

Course ID
LTE-TECH
Course Duration
3 days

Course Title
3G LTE/SAE: A Technology Overview

Related Courses

- 3G LTE: Technology, Business, and Competitive Landscape (LTE-BIZ, 2 days)
- 3G LTE Air Interface Techniques (LTEAI, 3 days)
- 3G LTE Advanced System Techniques (LTE-ADV, 4 days)
- 3G LTE Signaling and Functionality (LTESIG, 3 days)
- 3G LTE Planning Considerations (LTEPLAN, 4 days)

Aimed At

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

Group Size

5-25

Prerequisites

- UMTS-FDD: Network Architecture, Operation, and Design (3 day(s), UMTS-FDD)
- HSDPA: Network Architecture, Operation, and Design (2 day(s), HSDPA)
- HSUPA: Network Architecture, Operation, and Design (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 3G LTE/4G 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-4G. 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.
- Add a workshop day at the end of the course, for a total of four days, for a deeper dive into the MBMS system and multimedia services.

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
 - Exercises
- 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
- 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
- Course Wrap-Up: Future Evolution, Discussion

How You Will Learn

- An experienced wireless engineer/instructor will present this course in interactive lecture format.
- Along with the lecture, we will utilize exercises, case studies, and interesting group activities to enrich the class and communicate important points.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making the new ideas easier to grasp and more relevant.
- If your background is less technical, we will use meaningful examples to simplify the complex subject matter.
- You will receive a printed Participant Handbook which will help you retain and recall what you learned in class and apply it on your job.

Revised

June 8, 2009f