Transmission Line Fundamentals

Course Overview

Course Numbers:
H7215X-100

Gain a better understanding of transmission lines

Course overview

This course introduces students to the concept of transmission lines, which forms the basis for understanding RF and microwave technology. Students will understand the need for transmission lines and also the complexities involved in dealing with high-frequency systems.

What you will learn

After completing this course, you will be able to:

- Explain the need to enlarge the concept of simple hook-up wires to the more general theory of transmission lines
- Describe the concept of characteristic impedance of a transmission line
- Describe the relationship between characteristic impedance, termination impedance and reflections
- Compute VSWR, return loss and reflection coefficient and convert among these measures of reflection

Specifications

Audience
New college graduates, technicians and junior engineers entering the RF and microwave technology field whose responsibilities include product design, testing or manufacturing

Prerequisites
None

Course length
Half day

Course format
100% lecture

Delivery method
To save you time and travel, this course is delivered at your site.

Detailed course agenda

Transmission line basics

- Why do we need a special class for microwaves?
- What are transmission lines?
- Various wavelengths and their corresponding frequencies

Characteristic impedance

- Transmission lines versus regular hook-ups
- Distance and propagation in a transmission line
- Characteristic impedance
- Basic transmission lines

Terminating a transmission line

- Infinite transmission line
- Terminating a lossless transmission line
  - With a short and open
  - With its own characteristic impedance

Reflections

- Incident and reflected waves on a shorted line, an open line and on an arbitrarily terminated lin
- Reflection coefficient Impedance and Smith chart
- Gamma plane, plotting impedance
- Plotting impedance on a rectangular plane
- Smith chart

Standing waves
- Understanding phasors
- Phasor representation at an instant for short and open circui transmission lines
- Phasor representation for arbitrary termination
- Slotted line
- Standing wave ratio (SWR), scalar reflection coefficient (Rho) and return loss
- Reflectometer calculator
- Converting between Rho, return loss and SWR

Practical transmission lines
- Propagating modes
- Common connector and cable types

This course is part of Agilent

Technologies' Accelerated Education RF and Microwave Fundamentals Curriculum. It is designed to quickly give you the expertise you need to solve measurement problems effectively and efficiently. The courses in these curricula are the same ones Agilent uses to train newly hired engineers and engineers who are changing jobs within the company. For a complete listing of available Accelerated Education curricula, go: **www.agilent.com/find training.**

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H7215X-100 Transmission Line Fundamentals course, delivered on-site

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