Course Number H7216B, Opt. 101 Dedicated

RF Measurement Basics

Overview

Lab-intensive course for test technicians and test engineers new to RF

Course Overview

This course covers all aspects of basic high-frequency measurements. Upon completion, the student should be familiar with radio frequency (RF) measurements including measurement resolution and accuracy, transmission line theory, impedance matching, RF devices, noise, RF sources, modulation, distortion. The student will gain hands-on experience with connector care, power measurement, vector network analyzer measurements, and spectrum analyzer measurements.

What you will learn

- RF fundamentals
- Communications concepts
- Power measurements
- Network measurements
- Spectrum measurements
- Operation of test equipment
- Noise
- Modulation

Specifications

Course Type

Application Training

Audience

Test technicians and test engineers new to the area of RF and microwave

Prerequisites

The following knowledge or experience is required:

- A basic understanding of algebra and trigonometry
- A general understanding of basic electronics, basic physics, and general science, especially force, charge, current, voltage and power (basic vocational electronics training is desirable)

Course Length

32 hours maximum. The course is modular and can be customized to your needs.

Delivery Method

Scheduled (at Agilent training locations) or *Dedicated* (at customer site)

To save you time and travel, many Agilent courses can be delivered at your site. Agilent can provide required equipment, or save money by furnishing your own.

Course Format

This course is presented classroom style with approximately 50% lecture and 50% lab work on the various topics. All presentation materials are contained in the student workbook, which the student may keep for future reference.

Detailed Course Agenda

RF Fundamentals (6 hrs)

- AC/DC fundamentals
- Measurement resolution & accuracy
- DeciBels
- Understanding the frequency domain
- RF devices
- Transmission lines
- Impedance matching
- RF connector types and use

Communication Fundamentals (2 hrs)

- History
- Concepts
- Transceiver measurements

Power Measurements (2 hrs.)
- Average/peak
- Units of power
- Detectors: types/applications/range
- Accuracy/uncertainty
- Lab

Network Analysis (8 hrs)
- Linear vs. non-linear analysis
- Network principles/applications
- Operation/use
- Sources of error
- Error correction/calibration
- Lab

Noise (2hrs)
- Noise processes
- KTB
- Noise figure/phase noise

More RF concepts (4 hrs)
- RF sources
- Modulation
- AM, FM, PM, Digital
- Distortion

Spectrum Analysis (8 hrs)
- Time domain vs. frequency domain
- Applications
- Types of spectrum analyzers
- The swept-tuned spectrum analyzer
- Analyzer block diagram
- Heterodyne concepts
- Understanding the SA
  - Frequency range
  - Resolution
    - RBW filter
    - LO stability
    - The FFT
  - Sweeptime
  - Accuracy
  - Distortion
  - Noise floor
  - Video filtering/averaging
  - Optimum dynamic range

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