

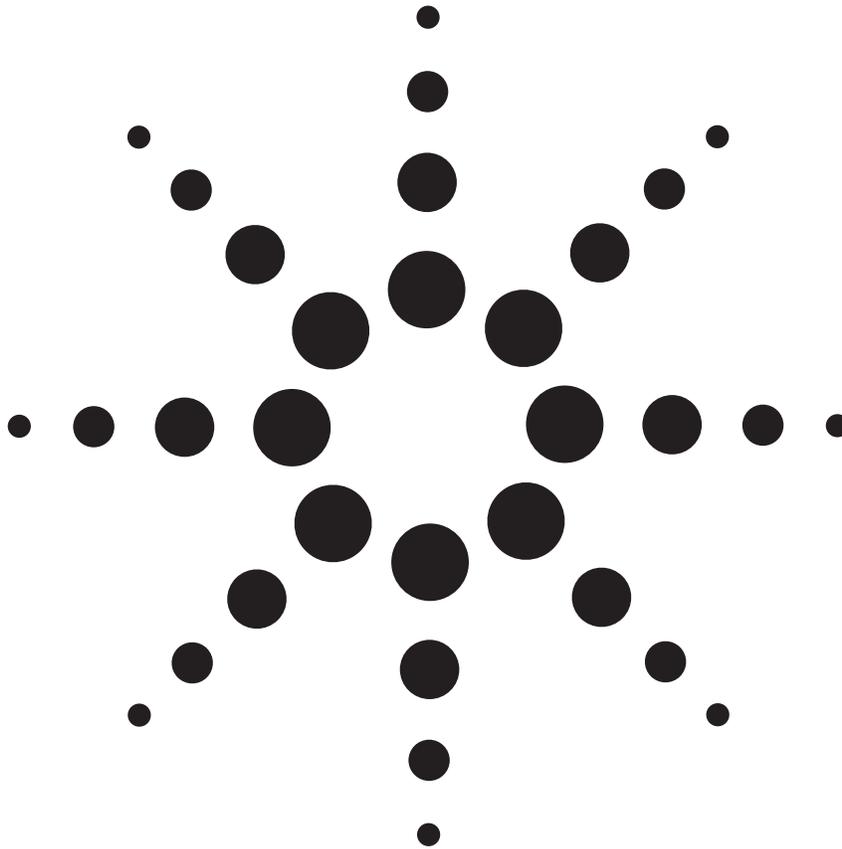
RF Design Fundamentals

Course Overview

Course Numbers:

Agilent Training Center: H7215A #235

Onsite Training: H7215B #235



Learn design techniques for planar transmission lines, matching circuits and RF amplifiers.



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Course Overview

This two-day course will provide the student with a firm grounding in the fundamental principles of RF engineering. This class presents the theory of wave propagation along a transmission line to develop the concepts of standing waves, reflection coefficient, VSWR, and to introduce the idea of distributed elements.

Students will learn about common planar transmission line technologies, as well as scattering parameters, signal flow diagrams, and the Smith Chart as aids to the analysis and design of RF circuits.

The course covers matching techniques using both lumped and distributed elements. Using this knowledge, students learn a methodology for RF amplifier design, supported by a low noise amplifier case study. Review includes RF connector issues. The ADS RF design suite is used to illustrate core concepts and as a design tool through the use of lab sessions.

What you will learn

- RF fundamentals
- Transmission line theory
- Design of planar transmission lines
- S-Parameters
- Signal flow diagrams
- Smith Chart
- Matching techniques
- RF amplifier design
- RF connector issues
- ADS design labs

Specifications

Course Type

User Training

Audience

Recent graduates requiring a rigorous introduction to the art of RF/microwave design, and engineers and technical managers wishing to consolidate their knowledge of RF/microwave principles.

Prerequisites

RF and Microwave Fundamentals or equivalent useful. Good understanding of complex numbers required.

Course Length

2 days

Course Format

Lecture and Labs

Delivery Method

Scheduled at Agilent locations, or

Dedicated at a customer site.

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

Detailed Course Agenda

High Frequency Fundamentals

Introduction of concepts and definitions for electrical length, skin depth and the decibel

Transmission Line Theory

- Transmission Line Model
- Wave propagation along a transmission line
- Reflection coefficient, VSWR, and standing waves
- Power transmission issues
- Input impedance to a transmission line
- Special case terminations and distributed elements

Practical Transmission Line Issues

Applications, features and synthesis/analysis of:

- Coax
- Microstrip
- Stripline
- Coplanar waveguide
- Grounded coplanar waveguide
- Substrate issues

Scattering Parameters

- Overview of linear network analysis
- S-parameter definitions and relationships
- Cascaded S-parameters
- Lab

Signal Flow Diagrams

- Applications
- Construction and simplification
- Analysis using signal flow
- Case study: two port network
- Case study: 3 dB PAD
- Case study: power meter head

Smith Chart

- Introduction
- Construction and axes
- Plotting on the Smith Chart
- Analysis using the Smith Chart

Matching Techniques

- Considerations for matching circuits
- L network matching networks
- Matching using the Smith Chart
- 3 element matching circuits
- Sub-matching
- Bode-Fano criteria
- Lab

RF Amplifier Design

- Device technology overview
- Amplifier specifications
- Unilateral design technique
- Bilateral design technique
- Designing for specific gain
- Stability criteria
- Causes and solutions of instability
- Amplifier noise
- Amplifier topologies
- LNA case study
- Lab

Connector Issues

- Generic connector issues
- Test instrument connector issues
- Board and equipment connector issues

For the latest information on class schedules and locations visit our website:

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(fax) (61 3) 9210 5947

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(fax) 64 4 495 8950

Asia Pacific:

(tel) (852) 3197 7777

(fax) (852) 2506 9284

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