

Telecoms & Tech Academy

COURSE DESCRIPTION **LTE RADIO PLANNING AND OPTIMISATION**

Format:
Classroom

Duration:
5 Day



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COURSE SUMMARY

HIGHLIGHTS

- **Squarely focused on the effective planning and optimisation of LTE networks**
- **Hand-on certification programme with end of course practical test**
- **Case studies using industry leading software tools: Mentum Planet and Symena Capesso**
- **Capacity planning - with capacity modelling techniques demonstrated**
- **Coverage optimisation using industry-leading software tools**
- **LTE link budgets with worked examples**
- **FDD/TDD eNB configuration options**
- **IDLE mode and CONNECTED mode parameter optimisation**

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“The course was very insightful and the lessons learnt from the course will be very relevant to the telecoms industry.”

BL ETISALAT

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COURSE SUMMARY

Mobile broadband is growing – fast! Are you confident enough to strategise, plan and facilitate advanced technology projects based on your current knowledge of LTE? If not, this course is for you!

The LTE Radio Planning and Optimisation programme begins with explaining the time and frequency domain of structures and goes on to cover those aspects of the LTE radio interface that will have an impact on coverage and capacity. Typical models are discussed and compared, and full link budget and radius predictions are carried out.

To support the link budget and modelling techniques, as well as apply the learning in an industry-leading software package, Mentum Planet is used to demonstrate and analyse the LTE radio planning process. We also model and analyse typical LTE deployments, discussing the major variables and discuss LTE implementation options in detail, while also looking at various KPIs that can be used to calculate network performance.

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- Plan an effective LTE network, understanding the impact of the major capacity and coverage issues and the different technology choices.
- Gain a solid foundation on which to plan and facilitate advanced technology projects - with higher competency levels bringing operational efficiencies, cost savings, and time-to-market advantage.
- Use capacity modelling techniques to determine the overall system capacity and plan for future network expansion..
- Enhance your understanding of LTE physical layer theory.
- Fully understand and calculate LTE link capacity under different radio channel conditions.
- Build and calculate detailed LTE link budgets for both Rural and Urban areas .
- Compare and select typical propagation models used to predict cell range for LTE radio links.
- Use a capacity models to determine the likely requirements of a single LTE subscriber.
- Discuss eNB configuration parameters and understand the impact on planning and optimisation process.
- Use dedicated coverage optimisation software to explore the impact of specific parameter selections on the planning process.
- Build the confidence to make decisions on technology implementation and procurement that are commercially viable, minimise risk, and in line with the strategy and goals of the wider organization.
- Understand how to apply KPIs to make determine the performance of their network.

COURSE CONTENTS

LTE ARCHITECTURE REVIEW

- LTE Development
- The E-UTRAN
 - eNB
 - LTE Uu and X2
- Evolved Packet Core (EPC)
- Serving Gateway (SGW)
 - Mobility Management Entity (MME)
 - Packet Data Network Gateway (PGW)
 - UMTS – LTE Inter-working
- Spectrum Requirements of LTE

LTE RADIO INTERFACE

- Overview of LTE air interface
- Role of Cyclic Prefix (CP) – (long and short CP)
- Logical, Transport and Physical channels
- Reference signals and channel estimation
- Synchronisation signals
- LTE synchronization schemes (time and frequency synchronization)
- Modulation and coding schemes
- Random access preamble
- LTE spectrum options
- LTE system data rates
- Adaptive modulation and coding
- Power control

LINK BUDGETS FOR LTE

- Defining link budget reference points
 - EIRP, IRL
- Setting coverage objectives
- LTE link budget
 - Parameter definitions
 - CINR, Rx Threshold, Noise
 - Worked examples
- Environmental margins
 - Fading, building, noise rise
- Determining cell radius from pathloss
- Propagation models
 - Common empirical and physical models

- Model comparisons
- Worked examples
- UE Radio Measurements
- Limitations of RSRP and RSRQ for Optimisation
- Formulation of RSRP and RSRQ Performance Targets
- LTE Measurement Tools

COVERAGE PLANNING

In this section the course will use Mentum Planet to demonstrate coverage planning, this will involve hands-on exercises to demonstrate the planning process and analysis of the prediction output.

- Setting up the planning project
- Single frequency network
- Interference coordination
- Multiple channel system
- MIMO
- Interference analysis
- Capacity and coverage analysis

ENB CONFIGURATION

- A Context for LTE Optimisation
- Physical Cell Identifier (PCI)
- Frequency Allocation
- Bandwidth Configuration, LTE Frequency Bands
- Centre Frequencies and EARFCNs
- SFN or Frequency Plan
- Interference Mitigation
- Cyclic Prefix Length
- Downlink/Uplink Switching in TDD Mode
- MIMO Options
- Control Channel Configuration
- SON Concepts

IDLE MODE PARAMETERS

- PLMN selection
- Cell selection
- Cell reselection
- RACH procedure

CONNECTED MODE PARAMETERS

- Intra-LTE handovers
- IRAT handovers
- Neighbour cell concepts in LTE
- Power control
- Timing advance

CAPACITY PLANNING FOR LTE

- LTE radio interface capacity
- Factors affecting capacity
- Setting capacity objectives
- The EPS Bearer Concept
- LTE Defined QoS Values
- Defining a subscriber profile
- Network design based on capacity

COVERAGE OPTIMISATION

In this section the course will discuss coverage optimisation and offer a hands on exercises using Capesso from Symena.

- Identifying optimisation targets
- Managing optimisation processes
- Running optimisations
- Analysing optimisation results

KPIS USED TO MEASURE NETWORK PERFORMANCE

- Network State Metrics
- Interoperability
- Packet Statistics
- Network state metrics and KPIs
- Real-Time actionable Metrics for LTE-A
- Smart Metrics
- Quality over Quantity

About Telecoms & Tech Academy

Telecoms & Tech Academy, part of Informa Tech is a leading training partner to the telecoms, media and technology (TMT) industries, having trained more than 30,000 professionals and 500 businesses globally.

We were borne out of the telecoms industry and understand the challenges the sector has been facing. Our training portfolio continues to evolve to help address new and emerging skills gaps faced by telecoms & tech businesses.

Our In-Company Solutions

Expert insight, delivered in a format to suit your needs, to enhance knowledge and drive performance in your team. Our learning & development consultants will work closely with your team to establish your unique business needs and define success measurements.