

# Memogram AB

## EPC Advanced Features and Protocols

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### Course description



The course 'EPC Advanced Features and Protocols' is tailored for telecom professionals assigned to operate and optimize the LTE Evolved Packet Core systems based on 3GPP Release 8 to Release 11. Therefore the focus is set on understanding the LTE system from a mobile operator's perspective, addressing the implementation issues and challenges for the Core Network Engineers.

A thorough system overview of the LTE/EPS is featured along with all the details on the Network functions, interfaces and network capabilities. The EPC systems and their features and signaling protocols are analyzed in detail. The role of Diameter and architectural options are explained. Furthermore a number of traffic cases are studied and several comparisons are made to the existing UMTS technology and the inter-working with the UMTS and GSM systems. The role of new policy and charging rules principles is clarified. The VoLTE implementation, based on IMS core systems is presented and the key principles for interwork, interconnect and roaming are discussed.

### Course Content

#### THE OVERALL EPS, EVOLVED PACKET SYSTEM (LTE) 4h

- EPS overall architecture and the major differences compared to UMTS
- LTE Radio and Core nodes and their relation to 3G systems
- LTE Service portfolio and compatibility to existing services
- IMS core functionality for operator centric end-user services
- The fundamental TCP/IP functions in LTE
- Mobility and compatibility between 2G/3G and EPS networks
- Migration vs. replacement of 3G systems
- LTE-Advanced: 3GPP R9 and 10 highlights

#### LTE RADIO NETWORK ASPECTS ON EPC SERVICES 2h

- Basic principles on LTE OFDMA radio
- S1 control plane and NAS protocol features
- Radio support for traffic prioritization and capacity allocations
- Radio bearers matching with subscription based QoS
- Seamless intra-LTE handover support
- PS-to-PS/CS Interworking with 2G/3G radio

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- Fallback for CS services to 2G/3G radio
- SON, Self-Optimized/Organizing Networks

## **EPC, EVOLVED PACKET CORE FEATURES AND PROTOCOLS 4h**

- MME, S/P-GW, HSS and PCRF system functions
- S1-AP and GTP-C v2 context and procedures in LTE
- Policy, charging and bearer control procedures in LTE
- APN, Default bearer vs. dedicated bearers
- UE vs. Network initiated bearer setup
- QCI (QoS Class Indicators) definition and recommendations
- eSRVCC, SR Voice Call Continuity and CS fallback support
- QCI mapping into 3G QoS classes and IP DSCP values
- Authentication and security in EPC
- USIM/ISIM and service provisioning issues

## **LTE/EPC MOBILITY MANAGEMENT PRINCIPLES 1h**

- Tracking Area (TA List) based mobility
- Mobility management in IDLE mode incl. ISR
- EPC support for ANR (Automatic Neighbour Relations function)
- Mobility Management in ACTIVE/CONNECTED Mode
- Inter-RAT mobility principles for PS and CS bearers

## **EPC SYSTEM DESIGN AND SIGNALLING SCENARIOS 3h**

- The protocols and interfaces in EPC, including S1
- Signalling scenarios on GTP-C v2 control protocol
- Diameter protocol and routing scenarios in EPC
- DRA based architecture in EPC
- EPC Signalling with SIP based traffic
- PCRF Interfaces and dedicated bearer set up
- End2end EPS scenario with policy and charging rules signalling flow
- International Roaming guidelines with EPC signalling

## **VOICE over LTE implementation in EPC, VoLTE 2h**

- VoLTE service architecture with PCRF support
- VoLTE provisioning and default APN attributes
- VoLTE support for International Roaming (guidelines)
- CS Voice migration options with VoLTE (ICS based)
- MT- and MO-scenarios with eSRVCC support to 2G/3G
- Instant messaging vs. SMS services in LTE

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## TRAFFIC CASES IN LTE/EPS 2h (distributed over the course)

- Combined 3G/LTE registration and mobility
- Network initiated Bearer setup for MT VoLTE traffic
- LTE Data Session setup procedures
- Mobile phone call set up (VoIP call session initiation)
- IMS application registration and IM message delivery
- Mobility in LTE: Paging and location update procedures
- Handover within E-UTRAN and Inter-RAT mobility

## Who should attend

The course targets Core Network engineers with the task of implementing the mobile system standards based on 3GPP LTE Advanced specifications (R8-R11).

Instructor on this course is: [Thomas Giarimi](#), Senior Consultant

## Prerequisites

The participants should have a good understanding and working experience from WCDMA and GSM CN Systems and basic knowledge from LTE R8 systems.

## Duration

3 days full time.

## Ordering information

Request a quote by emailing course ID 'B3C1' to: [admin@memogram.com](mailto:admin@memogram.com)