

# RF Design Workshop: Part 2 – VoLTE and Small Cells

With the introduction of LTE features such as Voice over LTE (VoLTE), multi-frequency, small cell deployment, and LTE-Advanced features, the existing RF design process needs to be enhanced. This workshop offers a foundation for features such as VoLTE, carrier aggregation, Heterogeneous Networks (HetNets), and small cells. The course revisits the data traffic driven link budget to reflect the VoLTE performance requirements and the differences for small cells. The antennas being planned to accommodate multi-band deployments are discussed, as well as the various RF parameters related to cell selection/re-selection and handover for proper load distribution in cases of multi-carrier and small cell deployment. In summary, this workshop provides a detailed understanding of RF design enhancements for VoLTE, LTE-Advanced and small cell.

## Intended Audience

This workshop provides practical examples and intertwines the exercises at every stage of the RF design process and is intended for RF designers, RF systems engineers, network engineers, deployment and operations personnel.

## Objectives

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

- Enumerate design considerations of deploying LTE in various scenarios
- Identify the key features of LTE-Advanced and their impact on RF design
- Discuss the link budget and planning for VoLTE, multi-frequency, and small cell deployment
- Sketch various antenna configurations
- Calculate the air interface capacity needs for data and VoLTE traffic
- Explain structure of RF design parameters related to cell selection, re-selection, and handover

## What You Can Expect

- Expert-Led Live Duration: 14 HOUR
- Prerequisite: RF Design Workshop: Part 1 - LTE
- Required Equipment: PC laptop with administrator privileges

## Outline

### 1. LTE Radio Network Design Review

- 1.1 Radio network design goals, inputs and outputs
- 1.2 LTE radio network planning process

### 2. Antenna Considerations

- 2.1 Multi-band antenna considerations
- 2.2 4x4 MIMO considerations
- 2.3 RRH deployment configurations
- 2.4 Integrated antenna considerations

### 3. LTE Capacity Planning

- 3.1 Data and VoLTE traffic modeling
- 3.2 Air interface capacity planning

### 4. Link Budget for Small Cells

- 4.1 Review LTE link budget for macro network
- 4.2 Small cell considerations
- 4.3 Impact of Tx power, frequency, of antennas
- 4.4 Pathloss for UL and DL

**Exercise:** Link budget walk-through

### 5. Link Budget for VoLTE

- 5.1 Link budget differences for VoLTE and data
- 5.2 SINR requirement for VoLTE
- 5.3 Use of RBs for VoLTE
- 5.4 Pathloss for UL and DL

**Exercise:** Link budget walk-through

### 6. RF Design Considerations

- 6.1 RF design guidelines
- 6.2 RF design tool configuration
- 6.3 Coverage prediction

**Exercise:** Coverage and interference

### 7. Small Cell Parameter Configuration

- 7.1 Cell selection/reselection parameters
- 7.2 Handover parameters