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HSUPA, HSPA EVOLVED AND LTE

Course Description

The course HSUPA, HSPA Evolved and LTE is 2-3 days long, focusing on the technical understanding of the HSPA technology, its evolution and LTE.

Who should attend?

The course targets cell planners and others in the wireless industry working with planning or operating UMTS/HSPA networks and need to understand more about HSUPA and how to plan for the future of the network with HSPA Evolved and LTE.

Course content

HSPA

WCDMA evolution: HSPA and MBMS

- Overall architecture
- Physical layer
- Resource handling and packet-data session

High-Speed Downlink Packet Access

- Overview
- Shared-channel transmission
- Channel-dependent scheduling
- Rate control and higher-order modulation
- Hybrid ARQ with soft combining.
- Architecture
- Details of HSDPA
- HS-DSCH: inclusion of features inWCDMA Release 5.
- MAC-hs and physical-layer processing
- Scheduling
- Rate control
- Hybrid ARQ with soft combining.
- Data flow
- Resource control for HS-DSCH
- Mobility
- UE categories
- Finer details of HSDPA
- Hybrid ARQ revisited: physical-layer processing
- CQI and other means to assess the downlink quality
- Downlink control signaling: HS-SCCH
- Downlink control signaling: F-DPCH
- Uplink control signaling: HS-DPCCH

Enhanced Uplink

- Overview
- Scheduling
- Hybrid ARQ with soft combining
- Architecture
- Details of Enhanced Uplink
- MAC-e and physical layer processing
- Scheduling
- E-TFC selection
- Hybrid ARQ with soft combining
- Physical channel allocation
- Power control
- Resource control for E-DCH
- Mobility
- UE categories

MBMS: Multimedia Broadcast Multicast Services

- Overview
- Macro-diversity
- Application-level coding
- Details of MBMS

HSPA Evolution

- MIMO
- HSDPA-MIMO data transmission
- Rate control for HSDPA-MIMO
- Hybrid ARQ with soft combining for HSDPA-MIMO
- Control signaling for HSDPA-MIMO
- UE capabilities
- Higher-order modulation
- Continuous packet connectivity
- DTX – reducing uplink overhead
- DRX – reducing UE power consumption.
- HS-SCCH-less operation: downlink overhead reduction
- Control signaling
- Enhanced CELL_FACH operation
- Layer 2 protocol enhancements
- Advanced receivers
- Receiver diversity (type 1)
- Chip-level equalizers and similar receivers (type 2)
- Combination with antenna diversity (type 3)
- Interference cancellation

LTE and SAE

- LTE and SAE: introduction and design targets
- LTE design targets
- Capabilities
- System performance
- Deployment-related aspects
- Architecture and migration
- Radio resource management
- Complexity
- General aspects
- SAE design targets
- LTE radio access: an overview 289

- Transmission schemes: downlink OFDM and uplink

SC-FDMA
- Channel-dependent scheduling and rate adaptation
- Downlink scheduling
- Uplink scheduling
- Inter-cell interference coordination
- Hybrid ARQ with soft combining
- Multiple antenna support
- Multicast and broadcast support
- Spectrum flexibility
- Flexibility in duplex arrangement
- Flexibility in frequency-band-of-operation
- Bandwidth flexibility
- LTE radio interface architecture 299
- RLC: radio link control
- MAC: medium access control
- Logical channels and transport channels
- Downlink scheduling
- Uplink scheduling
- Hybrid ARQ
- PHY: physical layer
- LTE states
- Data flow
- LTE physical layer 317
- Overall time-domain structure
- Downlink transmission scheme

System Architecture Evolution
- Functional split between radio access network and core network
- Functional split between WCDMA/HSPA radio access network and core network
- Functional split between LTE RAN and core network
- HSPA/WCDMA and LTE radio access network
- WCDMA/HSPA radio access network
- LTE radio access network
- Core network architecture
- GSM core network used for WCDMA/HSPA.
- The 'SAE' core network: the Evolved Packet Core
- WCDMA/HSPA connected to Evolved Packet Core.

Pre-requisites

The participants should have a good understanding and working experience from UMTS/HSPA Systems.

Course Length

2-3 days