

ADDAAC

Results of the eCall Feasibility Trial

Extended Version

26 June 2007

Feasibility trial in view of the European eCall system scheduled to be introduced in 2010

Project management: Allgemeiner Deutscher Automobil-Club e.V. (ADAC), Munich

Carried out by: ADAC Technical Centre, Landsberg

Time: March – May 2007

Further test partners:

Automobile Club d'Italia (ACI Global Spa), Milan

Adam Opel GmbH, Rüsselsheim

Airbiquity, Brussels

Continental Automotive Systems GmbH, Neubiberg

Österreichischer Automobil-, Motorrad- und Touring Club (ÖAMTC), Vienna

T-Mobile Deutschland GmbH, Bonn

5 June 2007

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This study proves that the European eCall system, as recommended by the eCall Driving Group and approved by the EU Parliament, works. eCall has tremendous potential to help accident victims faster. According to EU data, it could help reduce the number of road fatalities by 2,500 each year.



The EU plans to have every new car equipped with the eCall system from 2010. The system will automatically generate an emergency call after a serious accident. With this call, the data of the vehicle including location is transmitted to the 112 emergency call centre.



Via mobile networks, the call-taker gets a voice connection to the vehicle occupants and obtains information which is vital for rescue organisations.

This study aimed to demonstrate the feasibility of an automatic emergency call system in Europe with the transmission of the vehicle data including location, while leaving open the final technical and organisational details.

In addition to tests already carried out in other countries, this test focussed on the cross-border processing of eCalls.

The feasibility study was based on the Final Recommendations of the eCall Driving Group:

- To use the 112* emergency call number across Europe
- To use geo-positioning via satellite (GPS) to determine the exact location
- To use the specified Minimum Set of Data (MSD)
- To use the in-band modem procedure for voice and MSD data transmission as selected by ETSI/3GPP**

* Testing is not allowed using the 112 number. Therefore country-specific call numbers were used to route calls to the call centres of the participating automobile clubs.

** European Telecommunications Standards Institute (ETSI). 3rd Generation Partnership Project (3GPP).



- 9 Opel Vectra (plus 1 replacement vehicle)

- In-vehicle **eCall units** (test samples) with GPS antennae to determine location and GSM antennae to transmit the emergency call (alternatively Bluetooth-based transmission to the driver's mobile device)



- **Pushbutton** to manually activate an eCall*

* E-calls could have been triggered automatically by airbag control unit.



- One **mobile phone with a measurement function*** to determine network coverage (in dBm**) per vehicle



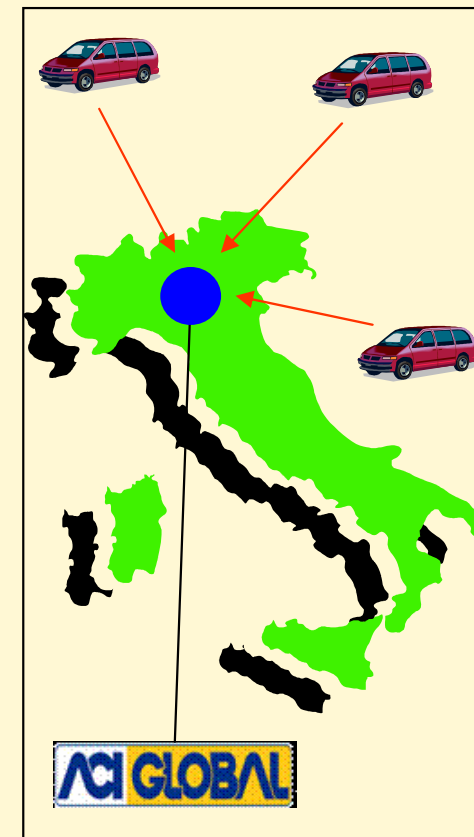
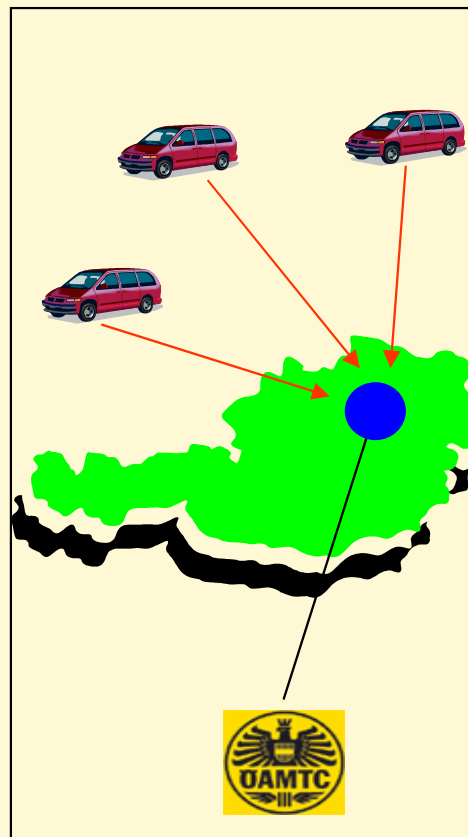
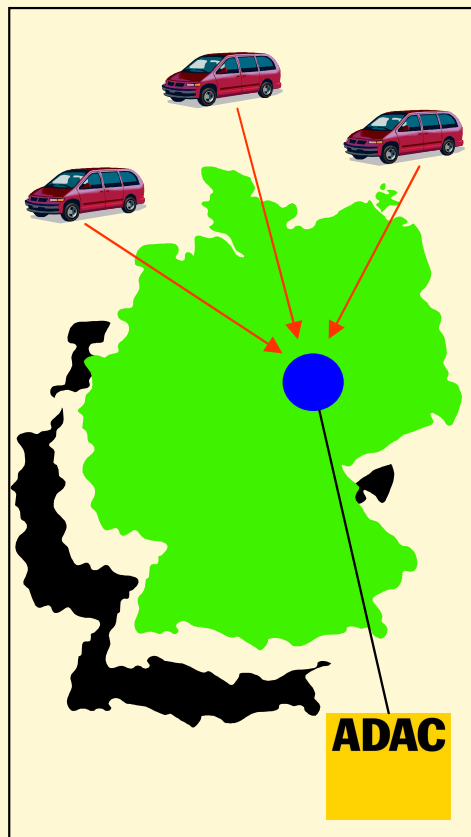
- One **emergency call centre** per country (ÖAMTC Vienna, ADAC Halle and ACI Milano)
- **Navigation devices** to confirm location data

* Provided by Nokia

** Decibel relative to 1 milliwatt

Procedure (1/4)

For ten days, nine vehicles were on the road in the three countries Austria, Germany and Italy. In each of these country there was one vehicle equipped with an Austrian, one with a German and one with an Italian SIM card to simulate cross-border traffic. The calls were taken by central call centres of the local automobile club.



At approx. 450 pre-set points, test eCalls were generated and logged. The selection of call-points was determined by the following criteria :

- Urban areas (approx. 55%)
- Rural areas (approx. 45%)
- Locations critical for GSM/GPS transmissions (tunnels, parking garages, dense forests)
- Near-border areas
- Cross-border areas

Notice: Cross-border areas and areas critical for GSM/GPS reception were tested both in urban and rural areas.

The trial did not include the following aspects:

- Requirements for call centre service levels
- 24/7 operation
- Routing via other mobile phone networks
- No live E112/112 conditions

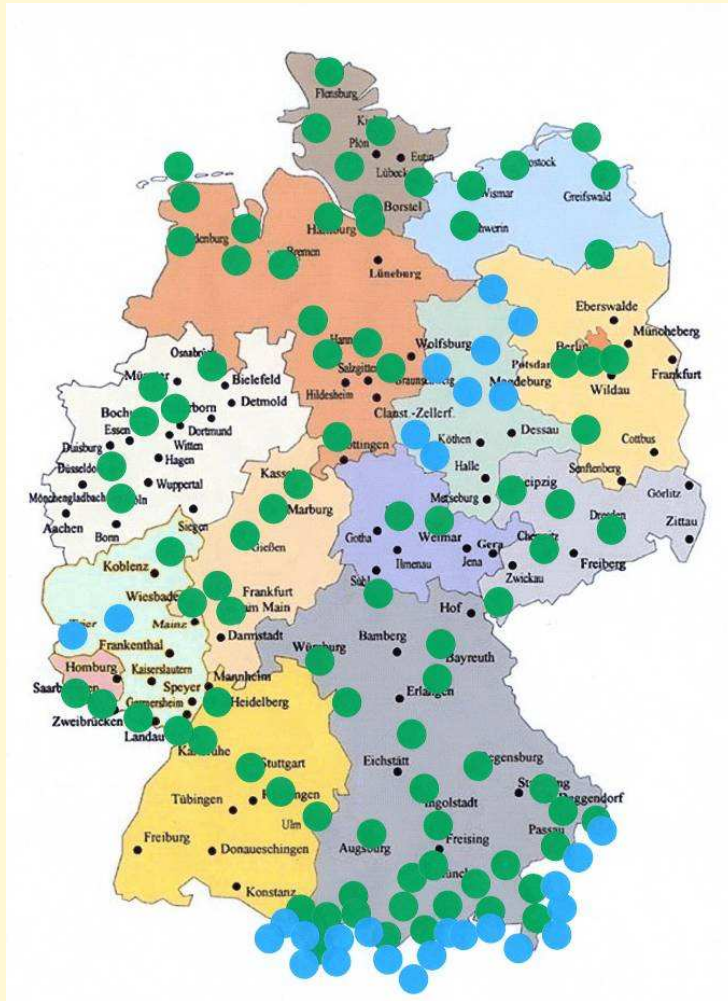
Procedure (4/4)

On a daily basis, the measurement data logged from the vehicles and the club call centres were uploaded via the Internet and sent to the ADAC Technical Centre to be analysed.

The screenshot shows a Microsoft Internet Explorer window with the address <http://87.119.205.12/ecall/Fahrzeug.aspx>. The page title is "Record sheet car / Erfassungsblatt Fahrzeug" and the subtitle is "ADAC eCall-feasibility-trial / ADAC-eCall-Machbarkeitsstudie". The form contains the following fields:

Licence-plate-Number / KFZ-Kennzeichen	<input type="text"/>
Driver / Fahrer	<input type="text"/>
Test-No. / TestNr. e.g. / z.B. 0006 BT	<input type="text"/>
Date / Datum	<input type="text"/>
country symbol, postcode, city / Länderkennzeichen, Postleitzahl, Ort e.g. / z.B.: I-23456 Milano	<input type="text"/>
environs / Umgebung	urban / städtisch
geo-co-ordinates / Geo-Koordinaten e.g. / z.B.: N 52 08 15 / W 10 47 11	<input type="text"/>
received GPS satellites / empf. Satelliten	<input type="text"/>
GSM-coverage / GSM-Pegel e.g. / z.B.: -30	<input type="text"/>
provider on display / im Handy-Display angezeigter Netzbetreiber	<input type="text"/>
quality of voice communication / Qualität Sprachverbindung	none / keine
radio-controlled time of sending test call /	<input type="text"/>

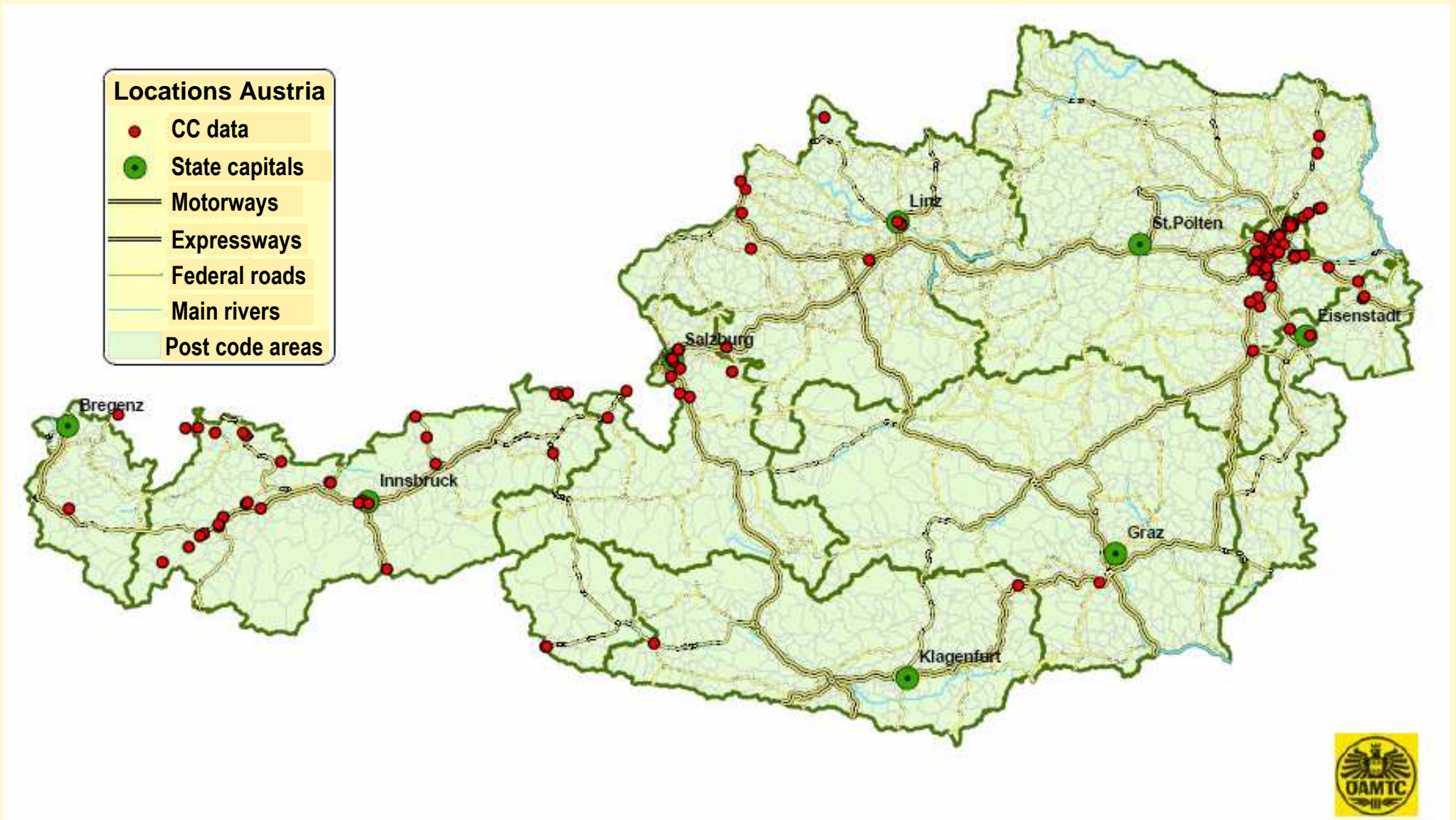
A total of 834 test calls were made from numerous locations in the three countries and analysed.



Germany



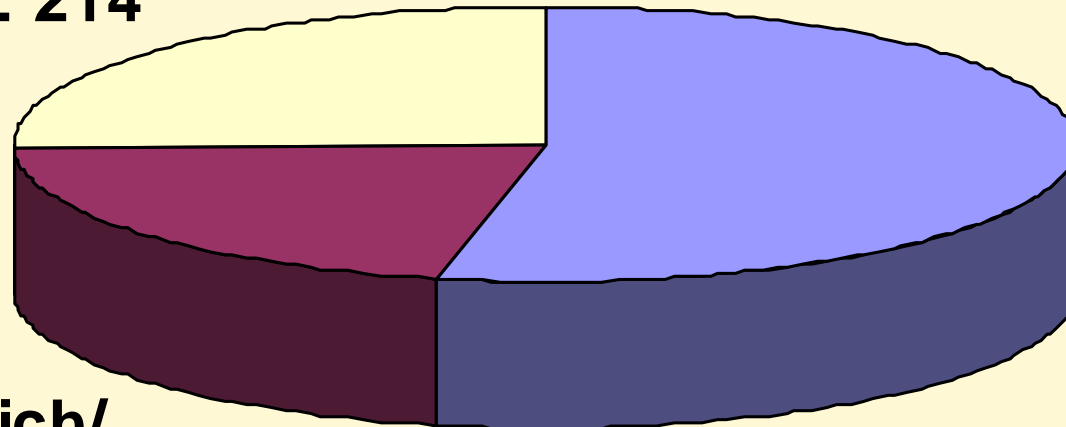
Italy



Austria

Distribution of test calls by country:

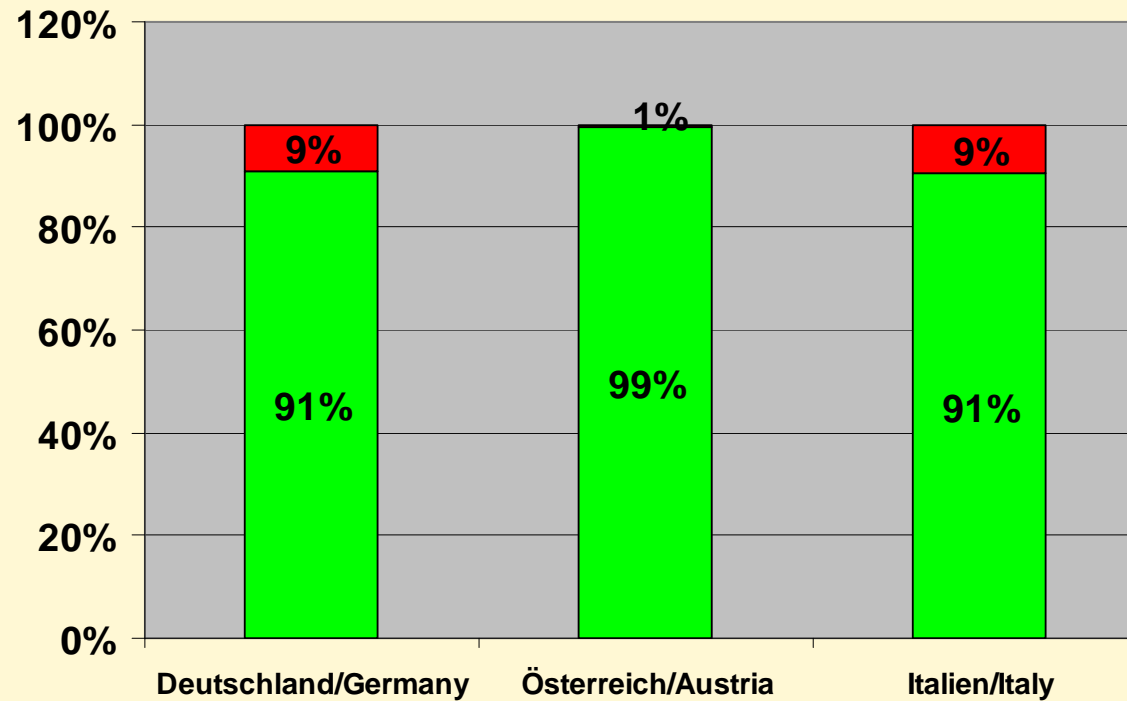
Italien/Italy: 214



**Deutschland/
Germany: 444**

**Österreich/
Austria: 176**

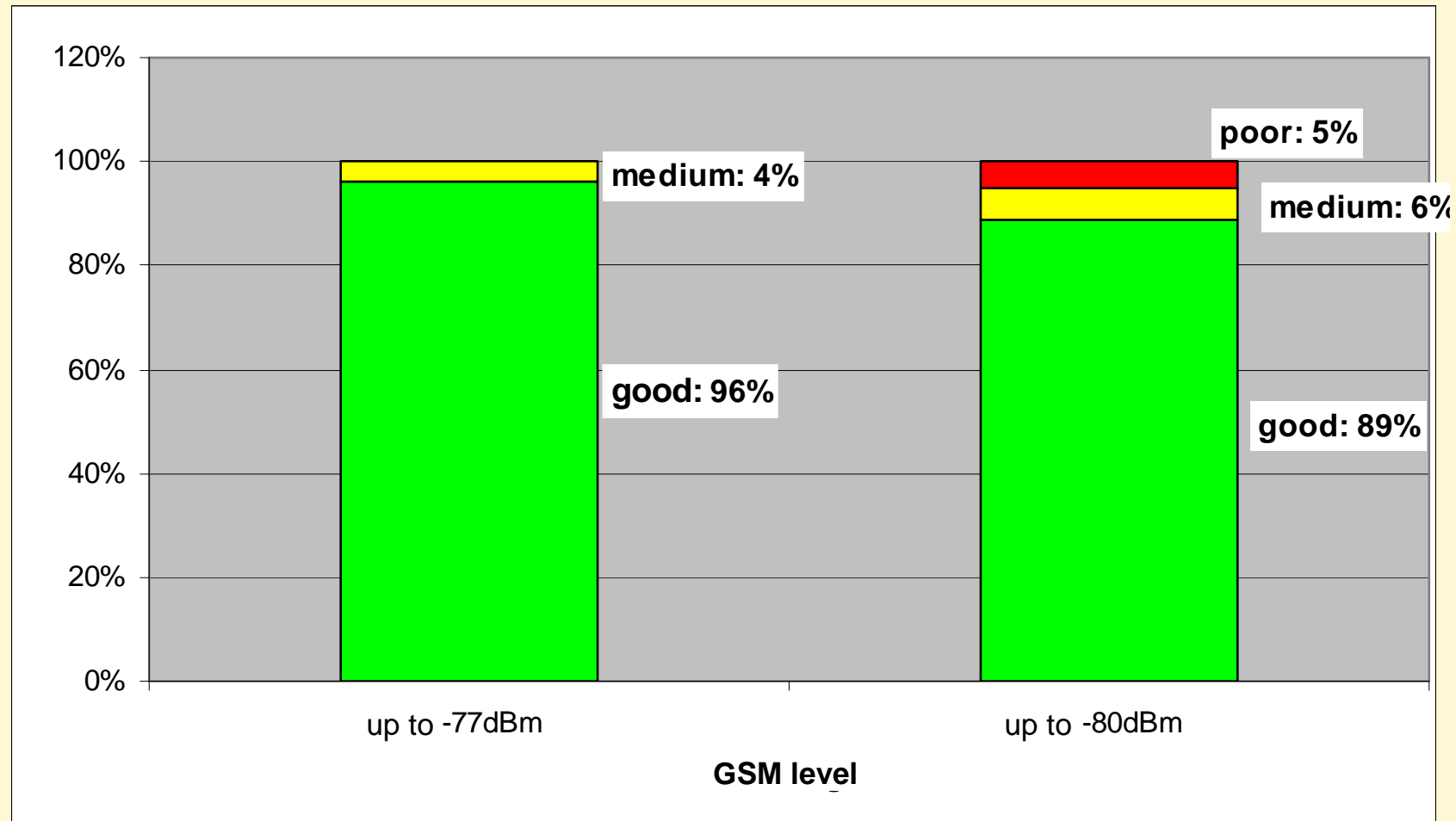
Successful (green) and unsuccessful (red) test calls:



The success of an eCall depends on sufficient GSM network coverage. Unsuccessful calls occurred only in areas with poor GSM network coverage.

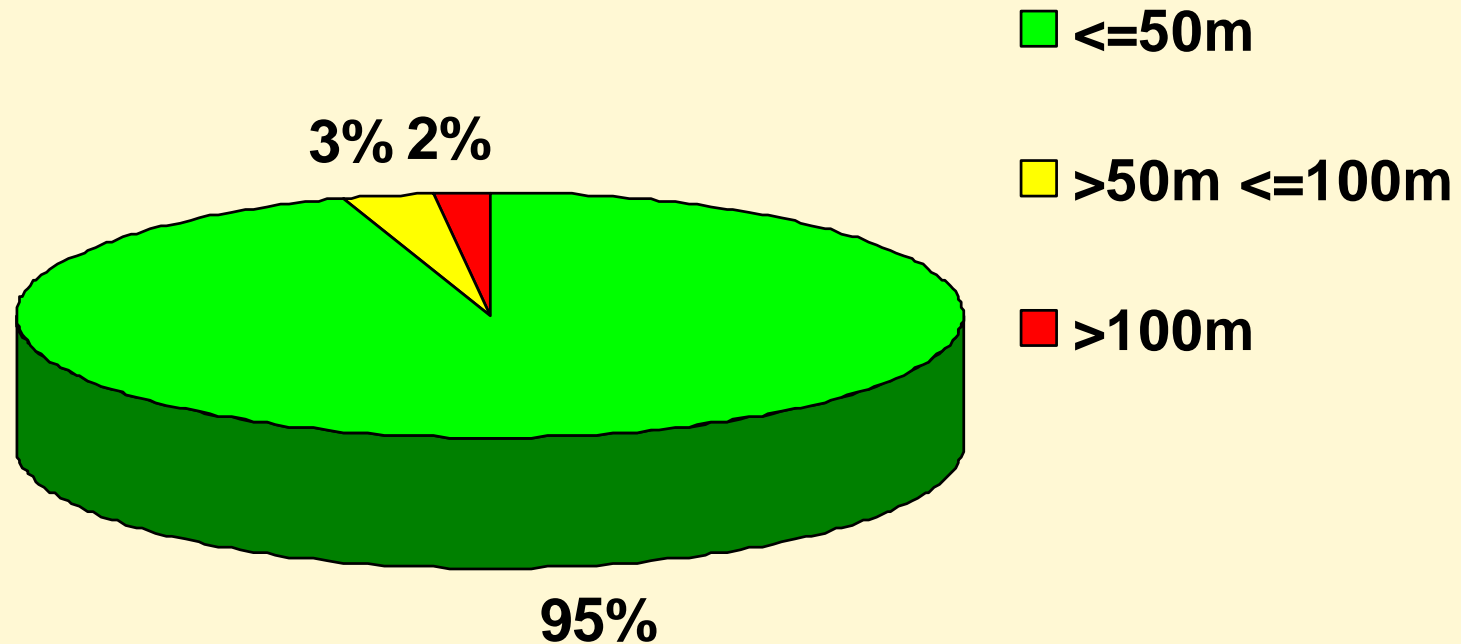
Notice: In Austria, fewer of the targeted call points had poor mobile network coverage.

Distribution of total voice-call quality:



At GSM levels up to -77 dBm, voice-call quality was good for 96% of calls. Up to that level all calls were successful.

Match between actual test vehicle locations* and locations transmitted via eCall unit (unadjusted):

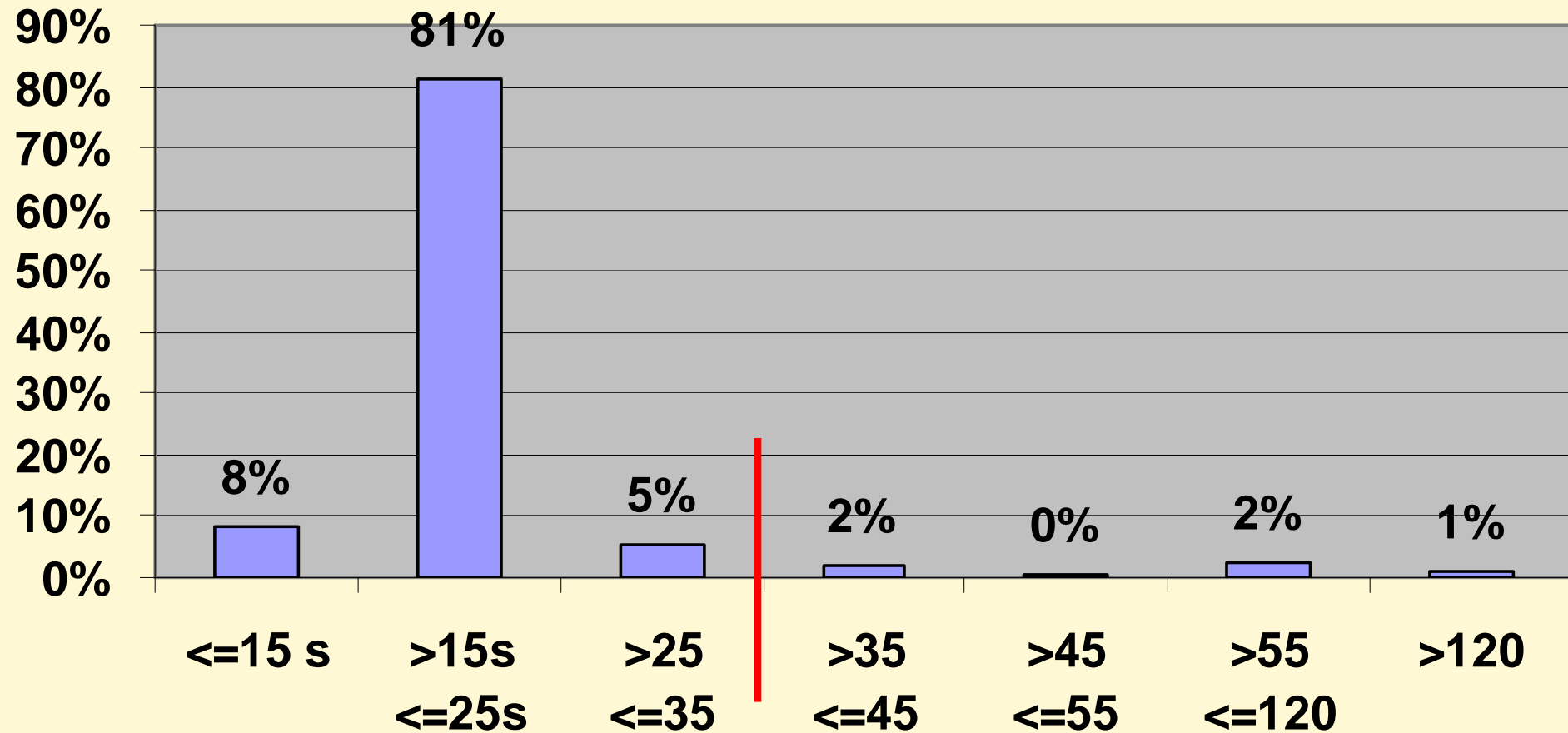


In 95% of all test calls the GPS positioning accuracy was 50m or better. The recommended criteria** were met in all test cases.

* Car navigation unit was used for reference.

** Recommended criteria of the eCall Driving Group: ≤ 50m in 50% of all cases and ≤ 150m in 95% of all cases.

Lead times between pushing the eCall button and signalisation of the call in the club call centres:



In 94% of all test calls, the call signalling time was 35sec or better.
The recommended criteria* were met in all test cases.

* Performance criteria recommended by the eCall Driving Group: 85% of all activated and sent eCalls should reach the PSAP within 35 seconds.

- This trial proves that the European eCall system scheduled to be introduced in 2010 is feasible.
- The recommended performance criteria for lead time and positioning accuracy were met or exceeded.
- Successful calls include voice and data transmission. In all successful calls the data was fully delivered.
- Sufficient GSM network coverage is crucial for the success of eCall. Unsuccessful calls only occurred in areas with low GSM level, i.e. in areas with poor GSM network coverage including parking garages and tunnels.

- A standardised and integrated pan-European eCall system should be built on interoperable and future-proof technologies.
- In addition to an SOS button, in-vehicle eCall units should be equipped with a “Service” button allowing motorists to request other services, such as roadside assistance or traffic information.
- In order to ensure competition, the motorist should be free to choose and switch service providers for the “Service” button without incurring additional cost.

- At the motorist's request, the location transmission feature should also be available for the "Service" button.
- To ensure an enhanced level of transmissions in tunnels, signal repeaters (to boost mobile networks) should be made mandatory.

In parking garages and underground garages, this does not seem to be required, as accidents in such places are not likely to be severe.

- Further studies are needed to ascertain the safety of transmission in actual crashes (vehicle damaged, vehicle battery disabled after crash, mobile reception of an overturned vehicle etc.).
- The power supply of the eCall unit must be maintained long enough after a crash.

In a joint press statement, Mr Wolfgang Tiefensee, the German Federal Minister of Transport, Mr Jacques Barrot, the EU Commissioner for Transport and Mr Peter Meyer, the ADAC President, emphasised the importance of electronic systems for road safety in Europe.

In their statement, they highlighted eCall as a measure contributing towards the further improvement of rescue services.



Feedback from the eSafety Conference in Berlin (2/5)

ADAC accident simulation gave an insight into the operational sequences of the whole chain of rescue after a severe accident and impressively demonstrated the benefit of eCall.



On 5 June, Germany and Austria signed the EU Memorandum* for the introduction of eCall.



* Memorandum of Understanding for Realisation of Interoperable In-Vehicle eCall

The participants in the conference showed great interest in the results of the ADAC eCall feasibility trial.



Selected expert discussions results:

- eCall data transmission: it is necessary again to identify the requirements for data transmission in order to allow a neutral evaluation of the available methods, e.g. inband modem and SMS.
- eCall flag: in order to avoid costly modifications in the mobile networks to the GSM standard, the use of 116112 as the standard eCall number across Europe was suggested.
- It was proposed to include public PSAPs in future testing.
- The demand was made that eCall systems should prove their robustness in crash tests.

- eCall can contribute towards improving road safety in Europe and the Member States' rescue services.
- eCall is feasible – across borders! ADAC and the ARC automobile clubs will continue to actively support the introduction of eCall in Europe.
- Integrating intermediary service providers in a Public Private Partnership (PPP) model can facilitate the timely introduction of eCall in countries with particularities in their emergency call systems.

- The PPP model makes it necessary to distinguish emergency calls from vehicles and traditional 112 emergency calls.
- ADAC and ARC support the eCall discrimination (“flagging”). “Flagging” can be achieved in various ways: 116112 is a possible solution amongst others.
- ADAC recommends the use of the PPP model in implementing eCall in Germany.
- In addition to offering a critical time factor, the PPP model promises to keep an increasing number of non-emergency calls from PSAPs.

- ADAC and ARC recommend to consider of the PPP model as an option in other Member States with similar structures to ensure a swift eCall roll-out in all of Europe.
- ADAC and ARC are open to continue talks with eCall stakeholders at the EU and the national levels to make eCall a reality in Europe.



Contact:

ADAC e.V.

Am Westpark 8

81373 München

Germany

Dietrich Heide

Phone: +49.89.7676.6408

E-mail: dietchich.heide@adac.de

Bernfried Coldewey

Phone: +49.89.7676.4959

E-mail: bernfried.coldewey@adac.de

www.adac.de/ecall