LTE Fundamental

2 Hr. 18 Min.

LEARNING OBJECTIVE:

Upon completing the course, the participant will be able to:

- Understand the need of 4G
- Understand the LTE Architecture, Roaming Scenarios and Interworking
- Dig deep into the Air Interface and understand the Channel concept
- Examine the Call flows

COURSE OBJECTIVE:

This Course covers the fundamentals of LTE wherein we will discuss about the need of 4G, Key requirements, Architecture and functionality of each network element. We will further look into the LTE Air Interface and Call flows. Finally we will also understand enhanced features and channel concept in detail.

WHO SHOULD ATTEND:

This course is designed to provide a general overview for strategic or technical managers, consultants, communications professionals, network professionals and others who plan to work in LTE wireless network.

TARGET AUDIENCE:

Those in a design, test, systems engineering, sales engineering, network engineering, or verification role.

INSTRUCTIONAL METHODS:

Lectures in Classroom, Virtual Classroom trainings, discussion, Questions & Answers. All participants will also receive comprehensive course materials.

COURSE OUTLINE:

1. LTE Introduction

1.1 Overview and objectives
1.2 User expectations
1.3 Operator Expectations
1.4 Mobile Broadband Evolution
1.5 Technology Comparison
1.6 3G vs 4G Technology Comparison
1.7 Requirements of LTE
1.8 LTE vs UMTS Network Architecture
1.9 LTE Network Architecture
1.10 OFDM

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1.11 Overview of LTE Air Interface
1.12 Key features of LTE
1.13 FDD and TDD
1.14 FDD and TDD Bands
1.15 Terminals, Modules and Fixed Wireless Terminals
1.16 LTE UE categories
1.17 LTE Specification Work – part 1
1.18 LTE Specification Work – part 2
1.19 LTE Standard Specification

2. EPS Architecture

2.1 SAE targets
2.2 Architecture Evolution
2.3 EPS Network Architecture
2.4 Functionality of e-node B and UE
2.5 Functionality of MME
2.6 Functionality of S-GW
2.7 Functionality of P-GW
2.8 Functionality of PCRF
2.9 Functionality of HSS
2.10 Roaming in Basic System Architecture Configuration
2.11 EPS Roaming Architecture
2.12 EPS Inter Working with 2G/3G networks
2.13 3GPP and Non-3GPP inter working
2.14 EPS inter working with Non 3GPP access technology
2.15 EPS Inter working with CDMA networks

3. Mobility Management

3.1 EPS Network Identities
3.2 Tracking Area update Concept
3.3 EPS Mobility management States
3.4 EPS Connection Management States
3.5 RRC States in E-UTRAN
3.6 EPS Bearer Service Architecture
3.7 EPS Bearer Services : Default Bearer
3.8 EPS Bearer Services : Dedicated Bearer
3.9 SAE Bearer QoS Awareness
3.10 SAE Bearer QoS attributes
3.11 QoS Class Identifier (QCI)
3.12 LTE/ SAE Handover
3.13 LTE /SAE handover Principles
3.14 Handover Preparation
3.15 Handover Execution
3.16 Handover Completion
3.17 Inter-system Handovers
3.18 Differences in E-UTRAN and UTRAN mobility
3.19 Policy and charging Control
3.20 Basic policy and Charging Control
3.21 PCC in roaming with PMIP: home Routed
3.22 PCC in Roaming : Local Breakout

4. Air Interface (OFDM)

4.1 Duplexing and multiple Access
4.2 LTE Multiple Access background
4.3 OFDM principle
4.4 OFDM: Nutshell
4.5 OFDM : frequency – time representation
4.6 OFDM and FFT/IFFT
4.7 Motivation for OFDMA in LTE
4.8 Solution to ISI: Cyclic Prefix

4. GSM Network Optimization

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4.9 Cyclic prefix : Normal and extended
4.10 OFDM Transmitter and receiver
4.11 OFDM Key parameters –
4.12 SCFDMA
4.13 OFDMA vs SCFDMA
4.14 SCFDMA Transmitter and receiver Design
4.15 LTE resource grid, Resource block, PRB
4.16 The usage of RE
4.17 LTE Duplexing – FDD/ TDD
4.18 LTE frame Structure
4.19 TDD radio frame Configuration
4.20 Special Subframe configuration
4.21 OFDMA Challenges

5. MIMO

5.1 Aspirations
5.2 Conventional vs New Antenna design
5.3 MIMO system Model
Multiple Antenna arrangement
5.4 MIMI design criterion
5.4 Physical channel processing example

Evaluation and feedback of the participants

Maximum number of participants:	15
Duration:	2 Hr. 18 Min.