

Hands-On

802.11 Wireless Installation and Troubleshooting



Course Description

This course teaches installation and troubleshooting technicians the key elements needed for installing, testing, validating and troubleshooting WiFi equipment used inside and outside building for public and private hotspot services.

The course introduces the elementary principles of radio used in WiFi services. It teaches how to survey the location in order to position access points in the appropriate location and how to avoid contention with other 802.11 services. Students are taught how to select the appropriate antenna type for the selected location and position plant inside and outside 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 802.11a/B/G And N Devices And Describe Their Wireless Characteristics**
- **Configure Wireless 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: Local Wireless Services

- Technologies and Terms

- Key Wireless Standard Options

 - Wireless Architecture

 - Different IEEE standard options

 - 802.11a/b/g/n

 - Relation between 802.11 and 802.16

 - Integration with LANs

 - Ad Hoc connection

 - Security

 - WEP, WPA and WPA-2

Hands-on Exercise: Configuring Ad-hoc Wireless 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

Channel Allocation

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 with 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
- Connecting Portal Services for Hot-spots
- 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
- WiFi Service requirements
- Coverage
- Defining the Service requirements
- Selecting Routers and Access Points
- Deploying bridges between buildings
- Routing and Fire-walling
- 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