



LotusCom Certified LTE Radio Planning and Optimization Professional

This certification program covers the principles and execution of LTE radio planning and optimization. The course begins with a discussion of the LTE physical layer explaining the time and frequency domain structures and covering those aspects of the LTE radio interface that will have an impact on coverage and capacity. A detailed examination of LTE link budgets is provided, identifying and calculating the typical link budget reference points and discussing elements of the budgeting process that are unique to LTE. Following the calculation of link budget pathloss, the course turns to propagation models and cell radius prediction. 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 will be used to demonstrate and analysis the LTE radio planning process. We also model and analysis typical LTE deployments, discussing the major variables and discuss LTE implementation options in detail. Optimization of the LTE radio plan is then explained and demonstrated, covering eNB configuration, as well as IDLE mode and CONNECTED mode parameters. The range and impact of the optimization parameters are discussed followed by an opportunity to experiment and explore “hands on” with dedicated optimization software. The impact of each of the parameters discussed are demonstrated.

At the end of the course, the delegate will 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 optimization process.
- Use dedicated coverage optimization 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, minimize risk, and in line with the strategy and goals of the wider organization.



Course Contents:

- LTE Architecture Review
- LTE Radio Interface
- Link Budgets for LTE
- Coverage Planning
- eNB Configuration
- IDLE Mode Parameters
- CONNECTED Mode Parameters
- Capacity Planning for LTE
- Coverage Planning for LTE
- Coverage Optimization



LTE Air Interface

This training course will cover the major aspects of the LTE Air Interface in a manner that both technical and non-technical people will be able to fully appreciate. The course begins with a review of the LTE system architecture in order to fully establish the context of the radio interface operation and protocols. This initial section will also cover issues related to spectrum and deployment of LTE systems as well as comparing the 3 three main “evolutionary” radio technologies, LTE, WiMAX and UMB.

The central theme to LTE is the OFDMA and SC-FDMA radio multiplexing and modulation technique, the operation of this technology is explained and the choice of technologies used for LTE physical layer are justified. Layer 2 of the LTE protocol stack contains three sub-layers, MAC, RLC and PDCP as well as the control protocol RRC, and the main elements of each of these protocols is explained, showing how each relates to issues of mobility and mobility management with example of typical procedures given. Architectural and operational aspects of the Multicast Broadcast Multimedia Service are also covered.

Why should you attend this course?

Attend this highly interactive 2-day course and you will:

- Show how the new LTE architecture inter-works with existing UMTS systems
- Explain the function of the LTE Uu, X2 and S1 interfaces
- Explain the basic functions of the eUTRAN component, eNB
- Compare the 3 main technologies proposed for evolving current radio systems
- Draw and explain functions of the major layers of the LTE Protocol Stack
- Explain the operation of OFDMA and justify the use of the technology
- Show how SC-FDMA reduces some of the problems associated with OFDMA
- Show how the time and frequency domains are able to support a Resource Block
- List some of the principle functions of the MAC, RLC and PDCP protocols
- Describe the operation of the RLC layer for real time and non-real time services
- Explain the operation of LTE mobility in the 3 different mobility states
- Describe the operation of the eMBMS and how TV might be transmitted using the service

Course Summary:

- LTE Architecture Review
- LTE Protocol Stack
- LTE Physical Layer
- LTE MAC, RLC and RRC
- LTE PDCP
- LTE Resource and Mobility Procedures
- LTE Evolved Multicast Broadcast Multimedia Service (eMBMS)

Who Should Attend this Course?



This course would benefit anyone looking for a thorough grounding in emerging LTE technologies. A good working knowledge of 2G and 3G mobile network technologies would be beneficial but not essential.

Small Cells and HetNets for LTE and LTE Advanced

As demand for network capacity continues to grow rapidly, operators and vendors are seeking to maximize the efficiency of current network technologies such as LTE, LTE Advanced and Wi-Fi. The small cell and Heterogeneous Network approach will become increasingly important over the next few years to achieve the efficiencies required.

This 2 day programme will guide the participant through the technologies associated with Heterogeneous Networks, including interference management (a key issue), mobility aspects including cell selection/ reselection to and from small cells and handover. The performance improvements promised by small theory and practiced will also be reviewed.

In addition the programme will discuss the relevant topics within the LTE advanced standard that will impact on the future architecture and performance of mobile broadband technologies.

Participants will develop or be able to:

- Assess the performance and efficiency gains of Heterogeneous Network deployment
- Contribute much more effectively to discussions relating to network requirements for Heterogeneous Network
- Evaluate implementation options for Heterogeneous Network and small cells
- Fully understand the technologies and changes required for Heterogeneous Network implementation
- Determine the implications for the transition from LTE to LTE Advanced
- Get the big picture of future network requirements and changes
- Confidence to discuss the latest technology trends
- Make decisions on technology implementation and procurement that are commercially viable, minimize risk, and in line with the strategy and goals of the wider organization.