Agilent Line Sweep, Antenna Test and RF Interference Training

Agilent Handheld N9330B Cable and Antenna Tester, N9340B Spectrum Analyzer and N9912A FieldFox RF Analyzer

Data Sheet

Gain a better understanding of spectrum analysis measurements

Course Overview

This 3-day course covers the theory and practical skills required to operate and understand test results for RF spectrum analysis and line sweeping on the Agilent N9330B, N9340B and N9912A FieldFox. Modules include an overview of radio as a transmission media, transmitters, receivers, wave propagation and radio antenna systems. Included in this course are numerous spectrum analysis and interference detection hands-on exercises.

What You Will Learn

- RF concepts and a practical understanding of transmitters, receivers and antenna coupling devices
- Setup and operation of the Agilent N9330B, N9340B and N9912A FieldFox
- Types of signals, interference and radio wave propagation through space
- Efficiently perform spectrum analysis and detect common sources of interference
- Troubleshooting techniques for resolving common problems affecting RF transmission
- Troubleshoot common problems affecting RF transmission
- Measuring effective center frequencies of antennas
- Saving and storing test results on the N9330B, N9340B and N9912A FieldFox
- Reading and interpreting results using the N9330B, N9340B and N9912A FieldFox

Specifications

Course type

User training

Audience

Field service technicians
Switch technicians
Design engineers
Managers/field supervisors
Field engineers
Installers

Prerequisites

None

Course length

Three days

Course format

Lecture with hands-on exercises that cover theory and practical applications

Delivery method

Scheduled at Agilent locations, or dedicated at a customer site upon request
www.agilent.com/find/training

Detailed Course Agenda

Overview of FieldFox

- Product overview
- Buttons & menus
- Results settings
- Connections and accessories

How Radio Works

- Why radio
- Radio – fiber – copper
- Broadband & narrowband
- Bandwidth defined
- Attenuation & noise
- FCC regulation

Understanding Radio Equipment

- Radio transmitters
- Radio receivers
- Antenna coupling
- Radio antennas
- How antennas work
- Antenna types
- Antenna gain & bandwidth
- Transmission lines
- Grounding overview

Introduction to Antennas

- Why antennas work – gain, beamwidth & bandwidth
- Antenna network components
- Terminations
- Testing standards

Agilent Technologies

Transmission Line Basics

- Coax characteristics: impedance, capacitive reactance & inductive reactance
- Types: size, frequency & loss
- Connectors: coax, waveguide, installation & testing
- Cable: crushed cable, damaged cable & other problems

Basics of Line Sweeping

- What are you testing?
- Cable & antenna test equipment
- TDR v/s FDR

Antenna Test Equipment

- Phase stable cables
- Equipment set-up
- Initial calibration
- Environmental considerations

Supporting Documentation

- Standard reporting
- Saving results
- Printing results

Test Interpretation

- Testing standards: sweep characteristics, limits & markers
- Return loss, distance-to-fault, VSWR, cable loss
- Post analysis tools
- Saving and printing plots

Modulation Techniques

- Amplitude, frequency and phase
- Cellular modulation

Spectrum Analysis

- Signal analysis
- Tips and tricks

For more information please visit our web site at
www.agilent.com/find/training
or contact your local representative.

Radio Wave Propagation

- Maxwell & waves
- Attenuation
- Free space loss
- Absorption
- Reflections & multipath
- Radio horizons & clearance

Interference

- Identification
- Detection
- Resolution

Types of Measurements

- Interference
- Power
- Adjacent channel
- Co-channel
- Carrier to interference

Troubleshooting Techniques

How to apply this knowledge in the real world

- Practical applications and labs
- Testing antennas, connectors and coax
- Detecting and identifying interference
- Individual performance testing and written test available in the United States and Canada

Course Fees (USA/Canada)

- 3-day course $1,800 USD per student at Agilent training center (Course #H7215A-123)
- 3-day on-site course $18,000 USD for up to 10 students on-site* (Course #H7215B-123)

* To save you time and travel, this Agilent course can be delivered at the site of your choosing. Contact your local representative for details.

Course Materials Provided:

- Student workbook with presentation materials, notes, tips, techniques, and lab exercises
- Quick reference cards with standard operating procedures, tips and techniques
- Agilent equipment for hands-on exercises. However, you are encouraged to bring your own N9330B, N9340B or N9912A FieldFox so you can train on, configure and save the measurements on the actual instrument you use in the field.
- Upon completion of the course and successful written and practical hands-on evaluation, students will receive a laminated certificate of completion wallet card.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Other European Countries:
www.agilent.com/find/contactus

Agilent Channel Partners

www.agilent.com/find/channelpartners
Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience..

Product specifications and descriptions in this document subject to change without notice.

October 1, 2009

Printed in USA, February 6, 2010
5990-5006EN

Agilent Technologies