

LTE ADVANCED

Introduction :

This 2-day course has the following objectives :

- To review the techniques used in IMT-LTE Rel 8 (LTE)
- To introduce the concept of SON (Self Optimizing Networks) over the different Releases

Target audience :

The course is addressed especially to the implementators & operators of LTE in Belgium by Belgacom.

It is addressed to :

- Mobile Telecom strategues
- Mobile Network managers & engeneers
- System Managers & Engeneers/System Integrators
- Technical Support Team
- Network technicians in GSM/UMTS/LTE networks
- Mobile Telecom managers in the GSM 2G/UMTS 3G/LTE world

Prerequisites :

- You have to master the basic concepts and techniques of datacommunication (modulation, multiplexing,...)
- You have to have a solid basic knowledge of the current 2G and 3G Mobile Networks

Content : LTE advanced

1. Introduction

- Drivers LTE (Long Term Evolution)
- Standardisation (3GPP – releases – up to 12 – timescale)

2. LTE architecture (Rel 8)

- SAE and LTE
- Functions of the physical, datalink and higher layers (general,overview)
- Physical layer
 - Frequencies, modulation, multiplexing (OFDM)
 - PRB (Physical resource blocks)
 - Use
 - Antenna techniques :
 - MIMO (Multiple Input Multiple output) – types
 - Beamforming, STC
 - AMC (Adaptive Modulation and Coding), FEC, TPC
 - Coverage - signalisation
- Datalink layer
 - Frame & slot structure
 - Functions
 - Link adaptation
 - Scheduling
 - HARQ
 - Security
 - Channels (RACH, BCH,...)
- PCI (Physical Cell Identity)
 - Technical background
 - Synchro signals (PSS/SSS)
 - Cell Search
 - PCI planning/clusters

3. LTE Protocol stack

- Examples
- Protocol stack for data
- Protocol stack for Voice (VoLTE)
- Protocolstack for video

4. Handovers

- types (Intra, inter) LTE
- Parameters, signalisation
- IRAT (Inter Radio access Technology) (definition, why, how)

- LTE and 3G (UTRAN)
- LTE and GERAN
- CS Fall Back
- Handover Optimization

5. Self Organising Networks - SON

- Introduction (vision, organisation, evolution, mapping on releases)
- Challenges (cell changes, interferences)
- Self configuration
 - Dynamic Radio Configuration
 - Architecture
- Self optimization
 - Mobility & load balancing
 - UL/DL load balancing
 - Energy saving
 - Energy Saving Management
 - Scenarios/expected gains
 - Coverage & Capacity Optimization(CCO)
 - CCO with adaptive antennas
 - CCO with Tx Power
 - RACH optimization
 - Measurements
 - Reporting
 - Inter eNB coordination
- Self healing
 - Cell degradation
 - Management/Detection/Prediction
- SON for Voice Core Networks
 - VoIP/VoLTE
- Interference Management (RRM and SON)
 - ICIC (Inter Cell Interference coordination) – eICIC
 - Challenges (cell changes, interferences)
- Mobility & load balancing optimization
- SON operation

6. Conclusion

Further developements