HSPA – High Speed Packet Access
Course No.1423
Duration: 2 Days

Course Overview:
This course presents a detailed technical discussion of the existing 3GPP R5 and R6 HSDPA / HSUPA specifications and the R7 enhancements that have been introduced to increase throughput, reduce latency, conserve power and reduce signalling overhead (commonly referred to as HSPA+ features). The course starts on WCDMA refresher making sure the main concepts & techniques are clear, and then continue covering the Node B WCDMA processes for scheduling, fast link adaptation and Hybrid-ARQ (HARQ), the physical layer, the new types of modulation and transport formats. A traffic case in which a user is allocated with HSDPA resources is presented. Calculations of HSDPA data rates are also described. Special attention will be provided to the Protocol Stack and data session call flow scenarios showing the message flow, the protocols and SW entities involved. Course description with information on the course – marketing oriented.

Who should attend?
Those who require an in-depth understanding of FDD HSPA

Prerequisites:
In-depth knowledge of WCDMA and/or completing the UMTS 2 days course

Course Content:

1. Introduction to HSPA Technology
   - Basic changes as compared with WCDMA
   - WCDMA limitations

2. HSDPA R5 – Overview
   - How HSDPA address the WCDMA limitations
   - QPSK & 16QAM modulations
   - Shared data channel vs Dedicated
   - HSDPA Scheduling Methods – Time & Code
   - Scheduling and Latency enhancements
   - The HSDPA Operation and scenario

3. HSDPA – RF Interface
   - HSDPA new radio channels
   - HS-PDSCH – High Speed Downlink Physical Shared Channel – functions and format
   - HS-PDCH: High Speed Dedicated Physical Control Channel – functions and format
   - CQI reporting process
   - UE Categories & capabilities
   - HS-SCCH: High Speed Shared Control Channel – functions and format
   - New physical channels – HS-PDSCH, HS-DPCCH, HS-SCCH

4. HSDPA – traffic case
   - Main steps involved during HSDPA resource allocation
   - Calculation of maximum channel data rates
   - The channel coding, modulation and rate adaptation
   - UE categories and capabilities

5. Errors Handling
   - Hybrid Automatic Repeat Request (HARQ) process
   - Retransmission
   - Multiple HARQ processes

6. HSUPA R6 – overview
   - Uplink limitations in HSDPA RLS 5 & 99
   - The improvements in HSUPA RLS 6
   - How are HSUPA Enhancements Achieved
   - HSUPA Operation

7. HSUPA – RF Interface
   - Enhanced Dedicated Channel (E-DCH) – functions and format
   - Enhanced Dedicated Physical Control Channel (E-DPCCH) – Functions and format
   - Enhanced Absolute Grant Channel (E-AGCH) – functions and format
   - Enhanced Relative Grant Channel (E-RGCH) – functions and format
   - Enhanced Hybrid ARQ Indicator Channel (E-HICH) functions and format
   - The HSUPA channels timing

8. HSUPA – Traffic case
   - Main steps involved during HSUPA resource allocation
   - Calculation of maximum channel data rates
   - The channel coding, modulation and rate adaptation
   - The Noise resource limitation and adaptation
   - RF load control

9. HSPA+ (R7 Enhancements)
   - HSDPA 64-QAM
   - MIMO
   - Continuous Packet Connectivity
   - D-TxAA
   - H-ARQ Processing and MIMO
   - HS-SCCH for MIMO
   - HSUPA 16-QAM
   - DTX / DRX Enhancements

10. HSPA Protocol Stack from R5 to R7
    - R99 Protocol Stack architecture
    - R5 Protocol Stack
    - R6 Protocol Stack
    - R7 protocol stack enhancements

11. The evolution to R8 & beyond

12. Summary