

UMTS Training – Universal Mobile Telecommunication System (UMTS)

UMTS Training

UMTS training course provides a technical overview of UMTS, HSPA and HSPA+ technology and its evolution.

Universal Mobile Telecommunications System (UMTS) Training covers 3G system overview, High Speed Packet Access (HSPA) and HSPA+.

Learn about:

- UMTS services
- UMTS Planning, Architecture, Design and Deployment
- UMTS Air Interface
- IP Multimedia Subsystem (IMS)
- UMTS Security
- UMTS Billing and Management
- UMTS QoS
- MBMS, DVB-H, Mobile TV, MBMS and DVB-H .

UMTS is an umbrella term for the third generation radio technologies developed within 3GPP.

The radio access specifications provide for Frequency Division Duplex (FDD) and Time Division Duplex (TDD) variants, and several chip rates are provided for in the TDD option, allowing UTRA technology to operate in a wide range of bands and co-exist with other radio access technologies.

Who Should Attend

This course addresses the needs of engineers and technicians who are already experienced in mobile systems and will move to new tasks. This course provides the technical platform for system developers but also for operation services, network planners and technical management.

Objectives

After successfully completing the course the attendees will:

- Understand the evolution from GSM to UMTS
- Understand the basics of UMTS radio communication



- Examine UMTS Radio Access Network (UTRAN)
- 3GPP release 99, 4, 5, 6, 7 and 8
- Understand the UMTS Core Network
- Examine the services in the UMTS core network environment
- Understand UMTS Protocols
- Understand Services in the UMTS Environment
- Understand Security in the UMTS Environment
- Explain the overall system design and describes the network elements and functions of a complete UMTS network.
- Examine the radio access and core network in further detail explaining the functions and services provided to the end users.
- Explain how different functions are distributed throughout the network by means of communication protocols providing references to the original UMTS standards published by the 3rd Generation Partnership Programs (3GPP and 3GPP2)

Outline

UMTS: The Core Network

- From GSM to UMTS
- UMTS Radio and Core Network (CN)
- CN Architecture in 3GPP Release 99, 4, 5, 6, 7 and 8
- Packet-switched and circuit-switched Core Network
- MSC & VLR
- HLR and HSS
- SGSN / GGSN
- IP Multimedia System (IMS)
- GLR / CAMEL / MExE
- The Virtual Home Environment (VHE) and OSA
- Billing and Charging in UMTS
- Location Services
- QoS
- Security
- Evolution to HSPA/HSPA+ and LTE

Services in UMTS

- QoS Architecture
- Security Architecture
- WAP
- LCS

- CAMLE
- MExE
- USAT

Protocols in UMTS

- Protocol Reference Architecture
- Transport Network Protocols
- Radio Network Protocols
- System Network Protocols

The UTRAN (UMTS Terrestrial Radio Access Network)

- Radio Network Subsystem (RNS)
- Differences to GSM
- The Radio Network Controller (RNC) Functions
- Macrodiversity
- RAKE receiver
- Soft and softer handover
- Cell breathing
- Adaptive Multirate Coding

CDMA and W-CDMA

- What is CDMA and W-CDMA?
- Comparison
- Introducing Spread Spectrum Systems
- Characteristics of Spread Spectrum Systems
- FH-CDMA
- DSCDMA
- Orthogonal and Pseudo-Random Codes
- Scrambling
- The Relationship between Multi-User
- Access and Performance
- Example for DS-SS-CDMA Operation

Spreading and Modulation in UTRAN

- I/Q-Code Multiplexed QPSK
- Complex-Scrambling
- Time- Multiplexed QPSK
- Physical Layer Procedure

- Cell Search Procedure
- Synchronization
- RACH Access Procedure (RACHing in)
- CPCH Access Procedure

Logical and Physical Channels, Transport Channels

- Concepts
- Types of Logical and
- Transport Channels
- Common and Dedicated Traffic Channels
- Transport Blocks and Formats
- Radio Bearers
- The Physical Layer
- Flexible Spreading Rates
- Frame Structures
- Support of Variable Bit Rates and Service Multiplexing

QoS in UMTS

- QoS Architecture
- Conversational Class
- Streaming Class
- Interactive Class
- Background
- Class
- UMTS Bearer Service Attributes

Procedures Examples

- Paging
- RRC Connection Establishment
- RRM Procedures
- MM Procedures
- Signaling Connection Establishment
- Radio Bearer Establishment