

**Source:** LM Ericsson  
**Title:** REPORT, download of local emergency numbers  
**Agenda item:** 8.1 Provision of IP-based multimedia services [IMS]  
**Document for:** DISCUSSION and APPROVAL

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## **Background**

During CN1#26 and CN1#27 and in a separate conference call, it has been discussed how to download local emergency numbers to the UE in a VPLMN. The topic was originally raised due to IMS, but the requirement is a generic enhancement to emergency services, and not only for IMS.

The background for this discussion can in brief be summarised to be:

1. Emergency numbers in certain countries are not listed as the 'general agreed' emergency numbers on the SIM or in the ME.
2. A conflict between emergency numbers and short numbers may be experienced while roaming to certain countries.
3. IMS may route all calls not identified as emergency numbers by the UE to the IMS domain where emergency calls cannot be supported.

SA2 outlined the requirements and asked CN1 to study the solution based on the messages MM INFORMATION in CS domain and GMM INFORMATION in PS domain. The solution from SA2 was proposed to be included in rel-5. SA2 also requested CN1 to consider performing parts of the solution (e.g. preparing the network to send the messages) in rel-4 as the problem was seen as important in some networks, and a solution was preferred as early as possible. An extract from the LS from SA2 (attached as N1-021888\_LS IN.zip)

### **Overall Description:**

A decision was made some time ago that there shall be no support for emergency calls in the IM CN subsystem for Release 5. The UE should in that case for voice telephony use the CS domain to place emergency calls. The solution described in paragraph 10.4 of TS 22.101 v 5.6.0 is incomplete. The Vodafone discussion paper S1-021670 and the SA1 CR S1-021776 propose an additional mechanism. Because of the importance for handling emergency calls in good order, SA1 would like to state this requirement for Release 5 and Release 6 (although further study is required on the complete Release 6 solution).

### **2. Answers to SA 1 questions:**

- ?? SA2 does support extensions to the current emergency call solutions and believes that passing emergency numbers to the UE in MM/GMM messages is technically feasible.
- ?? SA2 recommends having the requirement for GMM/MM transmitted emergency number information for Release 4 onwards.
- ?? At this point in time SA2 has not changed the current TS 23.228 emergency call handling because further study of all call cases is needed (e.g pre R4 SGSN and VPLMN based P-CSCF).

### **3. Additional Information**

By providing the local emergency call numbers in both GMM and MM information messages, problems with ambiguous CAMEL short code dialling (eg UK customers dialling 192 in Brazil, or Finnish customer dialling 118 in Japan) which lead to failed or false emergency calls can be avoided with appropriate MMI.

### **4. Actions** **To CN 1:**

To raise the necessary 24.008 CRs for MM and GMM information messages in R4 and R5.

**To SA 1:**

To update 22.042 (or other appropriate specifications) to describe and mandate the use of this functionality in R'5 mobiles.

At the same time SA1 updated 22.101 to include the download of additional emergency numbers in rel-5 (outlined in green in clause 10 of 22.101 copied in the end of the document).

CN1 has not been able to come to a complete agreement on the topic.

## **Current status within CN1**

CR 716rev2 of 24.008 introduce download of emergency numbers to ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT. This solution introduce download of emergency numbers to UEs attached to the PS domain. The benefit with using these messages is that these messages are acknowledgements to the UE while the original proposal (MM INFORMATION / GMM INFORMATION) is not acknowledged.

In addition, a mechanism (e.g. an operator configured list) will be available in the IMS domain (P-CSCF) to reject a session establishment if the destination is a certain number and the UE is calling from a certain MCC. This mechanism is described in CR 290rev2 of 24.229. This solution will ensure that emergency numbers not recognised by the UE will be rerouted back to the UE for an EMERGENCY SETUP over the CS domain.

No changes have been agreed to rel-4 on this topic.

## **Technical concerns with the current solution**

The current solution in CN1 leads to inconsistent behavior to the end user dependant on configuration of the handset, as the UE will act different depending on whether it is configured to work in CS-only mode or in CS/PS-mode.

The following scenario illustrates the inconsistency:

The UE is configured to be CS/PS or PS only.

An attached UE will receive the local emergency call list over PS. If the end user dials a 'local emergency number', the UE may either perform an EMERGENCY SETUP directly, or prompt the end user with questions whether the intention of the call is a short number or e.g. directory number (i.e. normal SETUP or EMERGENCY SETUP). EMERGENCY SETUP is sent if the call is an emergency call.

The UE is reconfigured to be CS only.

The UE is switched off (the list of local emergency numbers is deleted) and switched on again. If the end-user dials a 'local emergency number', the UE will not recognize the same dialed number as an emergency setup, but perform a normal SETUP.

This leads to a difference in setup-procedure for a UE dependant on configuration (CS-only or CS/PS). This difference can be omitted by introducing local emergency list in e.g. LOCATION UPDATING ACCEPT message. This will give a consistent behavior to an end user regardless of the preferred bearer service for a UE, and fulfill the general requirement as stated by SA1 and SA2. So far CN1 has not solved this issue.

A rel-5 UE only connected to CS-services will also not get downloaded numbers with the current solution.

It must be noted that the existing conflict between check for CAMEL short numbers and emergency numbers sent in normal SETUP must be handled by the MSC as a rel-5 network will consist of rel-5 terminals and older terminals without the local list of emergency numbers.

Existing UEs not aware of the additional list of local emergency calls will not be able to recognize local emergency numbers and will perform normal SETUP. Thus, the MSCs must also in the future recognize such SETUPS as emergency calls and differentiate such calls from e.g. CAMEL short codes. Handling of old UEs with one behavior and new UEs with an enhanced behavior is always necessary when new features are introduced.

## Proposal

The current solution in CN1 leads to inconsistent behavior to the end user dependant on configuration of the handset. It is proposed to have a uniform handling of release-5 UEs for handling of emergency calls regardless of the configuration of the bearer service (CS or PS).

A consistent behavior for a single UE independent of the bearer service is believed to be in line with the intention of the LS from SA2 and the requirements as stated in 22.101 v5.7.0.

Ericsson proposes that CN gives CN1 a directive to enhance the solution outlined in CR 716rev2 of 24.008 to give a uniform behaviour for rel-5 terminals. This may e.g. be achieved by downloading the list of emergency numbers via the LOCATION UPDATING ACCEPT message over CS domain.

## For information

For information, clause 10 of 22.101 version 5.7.0 is included.

## 10 Emergency Calls

### 10.1 General requirements

It shall be possible to establish an emergency speech call. Emergency calls will be routed to the emergency services in accordance with national regulations for where the subscriber is located. This may be based upon one or more default numbers stored in the ME. It shall be allowed to establish an emergency call without the need to dial a dedicated number to avoid the mis-connection in roaming case, such as menu, by use of a 'red button', or a linkage to a car air bag control. Emergency Calls shall be supported by the UE without a SIM/USIM being present. No other type than Emergency calls shall be accepted without a SIM/USIM.

The Emergency service is required only if the UE supports voice.

Note: It will be left to the national authorities to decide whether the network should accept emergency calls without the SIM/USIM.

It shall be possible to initiate emergency calls to different emergency call centers, depending on the type of emergency. The following types of emergency calls shall be possible:

- Police
- Ambulance
- Fire Brigade
- Marine Guard
- Mountain Rescue
- Spare, at least [three] different types

When a SIM/USIM is present, subscriber specific emergency call set-up MMI shall be provided. The Home Environment operator shall specify preferred emergency call MMI(s) (e.g. 911 for US citizens or 110, 118 and 119 for Japanese citizens). This shall be stored in the SIM/USIM and the ME shall read this and use any entry of these digits to set up an emergency call. It shall be possible to store more than one instance of this field.

Note: Release '98 and earlier SIM cards have the capability to store additional emergency call set-up MMI. However in many cases this has not been used.

It shall be possible to tie any emergency call number, specified in the preferred emergency call MMI(s) above, to any single emergency call type or to any combination of emergency types. The association between emergency numbers and emergency call type shall be able to be programmed by the Home Environment operator into the SIM/USIM.

Example:

19	Police (Albania)
100	Police and Fire Brigade (Greek cities)
100	Ambulance and Fire Brigade (Belgium)
112	Police and Ambulance (Italy)
112	General emergency call, all categories (Sweden)
115	Fire Brigade (Italy)
114	Ambulance (Austria)

Note: if the UE does not recognise the emergency call MMI(s) (i.e. the dialled number is not stored in SIM/USIM) but the serving network recognises the dialled number as an emergency call number used in the country, a normal call set up takes place over the radio interface and after the serving network has recognised the emergency number the call is routed as an emergency call.

When a SIM/USIM containing stored emergency numbers is present, only those numbers are identified as emergency numbers, i.e. default emergency numbers stored in the ME are ignored.

The following emergency numbers shall be stored in the ME for use when no emergency numbers are stored in the SIM: 000, 08, 112, 110, 911 and 999.

Note: Emergency numbers stored in the ME, for use when no emergency numbers are stored in the SIM, should not overlap with existing service numbers used by any operator.

The user friendly MMI which specifies the type of emergency directly (e.g. menu) should be supported for use in any (i.e. home or visited) PLMN to avoid the mis-connection in roaming case. This shall be allowed to both with and without SIM/USIM being present.

The following emergency numbers shall be stored in the ME for use without SIM/USIM: 000, 08, 112, 110, 118, 119, 911 and 999.

The serving network may download additional emergency numbers to the UE in order to ensure that local emergency numbers are known to the UE. The UE shall regard these emergency numbers as valid in that country (as identified by the MCC) and shall discard them when a new country is entered.

## 10.2 Emergency calls when attached to a CS CN Domain

PLMNs shall support an emergency call teleservice as defined in 3GPP TS 22.003 [14] (TS12).

## 10.3 Emergency calls when attached to a data only network

If an UE with voice capability attempts to make an emergency call while camping on a PLMN that does not support voice service to the UE, a new PLMN selection shall immediately take place, and the UE shall select the first available PLMN that supports emergency calls to the UE.

## 10.4 Emergency calls when attached to an IM CN subsystem

Emergency calls are not supported via an IM CN subsystem.

If the UE does recognise the emergency call MMI(s) (i.e. the dialled number is stored in USIM/ME), then the UE shall use the CS CN domain to attempt to establish the emergency call.

If the UE does not recognise the emergency call MMI(s) (i.e. the dialled number is not stored in USIM/ME) but the serving network recognises the dialled number as an emergency call number used in the country then the IM CN subsystem shall inform the UE to use a CS CN domain for emergency services.