Course ID
LTE-RADIO
Course Duration
3 days

Course Title
LTE Radio Access

Related Courses

- OFDM and MIMO (3 day(s), OM)
- LTE: Technology & Business (2 day(s), LTE-BIZ)
- LTE for Managers (1 day, LTE-EXEC)
- LTE/SAE Fundamentals (LTE-FUND, 2 days)
- LTE/SAE NGN Transport (LTE-SAE-NGN, 3 days)
- LTE Core Network (LTE-CORE, 5 days)
- LTE Tutorial (3 day(s), LTE-CT)
- LTE (LTE-C3DC, 3 days)
- LTE Air Interface Techniques (3 day(s), LTEAI)
- LTE Signaling (3 day(s), LTESIG)
- LTE Planning Considerations (4 day(s), LTEPLAN)
- LTE/SAE Technology (3 day(s), LTE-TECH)
- LTE: RF Network Design (5 day(s), LTEWK)
- 4G LTE: Next Generation Mobile Networks (4 day(s), LTE4)
- HSDPA (2 day(s), HSDPA)
- HSUPA (2 days, HSPA)

Aimed At

This course is aimed at a technical audience and is suitable for personnel at all levels from technicians through managers who are or will be involved in deploying LTE or who wish to keep up with the evolving 4G wireless technologies.

Group Size

5-25

Prerequisites

Those wishing to take this course should have a basic knowledge of the radio access aspects of UMTS and HSPA, along with some basic LTE knowledge.

Course in a Nutshell

LTE is a fourth generation mobile communication technology standardized by the 3GPP which enables support for broadband connectivity to mobile devices, permitting the delivery of demanding multimedia information to any device, anywhere, anytime. The radio access network and especially the air interface is the major focus of technology enhancements which enable the high bit rate broadband data transfers between the service platform and the mobile devices.

This course will provide you with a comprehensive understanding of the development, design, and capabilities of the LTE radio technologies and access network. The course will begin with a review of existing 3GPP and alternative technologies. The LTE access network is studied in detail, and a brief discussion of the core network is included as well. The LTE air interface is examined in detail from a technology viewpoint as well as a procedural perspective. The course concludes with a study of LTE operations and procedures and a look at the LTE Advanced functionality.

Customize It!

Let us know your reason for studying LTE so we can customize the course to your specific needs. The course is designed to focus on LTE radio aspects, but a brief study of core network elements is included so the audience will see how the radio access interacts with the core network. A longer course, combining both the radio and core network topics is also available.

Learn How To

- Describe the motivation for LTE
- State the performance objectives of LTE
- Understand the LTE physical layer technologies and principles
- Understand the LTE protocols and procedures
- Describe the LTE operations and procedures

Course Outline

- Review of the 3GPP UMTS and HSPA Evolution
  - UMTS architectural components
  - Migration to all-IP packet mode
  - HSDPA, HSUPA, HSPA+
  - Problems with the UMTS approach
  - Competing/complementing alternatives: WiMAX
  - The LTE approach
- What LTE is Designed to Achieve
  - The drivers for LTE
  - Architectural considerations
  - Capability goals and performance aims
  - Complexity considerations
  - Migration considerations
- LTE Access Network
  - Evolved NodeB (eNodeB)
  - eNodeB functionality
    - Radio resource management
    - Radio bearer control
    - Radio admission control
    - Connection mobility control
    - Dynamic resource allocation
  - The radio interface requirements
  - Interfaces: X2, S1
  - Backhaul options
  - Coexistence and interworking with:
    - 3GPP radio access technologies
    - Non-3GPP radio access technologies
- LTE Core Network
  - Why change the UMTS core?
  - EPC entities and functionality
  - Interfaces
  - All IP Platform
- LTE Radio Concepts
  - Frequency spectrum and bandwidth
  - Spread spectrum method and purpose
  - Modulation schemes and error correction
  - Multiple antenna principles
    - MIMO, diversity, spatial multiplexing, beamforming
  - Spectrum efficiency, spectrum flexibility
  - Peak data rates
  - Simulator results: Curves and recommended figures

- Exercises: Excel-based practical tool

- LTE Air Interface: Physical Layer
  - OFDM in the downlink
  - SC-FDMA in the uplink
  - Radio frame structure, subframe, timeslot, symbols
  - Resource blocks
  - Reference signals and other control signals
  - Scheduling considerations
  - Resource allocation in the downlink and uplink
  - Physical, logical, and transport channels
  - Radio channels and their usage
  - Maximum throughput estimations
  - Maximum throughput conditions
  - Exercises: Theoretical estimations

- LTE Air Interface: Signaling and Protocols
  - The protocol stack
  - Medium Access Control (MAC)
  - Radio Link Control (RLC)
  - Packet Data Convergence Protocol (PDCP)
  - Radio Resource Control (RRC)
  - ARQ and HARQ

- LTE Operations and Procedures
  - System acquisition
  - Radio resource and access procedures
  - Idle mode operations
  - Cell search and random access
  - RRC connection establishment
  - Bearer setup and handover
  - Power control
  - MME registration
  - Mobility

- LTE Rollout and Advanced Releases
  - LTE deployment: Where are we now?
  - LTE Advanced: What it is, what it promises

- Wrap-up: Course recap, Q/A, and Evaluations

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