Keysight Technologies
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

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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 the Keysight Technologies, Inc. Accelerated Education RF and Micro-wave 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 Keysight 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.keysight.com/find/training**.

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
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(BP-07-10-14)

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Published in USA, July 31, 2014
5988-5604EN
www.keysight.com