GSM-R interferences:
Report EIM

GFUG Meeting 15 May 2014
(updated version)
EIM envisages that mitigating interference can have impact on specifications of the onboard equipment, GSM-R network infrastructure, as well as on Public Networks.

Whatever solution, or combinations of solutions, will be selected, the following criteria shall be taken into account:

- **Interoperable**: national solutions do not lead to additional access criteria and do not result in different operational impact for foreign trains.
- **Migration**: during the time needed to implement the agreed solution, the stand-still principle is applicable: no increase of number and impact of interferences.
- **Balanced**: no disproportional action to be taken by only one of the actors.
- **Manageable**: the interference related requirements on system components (receivers, transmitters) of each of the actors have to be documented in standards (TSI, ETSI, 3GPP), regulation and/or agreements, and have to be monitored and maintained by the respective (regulatory) bodies.

This report reflects the actual status in the EIM member networks, demonstrating that the wanted situation as described above, is not reached yet.
Interference situation

**Actual status UK:**
- Issues are being reported at an average of 6 a month UK wide, and it has been calculated that there will be over 600 cases of interferences during period of CP5 (2014 to 2019).
- In addition a UK interference day was held where Rail and Frequency regulators attended as well as Mobile operators and DFT (UK Transport Ministry). The meeting concluded that an independent paper be written that compared options such as:
  - Do nothing
  - Cooperate
  - Fit modified train mobiles or filters to trains.
- This paper is hoped to be the start of a request for sponsorship for a combination of mitigation on the train and additional new GSM-R sites. This paper is currently being prepared by Affini and sponsored by NRT (Network Rail Telecoms), with a view to present to senior NRT management and then national regulators Mid June 2014.
Interference situation

**Actual status France:**
- The number of interferences is still increasing, consequences of commercial UMTS900 networks refarming and still GSM networks use.
- Important TTAB (Tram-Train Aulnay Bondy) issue in December 2013.
- Status of the formal communication:
  - Bilateral agreement between Railway IM and public mobile operators: process definition ongoing (initiated by French Regulator in January 2014)
  - Bilateral process engaged when interference is discovered:
    - IM collect info on public web site (national frequency regulator) and exchange with public operator
    - IM studies theoretical simulations
    - IM ask for frequencies to Interfered public operator then:
      - Change frequency plan, or
      - Change GSM-R engineering, or
      - Add a new equipment (repeater or BTS)
Interference situation

Actual status Belgium:
• The number of interfered locations is slowly increasing. 99% of the interferences are on the conventional railway lines.
• UMTS 900 has not yet been an issue, however the operators rollout is speeding up and problems are expected if nothing is done.
• Impact on day-to-day train operation is not really tangible on the conventional lines.
• Interferences on the “sensitive” ETCS L2 HSL were solved by reinforcing one of the BTS.
• Massive roll-out of ETCS Level 2 from this year onwards is planned.
• Mitigation measures: Another round of negotiating with the frequency spectrum regulator is foreseen. Until now the interference problem has not been recognised by the Regulator.
Interference situation

Actual status NL:

- A few cases due to interference of GSM public networks were experienced.
- Broadband systems in the 900 MHz (mainly UMTS900) are currently being rolled out by KPN and T-mobile since March 2013. No cases of interference were experienced up to this moment.
- In The Netherlands a subsidy program is being defined by the Dutch Ministry of Infrastructure and the Environment, for measures to improve the GSM-R network and onboard equipment:
  - For onboard equipment a total of €30 million will be made available to implement improved GSM-R CAB radios and EDORs or external filters (to counter blocking and intermodulation from strong signals)
    - Applicable to Dutch railway undertakings as well as to foreign railway undertakings that need to operate in The Netherlands.
    - To cover the purchase and implementation of CAB radios and EDORs or filters, and where needed certification.
    - For a total of ca. 5000 CAB radios, EDORs and/or filters.
    - It is expected that this program starts at July 1st, 2014. The improved CAB radios, EDORs or filters must be installed by July 1st, 2015.
  - For improvements of the GSM-R network (to counter unwanted emissions from MNO base stations) and improvements of non trainborne mobile equipment up to €10 million will be available, granted on a (motivated) case by case basis.

The program is not yet formally approved (changes reserved).