

Hands-On

# Private WiMAX Installation and Troubleshooting



## Course Description

This course teaches installation and troubleshooting technicians the key elements needed for installing, testing, validating and troubleshooting Private WiMAX equipment used for outside Private Link services.

The course introduces the elementary principles of radio used in WiMAX and the relationship between WiMAX and WiFi. Comparison will be made between the different versions of the 802.16a/c/d and e standards and with 802.11a/b/g/n. The course teaches how to survey the location in order to position plant in the appropriate location and how to avoid contention with other services. Students are taught how to select the appropriate antenna type for the selected location and position plant as required.

The correct safety procedures and service configuration options will be learned in this course. Students will undertake practical exercises to install devices, undertake the appropriate configuration, measure signal strength, loss, Signal to Noise ratio and survey a site.

## Students Will Learn

- **Recognize 802.16 Devices And Describe Their Wireless Characteristics**
- **Configure Wimax Devices To Provide Service**
- **Survey A Site For Delivery Of Quality Mobile Services**
- **Select And Align The Appropriate Antennas For Key Application Conditions**
- **Troubleshoot Wireless Problems**
- **And More...**

## Target Audience

This course is geared for installation and troubleshooting technicians.

## Prerequisites

This course assumes attendees already have basic knowledge of data communications, LANs and IP systems. No prior

knowledge of radio or Wireless systems will be assumed.

## Course Outline

### Module I: Private Local Loop Wireless Services

- Technologies and Terms

- Key Wireless Standard Options

- Wireless Architecture

  - Different IEEE standard options

  - 802.16a/c/d and e

  - Relation between 802.11 and 802.16

- Integration with LANs

  - Quality of Service

Hands-on Exercise: Configuring WiMAX connections

### Module II: Wireless Network Principles

- Radio Transmission Principles

- Radio Propagation

- Signal Power and Free Space Loss

- Effective Radiated Power (ERP)

- Polarization

- Absorption

- Diffraction

- Reflection

- Signal to Noise Ratio

- Cell Based operation

- Carrier interference noise

Interference effects and Fading

MiMo and SiSo

Modulation

Amplitude, Frequency and Phase Modulation

QAM

Multi-Access Systems

FDM, TDM, TDMA, FHSS, DSSS, OFDM, CDMA

Frequency use

Overlapping channels

Noise and signal strength

Operating Speed and multi-standard selection

Configuring Access Points

Hands-on Exercise: Setting up an infrastructure Access Points

Hands-on Exercise: Measuring Wireless Performance Parameters

### **Module III: Site Surveys and Coverage Measurement**

Site Surveys

Tools to use

How to affect coverage

Increasing/reducing range

Reducing spill-over into public areas

Cell structure planning

Bridging and repeating

Using WiMAX for Hot-spot Backhaul

Testing and troubleshooting

Hands-on Exercise: Site Survey and Fault Isolation

#### **Module IV: Positioning Antennas and Outside Plant**

Antenna types

Inside antenna systems

Outside Antenna Systems

Connections

Long Range Connection Systems

WiMAX Service requirements

Coverage

Defining the Service requirements

Monitoring and managing the service

Hands-on Exercise: Testing Antenna Performance

#### **Evaluation and Review**

### **Delivery Method**

Instructor-Led with numerous case-studies and Hands-On exercises.

### **Equipment Requirements**

**(This apply's to our hands-on courses only)**

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs

and gain valuable training using their specific equipment.

## **Course Length**

2 Days