

LTE Capacity Planning and Tuning – 3 days

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LTE is around for long time now and one major problem operators faced currently is the network capacity. With the advent of flat rates and mobile apps, users' demanded traffic has increased tremendously over the past few years, including more and more use of VoLTE. Networks have to deal with this huge traffic demand without compromising QoS requirements. This course is designed to qualify radio network engineers to effectively perform the dimensioning and tuning of LTE network capacity. It covers aspects of design, dimensioning, monitoring and fine-tuning the network.

Throughout this course, various use-case examples are analysed, as well as hands-on exercises, in order to improve knowledge retention.

WHO SHOULD ATTEND

This advanced technical course is better suited for telecom professionals working on LTE radio network performance, planning and optimization. System integrators and solution managers can also benefit of getting in touch of common problems found in real networks and ways to minimize/solve them.

PREREQUISITES

Solid background of LTE/EPS concepts, architecture, terminology and E-UTRAN implementation is required prior to this course. Although it's a deep technical course, participants are also provided with relevant theory \aspects required to better appreciate the course. It's recommend, but not essential, to have attended before other courses such as: Planning the LTE Radio, Optimizing the LTE Radio and LTE Radio Network Performance and Optimization.

LTE Capacity Blockage Areas

- Overview of network main capacity bottlenecks
- E-UTRAN Architecture and Protocols
- EPS Bearers and QoS Management
- QCI Concept
- LTE Key RRM features
- Interference scenarios and control techniques
- Resource Elements (RE) and Resource Blocks (RB)
- Bandwidth scalability and options
- LTE Mobility and Hierarchical Cell Structure (HCS)
- LTE Multi-RAN Interoperability
- Cell selection/re-selection
- Cell absolute priorities
- Intra/Inter frequency handover (via X2 and S1)
- IRAT handover
- Measurement reports (events)
- DL/UL Adaptive Modulation and Coding (AMC)
- UL Power Control
- LTE MIMO techniques and mode switching
- SON and ICIC

LTE Capacity Dimensioning

- Capacity planning process
- Input requirements for capacity planning
- LTE Traffic profiling and user distribution

- LTE Services
- Peak and cell throughput calculations
- MCS, SINR and Throughput relation
- Spectral efficiency analysis
- Link and System level simulations analysis
- Monte Carlo simulations overview
- Control channels overhead
- LTE Radio link budget overview and examples
- X2 and S1 capacity dimensioning overview
- Dimensioning for VoLTE
- Erlang B model in LTE
- Case-studies and exercises

LTE Capacity Monitoring

- LTE Capacity KPIs and counters overview
- Throughput definitions (peak, user, single-user, cell)
- Resource usage monitoring (PRB usage, TTI usage)
- LTE load concept
- Active users monitoring
- Low throughput identification (user and/or cell)
- Interference and UL SINR analysis
- CQI, MCS monitoring
- UE Power headroom
- Network latency monitoring
- UE State monitoring
- Use-cases and examples

LTE Capacity Tuning

- ANR: configuration and mobility control
- LTE PS IRAT Handover tuning
- UL Fractional Power Control fine tuning
- Downlink control channel dimensioning
- UL control channel dimensioning
- Cell bandwidth and capacity impact
- Use-cases and examples

LTE Evolution and Capacity Improvements

- SON features and network capacity
- ICIC and eICIC features
- Carrier Aggregation
- Advanced MIMO Techniques
- LTE-Advance Improvements (Interference cancelation receiver, CoMPT, Relay Nodes)
- HetNet Concept
- Homogenous vs HetNet network capacity
- Future challenges (Femtocells, Home eNBs, IoT)