Course ID
LTE-TECH
Course Duration
3 days

Course Title
LTE/SAE Technology

Related Courses

- LTE: Technology & Business (LTE-BIZ, 2 days)
- LTE Air Interface Techniques (LTEAI, 4 days)
- LTE Signaling (LTESIG, 3 days)
- LTE Network Planning (LTE-NPC, 5 days)

Aimed At

A technical audience with prior understanding of the WCDMA/HSPA technologies.

Group Size

5-25

Prerequisites

- UMTS (3 day(s), UMTS-FDD)
- HSDPA (2 day(s), HSDPA)
- HSUPA (2 day(s), HSUPA)

Course in a Nutshell

This course, aimed at a technical audience already familiar with WCDMA/HSPA, provides an overview of the ongoing 4G enhancement to the UMTS system that are part of the Long Term Evolution (LTE) of 3G wireless networks.

In this course, we will undertake a detailed study of the Evolved UMTS Radio Access Network (E-UTRAN), 3GPP Release 8. To help you get the most out of this discussion, special attention will be paid to the principles of Orthogonal Frequency Division Multiplexing (OFDM) and Multiple Input Multiple Output (MIMO) systems that are key to a full understanding of the LTE radio interface physical layer. Discussion of the new access network architecture, with its various interfaces and protocol suites, and an overview of the network entities and interfaces defined for the EPC (Evolved Packet Core) network (3GPP work item System Architecture Evolution or SAE) complete the course. All in all, the course will provide you with a great foundation for work with or advanced study of the 4G LTE technology.

Customize It!

- If your audience is technical but lacks exposure to WCDMA/HSPA, we can begin the course with a discussion of the prerequisite material before taking up LTE/SAE. This will extend the course to five days.
- Let us know whether you are focused on the radio or core network, planning/ optimization, equipment/application design, or applications/services, so we can include the topics most pertinent to your needs.
- Are you a Multimedia Engineer who would like to learn the concepts of LTE-SAE that relate to the transport of your services to the users? We can focus on the

transmission principles, supported data rates, and other issues relevant to your interest.

Course Outline

- LTE/SAE Introduction
  - Packetization of cellular networks
  - A brief overview of GSM, GPRS, and EDGE
  - UMTS overview
  - 3GPP Releases (Release 99 up to Release 8)
  - EPS (E-UTRAN and EPC) logical architecture
  - EPS interfaces
  - EPC (Evolved Packet Core) architecture
  - SAE/LTE interfaces
  - LTE/SAE expansion: Cases include expansion over WCDMA, over HSDPA, and over EDGE/RTTI; as well as general discussion of MPBN (Mobile Packet Backbone Network) transmission principles
- Radio Interface
  - OFDM: Principles of operation
  - MIMO system
  - Radio interface techniques: Uplink/downlink
  - Radio channel structure
  - Radio interface
  - Throughput estimation
  - Exercises; case studies
- Signaling
  - Radio Resource Control (RRC)
  - Packet Data Convergence Protocol (PDCP)
  - Radio Link Control (RLC)
  - Medium Access Control (MAC)
  - Packet data flow and multiplexing
  - Channel structure
  - Logical channels
  - Transport channels
  - Physical channels
  - 3GPP standards references
  - Practical exercises using air interface protocol analyzer log files
- Functionality
  - Downlink transmission
  - L1 and L2 control signaling
  - Physical layer
  - Power control
  - Link adaptation
  - Paging
  - Cell camping
  - Uplink transmission
  - Physical resources

- L1/L2 control signaling

- Mobility
  - LTE mobility
  - Idle mode behavior
  - Compatibility with 3G/2G
  - CS Fallback overview
  - VoLTE implementation
  - IMS overview
- Course Wrap-Up: Future Evolution, Discussion

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