

ADAC

Results of the eCall Feasibility Trial

eSafety Forum

18 September 2007

Objectives

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).

Test Equipment (1/2)



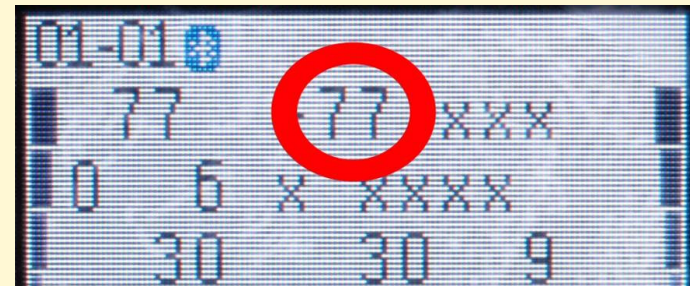
- 9 Opel Vectra (plus 1 replacement vehicle)

Test Equipment (2/2)

- 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.

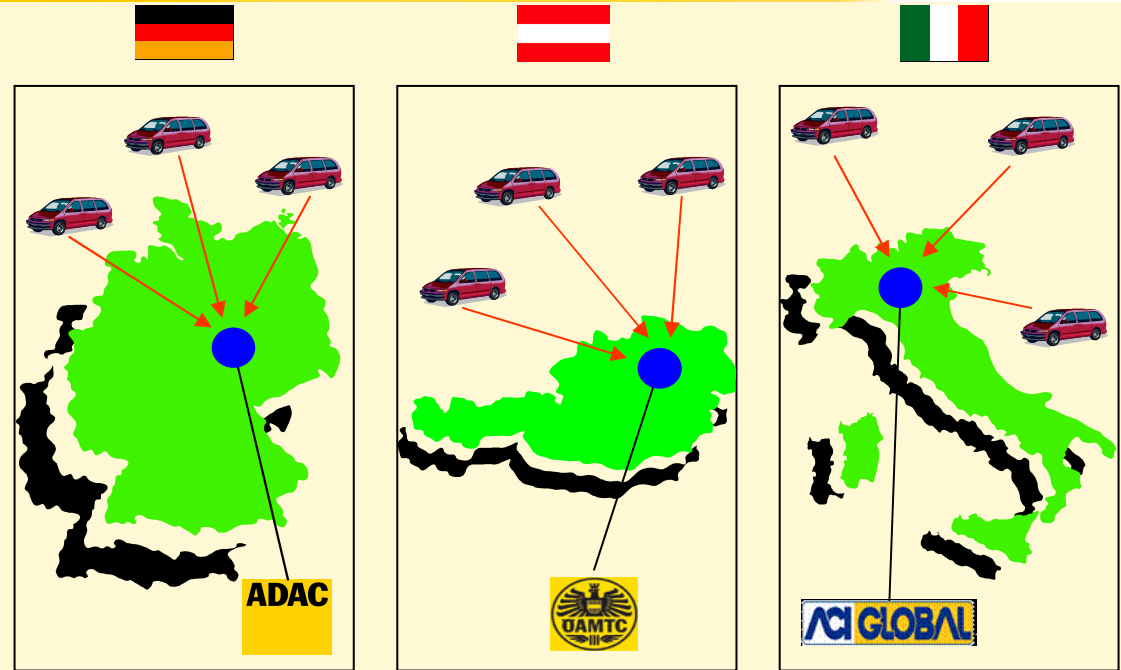


- One **mobile phone with a measurement function*** to determine network coverage (in dBm**) per vehicle
- One **emergency call centre** per country (ÖAMTC Vienna, ADAC Halle and ACI Milano)
- **Navigation devices** to confirm location data
 - * Provided by Nokia
 - ** Decibel relative to 1 milliwatt



Procedure (1/2)

In April/May 2007 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.

Procedure (2/2)

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

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.

Unbenannte Seite - Microsoft Internet Explorer

Adresse <http://87.119.205.12/ecall/Fahrzeug.aspx>

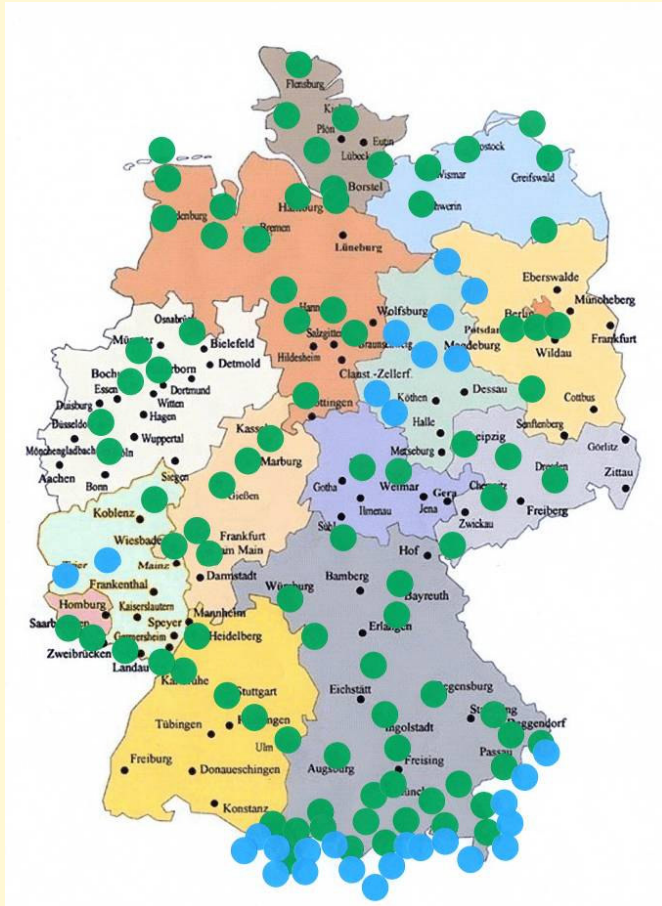
Record sheet car / Erfassungsblatt Fahrzeug
ADAC eCall-feasibility-trial / ADAC-eCall-Machbarkeitsstudie

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

Diskussionen sind auf <http://87.119.205.12/> nicht verfügbar

Results (1/7)

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

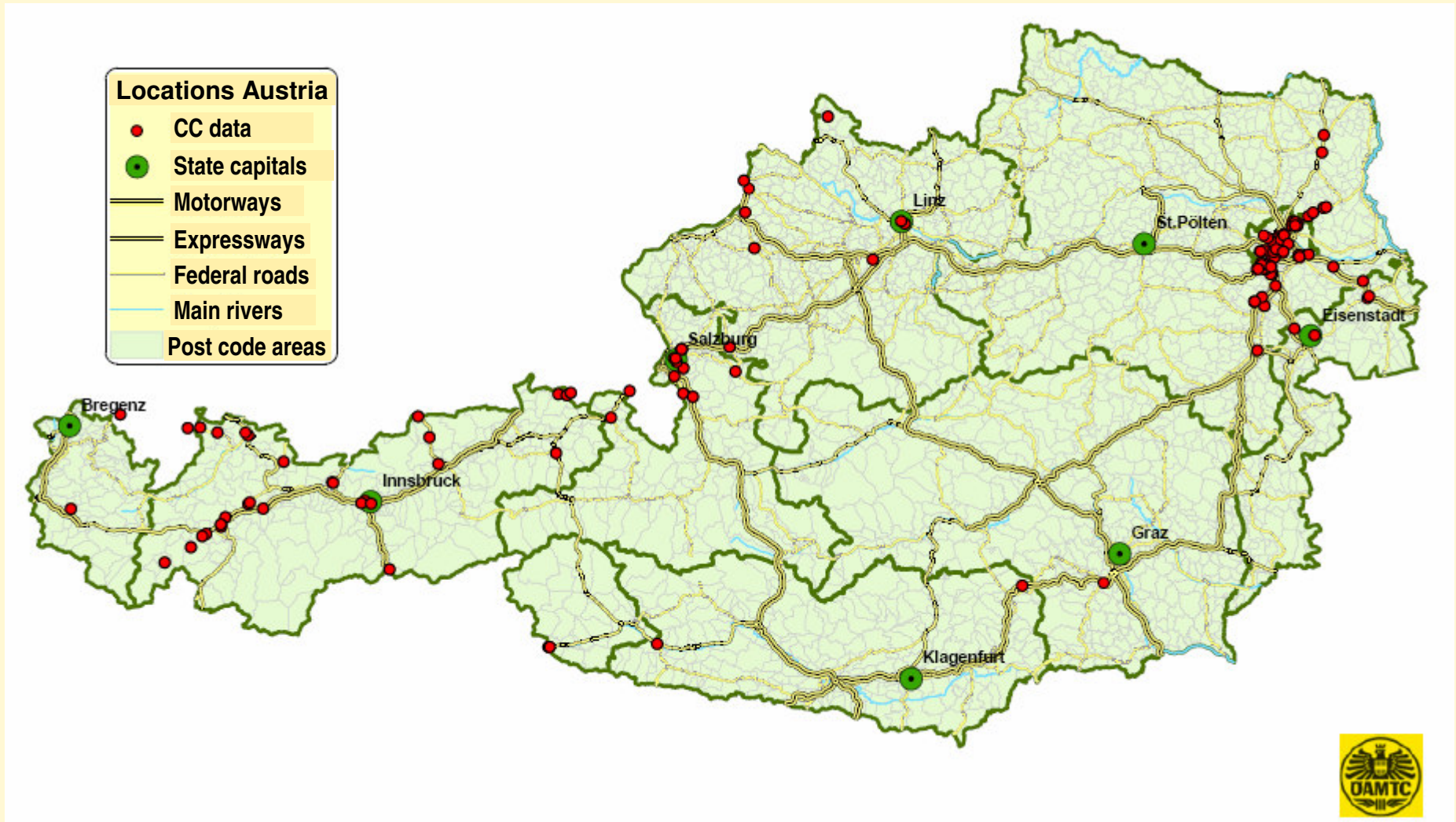


Germany



Italy

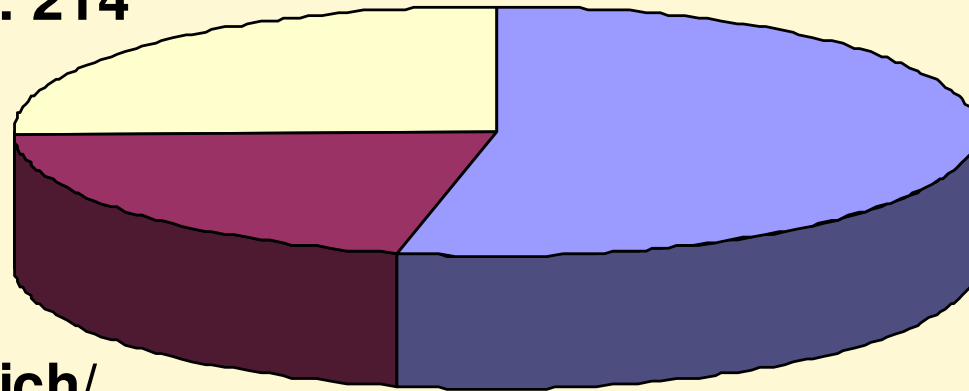
Results (2/7)



Austria

Distribution of test calls by country:

Italien/Italy: 214

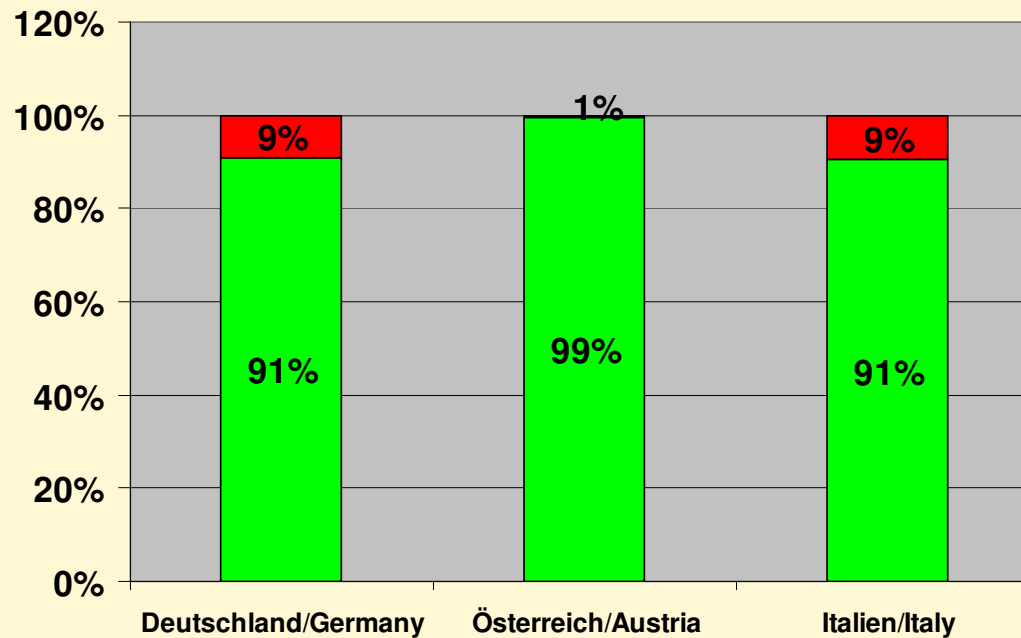


**Deutschland/
Germany: 444**

**Österreich/
Austria: 176**

Results (4/7)

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

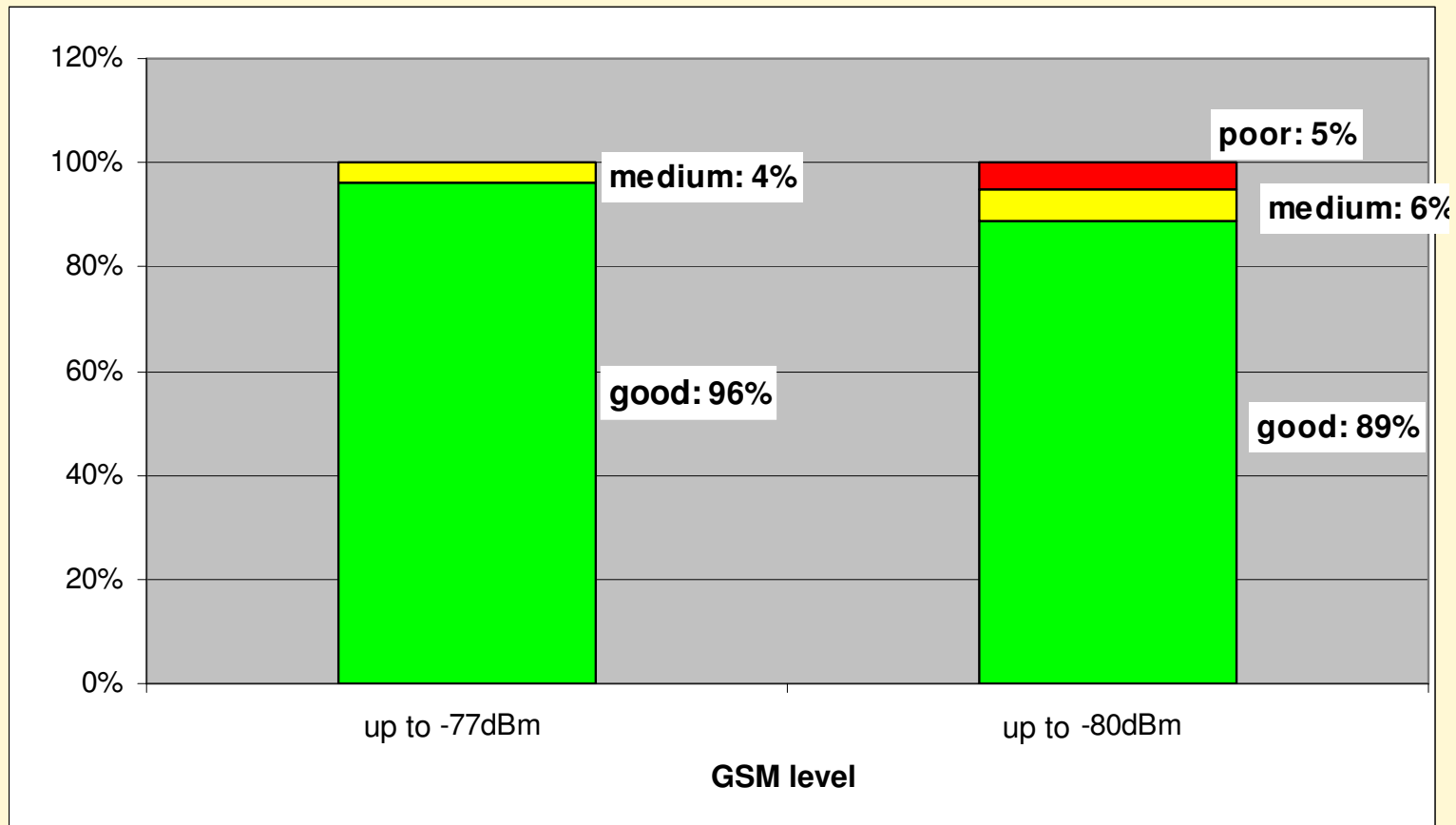


The success of an eCall depends on sufficient GSM network coverage. Unsuccessful calls occurred only in areas with poor GSM network coverage.

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

Results (5/7)

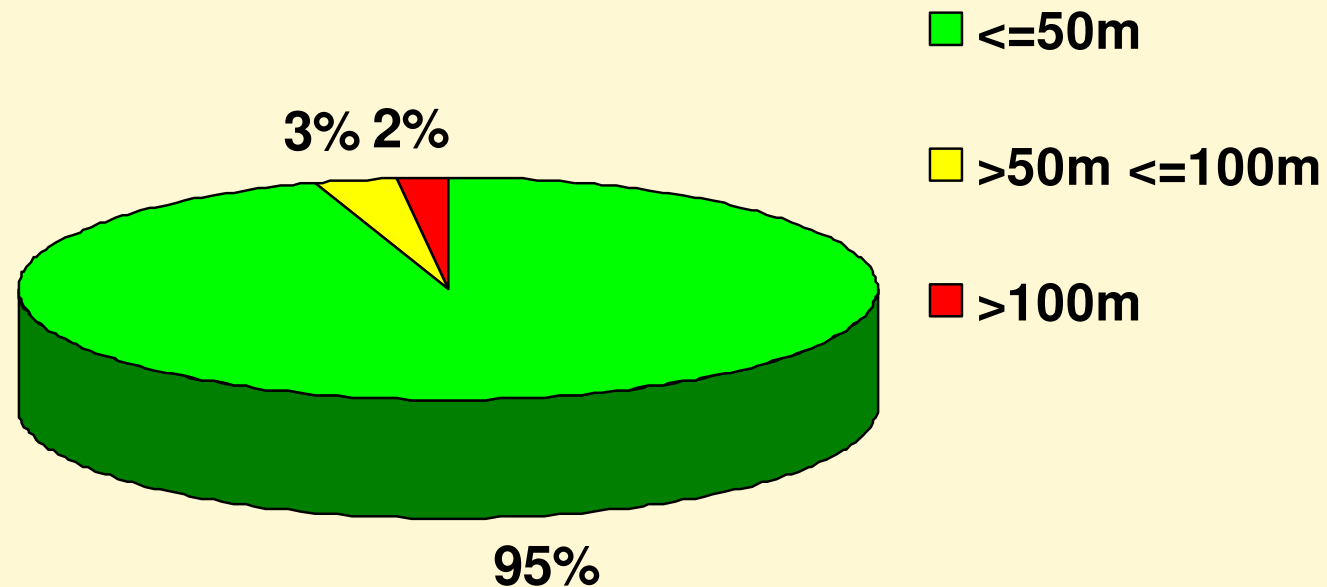
Distribution of total voice-call quality:



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

Results (6/7)

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



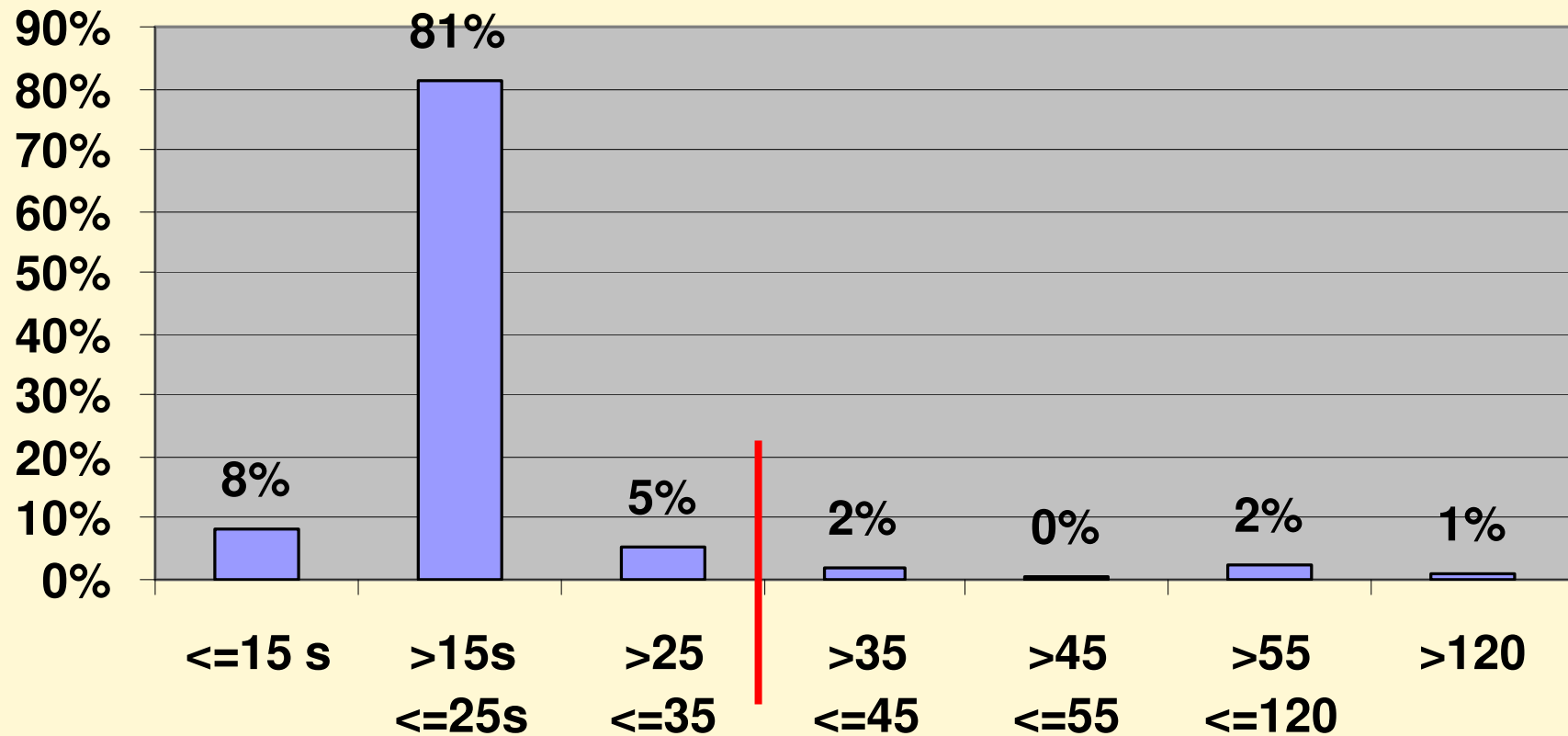
In 95% of all test calls the GPS positioning accuracy was 50m or better. The recommended criteria** were met in all test cases.

* Car navigation unit was used for reference.

** Recommended criteria of the eCall Driving Group: $\leq 50\text{m}$ in 50% of all cases and $\leq 150\text{m}$ in 95% of all cases.

Results (7/7)

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.

Conclusions and Recommendations (1/2)

- This trial proves that the pan-European in-vehicle eCall service is **feasible – across borders!**
- Sufficient mobile 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 mobile network coverage including tunnels and parking garages.

Hence, to ensure an enhanced level of transmissions in tunnels, signal repeaters (to boost the performance of mobile networks) should be made mandatory.

- 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.).
- 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.

Conclusions and Recommendations (2/2)

- 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.
- Integrating intermediary service providers in the public rescue chain can facilitate the timely introduction of eCall in countries with particularities in their emergency call systems.
- ADAC and ARC support the eCall discrimination to ensure a swift eCall roll-out in all of Europe.
- The discussion on the data transmission procedure for eCall must not lead to poor compromises – the only reasonable solution is a single pan-European standard for data transmission.

