ATIS-0700010.v002

ATIS Standard on -

Enhanced Wireless Emergency Alert (eWEA) via EPS Public Warning System Specification

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, 5G, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

Published by
Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

ATIS-0700010.v002

ATIS Standard on

Enhanced Wireless Emergency Alert (eWEA) via EPS Public Warning System Specification

Alliance for Telecommunications Industry Solutions

Approved February 2018

Abstract

This Standard describes the use of the Evolved Packet System (EPS) Public Warning System (PWS) for the broadcast of Enhanced Wireless Emergency Alert (eWEA) messages and includes the mapping of eWEA application level messages to the Cell Broadcast Center (CBC) message structure as used within the EPS. 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)
>
> D. Sennett, Technical Editor (AT&T)

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

Table of Contents

Table of Figures

Table of Tables

ATIS Standard on –

Enhanced Wireless Emergency Alert (eWEA) via EPS Public Warning System Specification

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 Federal Communications Commission (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 the Enhanced Wireless Emergency Alert (eWEA) standard for the eWEA via Evolved Packet System (EPS) Public Warning System (PWS) and is based upon the WEA enhancements identified in the September 2016 FCC Report & Order on WEA Enhancements, FCC 16-127 [Ref 11]. This specification supersedes ATIS-0700010, *CMAS via EPS Public Warning System Specification,* and its associated Supplement A. Any assumptions, requirements, and principles from the original published ATIS-0700010 and the associated ATIS-0700010 Supplement A that are applicable to eWEA are included in this ATIS specification.

1   Scope, Purpose, & Application

1.1   Scope

The scope of this standard is the support of eWEA via the EPSPWS. This standard covers the mapping of eWEA messages onto the 3rd Generation Partnership Project (3GPP)-defined PWS message structure within the EPS.

The support of eWEA via the Evolved Multicast Broadcast Multimedia Service (eMBMS) is beyond the scope of this Standard.

This standard is not intended to describe an overall end-to-end eWEA or PWS architecture and may include clarifications that may be lacking in existing 3GPP specifications.

The eWEA interface with the Federal network and the mobile device behavior upon reception of a eWEA alert are specified in separate standards [Ref 10, Ref 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 EPS PWS for the delivery of eWEA messages. The standard includes the mapping of eWEA application level messages to the Cell Broadcast Center (CBC) message structure as used within the EPS.

1.3   Application

This standard is applicable to the mapping of eWEA messages to the warning message delivery service on EPS.

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] 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).*[1]

[Ref 2] FCC 08-99, *Federal Communications Commission First Report and Order In the Matter of The Commercial Mobile Alert System*; April 9, 2008.[2]

[Ref 3] 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.[2]

[Ref 4] 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.[2]

[Ref 5] FCC 08-166, *Federal Communications Commission Order on Reconsideration and Erratum In the Matter of The Commercial Mobile Alert System*; July 15, 2008.[2]

[Ref 6] INCITS 31-2009[R2014], *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).[3]

[Ref 7] ATIS-0700006.v002, *eWEA via GSM/UMTS Cell Broadcast Service Specification.*[4]

[Ref 8] ATIS-0700008.v002, *Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification.*[4]

[Ref 9] ATIS-0700036, *Enhanced Wireless Emergency Alert (eWEA) Mobile Device Behavior (MDB) Specification (a revised version of J-STD-100).*[5]

[Ref 10] ATIS-0700037, *Enhanced Wireless Emergency Alert (eWEA) Federal Alert Gateway to CMSP Gateway Interface Specification (a revised version of J-STD-101).*[5]

[Ref 11] 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.[2]

[Ref 12] 3GPP TS 29.168, *3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Cell Broadcast Centre interfaces with the Evolved Packet Core; Stage 3.*[5]

[Ref 13] 3GPP TS 36.413, *3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP).*[6]

[Ref 14] 3GPP TS 36.331, *3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC); Protocol specification.*[6]

[Ref 15] 3GPP TS 23.041, *3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Technical realization of Cell Broadcast Service (CBS).*[6]

[Ref 16] 3GPP TS 23.038, *3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Alphabets and language-specific information.*[6]

---

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

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

[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 >

[4] This document is currently awaiting publication by the Alliance for Telecommunications Industry Solutions (ATIS), 1200 G Street N.W., Suite 500, Washington, DC 20005. < https://www.atis.org/docstore/default.aspx >.

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

[Ref 17] ISO/IEC 10646:2017, *Information technology -- Universal Coded Character Set (UCS)*.[6]

[Ref 18] 3GPP TS 22.268, *3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Public Warning System (PWS) Requirements*.[6]

[Ref 19] ATIS-0700035, *Enhanced Wireless Emergency Alert (eWEA) Service Description*.[4]

[Ref 20] ATIS-0700025.v002, *Enhanced Wireless Emergency Alert (eWEA) International Roaming Specification*.[4]

[Ref 21] IETF RFC 3986, *Uniform Resource Identifier (URI)*.[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, FCC 08-99 [Ref 2] and from the FCC Report and Order on WEA Enhancements, FCC 16-127 [Ref 11]:

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, FCC 08-99 [Ref 2].

3.1.2   Commercial Mobile Alert System (CMAS). CMAS refers to the voluntary emergency alerting system defined in the FCC First Report and Order, FCC 08-99 [Ref 2], 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   Commercial Mobile Service Operator. See Commercial Mobile Service Provider.

3.1.5   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 International Committee for Information Technology Standards (INCITS) 31-2009 standard [Ref 6], the Federal Information Processing Standards (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.

3.1.6   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 29th, 2016 FCC Report and Order on WEA Enhancements, FCC 16-127 [Ref 11].

3.1.7   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.

3.1.8   State/Local WEA Test Message. End-to-end system test message initiated by state/local emergency managers and terminating with members of the public who opt in to receiving them.

---

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

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

3.2 Acronyms & Abbreviations

3GPP	3rd Generation Partnership Project
ANSI	American National Standards Institute
ATIS	Alliance for Telecommunications Industry Solutions
CBC	Cell Broadcast Center
CBE	Cell Broadcast Entity
CBEM	Cell Broadcast Entity Message
CBS	Cell Broadcast Service
CMAS	Commercial Mobile Alert System
CMS	Commercial Mobile Service
eMBMS	Evolved Multicast Broadcast Multimedia Service
CMSP	Commercial Mobile Service Provider
EPS	Evolved Packet System
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
eWEA	Enhanced Wireless Emergency Alert
FCC	Federal Communications Commission
FIPS	Federal Information Processing Standards
INCITS	International Committee for Information Technology Standards
LTE	Long Term Evolution
MDB	Mobile Device Behavior
MME	Mobility Management Entity
NCE	Non-commercial Educational
OMC	Operation and Maintenance Center
PWS	Public Warning System
RMT	Required Monthly Test
SAME	Specific Area Message Encoding
SN	Systems & Networks
UE	User Equipment
WARN	Warning, Alert, & Response Network
WEA	Wireless Emergency Alert

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 1] was passed by Congress in September 2006 and was signed into law by President Bush on October 13, 2006.

Based upon the WARN Act, "*the Commission[9] shall complete a proceeding to adopt relevant technical standards, protocols, procedures, and other technical requirements based on the recommendations of such Advisory*

---

[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).

[9] The "Commission" referenced in the WARN Act is the Federal Communications Commission.

Committee[10] necessary to enable commercial mobile service alerting capability for commercial mobile service providers that voluntarily elect to transmit emergency alerts".[11]

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)))*."[12]

4.1 Key WARN Act Requirements

1. Transmission of emergency alerts via commercial mobile service is voluntary.
   a. Commercial mobile service operators may voluntarily elect to transmit emergency alerts.[13]

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.[14]

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.[15].

   > 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.[16]
   b. Must provide notification of this decision to its existing subscribers.[17]
   c. Shall not by itself provide a basis for liability against the provider (including its officers, directors, employees, vendors, and agents).[18]

5. Commercial mobile service licensee may not impose a separate or additional charge for such transmission or capability.[19]

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.[20]
   a. Based upon the above WARN Act requirement, WEA 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.[21]

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 any harm resulting from the transmission of, or failure to transmit, an emergency alert.[22]

---

[10] The "Advisory Committee" referenced in this quote is the Commercial Mobile Service Alerts Advisory Committee (CMSAAC) as in WARN Act § 602(a).

[11] WARN Act § 602(a)

[12] WARN Act § 602(b)(1)(A)

[13] WARN Act § 602(a)

[14] WARN Act § 602(b)(2)(B)(ii)

[15] WARN Act § 602(b)(1)(B)

[16] WARN Act § 602(b)(1)(B)

[17] WARN Act § 602(b)(1)(C)

[18] WARN Act § 602(e)(2)

[19] WARN Act § 602(b)(2)(C)

[20] WARN Act § 602(b)(2)(E) and § 603(c)(5)

[21] WARN Act § 602(c)(4)

[22] 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.[23]

4.2 FCC Report & Orders

This clause provides an overview of the FCC First Report and Order, FCC 08-99 [Ref 2], the FCC Second Report and Order, FCC 08-164 [Ref 3], the FCC Third Report and Order, FCC 08-184 [Ref 4], and the FCC Report & Order on WEA Enhancements, FCC 16-127 [Ref 11].

4.2.1 FCC First Report and Order

The FCC released the First Report and Order for CMAS, FCC 08-99 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 clause 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. (amended by FCC 16-127; clause 4.2.4.)
- *Geographic targeting (geo-targeting)*: Participating CMS Providers are required to target alerts at the county-level as recommended by the CMSAAC (amended by FCC 16-127; clause 4.2.4).
- *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 (amended by FCC 16-127; clause 4.2.4).
- *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.
- *Preemption of calls in progress*: CMAS alerts may not preempt a voice or data session in progress.
- *Initial implementation*: Participating CMS Providers must comply with these rules no later than 10 months from the date the FCC announces the selection of a Federal Government entity to perform the Alert Aggregator and Federal Alert Gateway functions required to implement the CMAS.

The FCC First Report and Order, FCC 08-99 [Ref 2] 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 5].

4.2.2 FCC Second Report and Order

The FCC released the Second Report and Order for the CMAS, FCC 08-164, on July 8, 2008, FCC 08-164 [Ref 3]. 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

---

[23] WARN Act § 602(e)(1)(B)

transmitter to enable the distribution of geographically targeted alerts by commercial mobile service providers that have elected to transmit emergency alerts. . ." Requirements and a further description of the NCE and public broadcast television station distribution of eWEA alerts is provided in clause 4.2.3 of this specification.

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.

The Periodic Interface Testing is a test message between the Federal Alert Gateway and the CMSP Gateway and is intended to ensure the availability and viability of both gateway functions. The Periodic Interface Test is not designed to test the CMSP's infrastructure or 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 CMAS, FCC 08-164, on August 7, 2008, FCC 08-184 [Ref 4]. 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.
- A compliance timeline under which participating CMS providers must begin eWEA 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 either or both of 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 subscriber's right to opt out as defined in the Third Report and Order may be found in ATIS-0700036 [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 11]. Listed below are the WEA enhancements which are applicable to the support of eWEA via the EPS PWS. For a summary of all of the eWEA enhancements, see ATIS-0700035, *eWEA Service Description* [Ref 19]:

- *Increasing Maximum WEA Character Length*: Alert text increased to a maximum of 360 characters of alphanumeric on 4G-Long Term Evolution (LTE) and future networks. Allowed to continue the delivery of 90-character messages on legacy 2G & 3G networks and devices.
- *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]. The inclusion of multimedia in WEA Alert Messages is a topic of the Further Notice of Proposed Rulemaking (FNPRM) portion of the FCC 16-127 and, therefore, is out of scope for the eWEA standards.

- *WEA Presentation*: Mobile devices must present an Alert Message as soon as they receive it, but mobile devices may not enable an Alert Message to preempt an active voice or data session. WEA-capable mobile devices engaged in active voice or data sessions on legacy networks may not be able to receive available Alert Messages until the active voice or data session concludes. If a mobile device receives a WEA Alert Message during an active voice or data session, the user may be given the option to control how the Alert Message is presented on the mobile device, with respect to the use of the common vibration cadence and audio attention signal.

- *WEA Geo-Targeting*: Participating CMS Providers 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 2]:
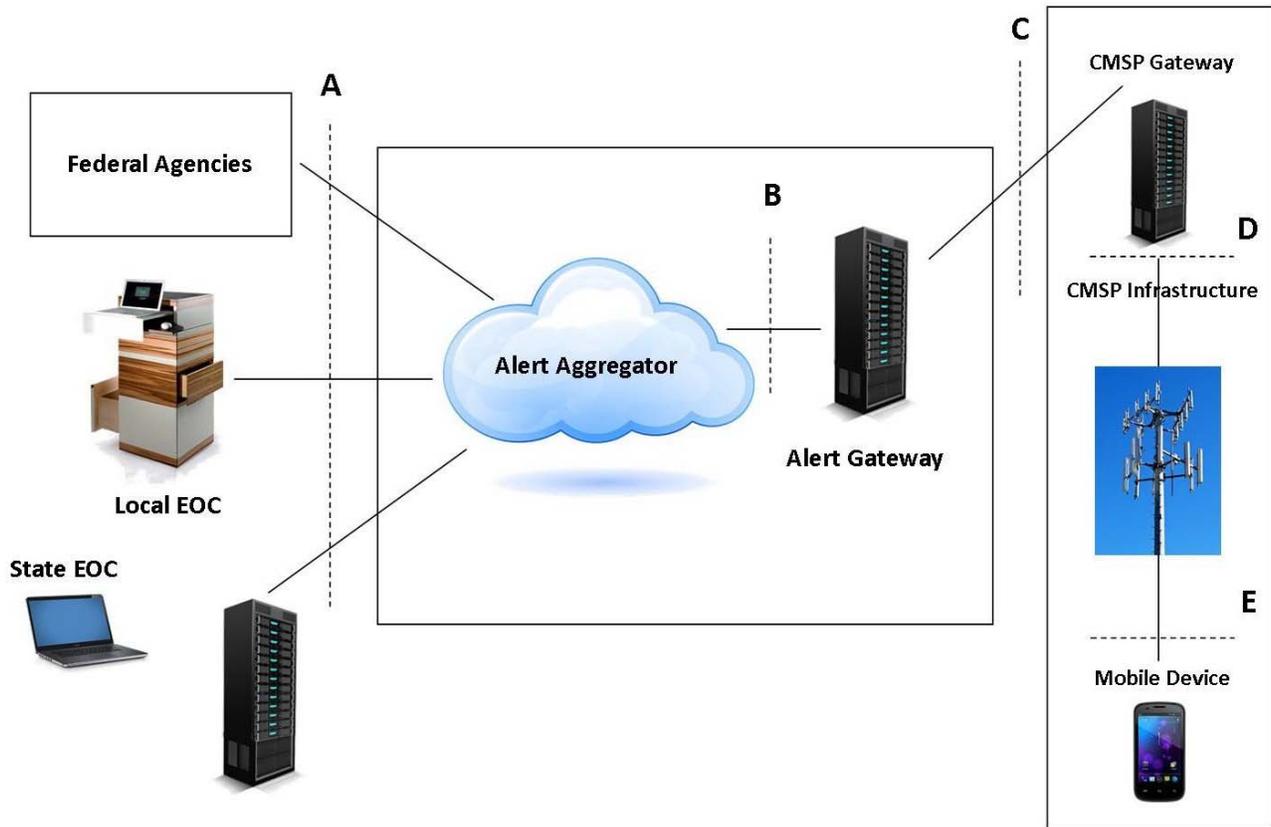
Figure 4.1: WEA Reference Architecture

5   Requirements

This clause identifies requirements specific to the mapping of the eWEA service to the public warning system that are not evident in existing 3GPP specifications.

5.1   General eWEA Requirements

1. The EPS PWS supporting eWEA shall support the technical realization as specified in 3GPP TS 23.041 [Ref 15].

2. The CMSP network may begin distribution for broadcast of the English alert text of eWEA Alert and eWEA Update messages before beginning the distribution for broadcast of any other associated additional languages.

5.2   Cell Broadcast Center (CBC) Requirements

The general CBC requirements for the EPS are specified in 3GPP TS 23.041 [Ref 15] and 3GPP TS 29.168 [Ref 12]. The requirements for the CBC interface with the CMSP Gateway [as a Cell Broadcast Entity (CBE)] are defined in ATIS-0700008 [Ref 8].

This clause defines the CBC requirements for the support of eWEA via EPS PWS.

1. The CBC shall support ATIS-0700008, *Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification* [Ref 8].

2. The CBC shall retain the information to identify the Tracking Area, Emergency Areas, and/or Cell ID list for an Alert until the Alert is cancelled or the Alert expires.

3. The CBC shall determine the set of network elements for the eWEA Alert where the message is to be broadcast as defined in 3GPP TS 23.041 [Ref 15] (e.g., list of cell sites, tracking areas, emergency 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 E UTRAN shall perform retransmissions of the eWEA alert message based upon the retransmission information provided by the CMSP Gateway.

6. The CBCs 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 15].

9. The CBC shall accept Cell Broadcast Service (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 the appropriate indication to the downstream nodes to support the broadcast of multiple eWEA Alert messages concurrently.

11. The CBC shall send only the long 360-character max text messages to the downstream nodes for the purpose of broadcasting over Evolved Universal Terrestrial Radio Access Network (E-UTRAN).

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

5.3 CMSP Gateway Requirements

The requirements for the CMSP Gateway interface with the Federal Alert Gateway are defined in ATIS-0700037, *eWEA Federal Alert Gateway to CMSP Gateway Interface Specification* [Ref 10]. The requirements for the CMSP Gateway with the CBC are defined in ATIS-0700008 [Ref 8].

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

1. The CMSP Gateway shall appear as a CBE in the Cell Broadcast Service network architecture, and thus shall support the CBE to CBC interface defined in ATIS-0700008 [Ref 8].

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

6. 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.

7. The CMSP Gateway shall generate the Message ID based on the Special Handling, Urgency, Severity, Certainty, and 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.

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 Specific Area Message Encoding (SAME) geocode values to the CBC [Ref 10].

   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 of the English alert message with 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 long 360-character max text messages for broadcasting on E-UTRAN.

13. Upon the reception of a cancel alert message, the CMSP Gateway shall cancel the English alert message and the equivalent 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 an equivalent Spanish alert message.

5.3.1 Message Coding

The eWEA alert messages that are received from the Federal Alert Gateway are UTF-8 encoded (per ATIS-0700037, *eWEA Federal Alert Gateway to CMSP Gateway Interface Specification (a revised version of J-STD-101)* [Ref 10]). 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.

5.3.2 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 21] regarding unsafe characters.

5.4 UE Requirements

This clause provides the User Equipment (UE) requirements for the support of eWEA via EPS PWS. The requirements for the UE behavior upon the receipt of the eWEA alert message are defined in ATIS-0700036, *Enhanced Wireless Alert (eWEA) MDB Specification (a revised version of J-STD-100)* [Ref 9].

1. The UE shall be able to receive the PWS related messages as specified in 3GPP TS 36.331 [Ref 14].

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

5.5 CBC to MME Requirements

This clause defines the requirements for the interface between the CBC and the Mobility Management Entity (MME).

1. CBCs shall be able to interface to all MMEs deployed in the CMSP network.

2. The CBC to MME interface shall follow the existing primitives in the 3GPP TS 29.168 [Ref 12] specification.

> NOTE: This includes setting the Concurrent Warning Message Indicator Information Element within the WRITE REPLACE WARNING REQUEST message appropriately to support the broadcast of multiple concurrent eWEA Alert messages.

5.6 Lawful Interception Requirements

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

6 Functional Architecture and Interfaces

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

The WEA Reference Point "D" maps to the interface between the CMSP Gateway and the CBC (see ATIS-0700008 [Ref 8]).

The WEA Reference Point "E" maps to LTE-Uu (3GPP TS 23.041 [Ref 15] and 3GPP TS 36.331 [Ref 14]).

Interface SBc is defined in 3GPP TS 23.041 [Ref 15] and 3GPP TS 29.168 [Ref 12].

Interface S1-MME is defined in 3GPP TS 23.041 [Ref 15] and 3GPP TS 36.413 [Ref 13].

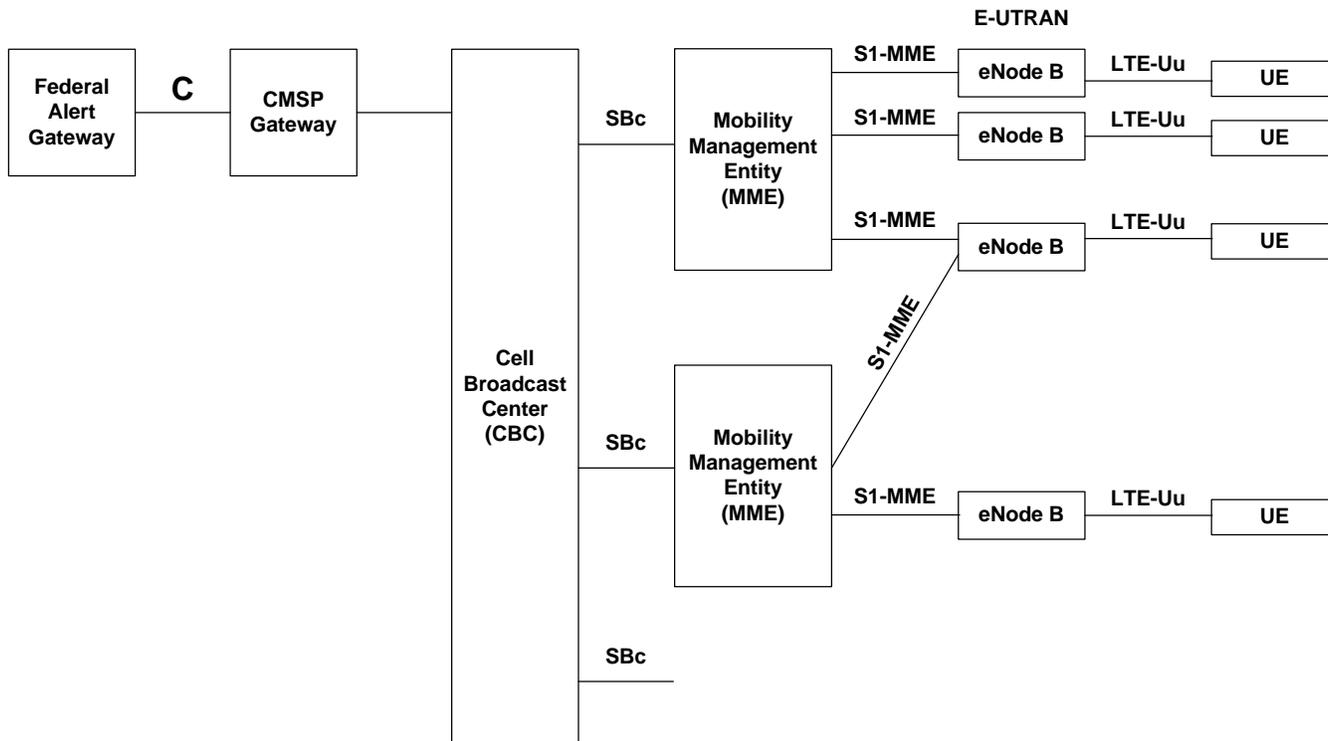The Warning System architecture for support of eWEA is as follows:

Figure 6.1: Warning System Architecture for eWEA

6.1 CBC to MME Interface

For the interface between the CBC and the MME, 3GPP has defined a mandatory protocol in 3GPP TS 29.168 [Ref 12].

6.2 CMSP Gateway to CBC Interface

The interface between the CMSP Gateway and the CBC is defined in ATIS-0700008 [Ref 8].

7 eWEA Call Flows

This clause provides call flows for the eWEA functionality as applicable to EPS. These call flows assume that Warning Message Delivery procedures as defined in the 3GPP TS 23.041 [Ref 15] are used within the CMSP infrastructure for EPS.

Within the 3GPP specifications, eWEA is considered to be a part of PWS, and therefore, this document also refers the Warning Message Delivery procedures for EPS as "EPS Public Warning System" or "EPS PWS".

The EPS PWS is depicted in the following figure:
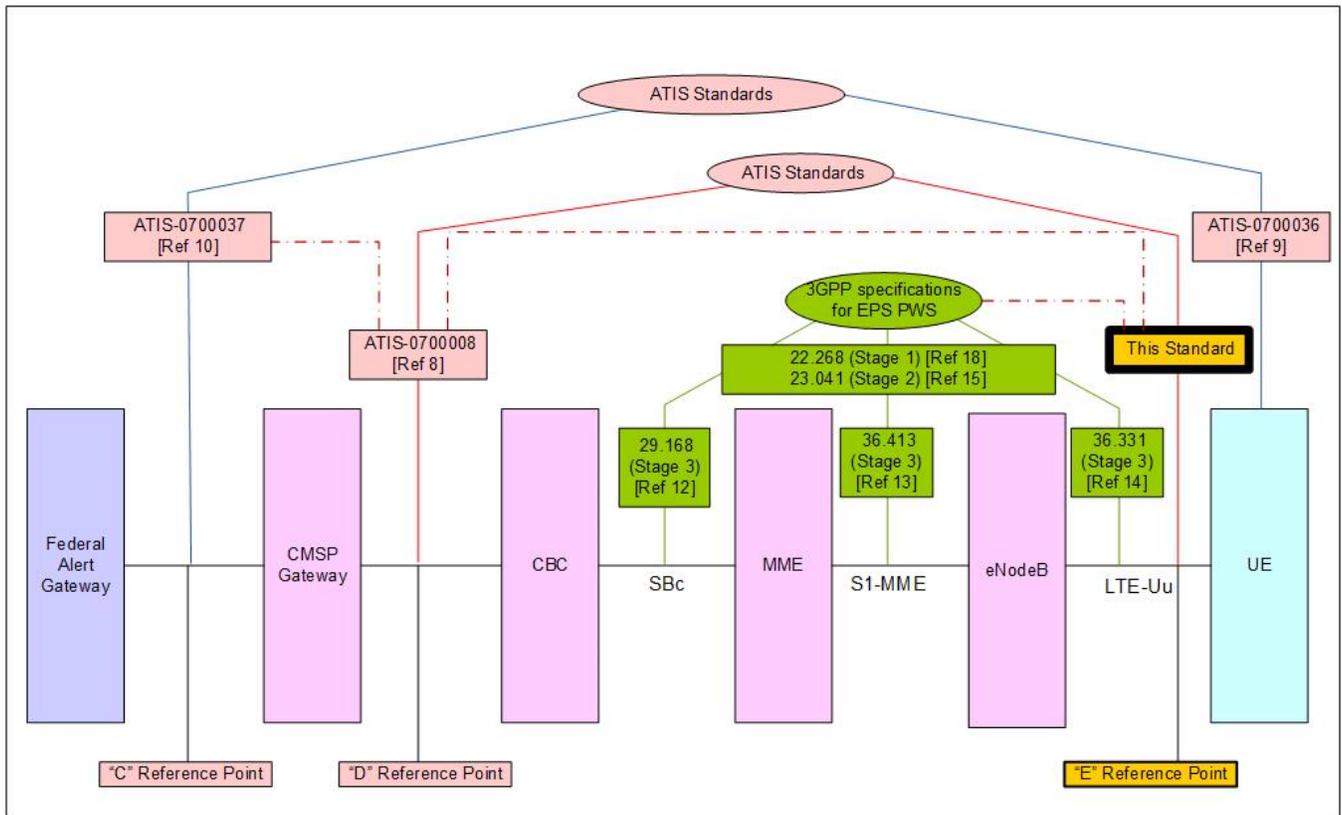
Figure 7.1: eWEA Reference Diagram for EPS Public Warning System

The dotted lines in Figure 7.1, *eWEA Reference Diagram for EPS Public Warning System*, show dependencies among standards and specifications.

Figure 7.1 provides the references to other Standards necessary to support the end-to-end transmission of eWEA alert messages. The CMSP Gateway is a CBE and its interface to the CBC is specified in ATIS-0700008 [Ref 8]. The interface between the Federal Alert Gateway and the CMSP Gateway is specified in ATIS-0700037 [Ref 10].

The mobile device behavior for processing the eWEA alert messages is defined in ATIS-0700036, *eWEA MDB Specification* [Ref 9].

The eWEA uses the EPS PWS functionality as defined in 3GPP TS 22.268 [Ref 18], 3GPP TS 23.041 [Ref 15] and the other related 3GPP Standards (3GPP TS 29.168 [Ref 12], 3GPP TS 36.413 [Ref 13], and 3GPP TS 36.331 [Ref 14]) referenced in Figure 7.1.

The following eWEA call flows are defined in this clause:

- New eWEA alert message call flow.
- Cancelled eWEA alert message call flow.
- Updated eWEA alert message call flow.
- Invalid eWEA alert message call flow.
- Transmission Control related message call flows.

7.1 New eWEA Alert Message Call Flow

The following is the call flow for a new eWEA Alert Message:
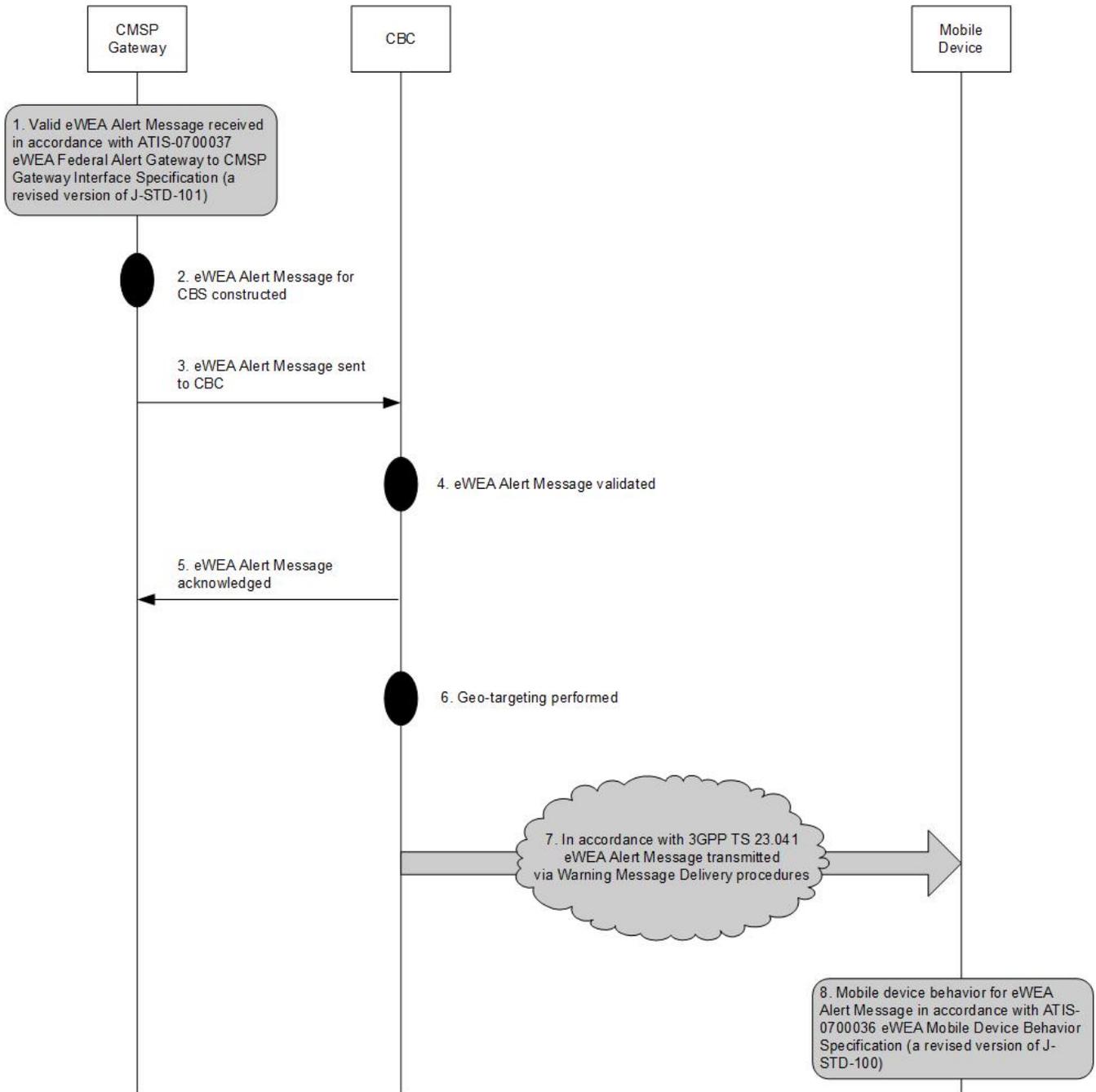
Figure 7.2: New eWEA Alert Message Call Flow

1. A valid eWEA Alert Message is received in accordance with ATIS-0700037 [Ref 10].

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.

    NOTE: The generation of the 90-character maximum English language message and the 90-character maximum Spanish language message is specified in ATIS-0700006, *eWEA via GSM/UMTS Cell Broadcast Service Specification* [Ref 7].

Steps 3 through 8 are repeated for the English-language eWEA message and 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 8].

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 8].

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 is transmitted via EPS Warning Message Delivery procedure for eWEA (i.e., EPS Public Warning System) in accordance with 3GPP TS 23.041 [Ref 15].

8. The mobile device behavior for the transmitted eWEA Alert Message is in accordance with ATIS-0700036, *eWEA MDB Specification* [Ref 9].

7.2 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, *eWEA Federal Alert Gateway to CMSP Gateway Interface Specification* [Ref 10].

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

3. The CMSP Gateway sends the eWEA Alert Cancelled Message to the CBC as defined in ATIS-0700008 [Ref 8].

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 8].

6. In accordance with 3GPP TS 23.041 [Ref 15], EPS Warning Message Delivery procedure for CMAS (i.e., EPS Public Warning System) is instructed to stop the broadcast of the eWEA Alert Message referenced in

the received eWEA Alert cancelled Message for CBS.

7.3 Updated eWEA Alert Message Call Flow

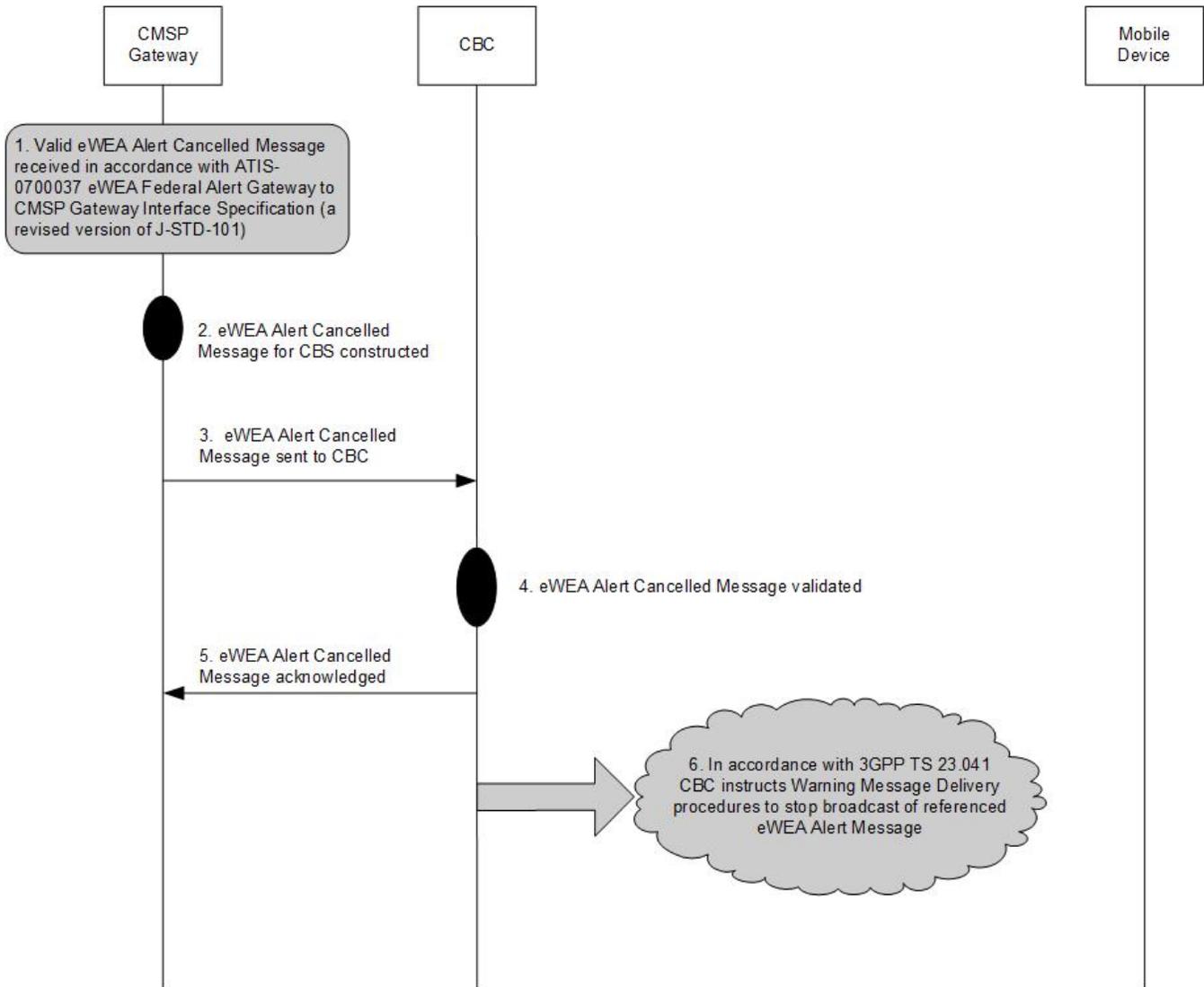The following is the call flow for an updated eWEA Alert Message:
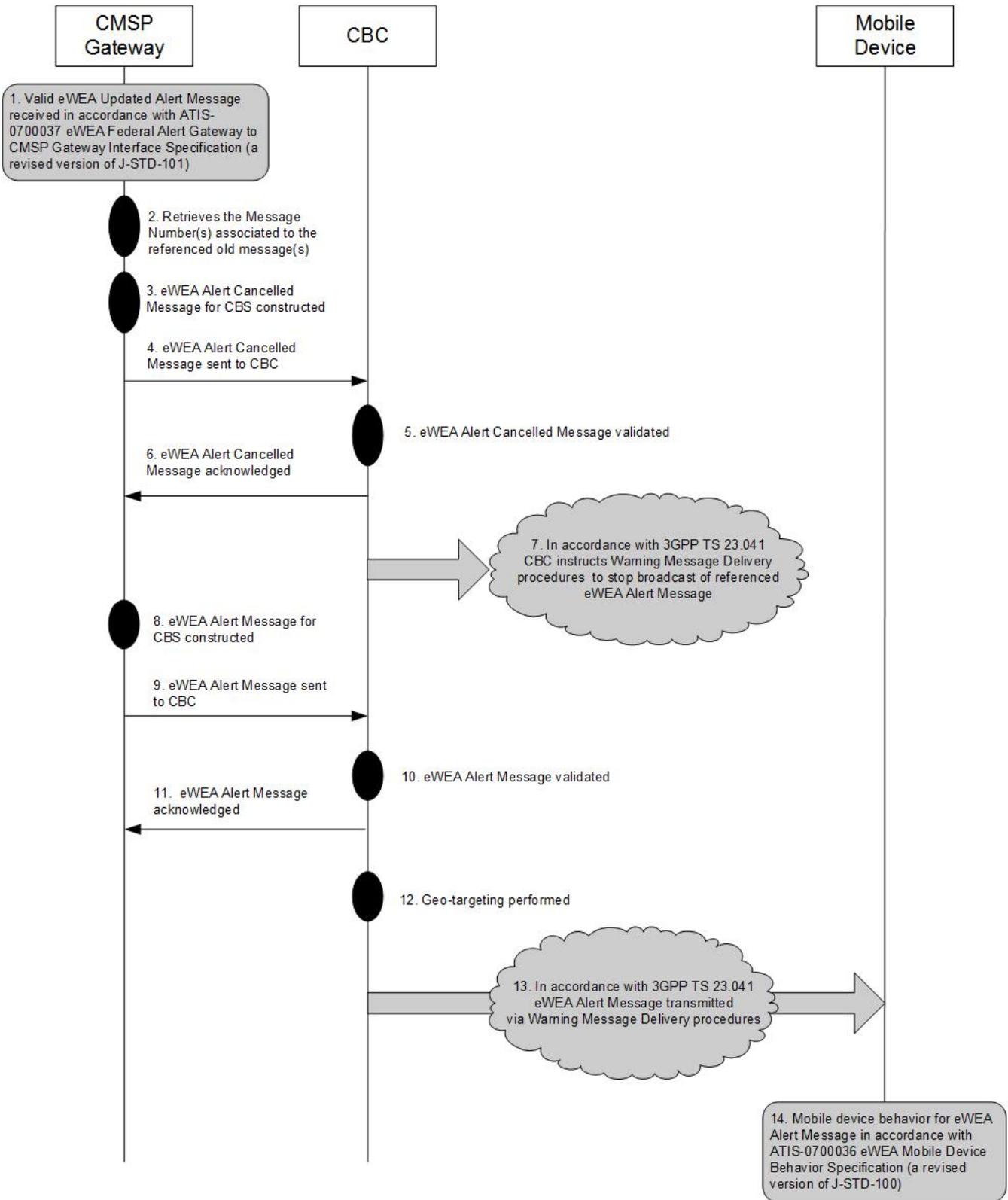
Figure 7.4: Updated eWEA Alert Message Call Flow

1. A valid eWEA Updated Alert Message is received in accordance with ATIS-0700037, *eWEA Federal Alert Gateway to CMSP Gateway Interface Specification* [Ref 10].

2. The CMSP Gateway retrieves the Message Numbers linked 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 message and then initiating the new message for English language and then for Spanish language if Spanish text was provided.

> NOTE: Steps 3 through 7 do not apply if the CMSP Gateway is unable to retrieve the Message Number 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.

Steps 3 through 7 are repeated for the English language message and also for the Spanish language message, if a linked Spanish message broadcast is ongoing.

3. The CMSP Gateway constructs the eWEA Alert Cancelled Message for CBS.
4. The CMSP Gateway sends the eWEA Alert Cancelled Message to the CBC as defined in ATIS-0700008 [Ref 8].
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 8].
7. In accordance with 3GPP TS 23.041 [Ref 15], EPS Warning Message Delivery procedure for eWEA (i.e., EPS PWS) is instructed to stop the broadcast of the eWEA Alert Message referenced in the received eWEA Alert Cancelled Message for CBS.

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

8. The CMSP Gateway constructs the eWEA Alert Message with the new message.
9. The CMSP Gateway sends the eWEA Alert Message for CBS to the CBC as defined in ATIS-0700008 [Ref 8].
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 8].
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 is transmitted via EPS Warning Message Delivery procedure for eWEA (i.e., EPS PWS) in accordance with 3GPP TS 23.041 [Ref 15].
14. The mobile device behavior for the transmitted eWEA Alert Message for CBS is in accordance with ATIS-0700036 [Ref 9].

7.4 Invalid eWEA Alert Message Call Flow

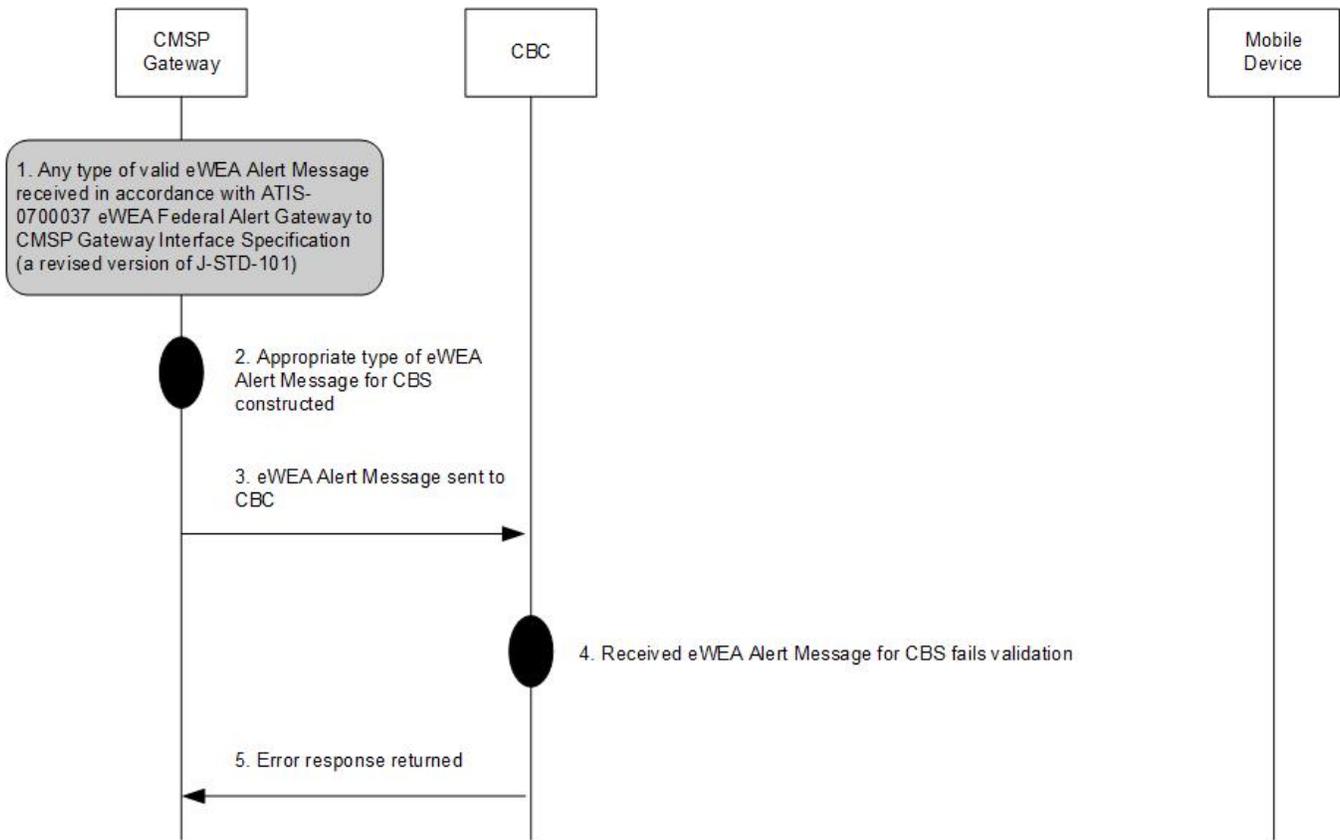The following is the call flow for an invalid eWEA Alert Message:

Figure 7.5: Invalid eWEA Alert Message Call Flow

1. Any type of valid eWEA Alert Message is received in accordance with ATIS-0700037 [Ref 10].
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 8].
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 8].

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 10] 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:

21

Figure 7.6: Cease Transmissions Call 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 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 stopping 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:
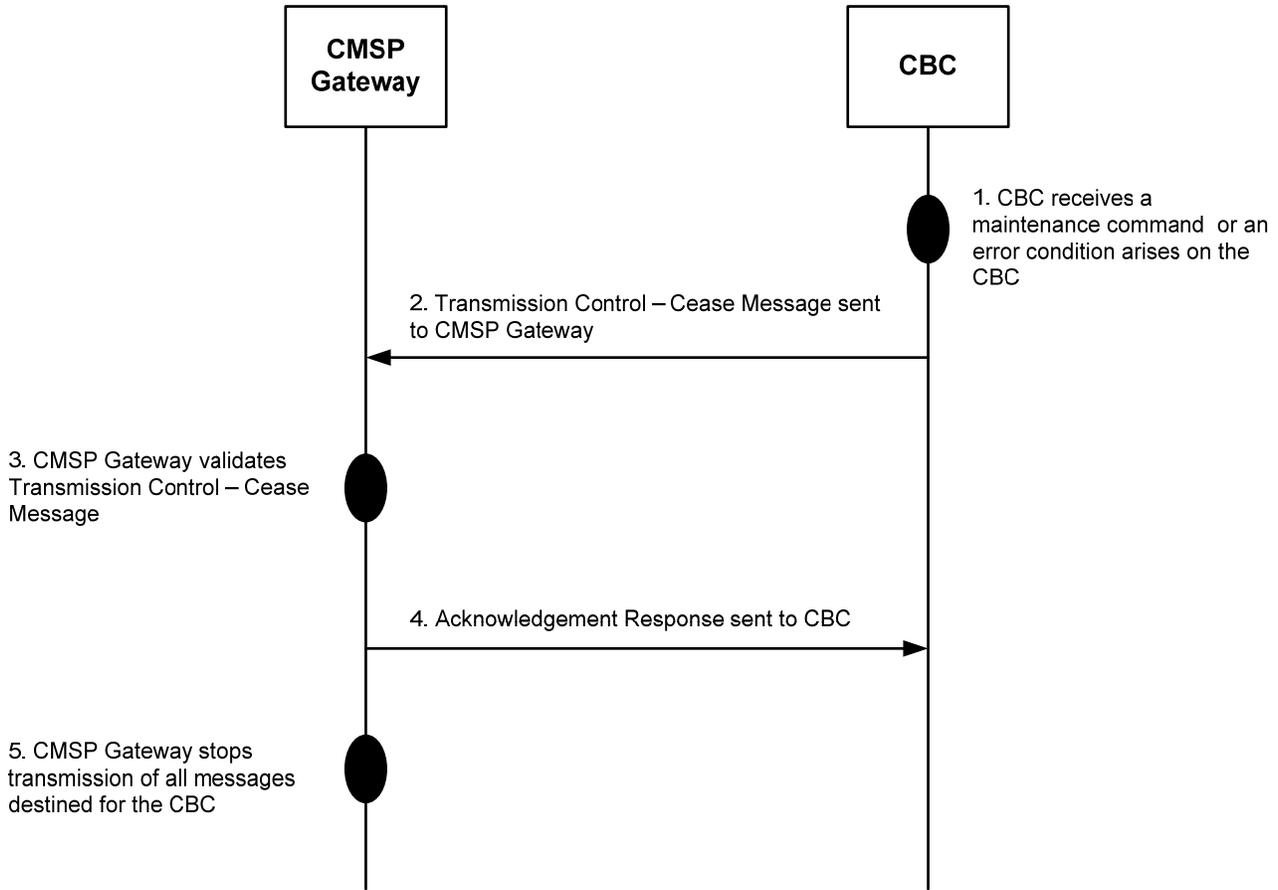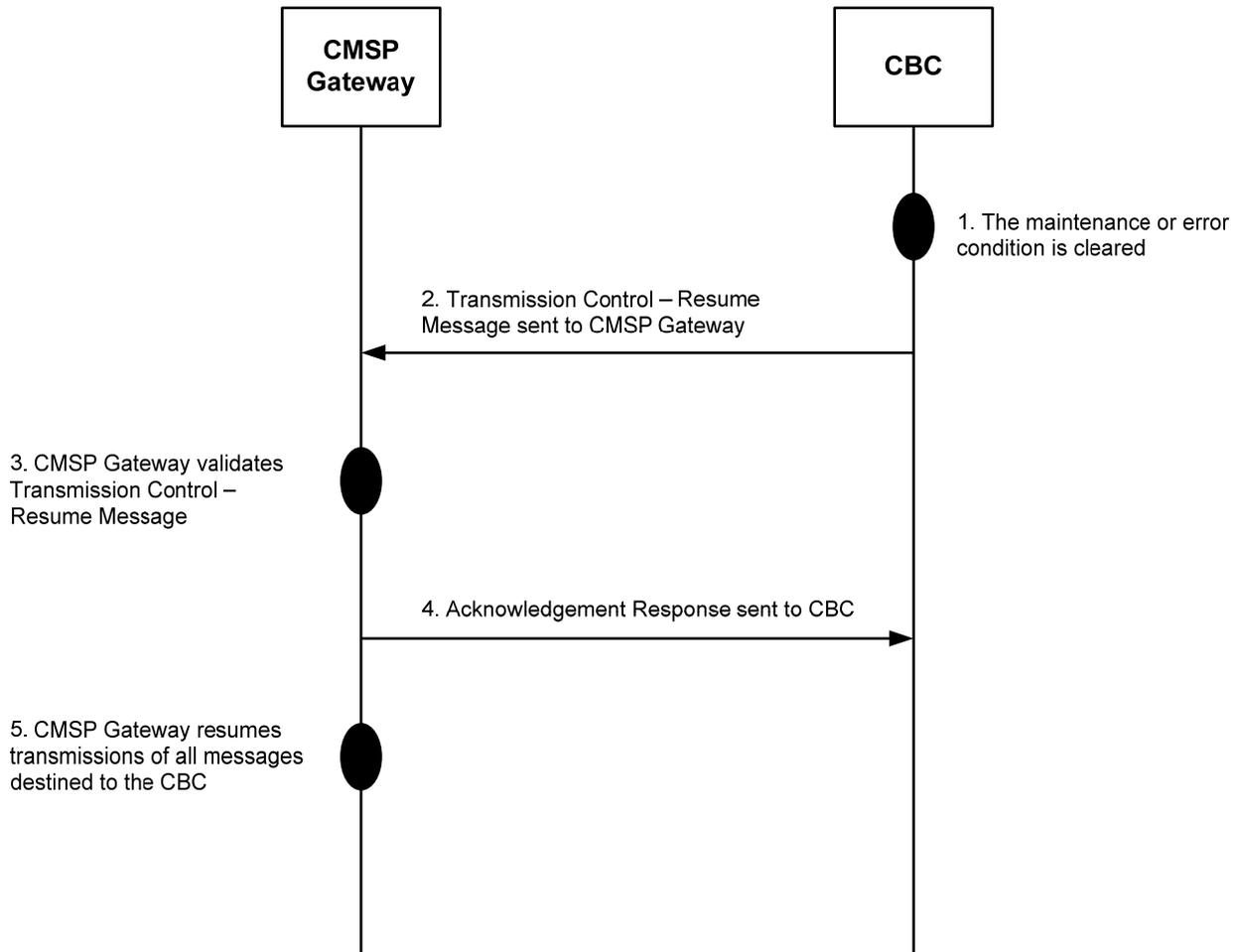
Figure 7.7: Resume Transmissions Call Flow

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 Warning Message Delivery for eWEA Application

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

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

8.1 eWEA Interfaces

As indicated in clause 6, *Functional Architecture and Interfaces*, 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 EPS architecture can be thought of as corresponding to the eNode-B to mobile device interface for the delivery of eWEA messages via the Message Delivery Service (the LTE-Uu in Figure 6.1, *Warning System Architecture for eWEA*).

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 Cell Broadcast Entity Message (CBEM) elements. This interface is specified in ATIS-0700008 [Ref 8].

The following diagram illustrates how the CMSP infrastructure delivers eWEA alert messages to the mobile devices through the Warning Message Delivery service:
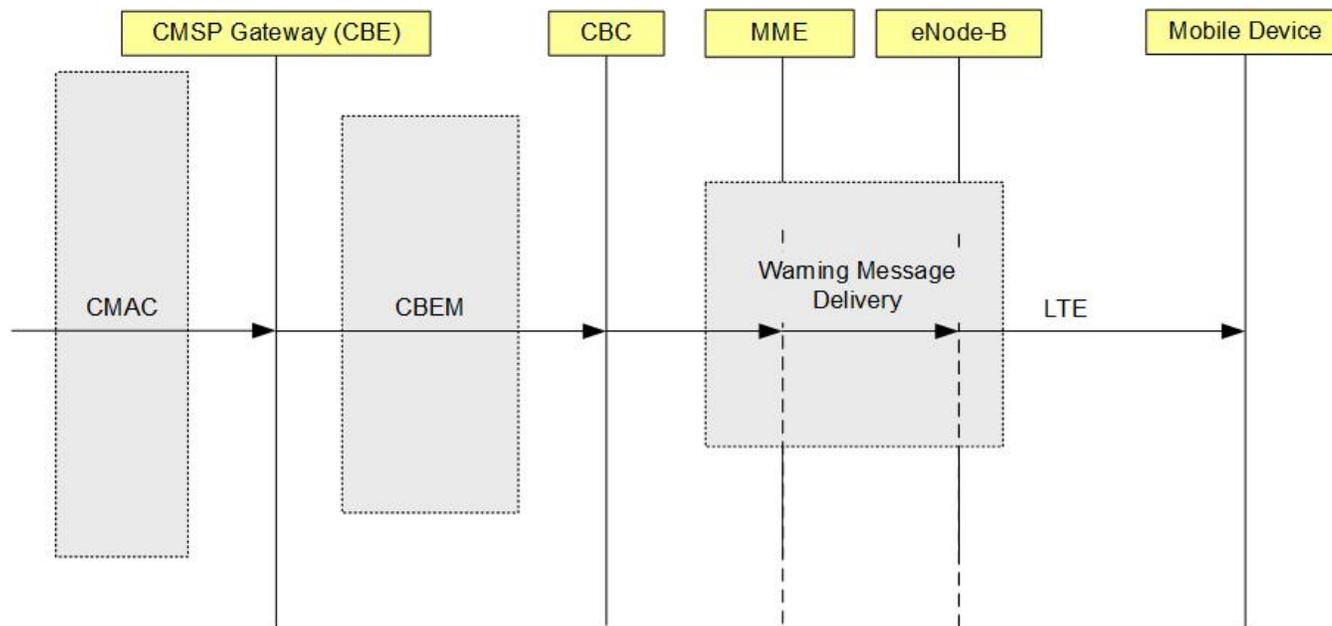

Figure 8.1: eWEA Message Relationship

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 10], to the CBEM messages before sending the alert message to the CBC, per ATIS-0700008 [Ref 8]. 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 EPS Warning Message Delivery service; this mapping is described in this Standard. This Standard also illustrates the mapping of the CBEM elements and the CBC message elements.

8.2 Warning Message Delivery Service & eWEA

The Warning messages delivered over the air interface are specified in 3GPP TS 23.041 [Ref 15] and 3GPP TS 36.331 [Ref 14]. This standard utilizes these messages to broadcast eWEA alert messages. The following sub-clauses provide an overview of the Warning message structures for the EPS. This standard specifies how the parameters of the Warning Message Delivery WRITE-REPLACE and STOP primitives are populated based upon the CBEM elements. The Warning messages associated with the EPS air interface are described in the relevant 3GPP specifications.

The following general requirements apply to Warning Message Delivery:

1. The long 360-character maximum message shall be broadcast on LTE and beyond networks.

2. The short 90-character maximum message shall be broadcast on pre-LTE networks.

8.3 Overview of eWEA Element Mapping

The following table illustrates which CMAC elements are used to derive CBEM elements and Warning message elements and are 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 Warning Message Delivery service. The clauses that follow describe in detail the element mapping from the CMAC to CBEM and CBEM to Warning messages.

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

CMAC Element	Mapped to CBEM?	Mapped to Warning Message?	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_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 (see Note 3)	Yes (see Note 3)
CMAC_long_text_alert_message	Yes	Yes	Yes
CMAC_long_text_alert_message_length	Yes	Yes (see Note 3)	Yes (see Note 3)

CMAC Element	Mapped to CBEM?	Mapped to Warning Message?	Delivered to Mobile Device?
CMAC_text_language	Yes	Yes (see Note 1, Note 4)	Yes (see 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 Message Identifier element. See clause 8.5.2, *Message Identifier*.

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

NOTE 3: The message length is calculated by the CBC and is used by the CBC to determine the values of Information Length in each CB Page of CB Data of the Warning Message Contents parameter. See clause 8.5.9, *Warning Message Contents*.

NOTE 4: The text language is contained in the WRITE-REPLACE WARNING REQUEST Data Coding Scheme parameter. See clause 8.5.8, *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 8] 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_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 Element	CMAC Element

CBEM_CBS_broadcast_text	Generated by the CMSP Gateway using the following:
	    CMAC_long_text_alert_message_length
	    CMAC_long_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 WRITE-REPLACE WARNING REQUEST Indication

This clause describes the usage of the following EPS Warning Message Delivery service WRITE-REPLACE WARNING REQUEST Message parameters for the support of eWEA alert message:

- Message Type
- Message Identifier
- Serial Number
- List of Tracking Area IDs
- Warning Area List
- Repetition Period
- Number of Broadcast Requests
- Data Coding Scheme
- Warning Message Content
- Operation and Maintenance Center (OMC) ID
- Concurrent Warning Message Indicator

NOTE: There are other message parameters defined in 23.041 [Ref 15] not included in this Standard.

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

Table 8.3: Mapping CBEM Elements to WRITE-REPLACE WARNING REQUEST Parameters

WRITE-REPLACE WARNING REQUEST Parameter	CBEM Element	Description
Message Type	Generated by the CBC	Identifies the message type (write-replace warning).
Message Identifier	CBEM_CBS_message_id	This identifies the source type of the eWEA message.
Serial Number	Generated by CBC and correlated to CBEM_message_number	This identifies a new eWEA message.
Tracking Area List	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC derives the Tracking Area List 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.
Warning Area List	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC derives the Warning Area List 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.
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.
Warning Type		Not used in eWEA.
Warning Security Information		Not used in eWEA.
Data Coding Scheme	CBEM_language	Identifies the language and coding used in the eWEA alert message; currently, 7-bit coding is used.
Warning Message Contents	CBEM_CBS_broadcast_text	This identifies the actual contents of the eWEA alert text.
OMC ID		Operator specific parameter.
Concurrent Warning Message Indicator		This indicates that the new eWEA message needs to be broadcast concurrently with other ongoing broadcast of eWEA messages.

8.5.1   Message Type

The Message Type uniquely identifies the message being sent. It is mandatory for all messages.

8.5.2   Message Identifier

The Message Identifier parameter identifies the source/type of a Warning message and is passed transparently from the CBC to the mobile device. For example, "Federal Alert Gateway" (= source), "WEA-Presidential" (= type) corresponds to one value for eWEA. A number of eWEA messages may originate from the same source (Federal Alert Gateway) and/or be of the same type. These will be distinguished by the Serial Number. The Message Identifier is coded in binary.

The mobile device shall attempt to receive the eWEA messages which have Message Identifiers that are in a "search list" as defined in 3GPP TS 23.041 [Ref 15]. A mobile device shall by default have the Message Identifiers for eWEA messages in its search list. This "search list" shall contain the eWEA Message Identifiers stored in the memory of the mobile device in a "list of Warning messages to be received".

The "search list" may be used to manage the subscriber "opt out" capabilities. For example, eWEA-Presidential is always included in the "search list"; eWEA-Extreme-Alert-Messages, eWEA-Severe-Alert-Messages, and eWEA-Amber-Alerts are included in the "search list" by default but may be removed by the subscriber if they choose not to receive these categories of alerts.

The following subclauses define the Message Identifiers assignments for the both the English and additional language (e.g., Spanish) eWEA Alert messages for GSM, UMTS, and LTE networks, in accordance with the Message ID range allocation in 3GPP TS 23.041 [Ref 15]:

8.5.2.1 Relationship of Message Identifier with Message Language

This clause defines the relationship of the Message Identifier with the message language.

1. The language of the alert message will only be identified by the Data Coding Scheme element (see clause 8.5.8).

2. Per 3GPP TS 23.041 [Ref 15], there are no restrictions, no mandates, and no requirements on the assignment of any alert message language supported by 3GPP TS 23.038 [Ref 16] to any WEA-associated Message Identifier.

3. Compliance with 3GPP TS 23.041 [Ref 15] for Message Identifiers and for Data Coding Scheme for message languages is required for compliance with the FCC regulations on the availability of CMAS alerts while roaming as defined in the *FCC First Report and Order for the Commercial Mobile Alert System*, FCC 08-99 [Ref 1] (see Clause 4.2.1).

4. Per 3GPP TS 23.041 [Ref 15], the CMSPs use the Message Identifiers listed in clause 8.5.2.2 when the eWEA messages are required to be received by the mobile device independently of the user's preferred WEA language configuration settings [Ref 9].

5. Per 3GPP TS 23.041 [Ref 15], the CMSPs use the Message Identifiers listed in clause 8.5.2.3 when the eWEA messages can be optionally received by the mobile device based on the user's preferred WEA language configuration settings [Ref 9].

8.5.2.2 Message Identifier Assignments for English Language eWEA Alert Messages

- The set of Message Identifier assignments as defined in this clause for English Language eWEA alert messages does not imply that English is the exclusive message language for this set of Message Identifiers.
    a. In the US, English alerts use this set of Message Identifiers.
    b. Canada uses both English and French for this set of Message Identifiers.
    c. European nations also use this set of Message Identifiers for non-English alert messages (see [Ref 20]).
- The English language eWEA-Presidential Alert message identifier shall be designated as MsgID1 and shall have the decimal value of 4370.
- The English language eWEA-Imminent Threat message identifiers shall be designated as shown in the following table:

Table 8.4: Message Identifiers for English Language eWEA Imminent Threat Alerts

WEA Message Class	Message Identifier	Message Identify Value (decimal)	Severity	Urgency	Certainty
English Language eWEA-Extreme Alerts	MsgID2	4371	Extreme	Immediate	Observed
	MsgID3	4372	Extreme	Immediate	Likely
English Language eWEA-Severe Alerts	MsgID4	4373	Extreme	Expected	Observed
	MsgID5	4374	Extreme	Expected	Likely
	MsgID6	4375	Severe	Immediate	Observed
	MsgID7	4376	Severe	Immediate	Likely
	MsgID8	4377	Severe	Expected	Observed
	MsgID9	4378	Severe	Expected	Likely

- The English language eWEA-Child Abduction Emergency message identifier shall be designated as MsgID10, and shall have the decimal value of 4379.
- The English language eWEA Required Monthly Test (WEA-RMT) message identifier shall be designated as MsgID11, and shall have the decimal value of 4380.
- The English language eWEA Exercise (WEA-Exercise) message identifier shall be designated as MsgID12, and shall have the decimal value of 4381.
    > NOTE: The usage of English language eWEA Exercise and the associated message identifier value of 4381 are for further study.
- The English language eWEA CMSP-defined message identifier shall be designated as MsgID13, and shall have the decimal value of 4382.
- The English language eWEA Public Safety message shall be designated as MsgID14 and shall have the decimal value of 4396.
- The English language State/Local WEA Test message shall be designated as MsgID15 and shall have the decimal value of 4398.
- Table 8.4 shall be used to derive the Message Id value for the English eWEA alert messages if the Special Handling element is not received within the CMAC message from the Federal Alert Gateway.

8.5.2.3 Message Identifier Assignments for Additional Language eWEA Alert Messages

The language for the Additional Language eWEA Alert messages (e.g., Spanish) shall be indicated with the Data Coding Scheme (see clause 8.5.8).

- The set of Message Identifier assignments as defined in this clause for additional language eWEA alert messages does not imply that English cannot be utilized for this set of Message Identifiers.
    a. In the US, non-English alerts, including Spanish, use this set of Message Identifiers.
    b. European nations could use this set of Message Identifiers for English alert messages (see [Ref 20]).
- The Additional Language eWEA-Presidential Alert message identifier shall be designated as MsgID16, and shall have the decimal value of 4383.
- The Additional Language eWEA-Imminent Threat message identifiers shall be designated as shown in the following table:

Table 8.5: Message Identifiers for Additional Language eWEA Imminent Threat Alerts

WEA Message Class	Message Identifier	Message Identify Value (decimal)	Severity	Urgency	Certainty
Additional Language eWEA-Extreme Alerts	MsgID17	4384	Extreme	Immediate	Observed
	MsgID18	4385	Extreme	Immediate	Likely
Additional Language eWEA-Severe Alerts	MsgID19	4386	Extreme	Expected	Observed
	MsgID20	4387	Extreme	Expected	Likely
	MsgID21	4388	Severe	Immediate	Observed
	MsgID22	4389	Severe	Immediate	Likely
	MsgID23	4390	Severe	Expected	Observed
	MsgID14	4391	Severe	Expected	Likely

- The Additional Language eWEA-Child Abduction Emergency message identifier shall be designated as MsgID25 and shall have the decimal value of 4392.
- The Additional Language eWEA Required Monthly Test (WEA-RMT) message identifier shall be designated as MsgID26, and shall have the decimal value of 4393.
- The Additional Language eWEA Exercise (WEA-Exercise) message identifier shall be designated as MsgID27, and shall have the decimal value of 4394.
     NOTE: The usage of the Additional Language eWEA Exercise and the associated message identifier value of 4394 are for further study.
- The Additional Language eWEA CMSP-defined message identifier shall be designated as MsgID28 and shall have the decimal value of 4395.
- The Additional Language eWEA Public Safety message shall be designated as MsgID29 and shall have the decimal value of 4397.
- The Additional Language State/Local WEA Test message shall be designated as MsgID30 and shall have the decimal value of 4399.
- Table 8.5 shall be used to derive the Message Id value for the Additional Language eWEA Alert messages if the Special Handling element is not received within the CMAC message from the Federal Alert Gateway.

8.5.2.4 Message Identifier Assignments

For a single eWEA Alert message, the same Message Identifier shall be used for both the short 90-character maximum eWEA Alert message and for the long 360-character maximum eWEA Alert message.

For example, if the eWEA Alert message to be broadcast is a eWEA-Child Abduction Emergency message, then the associated eWEA Message IDs assignments would be as follows:

- A decimal value of 4379 would be used for as the assigned Message ID for the English language 90-character maximum eWEA alert message broadcast on GSM/UMTS.
- A decimal value of 4379 would be used for as the assigned Message ID for the English language 360-character maximum eWEA alert message broadcast on LTE.
- A decimal value of 4392 would be used for as the assigned Message ID for the Additional language 90-character maximum eWEA alert message broadcast on GSM/UMTS, if the Spanish alert text was provided by the Alert Originator.
- A decimal value of 4392 would be used for as the assigned Message ID for the Additional language 360-character maximum eWEA alert message broadcast on LTE, if the Spanish alert text was provided by the Alert Originator.

8.5.3 Serial Number

The Serial Number identifies a particular message from the source and type indicated by the Message Identifier and is altered every time a new message with a given Message Identifier is to be delivered.

> NOTE: For eWEA application, since the previous message is always cancelled at the CBEM interface before delivering a new message with a given Message Identifier, the Serial Number may not be altered.

8.5.4 List of Tracking Area IDs

The MME uses the List of Tracking Area IDs to determine which eNodeBs belong to the Tracking Area. If no Tracking Area ID is present, the MME shall forward the message towards all connected eNodeBs.

8.5.5 Warning Area List

The Warning Area List indicates the areas where the Warning message needs to be broadcast. This list contains one of the following:

- Cell ID List
- Tracking Area ID List
- Emergency Area List

The Warning Area List is used by the eNodeB in determining to which Cells the eWEA alert message shall be broadcast. An eNodeB belongs to one or more Emergency Areas, serves a number of Cells, and belongs to one or more Tracking Areas.

8.5.6 Repetition Period

This field is used by the CBC to instruct the MMEs of the repetition rate of the Warning message. Refer to 3GPP TS 36.413 [Ref 13] to understand the usage of this field in EPS.

The repetition period is set by CMSP policies.

8.5.7 Number of Broadcasts Requests

This field indicates the number of times a Warning message is to be repeated. Refer to 3GPP TS 36.413 [Ref 13] to understand the usage of this field in EPS.

8.5.8 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 15]. The encoding of the Data Coding Scheme parameter is defined in 3GPP TS 23.038 [Ref 16].

8.5.9 Warning Message Contents

The Warning Message Contents parameter will contain the eWEA Displayable Text, which is the actual alert message that will be displayed on the mobile device.

The Warning Message Delivery service shall support the text profile for eWEA messages. The text profile specifies the maximum eWEA Displayable Text to be 360 characters for an English or Spanish language eWEA alert message encoded with GSM 7-bit encoding [Ref 16], which is provided by the CMSP Gateway.

The eWEA Displayable Text on the C interface is provided in UTF-8 format [Ref 17], which is capable of supporting text in English and other languages. It is the responsibility of the CBC to translate to the GSM 7-bit encoding for English and Spanish, or other appropriate coding schemes for other languages.

Optionally, a CMSP may choose to provide additional displayable information beyond the 360 character CMAM. The maximum length of the message is 1230 octets, or 1395 GSM 7-bit encoded characters. Note that in this case the length of the Warning Message Contents parameter will be 1246 octets [1230 octets Displayable Text plus 16 octets header (see 3GPP TS 23.041 [Ref 15])].

8.5.10 OMC ID

The OMC ID is an optional field which indicates the identity of an Operation and Maintenance Centre to which Trace records shall be sent. The use of this field is operator-specific.

8.5.11 Concurrent Warning Message Indicator

The Concurrent Warning Message Indicator parameter indicates to the eNodeB that the received Warning message is a new message to be scheduled for concurrent broadcast with any of the other ongoing broadcast of Warning messages.

8.6 Mapping of eWEA Message to STOP WARNING REQUEST Message

A STOP WARNING REQUEST Message is used during eWEA Cancel procedures (see clause 7.2, *Cancelled eWEA Alert Message Call Flow*). The following table illustrates how the STOP WARNING REQUEST Message parameters are derived from the CBEM elements:

Table 8.6: Mapping of CBEM Elements to STOP WARNING REQUEST Message Parameters

STOP WARNING REQUEST Message Parameter	CBEM Element	Description
Message Type	Generated by the CBC	Identifies the message type (Stop warning).
Message Identifier	CBEM_CBS_message_id	This identifies the source type of the eWEA message.
Serial Number	Generated by CBC and correlated to CBEM_referenced_message_number	This identifies a eWEA message to be canceled.
List of Tracking Areas	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC uses stored geo-targeting information of the active broadcast to be cancelled. Multiple occurrences of geocode, polygon, circle, and gnis values may exist for one eWEA message.
Warning Area List	CBEM_geocode_type CBEM_geocode CBEM_polygon CBEM_circle CBEM_gnis	CBC uses stored geo-targeting information of the active broadcast to be cancelled. Multiple occurrences of geocode, polygon, circle, and gnis values may exist for one eWEA message.
OMC ID		Operator-specific parameter.

NOTE: There are other message parameters defined in 23.041 [Ref 15] not included in this Standard.