



Vendor: 	System: 
Level: Advanced	Duration: 2 days
Course Title: LTE-Advanced (R10-R11)	

Description:

Unquestionably LTE™ R8/R9 has proved to be a great success. It is now the time for careful examination of all the technological improvements available in R10/R11 along with their various implementation scenarios.

"LTE-Advanced (R10-R11)" course presents operating principles of key LTE-Advanced features. This essential new LTE-Advanced concepts combined with students' technical experience should allow them to form their own opinions about usefulness and applicability of specific features in the existing environment of their network and local mobile market.

Target audience:

The course is intended for experienced network engineers and E-UTRAN developers who are planning or have already worked on introducing LTE-Advanced features.

Contents:

Introduction

4G/IMT-Advanced and 3GPP LTE-Advanced requirements, cell spectral efficiency, peak spectral efficiency, cell edge user spectral efficiency, mobility, scalable bandwidth, C/U-plane latency, handover interruption time, VoIP capacity, frequency bands,

Carrier Aggregation (CA) R10-R11

Intra-band contiguous/non-contiguous and inter-band CA, CA operating bands and bandwidth classes, UE categories, Primary & Secondary Cell / Component Carrier, implementation scenarios, L1/L2 protocol impact, SCell addition / modification / release, SCell activation / deactivation, multiple Timing Advance, enhanced Power Headroom reporting, regular and cross-carrier scheduling, CSI

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and HARQ-ACK reporting, PUCCH format 1b CS and format 3, (a)periodic SRS reporting, UL multi-cluster transmission, simultaneous PUCCH and PUSCH, handover scenarios, Event A6,

MIMO enhancements R10-R11

DL R8/R9 MIMO introduction – critical survey of existing TMs and transmission schemes, beamforming as the main MIMO solution in LTE-Advanced, new resource efficient Reference Signals – CSI-RS and URS for TM9/TM10, UL MIMO - flexible DM RS sequence allocation (OCC) for MU-MIMO, UL TM2,

Coordinated Multi-Point transmission (CoMP) R11

Distributed and centralized RAN, backhaul and fronthaul, DL CoMP - Joint Transmission (JT), Dynamic Point Selection (DPS) / Dynamic Cell Selection (DCS), Coordinated Scheduling/Beamforming (CS/CB), UL CoMP - Joint Reception (JR), Coordinated Scheduling and Beamforming (CS/CB), TM 10, CSI reporting,

eNB Relay (RN) R10-R11

E-UTRAN architecture supporting RNs, inband (type 1) / outband (type 1b), U/C-plane protocol stack for supporting S1/X2 over Un interface, RN start-up procedure – Phase I: Attach for RN preconfiguration and Phase II: Attach for RN operation, RRC RN Reconfiguration procedure, Uu/Un interface time multiplexing FDD & TDD, R-PDCCH channel, RN versus repeater,

Heterogeneous Network (HetNet) R10-R11

Various HetNet implementation scenarios utilizing CA, RN, MIMO and CoMP, HetNet micro cell range extension, interference problems, network synchronization, Enhanced Inter-Cell Interference Control (eICIC), Almost Blank Subframes (ABS),

Machine-to-Machine (M2M) R11

UE category 0, embedded SIM (eUICC), MFF1/MFF2 M2M SIM, M2M related USIM parameters – EFnasconfig, Extended Access Barring (EAB) and other access control procedures, overriding low access priority and EAB, overload protection: charging, periodic TAU optimisation, usage of low priority indicators, EMM and ESM back-off timers, PLMN (re)selection optimization, invalid USIM state reset, UE Power Saving Mode (PSM), RRC UE assistance for RRM and UE power optimisation,

Minimization of Drive Test (MDT) R11

MDT in connected/idle mode – Immediate/Logged MDT, MDT measurements MDT: RSRP/RSRQ, PH, UL interference, data volume, IP throughput and

measurement collection triggers, geographical positioning methods: GNSS, E-CID, E-CGI, MDT control – area based and signaling based MDT, trace collection,

SON enhancement overview R9-R11

RLF and other failures, RLF report, connection re-establishment, RACH optimisation, Mobility Robustness Optimisation (MRO), Mobility Load Balancing (MLB), Automatic Neighbour Relation (ANR), energy saving,

SR-VCC enhancements R10-R11

Reversed SR-VCC (rSR-VCC), voice and video SR-VCC (vSR-VCC), enhanced SR-VCC (eSR-VCC),

EPDCCH R11

Need for control channel capacity increase, EPDCCH transmission resources, EPDCCH sets, distributed and localized transmission, EPDCCH in MIMO, HetNet and CoMP environment.

Prerequisites:

Knowledge of E-UTRAN/LTE is required. Completion of *E-UTRAN/LTE Signalling* course (or equivalent) is highly recommended.

Training method:

Lectures and multimedia presentations.