3.7) On-going activities within CEPT/ECC

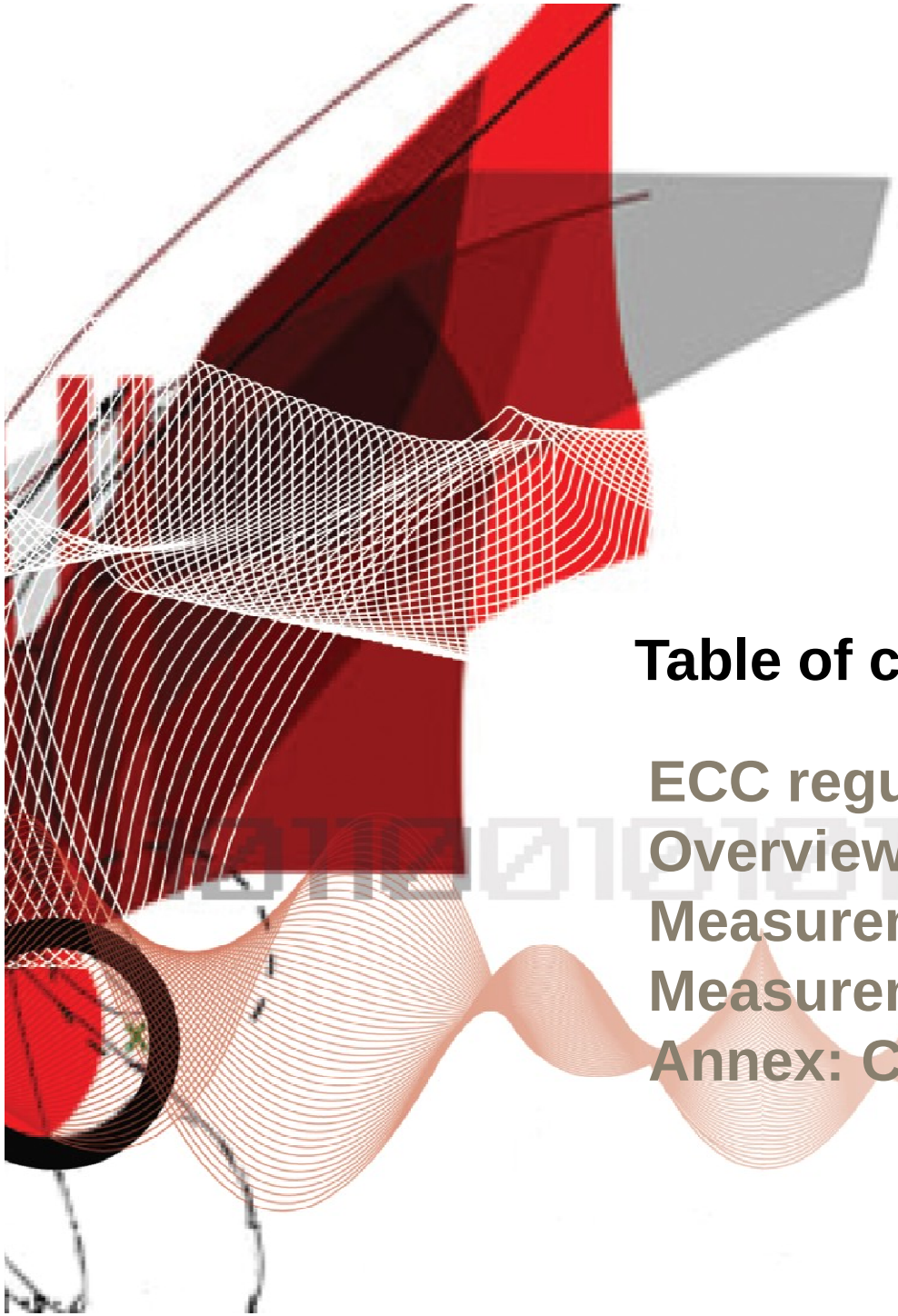
Thomas Weilacher

Vice Chairman

of CEPT/ECC Working Group

FM (Frequency Management)

thomas.weilacher@bnetza.de

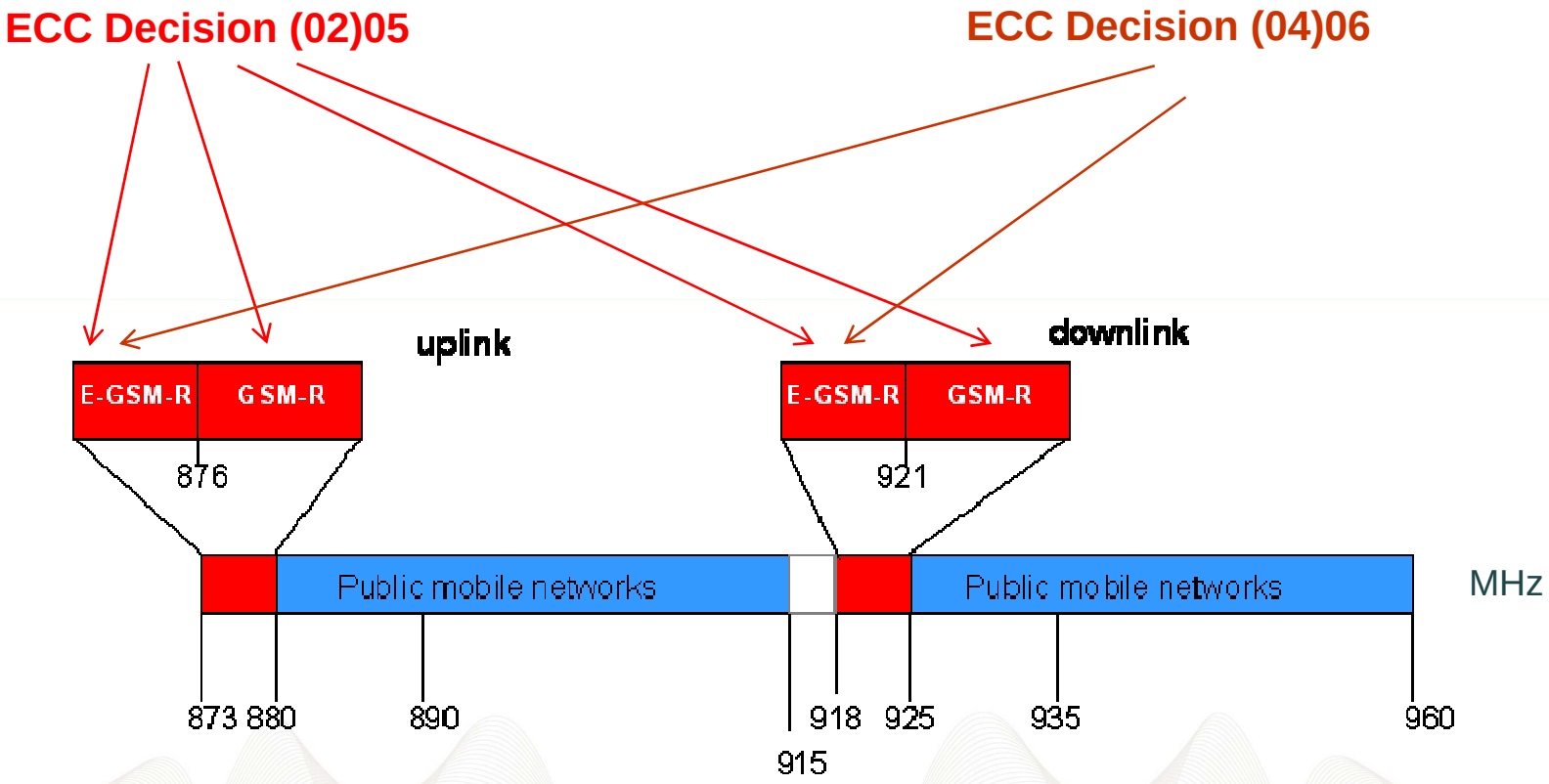


CEPT ECC
Electronic Communications Committee

Table of content

ECC regulations for GSM-R
Overview on activities within WG FM
Measurements MFCN / GSM-R
Measurements - General results
Annex: CEPT/ECC documentation

ECC regulations for GSM-R



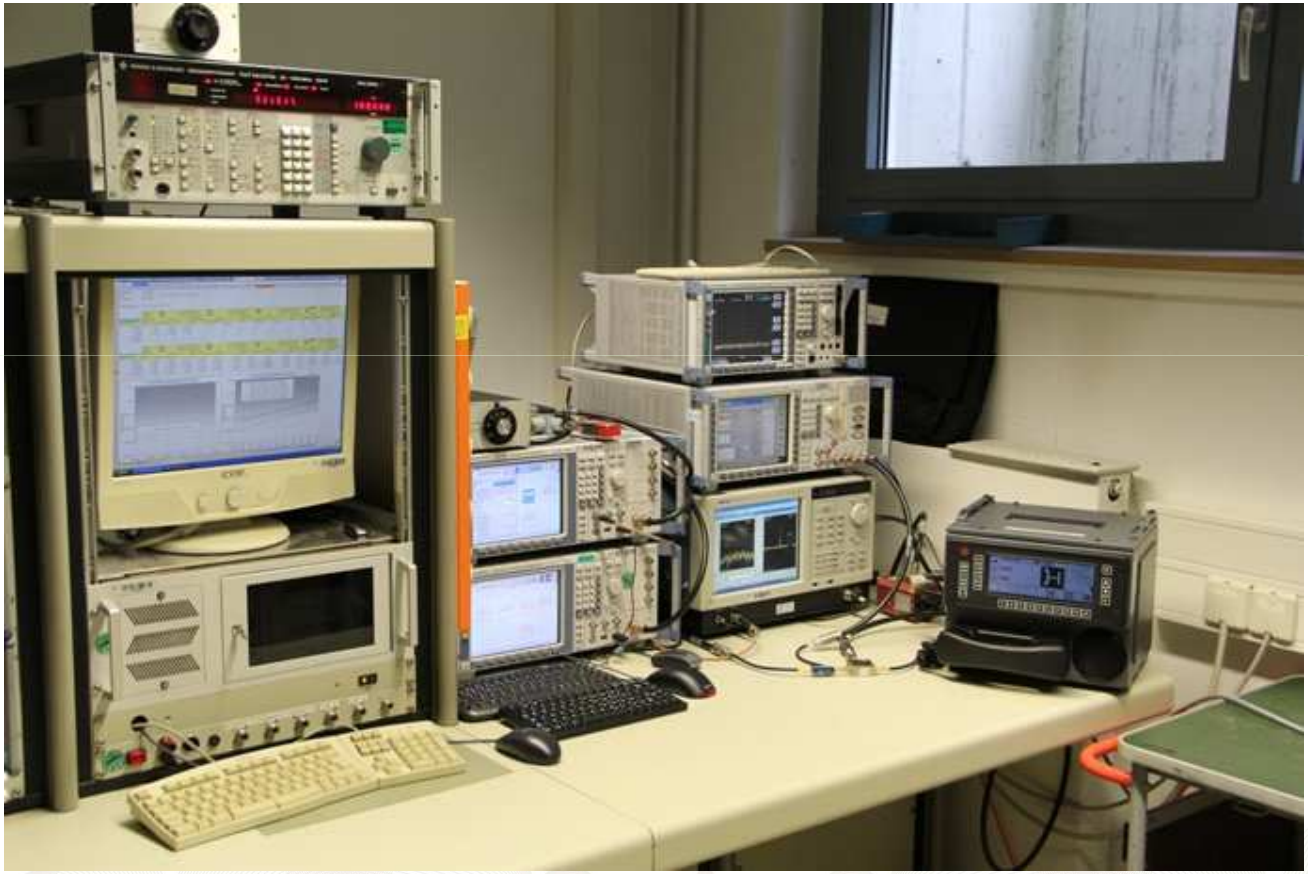
Overview on activities within ECC Working Group FM

- To monitor and review the situation in 2013/2014 (was requested by UIC in 2012)
- Establishment of a Correspondence Group (CG)
- A questionnaire regarding GSM-R interference cases was adopted and sent to CEPT administrations
- As a consequence of the analysis of the responses, measurements in a lab should be carried out to investigate the compatibility between MFCN (mobile/fixed communications networks) and GSM-R
- BNetzA (Federal Network Agency) volunteered to carry out these measurements in Munich/Germany for CEPT/ECC

Overview on activities within ECC Working Group FM, cont.

- Participation of UIC and of GSMA during the measurements (19 - 23 August 2013)
- Thanks to UIC for providing GSM-R receiver equipment
- Report on the results of the measurements will be finalised until 20 September 2013 and will be submitted to WG FM #78 (30 Sept. - 4 Oct. 2013, Montegrotto/Italy)
- WG FM will then decide how to proceed
- Follow-up activities (e.g. interpretation of measurement results) will most likely be prepared by the CG for WG FM #79 (3 - 7 February 2014)
- ECC informs the European Commission (Radio Spectrum Committee) regularly

Measurements MFCN / GSM-R



Measurements MFCN / GSM-R, cont.

- The aim of the measurements is to investigate the impact from downlink transmissions (925-960 MHz) of MFCN into the GSM-R terminal (cab radio)
- Three different technologies for MFCN:
  → GSM (200 kHz)
  → UMTS (5 MHz)
  → LTE (5 MHz and 10 MHz)
- Three interference mechanisms (inside the cab radio):
  → Interference due to unwanted emissions
  → Interference due to intermodulation
  → Interference due to blocking effects
- Mechanisms were isolated as far as possible

Measurements MFCN / GSM-R, cont.

GSM-R signal

- Downlink frequency: e.g. 924.8 MHz (Closest to MFCN)
- Two different receivers:
  → A GSM-R radio module representing equipment which is currently used in almost all trains so far (ETSI EN 300 910 V8.5.1 (2000-11), ETSI TS 145 005);
  → A GSM-R radio module representing equipment with further improved receiver parameters that exceed the requirements given in ETSI TS 102 933
- The GSM-R signal was generated by a BTS simulator

Measurements MFCN / GSM-R, cont.

GSM-R receiver

- Protection ratio measurements often represent a mixture of different interfering effects (unwanted emissions, blocking and intermodulation). To be able to separate these effects, some knowledge about the receiver is necessary
- Therefore measurements for both GSM-R receivers (cab radios) were carried out to assess the following parameters:
  → Receiver sensitivity
  → Receiver selectivity
  → Minimum C/I for noise-like interferers

Measurements MFCN / GSM-R, cont.

MFCN signals

- The interfering signals were produced by signal generators
- Two different GSM signals were used:
  → with unwanted emissions according to ETSI / 3GPP standard;
  → with unwanted emission suppression better than according to ETSI / 3GPP standard, representing a real GSM base station

- Two different UMTS signals (5 MHz) were used:
  → with unwanted emissions according to ETSI / 3GPP standard;
  → with unwanted emission suppression better than according to ETSI / 3GPP standard, representing a real UMTS base station

Measurements MFCN / GSM-R, cont.

MFCN signals

- Two different LTE signals were used:
  → with unwanted emissions according to ETSI / 3GPP standard;
  → with unwanted emission suppression better than according to ETSI / 3GPP standard, representing a real LTE base station

- The 10 MHz LTE signal was only used for measurements of blocking and intermodulation effects
- Further details are provided in document CG-GSM-R(13)023rev3

Measurements MFCN / GSM-R, cont.

Failure criterion

- The GSM standard defines 8 values for the quality of the received signal (RxQual) according to the bit errors encountered. RxQual=0 defines a (near) error free reception, RxQual=7 is the worst reception
- The failure criterion used for all measurements was a RxQual value of 4 for GSM-R
- The RxQual value of the wanted signal (GSM-R) was measured with the BTS simulator

Measurements - General results (preliminary)

General results (short overview)

- GSM-R receiver (cab radio) with improved parameters shows a very different behaviour (may be interfered when the GSM-R level is below -90 dBm and the interferer spectrum falls into the first MHz of the public GSM band)
- Blocking: Only occurred for GSM, neither for UMTS nor for LTE
- Impact on the GSM-R receiver is due to intermodulation
- UMTS (5 MHz), LTE (5 MHz) and LTE (10 MHz) cause the same effects
- IM3: Interference levels for UMTS or LTE can be higher than for GSM

Measurements - General results (preliminary), cont.

General results (short overview)

- Unwanted emissions falling into the GSM-R band: higher for UMTS and LTE compared to GSM (for both cases: according to the ETSI standard mask and according to the real mask); further assessment necessary
- Measurement report is still under development and will be provided to the forthcoming WG FM meeting
- Final report, also considering the combination of the three different effects, will be available after 20 September 2013 (doc. CG-GSM-R(13)024)
- Results will also be provided to European Commission

???

Thank you very much for your attention.

Any Questions?

Contact information

Federal Network Agency (BNetzA)

Canisiusstr. 21

55122 Mainz

Germany

Tel: +49 61 31 18 31 19

Fax: +49 61 31 18 56 04

Email: thomas.weilacher@bnetza.de

Thomas Weilacher

Annex: CEPT/ECC documentation

- Website of CEPT/ECC: http://www.cept.org/ECC
- All ECC deliverables (ECC Decisions, ECC Recommendations, ECC Reports) are available on http://www.cept.org/ecc/deliverables
- All working documents, meeting reports etc. of Working Group FM and its entities are available on http://www.cept.org/ecc/groups/ecc/wg-fm/client/meeting-documents
- Participation in meetings is possible for national delegations (CEPT administrations) and LoU/MoU partners (e.g. UIC, ETSI, EC)
- Information system EFIS, also providing national information: http://www.efis.dk