

UMTS/HSPA+ Air Interface

Course Number: UMTS3200-01EN | Duration: 4 Days

Target Audience

- UE & UTRAN Development Staff
- Network Engineering & Optimisation Personnel
- System Design Engineering Staff, IOT & System Test Engineers

Prerequisites

- UMTS & HSPA+ Overview (UMTS3000-01EN)

Learning Objectives

After completing this course, the students will be able to:

- Understand the differences between DCH and HS-DSCH/E-DCH Operation in Rel. 99 – Rel.9.
- Verify DC-HSDPA related procedures, MIMO operation as well DC-HSUPA operation.
- Plan and configure radio network parameters for UE and NodeB/RNC.
- Analyse UE-logs as well Iub- & Iu-network traces and determine faults.
- Know the differences between Ec/No and SIR as well RSCP and RSSI.

Course Outline

1. Spreading & Scrambling
 - 1.1 Design of OVSF and Code Tree
 - 1.2 Purpose of Scrambling Codes (DL/UL)
 - 1.3 Rake Receiver Architecture Types
 - 1.4 DL & UL Spreading Code Allocation
2. Channel Concept in UMTS/HSxPA
 - 2.1 LCH, TrCH and PHY Channels
 - 2.2 Channels per RRC State
 - 2.3 Rel. 99 TFS, TFC & CTFC
 - 2.4 HSPA+ Channel & eF-DPCH Operation (H-RNTI, Primary/Secondary E-RNTI)
 - 2.5 Multi-RAB with CS+PS Bearers
3. HARQ Operation in DL & UL
 - 3.1 HSxPA UE Category's (Rel.5 – Rel.9)
 - 3.2 Stop & Wait Machines
 - 3.3 CQI & Scheduling Info Reporting
 - 3.4 Retransmission Combining & LA
 - 3.5 Transfer of Higher Layer PDU's
4. RRC Idle Mode Procedures
 - 4.1 Cell Search Procedure
 - 4.2 System Info Decoding
 - 4.3 Paging Type 1 vs. Paging Type 2
 - 4.4 UMTS Cell Selection & Reselection
5. RRC Connected Mode Procedures
 - 5.1 RRC Establishment & DMCR
 - 5.2 SRB Setup & Reconfiguration
 - 5.3 RAB Setup & Reconfiguration
 - 5.3 RRC/RB Reestablishment & Release
6. HS/DCH Mobility Procedures
 - 6.1 Measurement Control & Events
 - 6.2 SHO Parameterisation
 - 6.3 HSxPA(+) Serving Cell Change
 - 6.4 Various Compressed Mode Settings
 - 6.5 Hard Handover & Inter-Frequency HO
 - 6.6 Inter-RAT HO (3G ⇔ 2G/4G)
 - 6.7 SRNS Relocation [UE (not)involved]
7. RRC & User Plane Operation in FACH & PCH
 - 7.1 Channel Type Switching & Cell Update
 - 7.2 User Data Reception & Transmission
 - 7.3 Call Setup in CELL_FACH or XXX_PCH
 - 7.4 Paging in CELL_FACH or XXX_PCH
8. HSDPA+ Procedure Details
 - 8.1 HS-SCCH Type 1, 2 & 3 Operation (64QAM, HS-SCCHless, MIMO)
 - 8.2 Dual Carrier HSDPA Operation (DC)
 - 8.3 HS-DPCCH Operation for DC / MIMO
9. E-DCH+ Procedure Details
 - 9.1 E-AGCH, E-HICH & E-RGCH Operation
 - 9.2 Dual Carrier E-DCH Operation
 - 9.3 Serving Grant Update
10. HSxPA Procedure Details & Functionalities
 - 10.1 HSPA Reconfigurations in DCH/FACH
 - 10.2 DTX/DRX Operation in DCH/FACH/PCH
 - 10.3 Flexible RLC-PDU with MAC-i/is MAC-ehs
 - 10.4 Summary of CPC Features