

EENA Technical Committee Document

Next Generation eCall
NG eCall

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EENA Technical Document < NG eCall >

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1 Scope

This document describes work done on Next Generation eCall and makes recommendations, including timescales.

It describes how Next Generation eCall can be achieved using IMS and what are its advantages and possible new functionalities.

It describes how coexistence of in-band modem eCall and IMS eCall can be managed.

It does not cover TPS eCall.

2 Introduction

eCall is being deployed in Europe and will be required by law in new cars from 2018. Current eCall deployments are based on ETSI and CEN standards, which were started more than 12 years ago, and use an in-band modem to transport eCall data in a circuit switched 112 call. However, circuit switched 112 will eventually be replaced by IMS emergency call in UMTS-PS and LTE networks and it is further expected that EU operators will want to phase out support of circuit switched (CS) GSM and UMTS over the next decade or two.

ETSI addressed the issue of how eCall can be achieved using IMS emergency call and in April 2014 published TR 103 140 [1]. The IETF has produced NG eCall drafts [2]. Standardization work is progressing in 3GPP and CEN.

Cars typically last around 15 years (compared to 2 years for mobile phones). The issue of how in-band modem eCall deployments in cars will continue to be supported, whilst network technology migrates to IMS, requires consideration.

3 Technology

3.1 IMS eCall

ETSI TR 103 140 [1] recommended IMS emergency call, with minor modifications, as the long term underlying communication mechanism for eCall.

Other recommendations of ETSI TR 103 140 [1] were:

- to use the initial SIP-INVITE message in the IMS emergency call for initial MSD transport.
- to specify new URN sub-classes for IMS eCall for routing purposes (equivalent to the "eCall flag" used for in-band eCall).
- to specify a new system information indicator in 3GPP, to tell the IVS that the network supports IMS eCall.
- not to use in-band modem over VoIP because modem signals may be impaired by de-jitter buffering.

3.2 Co-existence of in-band modem eCall with IMS eCall

Cars last typically 15 years, compared to 2 years for mobile phones. Cars being deployed with in-band modem eCall, based on circuit-switched 112, will need circuit switched 112 support from the network until the 2030s. This may be longer than the mobile operators desire.

As IMS emergency call capability will be extensively deployed well before the 2030s, in-band modem eCall and IMS eCall will have to co-exist. ETSI TR 103 140 [1] considered this co-existence and how migration from eCall to IMS eCall can be managed.

- Introduction of IMS eCall into IVSs can occur when standards are available. Such IVSs will also have to be capable of in-band modem eCall for many years.



- From a certain date PSAPs shall support IMS eCall but shall be able to receive and process in-band modem eCalls as well.
- An IVS capable of IMS eCall shall only use IMS eCall if informed (by a system information indicator) that IMS eCall is supported in the network.
- The mobile operator will only switch on the system information indicator when there is IMS eCall coverage and at least one routable PSAP capable of receiving IMS eCalls.

4 Functionality

4.1 Capabilities of IMS eCall

The capability advantages of IMS eCall compared to in-band modem eCall are:

- 1) Faster and more reliable MSD transfer, no loss of speech path, significantly more than 140 bytes possible (e.g. later) in the MSD.
- 2) Additional media (e.g. video from dashboard cameras, text from speech or hearing impaired users).
- 3) Two-way data enabling the PSAP to send instructions to vehicle, e.g. sound horn, flash lights, lock/unlock doors, disable ignition.

It should be noted that these advantages will be initially offset by limited IMS support in networks and PSAPs, which is why the inband version of eCall will remain critical for many years.

4.2 New user categories

The new categories which IMS eCall could support are:

- 1) Other vehicle categories requiring more than 140 bytes of data, e.g. multiple occupancy vehicles such as buses.
- 2) Medical emergency devices such as heart monitors.
- 3) Vulnerable road users.
- 4) Personal eCall.

The above will require new variants of the eCall MSD.

4.3 Other considerations

From an operational perspective as well as procurement point of view, IMS eCall should be seen in conjunction with in-band modem eCall, as well as PSAP transition from ISDN access lines to SIP access. All of these technical updates to deliver new and advanced services are likely to occur within a period of 5 to 10 years.

That being said, purchase of new equipment replacing today's TDM- and ISDN- based PBX systems should be considered to be SIP centric, with the flexibility to add new services in a modular way, without replacing the overall real time communication architecture.

5 Regulations

There are currently 3 areas of eCall regulation:

1. Oblige countries to upgrade PSAPs and take eCalls
[www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2013/0166\(COD\)&l=en](http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2013/0166(COD)&l=en)
2. Make eCall part of vehicle type approvals
<http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52013PC0316>
3. Oblige mobile network operators to deliver eCalls to PSAPs
http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2011/c_2011_6269_en.pdf

It is believed that IMS eCall can comply with all of the above. In the type approval regulation (2), there is a requirement that standards shall be European. However, the European standardisation process of IMS eCall is already underway in ETSI and CEN. The type approval regulation also places a restriction on what data can be sent to the PSAP (Article 6, point 8 of the type approval act says "No additional data shall be transmitted by the 112-based eCall in-vehicle system."). Therefore any additional functionality that IMS eCall can offer, over simply the MSD and voice, would have to be voluntary and separate from the initial eCall under current regulation.

It is recommended that the EU authorities begin a process to set new regulations for NG eCall. The additional functionality on offer can assist PSAPs and first responders and thus save lives. The new regulations for NG eCall should require all of the functionalities in section 4.1, should apply to all of the user categories in 4.2, and may take advantage of IMS as the transport mechanism.



6 EENA Recommendations

Stakeholders	Actions
European Authorities	Make clear that IMS eCall can fulfil existing eCall regulations. <i>Within 1 year.</i> Begin process of new regulation for NG eCall, i.e. additional functionalities and IMS eCall. <i>Within 5 years.</i>
National Government	Contribute to the European regulatory process.
National / Regional Authorities	Contribute to the standardisation work.
Emergency services	Continue to deploy eCall based on current standards. Start to deploy IMS eCall, from a certain date, as well as continuing in-band modem eCall.
National telecommunication regulator / Network Operators	Announce when circuit switched 112 will be phased out. <i>When known</i> Implement IMS eCall (based on IMS emergency call release 14) in networks. <i>Within 5 years.</i> Make plans for how the system information indicator will be used to inform IVSs of network and PSAP support of IMS eCall. <i>Within 5 years.</i>
IVS equipment suppliers	Contribute to the standardisation work.
Standardisation bodies.	CEN: Revise the HLAP (EN 16062 [4]) to make IMS eCall an alternative to in-band modem eCall, and describe how the PSAP uses the additional functionality. Update the requirements standard (EN 16072 [5]) to describe the new functionality. Define variants of the MSD for new user categories. <i>Complete within 2 years.</i> ETSI: Organize and define IMS eCall plugtests (as part of annual eCall TESTFEST [6] organized in partnership with ERTICO-ITS Europe or as part of NG112 plugtest [7] in cooperation with EENA) The expected 3GPP Release-14 specifications containing IMS eCall will be automatically transposed into ETSI specifications. 3GPP: Continue specification of IMS eCall in Release-14. IETF: None. URN sub-categories for IMS eCall routing have been defined.

7 EENA Requirements

Requirements
Current eCall deployments shall not be affected by plans for future NG eCall.
NG eCall deployed on IMS shall be based on 3GPP Release 14 onwards.
New user categories shall be supported on IMS eCall.
IVSs supporting IMS eCall shall also be capable of in-band modem eCall.
PSAPs shall support IMS eCall from a to-be-defined date and shall continue to support in-band modem eCall until a to-be-defined date.
In-band modem eCall and IMS eCall shall co-exist according to the ETSI proposed plan in TR 103 140 [1].

8 References

- [1] ETSI TR 103 140 V1.1.1 (2014-04), eCall for VoIP
http://www.etsi.org/deliver/etsi_tr/103100_103199/103140/01.01.01_60/tr_103140v010101p.pdf
- [2] IETF Next-Generation Pan-European eCall <https://tools.ietf.org/html/draft-ietf-ecrit-ecall>
- [3] CEN EN 15722 eCall Minimum Set of Data, available for purchase at
<http://shop.bsigroup.com/ProductDetail/?pid=000000000030301210>
- [4] CEN EN 16062 eCall High Level Application Protocol, available for purchase at
<http://shop.bsigroup.com/ProductDetail/?pid=000000000030301213>
- [5] CEN EN 16072 eCall Pan European Operating Requirements, available for purchase at
<http://shop.bsigroup.com/ProductDetail/?pid=000000000030301207>
- [6] <http://www.etsi.org/news-events/events/1002-4th-ecall-tesfest-2015>
- [7] <http://www.etsi.org/news-events/events/977>

9 Definitions and Abbreviations

NG eCall. Next Generation eCall, based on IMS eCall and offering unlimited data, multimedia and two-way data, and being the subject of future EU regulation.

IMS eCall. eCall deployed using IMS emergency call in 3GPP Release-14, instead of in-band modem and circuit switched 112.

In-band modem eCall. eCall deployed using in-band modem and circuit switched 112 according to CEN EN 16062 [4] and EN 16072 [5].

3GPP	3 rd generation partnership project
CEN	Centre Europeen de Normalisation (in French)
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobiles (2G)
HLAP	eCall High Level Application Protocol
IETF	Internet Engineering Task Force
IMS	Internet Protocol Multimedia System
IVS	In Vehicle System
MSD	Minimum Set of Data as defined in EN 15722 [3]
PSAP	Public Safety Answering Point
NG	Next Generation
TPS	Third party supported
UMTS	Universal Mobile Telecommunications System (3G)
URN	Uniform Resource Name
VoIP	Voice over Internet Protocol

