



Who Should Attend?

The course is intended for EPS/LTE technical staff and management.

Course Scope

1. Introduction.
 - 3GPP Mobile Network Evolution.
 - LTE Performance.
2. Network Architecture.
 - EPC: MME, S-GW, P-GW, HSS, EIR, PCRF, Interfaces.
 - E-UTRAN: eNB, S1 and X2 interfaces.
 - Interworking with GERAN/UTRAN: SGSN, S3, S4 and S12 Interfaces.
 - HPLMN Routed Traffic and Local Breakout International Roaming Scenarios.
 - Geographical Network Structure, Identity Numbers.
3. OFDMA and SC-FDMA.
 - Overview of Multiple Access Techniques Used in 3GPP RANs.
 - OFDMA Fundamentals.
 - OFDMA Transmitter/receiver.
 - OFDMA Advantages/disadvantages.
 - SC-FDMA Fundamentals.
 - OFDMA and SC-FDMA Comparison.
4. E-UTRAN.
 - FDD/TDD.
 - Inter-Cell Interference.
 - Basic Transmission Structures and Parameters.
 - MIMO.
 - Channels.
 - Transmission Process.
 - Air Interface Protocol Stack.
5. EPC.
 - MME in pool.
 - Signalling Transport - SIGTRAN.
 - User Data Transport - GTP.
 - Database Communication - Diameter.
 - Default and Dedicated EPS Bearer.
 - QoS.
6. PCC.
 - Policy and Charging Control.
 - PCRF in LTE.
 - Interworking Between EPS/LTE and IMS/VoLTE/RCS via PCRF.
7. Traffic Cases.
 - EPS Attach.
 - TA Update.



- Service Request.
- Connection Release.
- Dedicated Bearer Activation.
- UE Requested Bearer Resource Allocation.
- Intra-LTE Handover.
- Inter-RAT Handover.
- ISR.
- 8. Security.
 - Authentication & Key Agreement.
 - Key Hierarchy.
 - Ciphering.
 - Integrity Protection.
 - Key Chaining.
- 9. SON.
 - Self Organising/Optimising Network – Procedure Examples:
 - eNodeB Self Configuration.
 - Interference Avoidance.
 - Handover Optimisation.
 - Load Optimisation.
- 10. CSFB & SMSoSGs.
 - SGs Interface.
 - Combined EPS/IMSI Attach and TA/LA Update.
 - CSFB MT/MO Call.
 - SMS MT/MO.
- 11. IMS Services.
 - VoLTE and RCS Service Profile.
 - LTE – VoLTE Interworking.
 - IMS Architecture and Principles.
 - IMS Registration.
 - ASs Examples.
 - VoLTE Call.
 - SMS.
 - SR-VCC,
 - Chat.
- 12. A-LTE Overview.
 - CA.
 - MIMO.
 - CoMP.
 - eICIC and HetNet.
 - Relay Node.

Course Objectives

This training is an excellent choice for engineers who already have experience with previous generations of mobile technology and have begun to work with the new EPS/LTE system. This training course maintains an appropriate balance between the topics related



to E-UTRAN (radio part), EPC (CN part) and LTE based teleservices, allowing the participants to understand the system as a whole. This training also provides the required background knowledge needed to fully participate in more advanced training sessions which focus on particular subsystem or network element issues.

Prerequisites

The participants should have general technical telecommunications/computer science knowledge at university level. Knowledge of GSM/UMTS GPRS services is recommended.

Training Structure

Three-day training divided into logical sessions.

Methodology

Instructor-led training. Exercises and trace analysis.