Session 4 TELECOM

GSM-R IG: Guaranteeing GSM-R end-to-end interoperability – now and in the future

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Agenda

GSM-R Multivendor Interoperability Testing - Status

Multivendor Interoperability Testing - Next Steps
(ETCS over GPRS, FRMCS aspects and consideration)
GSM-R Inter Operability Testing (IOT) 2014-15 co-financed by the European Commission

- **EIRENE 5/13**
  - Issued 2000
  - EIRENE 6/14
  - Issued 2003

- **2002**
  - Global IOT Phase 1&2
    - Nortel and Siemens
    - Static roaming functionality
    - GSM services
    - Advanced Rail services

- **Q1/ Q4 2004**
  - IOT Phase 3 Initial & Regression
    - Siemens and Nortel
    - Inter PLMN connections
  - Nortel BSS to Siemens NSS

- **Q1 2005**
  - Global IOT & Field Phase 4.1
    - Nortel NSS to NSN BSS

- **Q1 2007**
  - Global IOT & Field Phase 4.2
    - Nortel BSS to Siemens NSS

- **Q1 2011**
  - Global IOT Phase 9.3
    - KCC NSS to NSN NSS

- **Q2 2011**
  - Global IOT Phase 9.2
    - KCC NSS to NSN BSS

- **Q3 2011**
  - Global IOT Phase 9.1
    - KCC NSS to NSN

- **2014-15**
  - Global IOT 2014-2015
    - Phase 1, 2 and 3
    - EIRENE 7.4.5/15.4.0
    - Nokia and KCC NSS & BSS
    - GSM-R E2E incl. Dispatcher & CAB

- **2016ff**
  - ETCS over GPRS capacity study

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**IOT Phase 3 extension**
- Focus on additional features (Late Entry, eMLPP, Call barring and Access Matrix, Class of Registration, …)

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**www.gsm-rail.com**
IOT Multivendor Test Campaign 2014-2015

Network-to-Network IOT (E-i/f)
Single Network - Multivendor IOT (A-i/f) type end-to-end

The tests including cab radios and were successfully executed, and proved the interoperability from end-to-end functionality point of view.
Conclusion of GSM-R IOT 2014-15

Tests of relevant interfaces of a multivendor GSM-R network were successfully completed:

- A-interface IOT testing between both vendor core and radio products incl. dispatcher and CAB Radio
- ISUP Interface between the both vendor core products

Functionality tested:

- Functionality as Basic and Supplementary GSM Services for voice and data (GSM regression)
- Cell reselection and handover scenarios
- Functional Addressing (FA)
- Location Dependent Addressing (LDA)
- Enhanced Multi-level Precedence and Pre-emption Service (eMLPP)
- Voice Group Call Service (VGCS)
- Voice Broadcast Service (VBS)
- Railway Emergency Call (REC)
- Originator to Dispatcher Information (OTDI)
- Late Entry
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GSM-R IOT for EIRENE FRS 8 / SRS 16:
Potential next steps

• Future prove Packet Data / IP technology as ETCS bearer

• Interface between core and radio – based on 3GPP standard (no railway modification, but selection of suitable functionality)
  -> positive impact on IOT

• GPRS/IP capable products: EDOR, RBC, KMC

-> Multivendor IOT would be beneficial

• CEF 1st call, Activity 12, approved by INEA:
  Study of ETCS capacity in station/hot spot environment mixing CS and PD (EoG)
  (UIC, NOKIA, KCC, FWK and Selex-ES)
FRMCS: Impacts on interoperability

GSM-R
- Inbuilt functionality in core and radio network layer (e.g. VGCS, preemption)
- IOT focus on following interfaces:
  - Core – Radio
  - Core – Core
  - Dispatcher, CAB Radio, Mobiles for e2e testing

3GPP Evolution
- Following the 3GPP path to continuously benefit from most successful communication system, thus guaranteeing interworking and global roaming
- Benefit for IOT by relying on 3GPP standardized technology

Public Safety
- Rely on 3GPP mission critical communication standardized for public safety

Spectrum, Sharing
- Dedicated spectrum for mission critical comm’
- Network Sharing with public operator or PDDR: Interoperability & SLA!

Migration
- Interworking between GSM-R and FRMCS to be covered by IOT
From GSM-R to FRMCS: Proposal for the realization of Railway functionality

GSM-R

Applications
  - Railway Functionality

Core
  - Railway Functionality

Radio
  - Railway Functionality

Mobile
  - Railway Functionality

FRMCS

Applications
  - Railway Functionality

Control
  - Dispatcher

Voice & Multimedia Core

EPC - Packet Core

Radio

Mobile
  - Smartphone
  - Terminal
    - Railway Functionality
From GSM-R to FRMCS: Interoperability: benefit from a 3GPP standardized solution

**GSM-R**
- **ETCS** (CS,PS)
- **MSC, SCP**
- **BSC / BTS**
- **CAB, OPH/GPH**

**FRMCS**
- **ETCS(Ps)**
- **EIRENE**
- **CCTV**
- **MCPTT**
- **ATO**

**Service Interworking**
- **3GPP Handover, Cell Reselection, Roaming**

**Interworking**

**EPC - Packet Core**
- **MME**
- **P/GW**
- **eMBMS**
- **PCRF**
- **PDG**

**Radio**
- **eNodeB**

**Mobile Smartphone**
- **CAB Application**
- **GPH/OPH Application**

**Main focus on railway functionality**
- **Main focus on 3GPP functionality**
CONCLUSION

• Interoperability testing for GSM-R has become an important success factor when it comes to reliable and interoperable solution serving seamless and secure train operation across Europe

• Further activities can be supported for EIRENE FRS 8 / SRS 16 e.g. with respect to ETCS over GPRS

• Compared to GSM-R the scope of Interoperability is enhanced for expected FRMCS: between application and application, application and network, between multivendor networks, and between FRMCS and GSM-R

• Most benefits for Interoperability Testing when following the 3GPP Evolution incl. functionality for mission critical communication under standardization for public safety market

• Industry ready to support for Interoperability Testing in FRMCS