RF Design Workshop: Part 1 - LTE

LTE_415x | Expert-Led Live | LTE and VoLTE | Expert
Course Duration: 2 days

LTE offers significant improvements over previous mobile wireless systems in terms of data speeds and capacity, through the use of technologies such as OFDMA and multiple antenna techniques. However, these gains are realized only with careful planning and design in the LTE Radio Access Network (RAN), to maximize the efficiency of available RF spectrum. This hands-on workshop guides participants through the theory and practice of RF design for LTE RANs. Participants will apply their understanding of the LTE air interface physical structure and related concepts to calculate the link budgets to support the market coverage and performance requirements. Participants will use coverage prediction tool for exercises to apply their knowledge and skills to real-world scenarios.

Intended Audience

This workshop is intended for LTE RF design and system performance engineers.

Objectives

After completing this course, the student will be able to:

- Apply a consistent process to radio network design
- Assess LTE RAN RF performance with RSRP and RSRQ measurements
- Map network requirements to corresponding system parameters
- Construct uplink/downlink link budgets to meet specific performance requirements
- Use coverage and capacity requirements to determine the optimal radio network design
- Exploit multiple antenna techniques to optimize coverage and performance

Course Prerequisites

LTE Overview

Outline

1. LTE Air Interface
1.1 E-UTRAN architecture
1.2 LTE Physical layer structure
1.3 Air interface resources
1.4 UE measurements (RSRP/RSRQ)
1.5 RSRP/RSRQ exercises

2. Overview of LTE Radio Network Design
2.1 Radio network design goals
2.2 Planning inputs and outputs
2.3 LTE RAN planning process

3. Market and Engineering Requirements
3.1 Coverage requirements
3.2 Capacity requirements
3.3 QoS requirements
3.4 Engineering requirements

4. LTE Link Budget
4.1 Cell edge throughput calculations
4.2 Link budget for UL and DL
4.3 Role of RRH and TMA
4.4 UL/DL link budget exercises

5. Antennas in LTE Networks
5.1 Multiple antenna techniques
5.2 Downlink feedback (CQI/RI/PMI)
5.3 Deployment considerations
5.4 Coverage prediction exercises

6. RF Design and Site Selection
6.1 RF design process and options
6.2 Morphology definitions
6.3 Propagation models
6.4 RF design tool configuration
6.5 Coverage prediction

7. RF Configuration Parameters
7.1 Sync signal and PCI planning
7.2 Reference signal planning
7.3 RA preamble planning
7.4 PCI and RACH planning exercises

8. Advanced Features of LTE
8.1 Carrier aggregation
8.2 HetNet and eICIC support
8.3 SON features

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