

UMTS Technical Description (WCDMA)

Course No. 1405

Duration: 2 Days

Course Overview:

UMTS (W-CDMA) is one of the third generation wireless systems. UMTS is designed to increase a subscriber's data rates and system capacity. This course offers a technical overview of UMTS, focusing on the UMTS air interface (WCDMA), radio network and core network. It covers the network architecture, components and basic operations of UMTS networks. In addition, this course explores the details of the W-CDMA air interface technology and its ability to support multiple subscribers simultaneously. Aspects of CDMA technology pertaining to W-CDMA Air Interface including coding, modulation, spreading, scrambling, handovers and power control mechanism are clearly explained. This course then focuses on circuit-switched and packet-switched core networks. The key concepts in the course are tied together with several system scenarios to provide insight into location management, mobility management and handovers. The course concludes with an overview of the UMTS road map outlined by 3GPP from RLS99 to RLS10.

Who should attend?

- This course intends to provide a technical overview of UMTS (W-CDMA). It is appropriate for personnel in planning, deployment, RF engineering, network performance, and network operations.

Prerequisites:

- Delegates should have a basic understanding of IT and telephony and be familiar with Cellular telecommunications, the basic cellular procedures and SS7 signaling

Course Content:

1. Cellular Networks refresher

- Cellular system basic elements
- HLR, VLR, AUC, EIR functions
- The cell functions and radio interface
- Short Message Service network elements
- The existing access technologies for 2G (TDMA/FDMA/CDMA)
- Overview of the 2G technologies and standards of the existing leading 2G systems

2. UMTS system architecture overview

- Motivation behind UMTS and the expectations from 3G
- Key features, services and supported data rates
- Billing new aspects in 3G networks
- Technologies landscape and migration road map to 3G
 - GSM/GPRS over EDGE to UMTS
 - CDMA to 3G CDMA2000 (1xRTT & 1xEV-DO)

3. UMTS Core Network architecture

- Network architecture
- Packet core key components (SGSN & GGSN, SIGTRAN)
- Circuit core key components (MSC, TRAU, VLR, HLR)

4. UMTS (W-CDMA) Radio Access Network architecture

- Functions of UTRAN
- Key Components (RNC, Node B)
- The transport interface between UTRAN components and the Core
- UMTS (W-CDMA) Air Interface

5. The W-CDMA Technology presentation

- The WCDMA principle
- The Spread Spectrum principle
- Spreading & De-spreading
- What's OVFS codes
- Scrambling the downlink signal
- Uplink & Downlink codes

6. The radio interface

- The Downlink channels functions
- Transport channel, Logical channel, Physical channel
- The Logical channels mapping into the Physical channels
- The physical Channels structure
- System Acquisition process with Pilot & SCH channels
- Random Access in the uplink channel

7. Interfaces and Protocols High-Level Overview

- Protocol structure in UMTS (W-CDMA)
- Control & User Plane Protocols
- Channel structure
- Logical, physical and transport channels
- Physical, MAC and RLC and RRC

8. Handovers in UMTS

- The Soft Handover concept
- Soft Handover overview
- The Rake Receiver & multiple ways handover
- 3G / 2G handover

Continued ...

Mastering UMTS (WCDMA)

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Course Content:

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9. System Scenarios Overview

- Registration & Location update
- Location area & Routing area
- Land to Mobile call setup
- Authentication
- Ciphering
- Packet data session setup

10. HSDPA & HSUPA Overview

- Overview of RLS5 and HSDPA
- Overview of RLS6 and HSUPA
- 3.5G Network operation of HSPA/WCDMA
- What's HSPA+

11. UMTS Future Evolution

- The migration from RLS99 to RLS 4 and Voice over packet
- What's IMS ?
- What's LTE ?

12. Glossary

13. Summary