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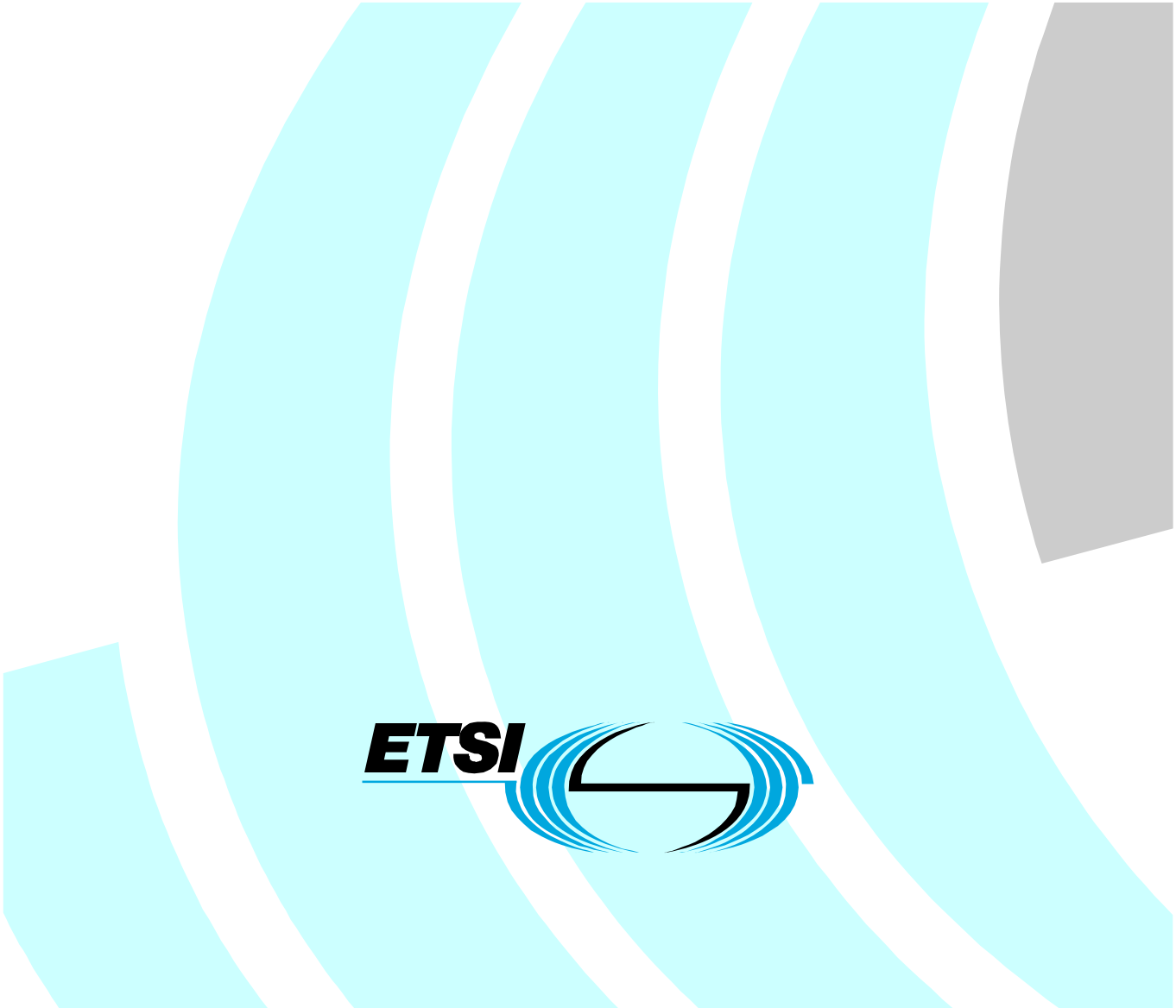
Technical Specification

Emergency Communications (EMTEL); European Public Warning System (EU-ALERT) using the Cell Broadcast Service



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Contents

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Foreword

This Technical Specification (TS) has been produced by ETSI Special Committee Emergency Communications (EMTEL).

Introduction

The Netherlands have taken the lead in an EC funded project on "Cell Broadcast for Public Warning" having announced publicly that the Netherlands will implement such a service in 2010. A number of European countries are investigating the possibility to deploy a Public Warning Service in their own country and have given their support to the EC funded project.

The generic name for the European Public Warning System is EU-ALERT. The letters EU will be replaced by characters identifying a particular country (e.g. NL-ALERT signifying the Netherlands, UK-ALERT signifying the United Kingdom). Such a strategy will allow each country to configure their own Public Warning System to meet their specific national requirements whilst incorporating it within a common core specification agreed by all European countries. By this approach roaming will be supported and terminal behaviour will be uniform, irrespective of the country which the subscriber is roaming in.

It is intended that the present document shall provide an input to 3GPP so that the European PWS requirements can be captured in a 3GPP stage 1 requirement specification and assigned a similar status to that of CMAS and ETWS, already defined in 3GPP.

1 Scope

The present document defines the system requirements for a European Public Warning Service using the Cell Broadcast Service [1] as a means of message distribution and delivery to UEs, and is produced to enable 3GPP to develop a specification for terminals which can be purchased and sold anywhere in Europe.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 123 041: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of Cell Broadcast Service (CBS) (3GPP TS 23.041)".

[2] ETSI TS 122 268: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Public Warning System (PWS) requirements (3GPP TS 22.268)".

[3] ETSI TS 102 182: "Emergency Communications (EMTEL); Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies".

[4] ITU-T-SG2 COM 2 - LS 56 - E: "Liaison to 3GPP and 3GPP2 for comments on MI blocks over 1000 for Civil Alerting", 16-24 November 2009.

NOTE: Available at http://www.itu.int/net/itu-t/ls/ls.aspx?isn=208.

[5] ETSI TS 125 331: "Universal Mobile Telecommunications System (UMTS); Radio Resource Control (RRC); Protocol specification (3GPP TS 25.331)".

[6] ISO 3166-1: "Codes for the representation of names of countries and their subdivisions - Part 1: Country codes".

[7] ETSI TS 123 038: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Alphabets and language-specific information (3GPP TS 23.038)".

[8] EU Position Paper v5.1.

NOTE: Available at https://service.projectplace.com/pub/english.cgi/0/283748154.

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 102 444: "Emergency Communications (EMTEL); Analysis of the Short Message Service (SMS) and Cell Broadcast Service (CBS) for Emergency Messaging applications; Emergency Messaging; SMS and CBS".

[i.2] ETSI TR 122 968: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Study for requirements for a Public Warning System (PWS) service (3GPP TR 22.968)".

[i.3] ETSI TR 102 850: "Emergency Communications (EMTEL); Analysis of Mobile Device Functionality for PWS".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Amber alert: alert to seek help from citizens to find abducted children

EU-ALERT: generic term for the European Public Warning Service

NOTE: Specific Countries are identified by replacing the letters EU with the Country Identification letters in ISO 3166-1 [6]. E.g.:

- NL-ALERT: The national variant of EU-ALERT for the Netherlands
- UK-ALERT: The national variant of EU-ALERT for the United Kingdom
- FR-ALERT: The national variant of EU-ALERT for France.

Message Identifier: parameter in a Cell Broadcast message that is an indication of the topic

NOTE: A topic should be activated on the UE. The UE will only process messages with a Message Identifier that is in the topic list.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CBS	Cell Broadcast Service
CMAS	Commercial Mobile Alert System
ETWS	Earthquake and Tsunami Warning System
FCC	Federal Commission for Communications
GSM	General System for Mobile communication
IP	Internet Protocol
ITU	International Telecommunication Union
MI	Message Identifier
MMI	Man-Machine Interface
PWS	Public Warning System
UE	User Equipement
UMTS	Universal Mobile Telecommunications System
URL	Unified Resource Locator

4 Background

For the public authorities, warning the population on the occurrence of a possible disaster is one of their responsibilities. They will use for this purpose all means of communication, in relation with the specific features of the disaster (e.g. the level of risks, it can be forecast or not; the coverage is limited or broad).

The mobile device PWS is in this view a complement to a whole set of communication media and should be taken in consideration by the authorities organising the Civil Safety, in the frame of an overall scheme of population protection.

The characteristics of the mobile radio services and their rather extensive coverage with GSM and UMTS technology make it a very relevant tool for addressing the population in real time with short notice, selecting the targeted area, broadcasting relevant information or advice. Additionally it can be assumed that the PWS service can be used not only for warning but also during the phases after the occurrence of the catastrophic event to distribute updated instructions to the affected population.

ETSI's Special Committee EMTEL's Technical Specification TS 102 182 [3] provides an overview of the requirements for communication from authorities/organizations to individuals, groups or the general public in all types of emergencies. It collects operational and organizational requirements as a basis for a common notification service, including targeting of the area to be notified. Although many of the requirements relate to national public policies and regulations, there are a number of service and technical aspects which are better dealt with on the European level to ensure harmonized access and services over Europe and service effectiveness through increased user awareness by using standardized solutions.

ETSI's Special Committee EMTEL's Technical Report TR 102 444 [i.1] contains an analysis of the use of CBS for broadcasting emergency messages.

3GPP WG SA1 conducted a study for requirements for PWS in TR 122 968 [i.2], where the EMTEL specification TS 102 182 [3], TR 102 444 [i.1], requirements from Japan for ETWS and requirements from the USA for CMAS were used as input.

From this study, SA1 delivered a specification for PWS Requirements in TS 122 268 [2] which covers PWS in general, where both ETWS and CMAS are regional adaptations of PWS. However, the European Requirements are not currently considered in TS 122 268 [2], due to the lack of ongoing input from Europe.

The EC funded project on "Cell Broadcast for Public Warning" has provided the mechanism for Europe to reach a consensus on the requirements for a Public Warning Service - vital for harmonisation across European countries without which significant issues concerning roaming would arise.

The EC funded project "Cell Broadcast for Public Warning" was initiated by the Ministry of Interior and Kingdom Relations of the Netherlands. The purpose of the project was to share knowledge, experiences and to identify the need for standardization of (technical) requirements among the participating European countries.

A Position Paper has been created from the EC funded project [8].

A number of European countries have signed their support for the EU Position Paper [8]. The signatory documents are contained in annex A.

Not only the EU project has concluded that Cell Broadcast would be the bearer technology best suited for the purpose of EU-Alert, but also ETWS and CMAS are based on the Cell Broadcast Service as specified in TS 123 041 [1]. The remainder of the present document assumes usage of the Cell Broadcast Service.

It is now possible to provide 3GPP with a consensus of European requirements as a basis for updating the 3GPP specifications to ensure that EU-Alert requirements are taken into consideration when placing terminals on the European market.

The clauses in the present document identify the key aspects from the EU Position Paper [8], and use the results from the analysis of mobile device functionality in TR 102 850 [i.3].

4.1 Importance of NL-Alert

NL-Alert will be implemented as a Public Warning Service which is additional to existing services like siren systems, radio and/or television, Internet, SMS, and social media. The Netherlands Government strongly believes in a multi-channel approach to optimise the reach of the service among the population. However, once the service has matured (i.e. adopted by the general public and first responders) it is very likely that NL-Alert will become the main national alert service.

All professionals involved in the design and implementation of NL-Alert should therefore be aware that people's lives may depend upon this service. The service should be robust, resilient, reliable and simple.

5 EU-Alert capabilities

5.1 Language

The need to support Public Warning Messages in various languages is necessary for the European Public Warning System because there are many European countries that share boarders where there is a frequent and significant movement of mobile subscribers across those boarders, i.e. a high instance of international roaming.

The EU Position Paper [8] identifies that emergency messages should be sent out to users in their own language but when not practicable, then in the language of the message originator.

It is impractical to determine the language of the user and so messages shall be sent out in the native language of the country originating the message and subject to national requirements, in any other language or languages that the originator chooses.

To support international roaming, it would be beneficial if all European countries would use the same Message Identifier for emergency messages in the local language. If emergency messages are broadcast in other languages besides the local language, then the Message Identifier for such messages should also be the same across Europe.

For example, should the Netherlands support English messages, and one or more Message Identifiers are allocated for this, then these should be the same Message Identifiers as used in other European countries that broadcast alert messages in English. The UK would broadcast English alert messages with Message Identifiers for the local language.

The FCC may mandate CMAS to support more languages than English. 3GPP has reserved a range of MIs for CMAS which could potentially be used to accommodate these languages. EU-Alert Message Types shall be mapped onto the CMAS Types for those languages in order to support roaming.

This will require a CBS structure to accommodate the requirement to broadcast messages in multiple languages virtually simultaneously in order not to disadvantage any recipient of a message in a particular language.

The use of CBS Message Identifiers defined in TS 123 041 [1] is one mechanism that would be able to identify that a message is in a particular language. Another way is to use the language filter, as specified in TS 123 038 [7] for 20 languages where messages in all languages would be broadcast with the same MI as for the local language.

Much of this work is being studied by the ITU [4].

5.2 Message Types

EU-Alert has identified the need for three types of messages:

- Alert messages to warn citizens of an imminent emergency situation
- Advisory messages of lesser urgency
- Amber alerts (child abduction alerts)

The Alert messages may have three levels of severity:

- EU-Alert level 1
- EU-Alert level 2
- EU-Alert level 3

EU-Alert level 1 shall have no opt-out; levels 2 and 3 do allow opt-out by the user.

All levels of EU-Alert messages shall be associated with a dedicated alerting indication (see clause 6.1.2).

The Advisory messages have only one level:

- EU-Info

EU-Info messages shall not be associated with the dedicated alerting indication specified in clause 6.1.2.

Depending on national requirements of a particular European country, Amber alerts may need to be broadcast as part of the EU-Alert service:

- EU-Amber

EU-Amber messages shall not be associated with the dedicated alerting indication specified in clause 6.1.2.

The following message types have not been identified in the EU Position Paper [8], but are added for compatibility with CMAS.

- EU-Monthly Test
- EU-Exercise
- EU-Reserved

EU-Monthly Test messages may be broadcast with a separate Message Identifier, but test messages may also be broadcast on a regular basis as an EU-Alert message to the general public. Test messages could for example be broadcast at the same time as the monthly test of the sirens is done. UEs may be made available with the capability of receiving EU-Monthly Test messages. The ability of a UE to receive and present EU-Monthly Test message is an optional capability.

EU-Exercise messages are for further study.

EU-Reserved messages are reserved for national government- specific use.

5.2.1 Message Identifiers

The use of CBS Message Identifiers defined in TS 123 041 [1] is one mechanism that would allow Message Types to be identified. Message Identifiers for EU-Alert are related to the level of the severity of the message and to the language. There is also a relation with the types of UEs that may be served.

Five types of UEs can be distinguished for the purpose of EU-Alert:

1) **Legacy UEs**; currently in use and supporting Cell Broadcast. These UEs will have to be manually activated by citizens. Generally Message Identifiers below 1 000 are accessible.

2) **UMTS capable legacy UEs that support Cell Broadcast reception on 2G but not on 3G:** where 3G coverage exists, typically the operator will camp these mobiles on 3G cells.

3) **UEs that are to be sold in the coming period** are not-compliant with EU-Alert, but do support Cell Broadcast. Mobile operators may support provisioning of these UEs in order to enable maximum support for EU-Alert.

4) **Future UEs** that are EU-Alert compliant.

5) **UEs that do not support Cell Broadcast** at all.

The use of EU-Alert message types is as follows.

Table 1

Type	Similar CMAS message type	Comment
EU-Alert level 1	Presidential Alert	Broadcasting of level 1 alerts in the local language where opt-out is not allowed. A temporary MI for legacy UEs is to be registered with GSMA.
EU-Alert level 2	Extreme Alert	Broadcasting of level 2 alerts in the local language where opt-out is allowed. A temporary MI for legacy UEs is to be registered by GSMA.
EU-Alert level 3	Severe Alert	Broadcasting of level 3 alerts in the local language where opt-out is allowed.
EU-Info	none	Users should be able to opt-out from these messages. A temporary MI for legacy UEs and UEs that are to be sold in the coming period is to be registered with GSMA.
EU-Amber	Child Abduction Alert	Allocated for Amber (child abduction) alerts in the local language.
EU-Monthly Test	Required Monthly Test	Allocated for monthly test messages that may or may not involve the general public and may or may not require special UEs.
EU-Exercise	Exercise	Allocated for use during exercises. Its use is for further study.
EU-Reserved	Reserved for CMSP use	Reserved for operator specific use. In EU-Alert this MI is reserved for national government requests to operators.

Message Identifiers for EU-Alert shall be the same as their comparable CMAS message types.

Roaming on a network that offers a CMAS compliant service will provide a similar user experience as is offered by the EU-Alert service, and vice versa, Roaming individuals with a CMAS compliant UE should receive alert messages of similar severity levels as they may expect in their home network.

It depends on national requirements which Message Types will be used for broadcasting.

Message Identifiers for the support of additional languages shall be formally allocated when required. 3GPP WG CT1 is responsible for allocating Message Identifiers in the range 1 000 decimal and above. GSMA is responsible for registration of Message Identifiers in the range below 1 000 decimal.

5.3 Service activation

With regards to service activation, EU-Alert may be subject to local regulatory requirements, such as:

- Provisioning of the UE by the operator with the service activated by default.
- Activation of the Cell Broadcast capability in the UE remotely through the network (see TS 125 331 [5]).

Activation of CBS is possible through the Index Message, but may also be available through a specific menu in the MMI. The Cell Broadcast services that are referred to are EU-Alert and also other, commercial services that may be offered by the operator.

5.4 Bearer technology

The EU-Alert service is based on the Cell Broadcast Service as specified in TS 123 041 [1] and shall be supported on 2G as well as 3G technologies.

Since a Public Warning System is usually deployed for many years, future technologies, such as LTE, shall also provide a broadcast capability that fulfils the requirements set forth in the present document.

5.5 Security considerations

For a reliable use of the Cell Broadcast service the user must have the highest possible confidence in the validity of the message received. As Cell Broadcast Service does not provide any capability for the UE to authenticate that the EU-Alert messages received are from a genuine source. It is possible that malicious EU-Alert messages can be transmitted. Therefore, additional security measures should be provided in the network to ensure that the source of the EU-Alert message is genuine.

It is possible that malicious Cell Broadcast messages could be sent from a spoofed base station, which the network or the UE may not be able to detect. A long-term solution to authenticate the source of a Cell Broadcast message may require specific functionality in the UE.

In general it may therefore be necessary for a recipient of an EU-Alert message to cross check with other means of public warning messages that the received message is genuine (TV messages, Radio, Internet sites for additional information). It should be supposed that in the context of an EU-Alert, the public authorities will use several mechanisms for transmitting the alert notification. Attention is therefore drawn to the corresponding issues which require a combination of security and reliability measures to be observed by all.

Hereunder are some examples of possible measures:

- maintain strict access control to all facilities (firstly control rooms) used in the transmission line;
- adopt strict processes in checking the validity of IP addresses of servers involved in the transmission of a message from the authorities to each network operator;
- have clearly established procedures between those who will be involved at the time of an Alert (personal contacts, planned exercises, regular updates etc.).

Refer to [i1] for additional information.

5.6 Delay Requirements

There are no strict delay requirements for PWS.

From an operational point of view two transmissions of a 93 character warning message within 3 minutes could be sufficient. Each transmission represents the use of one language using an "EU" or a "legacy" Message Identifiers.

6 UE specific aspects

It is assumed that at least the capabilities that are provided through the Cell Broadcast Service are supported by the UE. These capabilities are for example:

- Support for CBS, regardless if the UE is connected to a 2G or a 3G network.
- Detection and suppression of duplicate messages.
- Support for Class 0 and Class 1 type messages as per TS 123 038 [7].
- Support of the Index Message to select the message types with the desired alert level and desired language.

In TR 102 850 [i.3] an analysis was done into existing requirements for UE specific aspects for use in a PWS, and included the requirements from the EU Position Paper [8]. The requirements listed below are based on the result of the analysis.

6.1 UE requirements

UE requirements in this clause are related not only to EU-Alert messages, but also to EU-Info and EU-Amber Message Types, unless specifically mentioned otherwise.

6.1.1 Maintaining user preferences

The following are the requirements on the UE for the support of user preferences for EU-Alert.

1) The UE shall be able to maintain user alert opt-out selections for all Message Types. Depending on national regulatory requirements, it may not be allowed to opt-out of all types of Alert Messages.

2) The UE shall be able to maintain user EU-Alert language preferences. If the user has opted-in to receiving EU-Alert messages then these will be presented in the local language. The user may wish to receive messages in other languages than the local language as well. A typical example would be the additional selection to receive messages in English for those users that do not understand the local language, provided that messages in English are broadcast next to messages in the local language.

3) It shall be possible for users to configure the behavior of a UE with regard to alerting and should allow at least volume adjustment.

6.1.2 Presentation of the message

The following are the requirements on the UE for the presentation of EU-Alert messages.

1) The presentation of EU-Alert messages shall take priority over all other UE functions, but shall not preempt active voice or data sessions.

2) A momentary interruption of a voice or data session to alert the user that an EU-Alert message has been received is not considered preemption as long as the voice or data session is not terminated.

3) The UE shall support a dedicated alerting indication (audio attention signal and a dedicated vibration cadence) and be distinct from any other device alerts and restricted to use for EU-Alert notification purposes.

4) The alerting indication requirements may be specific for a European country.

5) It shall be possible for an EU-Alert message to be displayed on the screen of the UE upon reception and without any user interaction. (This assumes support for Class 0 type messages.) The need for scrolling to view the entire message should be minimized.

6) The EU-Alert message shall stay on the display, until the message indication is cancelled by the user (e.g. by pushing keys). The frequency and duration of the continued alerting indication is UE implementation specific.

7) It shall be possible for the user to review the EU-Alert messages at a later time.

8) The UE shall not support any capabilities to forward received EU-Alert messages, to reply to received EU-Alert messages, or to copy and paste the content of EU-Alert messages.

9) The UE shall be able to support reception of multiple EU-Alert messages that are received within short spaces of time (e.g. less than 5 seconds).

10) The UE may be able to process a Uniform Resource Locator (URL), which is a reference (an address) to a resource on the internet, or an embedded telephone number.

NOTE: In case regulatory requirements prohibit the use of URLs or embedded phone numbers, then the message text should not contain such a URL or phone number.

6.1.3 Feature behaviour

An EU-Alert message shall not preempt any active voice or data sessions, and it is desired future behaviour of the UE that the UE shall alert the user that an EU-Alert message has been received with the alerting indication that is specific for EU-Alert messages, and the EU-Alert message shall be displayed immediately.

When an EU-Alert message is displayed, it shall remain on the display until it is acknowledged by the user. When during that time another EU-Alert message is received, the UE will notify the user of this through the EU-Alert attention signals. This new message will be displayed after the user has acknowledged the previous EU-Alert message.

The UE will continue to display EU-Alert messages when any non-EU-Alert messages (e.g. another Cell Broadcast message, an SMS or an MMS message) or voice call is received, till the user has acknowledged the EU-Alert messages. After the EU-Alert messages have been acknowledged shall the user be able to respond to non-EU-Alert messages or voice calls.

The user may be notified of any incoming non-EU-Alert message or voice call in a manner consistent with normal device behaviour for such messages or calls, but the displaying of the EU-Alert message shall not be interrupted.

6.2 Considerations for individuals with special needs

Special consideration shall be required in the UE receiving a PWS message for hearing impaired persons. Whilst a UE receiving a Public Warning Message is expected to give an unmistakeable audible warning sound, this is of no use to a hearing impaired person. The UE could of course "vibrate" in a special way but that will only be of use to a hearing impaired person if the phone is in contact with the person's body. There will be cases where the hearing impaired persons UE are not in contact with the person's body and so another means of indicating the receipt of a PWS message is required. That may take the form of a visible flashing indication on the UE.

The EU Project has stated in its Position Paper [8] that the use of pictograms should be studied. Pictograms may overcome language barriers. The use of pictograms in Cell Broadcast messages assumes support for EMS messages.

Annex A (informative): European countries letters of support

The letter of support for the EU Project Position Paper [8] is presented in a letter from the Dutch Ministry of Interior and Kingdom Relations. The Dutch Ministry does the project management for the project "Cell Broadcast for Public Warning".

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Subject Position Paper EU Project Cell Broadcast

Enclosures
1

Whomever it may concern,

Hereby I would like to present to you the Position Paper, which is the result of discussions held during the workshops of the EC funded project "Cell Broadcast for public warning - Sharing knowledge and experiences and identification and standardisation of (technical) requirements."

With this position paper, we aim to describe the common position of the partner and participating countries of the project towards the possible use of cell broadcast for civil alert applications. The objective is to provide direction for the mobile (standardization) industry and the European Commission in order to offer our citizens a seamless Cell Broadcast service for alerting and informing the public in times of crisis at both national and international level. As a partner country of this project, we support all statements made in the position paper.

Yours faithfully,

Henk Gevekе

Director National Security of the Dutch Ministry Interior and Kingdom Relations

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The support letter has been signed by:

- The Director National Security of the Dutch Ministry of Interior and Kingdom Relations.

Copies of this letter (same text, but different letter head and signature) have been signed by:

- The Deputy Director, Capabilities Civil Contingencies Secretariat in the UK Cabinet Office
- The Head of Training, Exercises & Emergency Preparedness Department of the Swedish Civil Contingencies Agency
- The Head of the Norwegian Directorate of Civil Preparedness
- The Deputy Secretary-General for Internal Security of the Estonian Ministry of Interior
- The Federal Office for Civil Protection and Disaster Assistance of the German Ministry of Interior
- A French government representative during the closing seminar of the EU project in the Netherlands
- Hungary
- Poland
- Finland
- Spain

It was deemed necessary to have member states sign a support letter, since the project is not an official EU government body and officially ended in December 2009.

Annex B (informative): Bibliography

Doc. FCC 08-99:"First Report and Order", 9 Apr 2008.

The Dutch Ministry of the Interior and Kingdom Relations: "NL-Alert High Level Service Design", March 2010.

NOTE: Available at https://service.projectplace.com/pub/english.cgi/0/283748154.

History

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