Course ID	Course Title
UMTS-FDD-DO	**UMTS-FDD Network Design and Optimization**
Course Duration	
2 days	

Related Courses

- UMTS-TDD Network Design and Optimization (UMTS-TDD-DO, 2 days)
- UMTS-TDD: Network Architecture, Operation, and Design (UMTS-TDD, 2 days)
- HSDPA: Network Architecture, Operation, and Design (HSDPA, 2 days)
- 1xRTT: Network Architecture, Operation, and Design (1XRTT, 2 days)
- 1xEVDO: Network Architecture, Operation, and Design   (EVDO, 2 days)
- Traffic Engineering Models for 3G Network Design (TRAFFIC3G, 2 days)
- IP-Based Systems: TCP/IP and Mobile IP (IPSYS, 2 days)
- Multimedia Applications: IMS, SIP, and VoIP (MULTIMEDIA, 2 days)
- GSM: Network Architecture, Operation, and Design (GSM-I, 5 days)

Aimed At

Those with UMTS-FDD background who wish to learn more about UMTS-FDD network design and optimization techniques. The standard presentation of this course assumes a bachelor of science in Electrical Engineering, Mathematics, Physics, or a related subject along with an appropriate background in communications engineering.

Group Size

5-25

Prerequisites

- UMTS-FDD: Network Architecture, Operation, and Design (UMTS-FDD, 2 days)
- Direct Sequence Spread Spectrum: Techniques and CDMA-based Technologies (CDMA, 2 days)

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Course in a Nutshell	As UMTS-FDD proliferates worldwide, there's growing demand for a good, strong course on the design and optimization of UMTS networks. We created this course to respond to that need.

In this course, you will build on your existing knowledge of the UMTS network architecture and operation by learning how to design and optimize a radio network based on the FDD mode of UMTS. We will learn both the user and network equipment protocols. We will cover in detail the connection of the FDD RAN to the 3G core and IP networks. We will also study in depth the dimensioning and optimization of both the radio and core network parameters. All in all, the course will help you design UMTS-FDD networks that provide optimum performance for broadband wireless services while also being cost effective.

Customize It!

Customize this course to your specific needs at little-to-no additional cost. We offer distinct versions of this course tailored for audiences such as:

- Network design and optimization engineers

- Equipment or application designers

- Less technical audiences such as managers, business planners, marketing specialists, and analysts

Learn How To

- Describe the channels and protocols of UMTS-FDD

- Describe the overall architecture of a UMTS-FDD network

- Discuss deployment scenarios and radio resource management issues

- Dimension a UMTS-FDD radio network

- Define and use the parameters involved in the UMTS-FDD optimization process

- Design and optimize a UMTS-FDD network for wireless broadband services

Course Outline

- RF Planning and Optimization
  - o Overview of the Network Deployment Process
  - o Initial Optimization
  - o Ongoing Optimization
  - o Link Budgets
  - o Uplink Link Budgets
  - o Downlink Link Budget for CPICH
  - o Downlink Link Budget for Various Services (Connected Mode)
  - o Uplink and Downlink and Service Comparison
- Network Planning Tools
  - o Network Planning Tool Inputs
  - o Coverage Considerations During Network Planning
- Interference Considerations During Network Planning

- Topology Planning
- Parameter Setting and Optimization During Network Planning
- RF Optimization
  - Quantitative Optimization
  - Qualitative Optimization
  - Idle Mode Optimization
- Capacity Planning and Optimization
  - Basic UMTS Traffic Engineering
  - Capacity Requirements
  - Uplink Capacity Estimation
  - Estimating Downlink Capacity
  - Effect of Video-Telephony and PS Data on Traffic Engineering
  - WCDMA Traffic Engineering and Video-Telephony
  - WCDMA Traffic Engineering and PS Data
  - Multi-Service Traffic Engineering
  - Multi-Service Capacity
  - Uplink and Downlink Capacity Comparison
- Capacity Planning
  - Inputs for Capacity Planning.
  - Capacity Planning for the CS Domain
  - Capacity Planning for the PS Domain
  - Capacity Planning with a Network Planning Tool.
  - Microcell Issues
- Optimizing for Capacity
  - Coverage and Capacity Tradeoffs
  - Capacity Estimation in a Deployed Network
  - Capacity Monitoring for a Deployed Network
- Initial Parameter Settings
  - Physical Layer Parameters
  - Frequency Selection and Management
  - PSC Planning
  - Power Allocation
- Intra-Frequency Cell Reselection Parameters
  - Overview of the Intra-Frequency Cell Reselection Procedure
  - List of Intra-Frequency Cell Reselection Parameters
  - Intra-Frequency Cell Reselection Metrics
  - Intra-Frequency Cell Reselection Trade-offs in Idle Mode
  - Intra-Frequency Cell Reselection Parameter Recommendations for Idle Mode
  - Intra-Frequency Cell Reselection in CELL_FACH State
  - Inter-Frequency Cell Reselection Considerations
  - Access Parameter Recommendations
- Intra-Frequency Handover Parameters
  - Intra-Frequency Handover Procedure

- o Intra-Frequency Handover Parameters
- o Intra-Frequency Handover Metrics
- o Intra-Frequency Handover Trade-offs
- o Intra-Frequency Handover Parameter Recommendations
- o Inter-Frequency Handover Considerations

- Service Optimization

  - o KPI and Layered Optimization Approach
  - o Principal KPI Definitions
  - o Voice Service Optimization
  - o Adaptive Multi-Rate (AMR) Codec
  - o AMR Service
  - o Call Setup, Events, and Signaling
  - o Call Retention Event and Signaling
  - o Connection Supervision and Link Quality Indicators
  - o Troubleshooting AMR Failures
  - o Parameter Optimization
  - o Call Quality Metrics and Test Process

- Video Telephony Service Optimization

  - o Video Telephony and Voice Comparison
  - o Video Telephony Test Process and Metrics
  - o VT versus AMR Optimization

- PS Data Service Optimization

  - o PS Data versus AMR Optimization
  - o Typical PS Data Applications and QoS Profiles
  - o Channel Reconfiguration and Resource Planning
  - o Quality Metrics and Test Process
  - o PS Data Parameters

- Inter-System Planning and Optimization

  - o Inter-System Boundary Planning
  - o Inter-System Borders
  - o Typical Inter-System Scenarios
  - o Boundary Determination
  - o Inter-System Transition in Connected Mode
  - o Inter-System Change Procedures
  - o Message Flows and Delays
  - o Compressed Mode Issues
  - o Compressed Mode Performance Metrics
  - o Inter-System Transition in Idle Mode
  - o Inter-System Cell Reselection Parameters

- Optimizing Inter-System Parameters

- Additional Inter-System Planning and Optimization Issues

  - o Inter-System Handover When More WCDMA Carriers Are Present

- Inter-System Triggered for Capacity Reasons

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

How You Will Learn

- A seasoned instructor will present this course in interactive lecture format
- Along with lecture, we use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful and ingenious examples and analogies to simplify the complex subject matter.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.
- You will learn the key concepts and techniques of UMTS-FDD network design and optimization from both the theoretical and practical perspectives.

Revised   *Feb. 12, 2007*