



# Principles of 3G Radio Network Planning

*"Effective quality of service delivery through skillful design and planning"*

## Overview

This practical course takes the participants through the network planning process for a UMTS/HSPA network. It is split into 2 distinct phases:

1) Defining the network in terms of initial capacity and coverage. In this phase end-user services are identified, along with the QoS requirements that are needed to meet required delivery targets for both voice & data (with HSPA);

2) Implementation of a detailed planning process. Here the accuracy of all design parameters is enhanced through a process of iteration whilst introducing new field details & parameter measurements in to the original design baseline. Participants will use a number of planning tools to plan & analyse the design taking into consideration aspects such as power control, handovers & radio resource management to meet KPIs.

## You will be able to

- To define a 3G Network
- To configure and dimension a 3G Network
- To evaluate and implement a network strategy based on Network coverage and capacity
- To evaluate and incorporate a plan based on selected base station sites as well as identify green field opportunities
- To design and evaluate HSPA in the network

## Who can benefit

Technical personnel for telecommunications organizations.

## Pre requisite knowledge

Participants should have an understanding of the 3G network infrastructure & signalling and have attended the 3G Cellular Networking & UMTS Signalling Protocols & Procedures with HSPA.

## Outline

### Introduction

- Evolution of Radio Network Planning
- Introduction to Radio Network Optimization & planning trends
- Review of RF considerations

### Network Technology Review

- 3GSM Family of Technologies
- Spread spectrum WCDMA
- Radio Network Interfaces
- HSPA air interface structure & operation
- Logical, Transport and Physical Channels

- Radio Link Performance Indicators
- Evolution to LTE & LTE-Advanced

### Radio Network Planning Process

- Planning life cycle
- No. of sites required
- Coverage and capacity planning
- Analysis of network KPIs
- Power control, handovers & HSPA Adaptive Modulation & Coding (AMC)
- Internal and external interference management

### Phase 1: Defining the Network Plan

- Network Configuration and Dimensioning
- Service definition
- Service Quality requirements
- Traffic Analysis
- Requirements and Strategy for Coverage, Quality, and Capacity planning per offered service, including HSPA

### Phase 2: Implementing the Plan

- Link/power budget planning
- Cell capacity calculation
- Propagation measurement and Coverage prediction
- Site acquisition and coverage optimization
- Capacity requirements
- Traffic distribution, service distribution and system features
- Planning models
- Interference issues
- External interference analysis
- Final parameter planning



## Orbitage Communications Certification Track

- Area/cell specific planning
- Handover strategies & neighbour planning
- Maximum loading
- Additional radio resource management
- Impact of HSPA on planning
- Adaptive Modulation & Coding vs Power Control

### Practical Planning Exercises

- Detailed link budget planning for 3G & HSPA
- Planning a 3G/UMTS network using a planning tool including overlay of HSPA on the plan
- Analysis of plan
- Changing parameters

DURATION	4 days
MAXIMUM CLASS SIZE	12