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