Harmonised eCall European Pilot

I_HeERO - Ghost calls from mobile handsets

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This project is funded by the European Union

Agenda

- Introduction
- ETSI Standard
- Examples of true and fake eCalls (ghost calls)
- Solution implemented in Portugal
- Graphical evidences
- Conclusion

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Introduction

- In 2015 one of the first actions in the scope of the I_HeERO Project in Portugal was the implementation of the eCall flag by all MNO's;

- During the tests we found that some misconfigured mobile handsets when calling to 112 mimicked the eCall. **Normal emergency calls were identified by the mobile networks as eCalls which did not comply with the standard (ETSI 3GPP TS 24.008).**

- These mobile terminals provided erroneous values in the Emergency Category of Emergency Setup messages in the Mobile Radio Interface.

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ETSI Standard - *ETSI 3GPP TS 24.008*

Table 10.5.135d/3GPP TS 24.008: Service Category information element

Emergency Service Category Value (octet 3)
The meaning of the Emergency Category Value is derived from the following settings (see 3GPP TS 22.101 [8] clause 10):

Bit 1 Police
Bit 2 Ambulance
Bit 3 Fire Brigade
Bit 4 Marine Guard
Bit 5 Mountain Rescue
Bit 6 manually initiated eCall
Bit 7 automatically initiated eCall
Bit 8 is spare and set to "0"

Mobile station may set one or more bits to "1"
If more than one bit is set to "1", routing to a combined Emergency centre (e.g. ambulance and fire brigade in Japan) is required. If the MSC can not match the received service category to any of the emergency centres, it shall route the call to an operator defined default emergency centre.

If no bit is set to "1", the MSC shall route the Emergency call to an operator defined default emergency centre.
A mobile station initiating an eCall shall set either bit 6 or bit 7 to '1'. The network may use the information indicated in bit 6 and bit 7 to route the manually or automatically initiated eCall to an operator defined emergency call centre.

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Erroneous values

The most common audit finding was the mobile handsets sending all bits set to "1"

Octet121	Emergency category	
00101110	Parameter name	(46) Emergency category
00000001	Parameter Length	1
.......1	Police	(1) Yes
......1.	Ambulance	(1) Yes
.....1..	Fire Brigade	(1) Yes
....1...	Marine Guard	(1) Yes
...1....	Mountain Rescue	(1) Yes
..1.....	Manuly Initiatd eCall	(1) Yes
.1......	Auto Initiated eCall	(1) Yes
1.......	Spare	1

All bits are set to 1

Trace Example – Incorrect eCall

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Correct values

A correct manual eCall value should be like the example below (only the 6th bit is set to 1 all others set to 0)

Octet110	Emergency category	
00101110	Parameter name	(46) Emergency category
00000001	Parameter Length	1
.......0	Police	(0) No
......0.	Ambulance	(0) No
.....0..	Fire Brigade	(0) No
....0...	Marine Guard	(0) No
...0....	Mountain Rescue	(0) No
..1.....	Manuly Initiatd eCall	(1) Yes
.0......	Auto Initiated eCall	(0) No
0.......	Spare	0

Trace Example – Correct eCall

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Solution Implemented in Portugal

Bits Emergency Category		Type of call
X_6 ="1"	00 10 00 00	Manual eCall
X_7="1"	01 00 00 00	Automatic eCall
X_6 & X_7="11"	01 10 00 00	Manual eCall
Other combinations	Default	Normal Emergency Call

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Tested Cases in Lab Environment

Emergency Category (bits)	Type of call (MEO network)	Notes
01 00 00 00	Automatic eCall	Tested in Lab
00 10 00 00	Manual eCall	Tested in Lab
01 10 00 00	Manual eCall	Not Tested, because we don't have terminals with this implementation
11 00 00 00	Automatic eCall	Not Tested, because we don't have terminals with this implementation
10 10 00 00	Manual eCall	Not Tested, because we don't have terminals with this implementation
11 10 00 00	Manual eCall	Not Tested, because we don't have terminals with this implementation
11 11 11 11	Normal Emergency Call	Tested in Lab
xx xx xx xx (other combinations)	Normal Emergency Call	Not Tested, because we don't have terminals with this implementation

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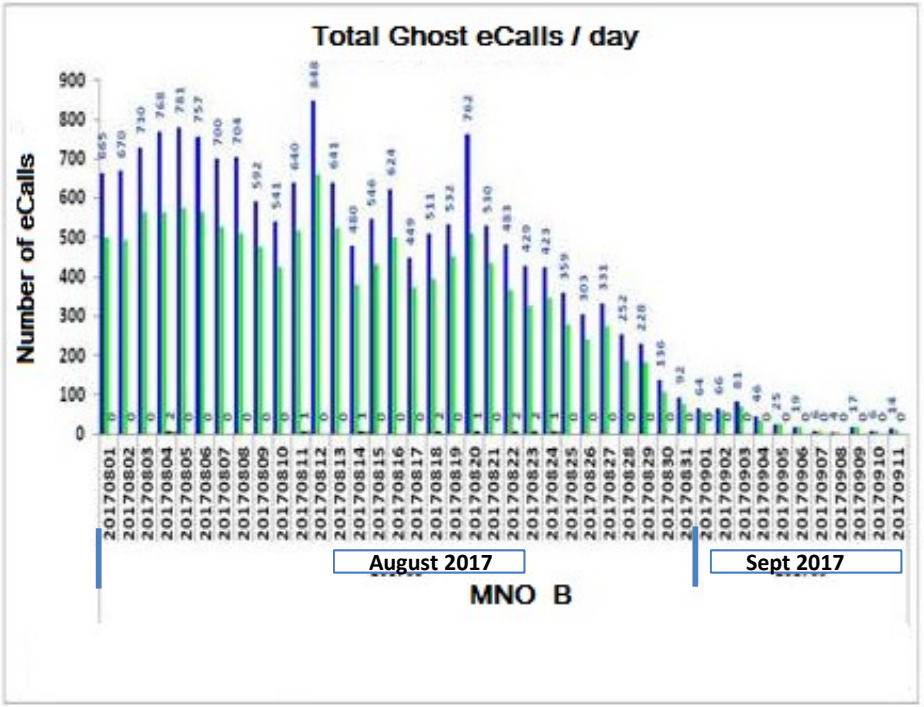
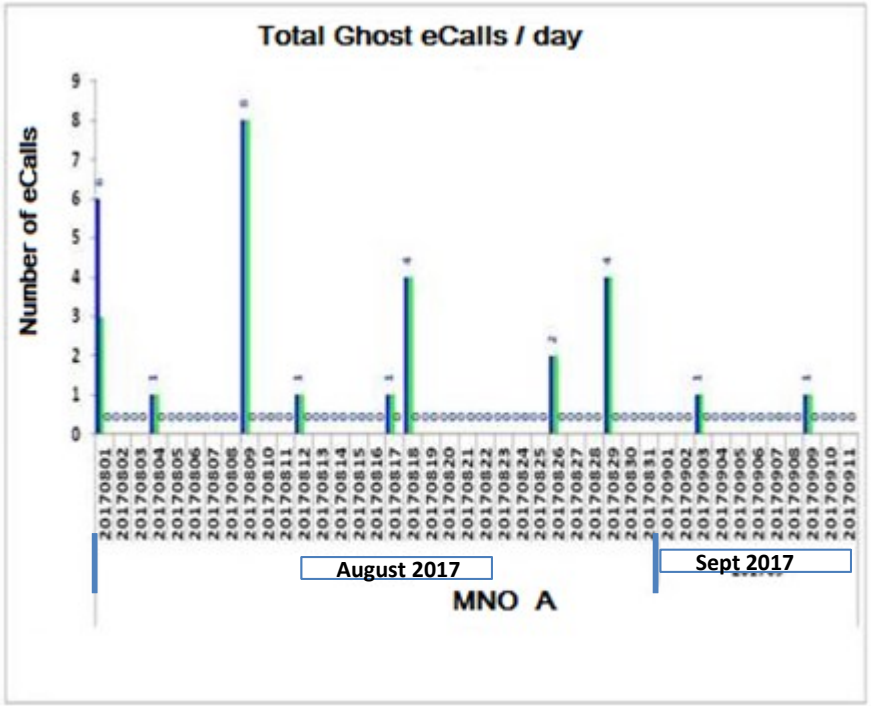
Evidences



Evolution of Implementation



After Implementation

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Conclusion

The software in the core network should analyze all the bits of the emergency category, and not only the bits corresponding to manual eCall and automatic eCall.

After this analysis and according to the detected combination of bits, the call should then be classified as an eCall or a normal emergency call.

Complementary Measures:

Nowadays our MNO's only include in their packages handsets that are submitted to tests and prove to have the emergency standard bits correctly configured.

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