

# LTE/LTE-Advanced Overview

Course Number: LTE4000-01EN | Duration: 2 Days

## Target Audience

- UE & E-UTRAN Development Staff
- Network Engineering & Optimisation Personnel
- System Design Engineering Staff, IOT & System Test Engineers
- Technical Sales and Marketing Personnel

## Prerequisites

- None

## Learning Objectives

After completing this course, the students will be able to:

- Understand LTE key features and able to identify the major steps in the network architecture evolution towards an LTE network.
- Know the LTE network architecture, interfaces and protocols stacks.
- Describe OFDM, OFDMA, SC-FDMA concepts.
- Describe LTE air interface channel types and its characteristics.
- Know UE states and main signaling procedures.
- Explain different LTE voice services.
- Give example of LTE deployment scenario.

## Course Outline

1. Introduction and Background
  - 1.1 Motivation and Major Steps in Network Architecture Evolution towards LTE
  - 1.2 Standardisation Bodies around LTE
  - 1.3 LTE Key Features
  - 1.4 LTE-Advanced Main Features
2. LTE Network Architecture and Protocols
  - 2.1 LTE/SAE Network Subsystem
  - 2.2 LTE/SAE Network Elements and its Functions
  - 2.3 Protocol Stacks and Network Interfaces
  - 2.4 LTE Roaming Architecture
  - 2.5 LTE Interworking Architecture with 2G/3G/Non-3GPP Networks
3. LTE Air Interface
  - 3.1 Multiple Access Concepts
  - 3.2 Basic of OFDM, OFDMA, OFDMA Signal Generation Concepts
  - 3.3 Basic of SC-FDMA, SC-FDMA Signal Generations Concepts
  - 3.4 LTE Subcarriers, Frame Structure , Resource Block and Modulation Options
  - 3.5 LTE Channel Structure
  - 3.6 LTE Channel Characteristics
  - 3.7 Basic of Multiple Antenna Technologies
  - 3.8 LTE Max. Bit Rate Calculation
  - 3.9 LTE UE Capabilities
4. UE States and Signaling Procedures
  - 4.1 UE States (ECM, EMM and ESM)
  - 4.2 Synchronisation and Cell Search
  - 4.3 Random Access
  - 4.4 RRC Connection Establishment
  - 4.5 Attach and Default Bearer Establishment
  - 4.6 Dedicated Bearer Establishment
  - 4.7 Tracking Area Update
  - 4.8 Intra-System Handover
  - 4.9 LTE Authentication Procedures
5. LTE Voice Services
  - 5.1 CSFB
  - 5.2 VoIP, Protocol Stack, ROHC
  - 5.3 VoLGA
  - 5.4 SRVCC
  - 5.5 TTI Bundling
  - 5.6 Semi-Persistent Scheduling
6. LTE Deployments
  - 6.1 Example of LTE Deployment Scenarios
  - 6.2 Radio Frequency Aspects
  - 6.3 FDD vs. TDD Aspects