



Mobile School Training International – Mobile Communication

INTRODUCTION

For over 10 years Rabion Consultancy has been providing Mobile School training. In the past the training was offered as 'in-house' training for mobile network operators. We have renewed the training to keep pace with latest developments such as LTE, M2M, and 5G.

TRAINING OBJECTIVE

The objective of the mobile School training is to provide detail insight into mobile communication technology. The architecture and functionality of mobile communication systems such as GSM, UMTS and LTE are presented, for both radio networks and core networks.

In addition network security, provisioning, resource management; billing, number portability, international roaming, interconnection etc. will be presented. Focus in the training will be at the growth in data service usage and the increasing role of IP protocol, SIP, VoIP and IMS.

Theory will be combined with practical cases and exercises. After completion of the training the participants will have overview and understanding of the developments in mobile communication technology and the insight in how networks and services are working.

TRAINING

The training is class instruction training, and consists of presentation, cases, exercises and examples. The trainer will use training material (PowerPoint sheets) via a projector. The training duration is 5 days. The size of the Group of participants is at maximum 12 persons.

Training times are between 9.00-12.00 and between 13.00-16.30. The course is in English language. The participant will receive an electronic copy (.pdf) of all training material, and optionally a paper version. The participants will receive a training certificate after completion of the training.

TRAINERS

The trainers are experts in their fields. The trainers are actively involved in the telecommunications industry and are up to speed with new business developments and new technologies. Their knowledge is far more than just textbook knowledge; they gained hands-on expertise in carrying out projects and assignments for customers. The trainers will discuss cases in the training and will explore the theory of telecommunications using examples from daily practice.

PROGRAMME

The Mobile School training consists of 5 days training. The first half day consists of introduction and overview of Mobile Communication, history of mobile communication, and overview of the mobile communication industry. There are 3 half days sessions about mobile radio networks, 3 half days about the mobile core network, and 1 half day concerning the services in the network. The final day is about M2M, NFC, WiFi roaming, terminal developments, international roaming. The program details are provided in this brochure.

**ABOUT RABION CONSULTANCY**

Rabi3n Consultancy BV is an independent consultancy firm in Information and Communications Technology, based in the Netherlands. Rabi3n Consultancy has no ties or relations to system developers or software companies. Therefore we can be fully committed to the needs and requirements of our clients. We focus at the Telecommunication industry. Our clients are Telecom Operators, Service Providers, Telecom Regulators, Telecom solution/equipment suppliers. The company is founded in 1999 and privately held. Rabi3n Consultancy offers up-to-date training courses based on knowledge and expertise that is gained by our trainers in working with the latest developments in the telecommunication market.

The main areas of expertise that we work on are: Mobile Communication (GSM, GPRS, UMTS, LTE, and 5G), International Roaming, Wholesale (MVNO, MNVE etc.), Broadband, Telecom and Data Infrastructure (xDSL, IP), VoIP, Billing & Payments, Telecom Business Processes, Number Portability and Numbering Management, and Interconnection. Rabi3n Consultancy has a wide international experience in providing telecommunication training as well as in providing consultancy.



Additional Information:

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PROGRAMME MOBILE SCHOOL – INTERNATIONAL

Mobile School International consists of 5 days of training.

Day 1 (Morning): Overview and Introduction Mobile Communication

- Opening and Introduction
- Basic terminology (cellular technology, location updating, handover, use of frequency spectrum, interference)
- History Mobile Communication
- Industry Mobile Communication
- Overview Mobile Communication technology generations

Day 1 (Afternoon): Mobile Radio networks

- Terminology Radio Communication, propagation of radio waves
- Architecture mobile network (coverage, capacity and interference)
- Erlang Theory: application and examples
- Access methods: TDMA, FDMA, CDMA, OFDMA
- GSM and UMTS and LTE: the differences
- Network elements (BTS, BSC, Node B, RNC), network elements for LTE
- Radio and frequency spectrum
- Diversity (antenna, polarisation, and frequency diversity)
- Software Defined Radio

Day 2 (Morning): Mobile Radio networks

- About cells, sectors, sites, TRX-es, and antennas
- Physical transmission, microwave, leased lines, fiber
- Case: Traffic and capacity calculations
- Capacity management
- Example: Capacity management calculations, case
- Identifiers in the network (MSISDN, IMSI, IMEI etc.)
- Modulation and Modulation technology
- New Modulation technique for LTE (64QAM)
- FDD and TDD techniques
- GSM→GPRS→EDGE→UMTS→HSPA →LTE
- GSM: Frequency planning
- UMTS: Power Control
- MIMO
- Femto cells and Pico cells

Day 2 (Afternoon): Mobile Radio network

- Bandwidth in het Mobile (radio) network
- GSM radio interface (Physical channels and logical channels)
- UMTS radio interface(Physical channels and logical channels)
- Handovers
- Management and Operation of the Radio network
- Quality parameters (CST, CSR, CCR, MOS)
- Mobile Communication and Health risks

Day 3 (Morning): The Core network

- Architecture of the core network
- Network elements in the core network
- Transmission in the network
- Signalling and the Signalling network
- Signalling applications (BSSMAP, MAP, INAP, ISUP, CAP, RANAP etc.)



- SIGTRAN
- Location Updates, Network Selection

Day 3 (Afternoon): The Core Network

- Security in the network
- Circuit switched en Packet switched techniques
- Exercise: Traffic Cases (Voice)
- Identifiers in the network (IMSI, IMEI, MSISDN)
- SIM and USIM
- Intelligent Networks (IN), CAMEL (a.o. for prepaid)
- Basics of IP, the Internet Protocol, IPv4 to IPV6 migration
- The development of GSM to UMTS to LTE
- All-IP developments in the core network
- Network elements in the LTE network
- Quality of Service (QoS)
- The use of APNs, PDP profiles in the packet network

Day 4 (Morning): The Core network (continued)

- Exercise: Traffic Cases (PS data)
- Next Generation Networks (NGN)
- SIP protocol, SIP entities and Session Control
- IP Multimedia Subsystem (IMS)
- Voice in LTE networks: CS fall back, Simultaneous voice LTE, VoLTE, OTT
- Exercise: Traffic Case (NGN)

Day 4 (Afternoon): The Core network and services in the network

- Voice Services: Voicemail, Supplementary services
- SMS architecture and SMS services
- Traffic cases SMS
- Network provisioning/activation
- Prepaid and Postpaid applications
- Billing systems and processes
- Network interconnection, SMS Interworking
- International Roaming
- Number Portability
- Exercise: traffic cases Number Portability

Day 5 : Developments in Mobile Communication

Subject 1: LTE

- LTE and LTE-Advanced standards (4G)
- Techniques and applications of the global LTE standard
- Use of Spectrum for LTE
- LTE and SAE
- LTE Roaming

Subject 2: Wifi

- WiFi methods for access en modulation
- WiFi developments: WiFi roaming
- WiFi vs LTE. What are the differences?

Subject 3 : Wholesale Services

- Service Providers and ESPs
- Mobile Virtual Network Providers (MVNO)
- Mobile Virtual Network Enablers (MVNE)
- Use of Dual IMSI solutions
- Local Break Out(LBO) and Single IMSI/ARP (EU roaming regulation)

**Subject 4: Regulation, standardisation and specification**

- Standardisation and specification
- International organisations for telecommunication and internet
- Regulation and Monitoring
- Digital Dividend and Spectrum Re-farming
- EU Roaming Regulation

Subject 5 : M2M (machine-to-machine)

- Services and Applications, differences with regular data services
- Use of Numbering resources (IMSI, MSISDN) and SIM applications

Subject 6: Handsets, Smartphones and Operating Systems

- Important Operating Systems
- NFC technology
- eUICC developments
- Mobile banking and Mobile payments