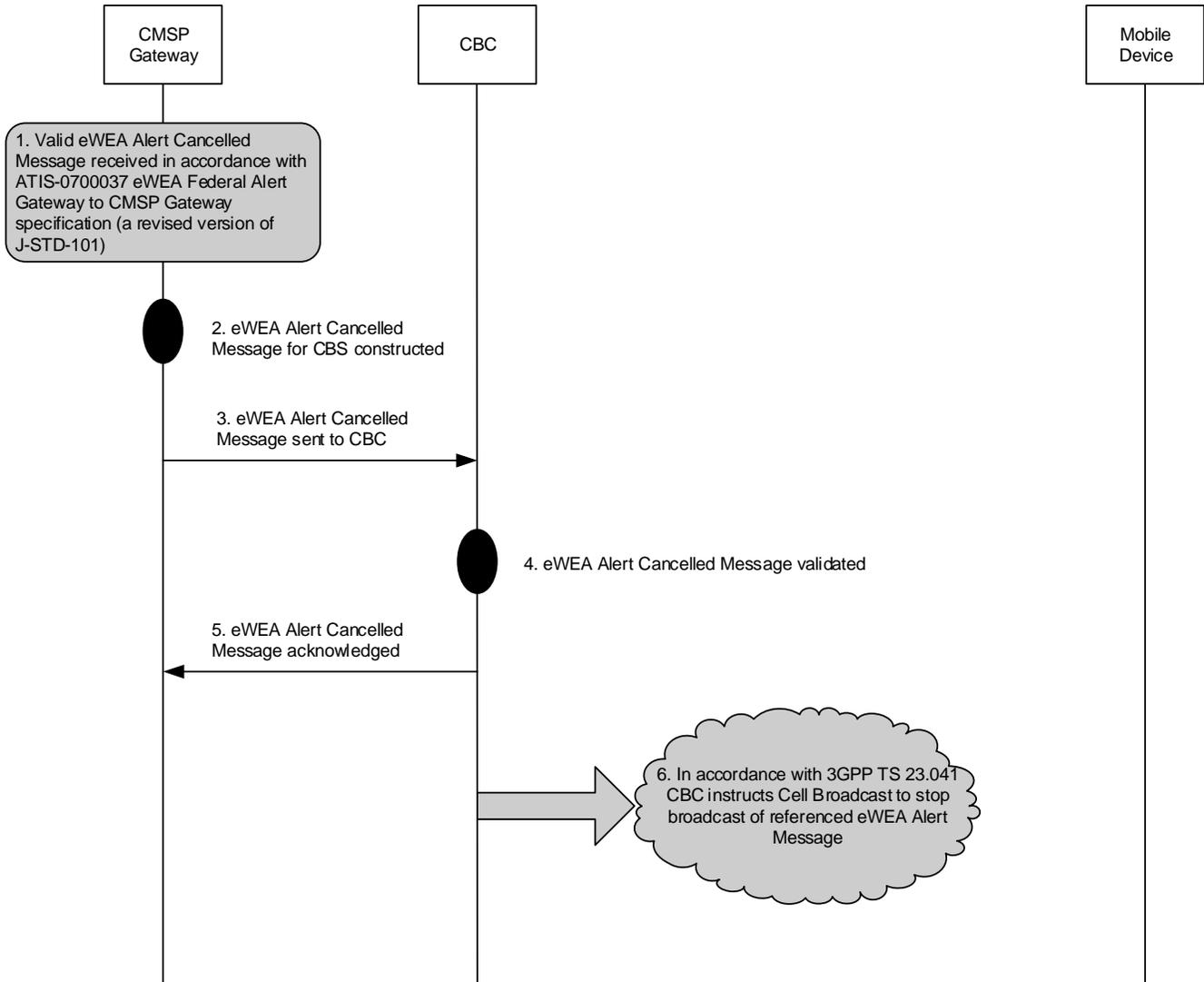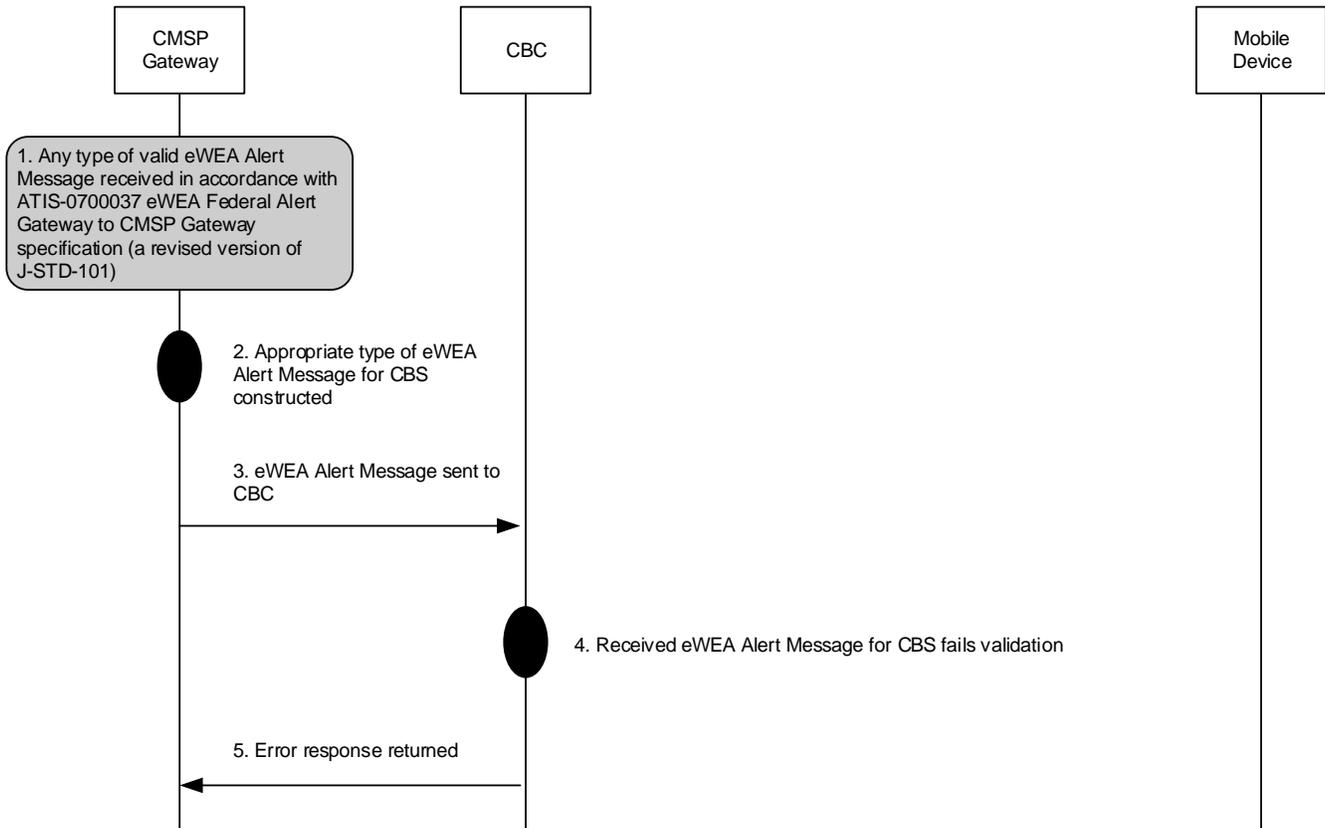

Figure 7.4: Invalid eWEA Alert Message Call Flow

1. Any type of valid eWEA Alert Message is received in accordance with ATIS-0700037 [Ref 8].
2. The CMSP Gateway constructs the appropriate type of eWEA Alert Message for CBS.
3. The CMSP Gateway sends the constructed eWEA Alert Message to the CBC as defined in ATIS-0700008 [Ref 16].
4. The CBC validates the received eWEA Alert Message and the received message fails validation.
5. The CBC returns an error response to the CMSP Gateway as defined in ATIS-0700008 [Ref 16].

7.5 Transmission Control Message Call Flows

The CBC may request message traffic from the CBE be ceased or resumed based upon internal error processing or due to a maintenance condition on the CBC. This clause provides the following transmission control call flows:

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

The relationship and interaction of Transmission Control Messages on the CBE to CBC interface with the Transmission Control Messages on the Reference Point "C" Interface of ATIS-0700037 [Ref 8] is beyond the scope of this Standard.

7.5.1 Cease Transmissions Call Flow

The CBC may request message traffic from the CBE be ceased based upon internal error processing or due to a maintenance condition on the CBC.

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 CBE to CBC Interface:

Figure 7.5: Cease Transmissions Call Flow

1. The CBC receives a maintenance command to request the CMSP Gateway 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 CBE 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.

7.5.2 Resume Transmissions Call Flow

Once the maintenance or error condition that triggered the stop of message transmission over the CBE 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 CBE to CBC Interface:
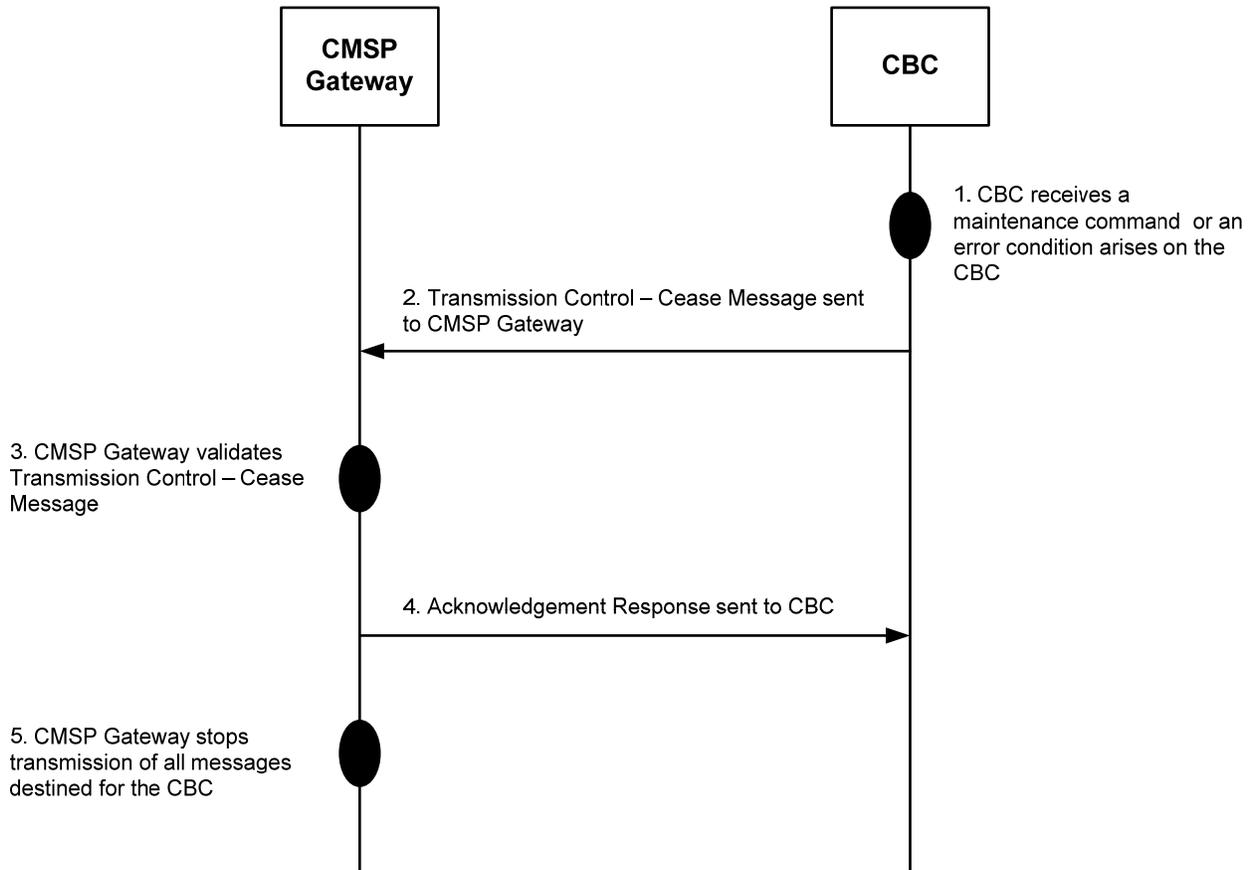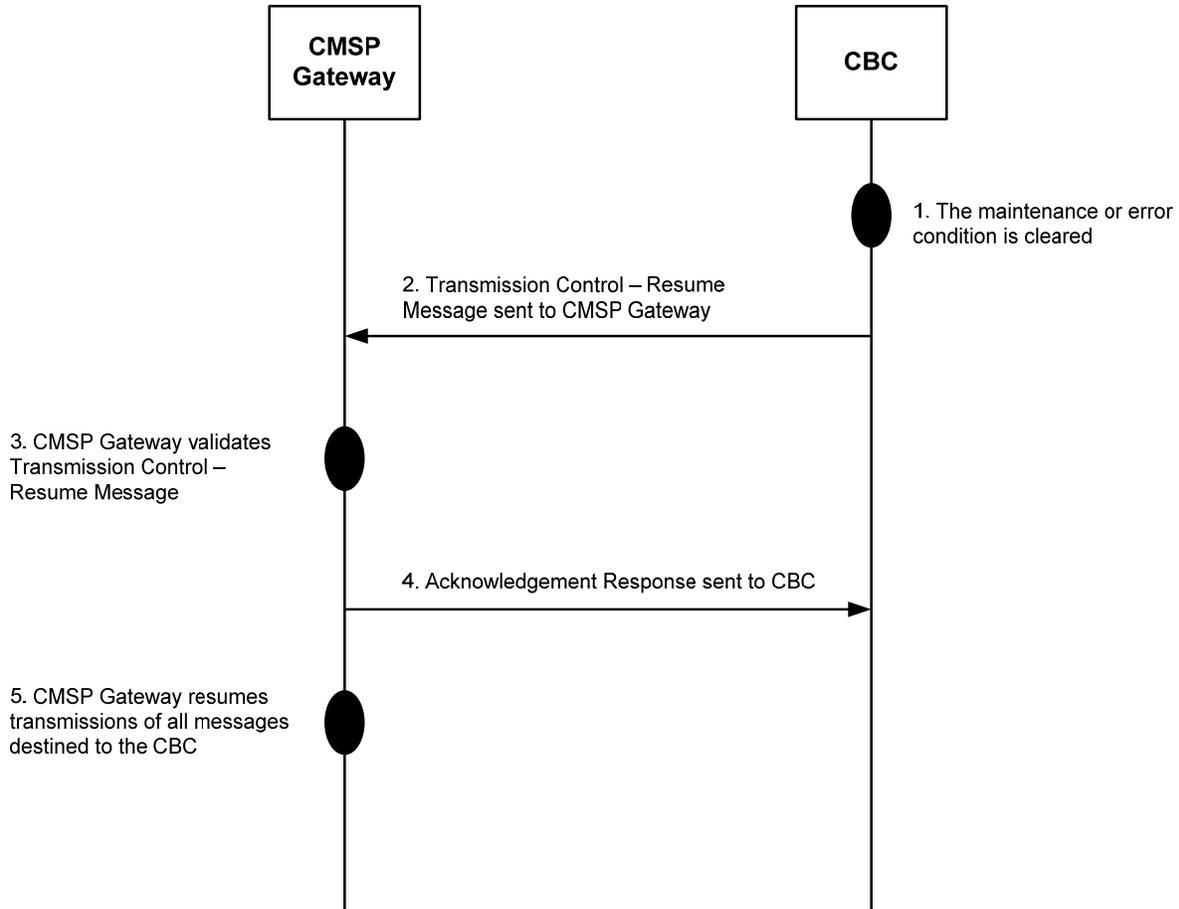
Figure 7.6: Resume Transmissions Call Flow

1. The maintenance or error condition that triggered the stop of message transmission over the CBE to CBC Interface is cleared.
2. The CBC sends the Transmission Control – Resume Message to the CMSP Gateway via the CBE 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 CSMP Gateway may resume transmission of messages destined to the CBC.

8   Cell Broadcast Service Messages for ᴇWEA Application

This clause describes the use of Cell Broadcast messages to support the eWEA alert messages as follows:

- Description of the mapping of the eWEA message structure to the Cell Broadcast message structure.
- Description of the Cell Broadcast parameters which have specific application to the eWEA alert messages.

8.1   eWEA Interfaces

As indicated in clause 6, the interface between the CMSP infrastructure and the mobile devices is referred to as Reference Point "E" in the eWEA functional architecture. Reference point "E" is a logical abstract interface (i.e., it

is not a physical interface), and in the GSM/UMTS architecture can be thought of as corresponding to the Base Transceiver Station (BTS)/Node B to mobile device interface for the delivery of eWEA messages via the Cell Broadcast Service (interface 4 in the GSM architecture of Figure 6.1 and the Uu in the UMTS architecture of Figure 6.2).

The interface between the CMSP Gateway and the CBC is referred to as Reference Point "D". The data elements that are sent between the CMSP Gateway and the CBC over Reference Point "D" are CBE message elements and are referred to as CBEM elements. This interface is specified in ATIS-0700008 [Ref 16].

The following diagram illustrates how the CMSP infrastructure delivers eWEA alert messages to the mobile devices through the Cell Broadcast Service:
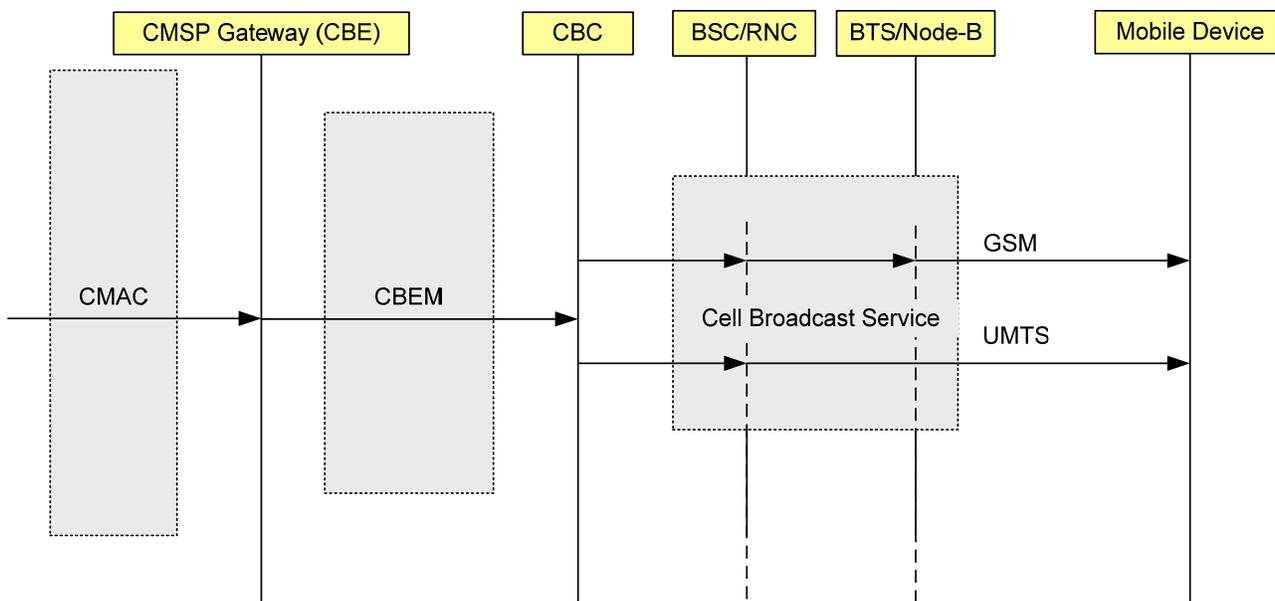
Figure 8.1: eWEA Message Relationship

Within the eWEA functional architecture, the CMSP Gateway converts the CMAC messages received over Reference Point "C" from the Federal Alert Gateway, per ATIS-0700037 [Ref 8], to the CBEM messages before sending the alert message to the CBC, per ATIS-0700008 [Ref 16]. The mapping of CMAC elements to CBEM elements is governed by the eWEA data that is to be delivered to the mobile devices via the GSM/UMTS Cell Broadcast Service; this mapping is described in this Standard. This Standard also illustrates the mapping of the CBEM elements and the Cell Broadcast Service elements.

8.2 Cell Broadcast Service & eWEA

The Cell Broadcast messages are delivered based upon the CBS capabilities as specified in 3GPP TS 25.324 [Ref 15], 3GPP TS 25.419 [Ref 3], 3GPP TS 25.925 [Ref 17], and 3GPP TS 44.012 [Ref 18]. This standard utilizes these messages to broadcast eWEA alert messages. The following sub-clauses provide an overview of the CBS message structures for GSM and UMTS.

This standard specifies how the parameters of the CBS WRITE-REPLACE and KILL primitives are populated based upon the CBEM elements. The cell broadcast messages associated with the GSM and UMTS air interfaces are described in the relevant 3GPP specifications and in ATIS-0700007 [Ref 4].

8.2.1 eWEA Cell Broadcast Message Structure for GSM

For GSM, the CBS message is sent using four consecutive Cell Broadcast Channel (CBCH) blocks, each having 22 octets of payload plus 1 octet of header. The 88 octets (4 times 22) have the following format:

- CBS Header: 6 octets
    - Serial Number: 2 octets
    - Message Id: 2 octets
    - Data Coding Scheme: 1 octet
    - Page Parameter: 1 octet

- CBS Content: 82 octets
    - 79 octets of eWEA alert text
    - 3 octets of padded text

8.2.2 eWEA Cell Broadcast Message Structure for UMTS

For UMTS, the CBS message is sent using the Broadcast/Multicast Control (BMC) CBS message on consecutive Common Control Channel (CTCH) blocks. The number of CTCH blocks used depends on the number of octets to be sent and the other transmission rate, etc. The format of these messages is as follows:

- CBS Header: 6 octets
    - Message Type: 1 octet
    - Message Id: 2 octets
    - Serial Number: 2 octets
    - Data Coding Scheme: 1 octet

- CBS Content: N octets (where N <= 1246, but for this eWEA application, N = 81).
    - Number of Pages: 1 octet ("1")
    - CBS Information Page 1 (82 octets maximum)
    - CBS Information Length 1 ("79")
    - CBS Information Page 2 (not used in eWEA application)
    - CBS Information Length 2 (not used in eWEA application)
    :::::::::::
    :::::::::::
    - CBS Information Page 15 (not used in eWEA application)
    - CBS Information Length 15 (not used in eWEA application)

8.3 Overview of eWEA Element Mapping

The following table illustrates which CMAC elements are used to derive CBEM elements, CBS elements, and ultimately delivered to the mobile device. Note that only a small portion of the CMAC elements are ultimately delivered to the mobile device. Most CMAC elements are used by the network entities supporting the eWEA and/or CBS service. The clauses that follow describe in detail the element mapping from the CMAC to CBEM and CBEM to CBS messages.

Table 8.1: Element Mapping from CMAC to CBEM to Mobile Device

CMAC Element	Mapped to CBEM?	Mapped to CBS?	Delivered to Mobile Device?
CMAC_area_description	No	No	No
CMAC_cap_alert_uri	No	No	No
CMAC_cap_identifier	No	No	No
CMAC_cap_sent_date_time	No	No	No
CMAC_category	No	No	No

CMAC Element	Mapped to CBEM?	Mapped to CBS?	Delivered to Mobile Device?
CMAC_certainty	Yes (see Note 1)	Yes (see Note 1)	Yes (see Note 1)
CMAC_circle	Yes	Yes	No
CMAC_cmas_geocode	Yes	Yes	No
CMAC_Digital_Signature	No	No	No
CMAC_expires_date_time	Yes (see Note 2)	Yes (see Note 2)	No
CMAC_gnis	Yes	Yes	No
CMAC_message_number	Yes	Yes	No
CMAC_message_type	Yes	Yes	No
CMAC_note	No	No	No
CMAC_polygon	Yes	Yes	No
CMAC_protocol_version	No	No	No
CMAC_referenced_message_cap_identifier	No	No	No
CMAC_referenced_message_number	Yes	Yes	No
CMAC_response_code	No	No	No
CMAC_response_type	No	No	No
CMAC_sender	No	No	No
CMAC_sender_name	No	No	No
CMAC_sending_gateway_id	No	No	No
CMAC_sent_date_time	No	No	No
CMAC_severity	Yes (see Note 1)	Yes (see Note 1)	Yes (see Note 1)
CMAC_special_handling	Yes (see Note 1)	Yes (see Note 1)	Yes (see Note 1)
CMAC_status	No	No	No
CMAC_short_text_alert_message	Yes	Yes	Yes
CMAC_short_text_alert_message_length	No	Yes	Yes (see Note 3)
CMAC_text_language	Yes	Yes	Yes (see Note 1, Note 4)
CMAC_urgency	Yes (see Note 1)	Yes (see Note 1)	Yes (see Note 1)

NOTE 1: The CMAC_special_handling, CMAC_severity, CMAC_certainty, CMAC_urgency, and CMAC_text_language elements are used to derive the CBS Message Identifier element. See 8.5.6, *Message Identifier*.

NOTE 2: The CMAC_expires_date_time element is used to derive the CBS number of broadcasts requested. See 8.5.7, *Number of Broadcasts Requests*.

NOTE 3: The message length is calculated by the CBC and is contained within the WRITE-REPLACE CBS Message Information Length1 parameter.

NOTE 4: The text language is contained in the WRITE-REPLACE Data Coding Scheme parameter. See 8.5.5, *Data Coding Scheme*.

8.4 Mapping of CBEM Elements from CMAC Elements

The following table illustrates how the CBEM elements defined in ATIS-0700008 [Ref 16] are derived from the CMAC elements of Federal Alert Gateway to CMSP Gateway interface:

Table 8.2: Mapping of CBEM Elements from CMAC Elements

CBEM Element	CMAC Element
CBEM_protocol_version	N/A Specific to the CMSP Gateway to CBC interface.

CBEM Element	CMAC Element

CBEM_message_number	Generated by the CMSP Gateway using the following:
	    CMAC_message_number
	    CMAC_cap_identifier

CBEM_referenced_message_number	Generated by the CMSP Gateway using the following:
	    CMAC_referenced_message_number
	    CMAC_referenced_message_cap_identifier

CBEM_sender_id	N/A Specific to the CMSP Gateway to CBC interface.
CBEM_message_type	N/A Specific to the CMSP Gateway to CBC interface, but the CMSP Gateway may use the CMAC_message_type to generate this element.
CBEM_response_code	N/A Specific to the CMSP Gateway to CBC interface.
CBEM_response_description	N/A Specific to the CMSP Gateway to CBC interface.

CBEM_CBS_message_id	Generated by the CMSP Gateway using the following:
	    CMAC_special_handling
	    CMAC_severity
	    CMAC_urgency
	    CMAC_certainty
	    CMAC_text_language

CBEM_data_coding_scheme	Set to "GSM_7_Bit_Coding".
CBEM_language	Generated by the CMSP Gateway using the following: CMAC_text_language

CBEM_CBS_broadcast_text	Generated by the CMSP Gateway using the following:
	    CMAC_short_text_alert_message_length
	    CMAC_short_text_alert_message

CBEM_repetition_period	N/A Generated by the CMSP Gateway.
CBEM_number_of_broadcasts_requested	Generated by the CMSP Gateway using the following: CMAC_expires_date_time
CBEM_displaymode	N/A Do not include this optional element in the CBEM message which implies default value of "0" for normal display mode.
CBEM_start_date_time	N/A Do not include this optional element in the CBEM message which implies an immediate start of the message broadcast.

CBEM_geocode_type	Generated by the CMSP Gateway using the following:
	    CMAC_cmas_geocode
	    CMAC_cap_geocode
	    Mutual agreements between CMSP Gateway and CBC

CBEM_ geocode	Generated by the CMSP Gateway based upon the value of the
	    CBEM_geocode_type element and the following:
	    CMAC_cmas_geocode
	    CMAC_cap_geocode
	    Mutual agreements between CMSP Gateway and CBC

CBEM_polygon	CMAC_polygon
CBEM_circle	CMAC_circle
CBEM_gnis	CMAC_gnis

8.5 Mapping of eWEA Message to Cell Broadcast WRITE-REPLACE Indication

This clause describes the usage of the following GSM/UMTS Cell Broadcast Service (CBS) WRITE-REPLACE Indication parameters for the support of eWEA alert message:

- Category
- CBS Message Information Page
- Cell List
- Channel Indicator
- Data Coding Scheme
- Message Identifier
- Number of Broadcast Requests
- Number of Pages
- Repetition Period
- Serial Number (New Serial Number)
- Service Area List

The following table illustrates how the above indicated WRITE-REPLACE parameters are derived from the CBEM elements:

Table 8.3: Mapping CBEM Elements to CBS WRITE-REPLACE Parameters

CBS WRITE-REPLACE Parameter	CBEM Element	Description
Message Identifier	CBEM_CBS_message_id	This identifies the source type of the CBS message.
New Serial Number	Generated by CBC and correlated to CBEM_message_number	This identifies a new CBS message.
Cell List/Service Area List	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC derives the Cell List (GSM) or Service Area List (UMTS) from the geo-targeting information received from the CMSP Gateway. Multiple occurrences of geocode, polygon, circle, and gnis values may exist for one eWEA message.
Channel Indicator	N/A	This is generated by the CBC and coded as "basic channel" for eWEA applications.
Category	N/A	This is generated by the CBC and coded as "normal" for eWEA applications.
Repetition Period	CBEM_repetition_period	This indicates the repetition period used to broadcast the eWEA alert message.
Number of Broadcasts Requested	CBEM_number_of_broadcasts_requested	This indicates the number times the eWEA alert message repeated.
Number of Pages	Calculated by CBC	This indicates the number of pages used to broadcast the eWEA alert message. It is anticipated that only one page is required to broadcast the 90-character eWEA alert message.
Data Coding Scheme	CBEM_language	Identifies the language and coding used in the eWEA alert message; currently, the language is English or Spanish and 7-bit coding is used.

CBS WRITE-REPLACE Parameter	CBEM Element	Description
CBS Information Page 1	CBEM_CBS_broadcast_text	This identifies the actual contents of the eWEA alert text.
CBS Information Length 1	Calculated by CBC	This identifies the length of the CBS Information page 1; with 90 characters, the length will be 79.

8.5.1   Category

The optional Cell Broadcast Category parameter (as defined in 3GPP TS 23.041 [Ref 2]) is not required for eWEA alert messages. Since the category is omitted, the default category implied is "Normal" message.

8.5.2   CBS Message Information Page

The CBS-Message-Information-Page1 will contain the eWEA Displayable Text which is the actual alert message that will be displayed on the mobile device.

Cell broadcast shall support the text profile for eWEA messages. The text profile specifies the maximum eWEA Displayable Text to be 90 characters for an English or Spanish language eWEA alert message encoded with GSM 7-bit encoding [Ref 10] provided by the CMSP Gateway. Languages other than English and Spanish – or coding other than GSM 7-bit coding – may result in a change to the maximum number of characters supported.

The eWEA Displayable Text on the C interface is provided in UTF-8 format [Ref 11], which is capable of supporting text in English, Spanish, and other languages. It is the responsibility of the CBC to translate to the GSM 7-bit encoding for English or Spanish, or to other appropriate coding schemes for other languages.

The Number-of-Pages element shall be "1" for a standard 90-character or less CMAM. CBS-Message-Information-Length "1" shall contain the number of octets of the eWEA displayable text information contained in CBS-Message-Information-Page1.

The maximum 90-character eWEA Displayable Text is mapped into CBS-Message-Information-Page1.

Optionally, a CMSP may choose to provide additional displayable information beyond the 90-character CMAM. This optional additional displayable information is mapped into CBS-Message-Information-Page2 to CBS-Message-Information-Page15.

8.5.3   Cell List

This field provides a list of the cells that identify the target area for the broadcasting of a eWEA alert message. Refer to 3GPP TS 23.041 [Ref 2] to understand the usage of this field in GSM.

8.5.4   Channel Indicator

For GSM, the Channel Indication parameter shall be set to indicate use of the "basic channel".

8.5.5   Data Coding Scheme

The language and character set for the eWEA alert message shall be specified by the Cell Broadcast Data Coding Scheme parameter as specified in 3GPP TS 23.041 [Ref 2]. The encoding of the Data Coding Scheme parameter is defined in 3GPP TS 23.038 [Ref 10].

8.5.6   Message Identifier

The Message Identifier parameter identifies the source/type of a CBS message and is passed transparently from the CBC to the mobile device.

The assignment of Message Identifiers for eWEA messages is specified in clause 8.5.2 of ATIS-0700010, *eWEA via EPS Public Warning System Specification* [Ref 21], which is applicable for GSM, UMTS, and LTE networks.

8.5.7 Number of Broadcasts Requests

This field indicates the number of times a CBS message is to be repeated. Refer to 3GPP TS 23.041 [Ref 2] to understand the usage of this field in GSM and to 3GPP TS 25.419 [Ref 3] to understand the usage of this field in UMTS.

8.5.8 Number of Pages

This field identifies the number of CBS information pages used by a eWEA alert message. In the initial eWEA application, where the eWEA alert messages are broadcast in the text-mode, the maximum number of text characters that apply to one eWEA alert message is 90 characters coded in 7-bit format. One CBS Information Page (which can carry up to 82 octets) is able to carry all of the 90 characters (90*7 = 630 bits, 630/8 = 78.75 or 79 octets).

8.5.9 Repetition Period

This field is used by the CBC to instruct the BSCs/RNCs the repetition rate of the CBS message. Refer to 3GPP TS 23.041 [Ref 2] to understand the usage of this field in GSM and to 3GPP TS 25.419 [Ref 3] to understand the usage of this field in UMTS.

The repetition period is set by CMSP policies.

8.5.10 Serial Number (Old Serial Number and New Serial Number)

The CBS WRITE-REPLACE Indication has two Serial Number parameters defined: Old-Serial-Number and New-Serial-Number. The Serial Number parameter is used to uniquely identify CMAMs which have the same message identifier and are broadcast at the same time.

When a new CMAM or updated CMAM is broadcast, only a New-Serial-Number is required.

Refer to 3GPP TS 23.041 [Ref 2] to understand the usage of this field in GSM and to 3GPP TS 25.419 [Ref 3] to understand the usage of this field in UMTS.

8.5.11 Service Area List

This field provides a list of the service areas that identify the target area for the broadcasting of a eWEA alert message. Refer to 3GPP TS 25.419 [Ref 3] to understand the usage of this field in UMTS.

8.6 *Mapping of eWEA Message to Cell Broadcast KILL Request/Indication*

A CBS KILL Request/Indication is used during eWEA Update and Cancel procedures (see 7.2, *Updated eWEA Alert Message Call Flow,* and 7.3, *Cancelled eWEA Alert Message Call Flow*). The following table illustrates how the KILL parameters are derived from the CBEM elements:

Table 8.4: Mapping of CBEM Elements to CBS KILL Parameters

CBS KILL Parameter	CBEM Element	Description
Message Identifier	CBEM_CBS_message_id	This identifies the source type of the CBS message.
Old Serial Number	Generated by CBC and correlated to CBEM_referenced_message_number	This identifies a CBS Message to be canceled.
Cell List/Service Area List	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC uses stored geo-targeting information of the active broadcast. Multiple occurrences of geocode, polygon, circle, and gnis values may exist for one eWEA message.
Channel Indicator	N/A	This is generated by the CBC and coded as "basic channel" for eWEA applications.