UMTS Air Interface

Duration: 2 days or 12 hours **Level**: Level 4

UMTS Air Interface

Course Outline

Divided into 8 sections, the topics covered will include:

Section 1: Air Interface Structure and Channels (1.5 hours)

- UMTS Air Interface Architecture - NAS, AS.
- Logical Channels - Control and Traffic - BCCH, PCCH, CCCH, DCCH, CTCH, DTCH.
- Transport - Common and Dedicated - RACH, BCH, PCH, FACH, DCH, HS-DSCH, E-DCH.
- Physical Channels.
- HSDPA and HSUPA Enhancements.
- Channel Mapping.

Section 2: Physical Interface (1.5 hours)

- Spread Spectrum - Channel Requirements, Channel Rates, Spreading, DSSS, Despreading.
- UMTS Codes - PSCH, SSCH.
- Scrambling Codes - Scrambling Code Groups, STSR, Channel Information.
- Spreading Codes - Code Allocation.
- Basic DSS System.
- Rake Receiver.
- Uplink and Downlink Code Processing.
- Timing - Frame, Node B, Cell, UE.

Section 3: Physical Channels (1.5 hours)

- Uplink and Downlink Physical Channels.
- CPICH Measurements.
- Downlink Format - P-SCH, S-SCH, CPICH, P-CCPCH, S-CCPCH, PICH, AICH, DPCH, DPCCH, HS-SCCH, HS-PDSCH, E-HICH, E-RGCH, E-AGCH and F-DPCH.
- Uplink Format - PRACH, DPCCH, E-DPCCH, E-DPDCH, HS-DPCCH.
- Transmission Gap Position.
- Compressed Mode.

Section 4: Radio Resource Control (1.5 hours)

- RRC Functions.
- RRC Architecture - GC, Nt, DC.

- RRC Procedures - General, Connection Management, Bearer Control, Mobility.
- Idle Mode Procedures - System Information, Paging.
- Connected Mode - Identities.
- RRC Connection.
- Radio Bearer Procedures.
- Analysis of real network traces using Mpirical's drive test tool.

Section 5: UMTS Operational Procedures (2.5 hours)

PLMN Selection.

- Cell Selection Procedures.
- System Information.
- UMTS Mobility, Cell Reselection.
- Measurement Reporting.
- Handover Procedures - Soft, Softer, Hard, Inter-frequency Handover Triggers, Planning Handovers.
- Common Channel Procedures.
- HSDPA and HSUPA Operation - Release 5 and Release 6.
- HARQ Configuration.
- MAC-ehs and MAC-e/es.
- Analysis of real network traces using Mpirical's drive test tool.

Section 6: Power Control (1 hour)

- Closed Loop Power Control - Uplink, Uplink Single Channels, Uplink Multiple Channels.
- Transmit Diversity.
- Space Time Diversity.
- Smart Antennas - Advantages and Disadvantages.

Section 7: Idle Mode Interworking (1 hour)

- 2G / 3G Coverage Areas.
- Idle Mode and Idle Mode Reselection.
- UMTS to GSM Cell Reselection.
- GSM and GPRS to UMTS Cell Reselection.
- Mobility Procedures and Interworking Issues.
- Analysis of real network traces using Mpirical's drive test tool.

Section 8: Connected Mode Interworking (1.5 hours)

- 3G / 2G State Model.
- Mobility in Different UE States.
- Modes for RRC Connection.
- Circuit Switched Connected Mode Interworking Procedures.
- Packet Switched Connected Mode Interworking Procedures.
- Analysis of real network traces using Mpirical's drive test tool.

Who Should Attend

Technical Staff requiring detailed knowledge of UMTS Air Interface operation. Engineers and Designers requiring a comprehensive understanding of the UMTS Air Interface.

Pre-learning

Pre-learning is provided to prime those attending the instructor led phase. Each lesson is based on an interactive online format and should take about 30 minutes to complete. The pre-learning lessons are:

- Test of Understanding - Try the online check to see how much you know.
- UMTS Architecture.
- W-CDMA Principals.
- UMTS UE and Air Interface.

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