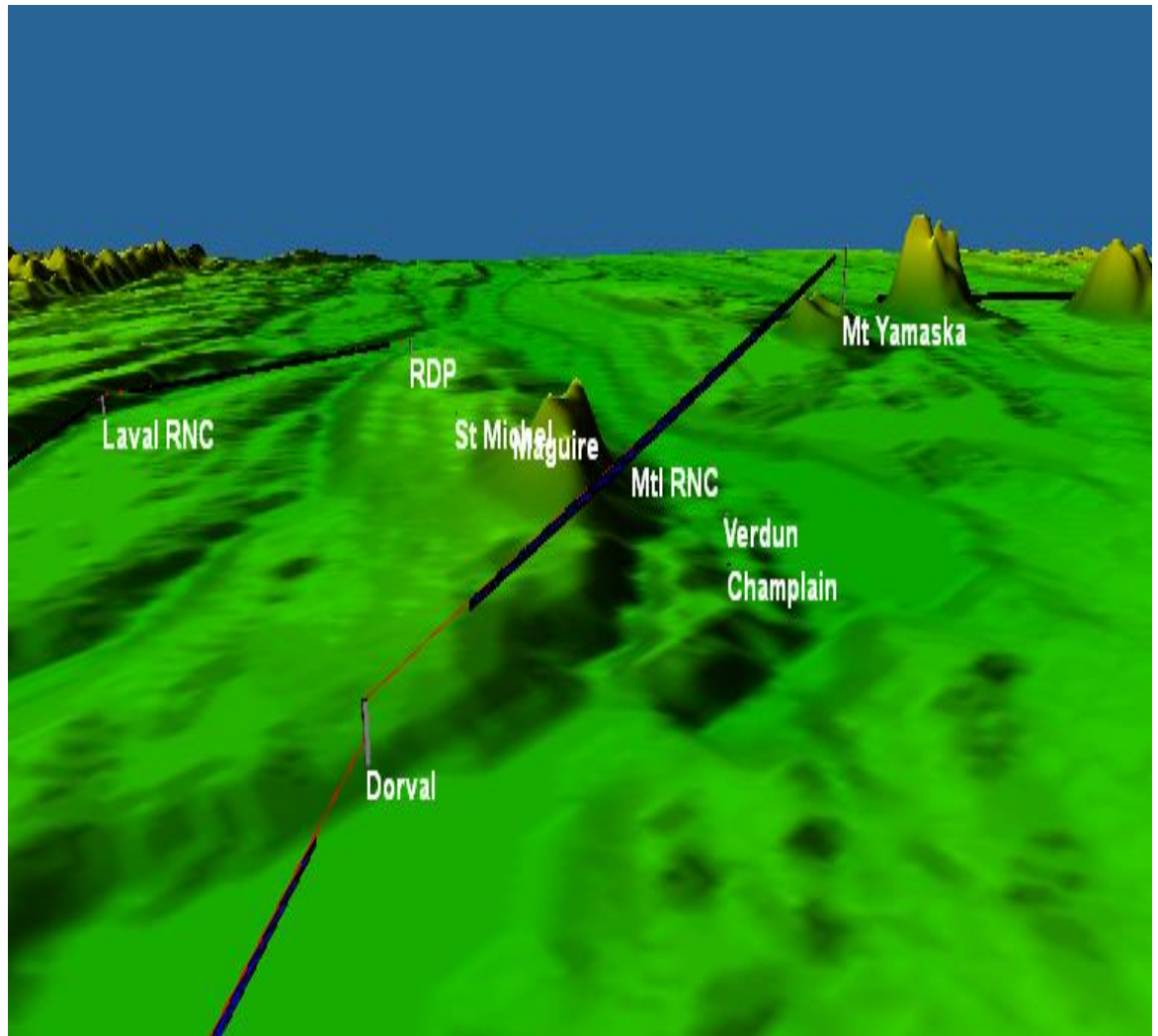


# Pathloss 5 Training



**FULL PATHLOSS 5 OPERATION  
INCLUDING MICROWAVE THEORY,  
POINT-TO-POINT (PTP), POINT-TO-MULTIPOINT (PTMP)  
AND COVERAGE APPLICATIONS  
(PL5-05)**

**5 Day Training**

**FOR MORE  
INFORMATION**

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## PATHLOSS

RF communication network design can be a complex and sometimes daunting task. Fortunately, engineers and technicians working on RF network planning can use software tools such as Pathloss to ensure a methodical and thorough approach to their task.

The Pathloss program is a state-of-the-art comprehensive path design tool for networks operating in the frequency range from 30 MHz to 100 GHz.

Designed for use throughout the world with diverse equipment and wide-ranging atmospheric conditions, Pathloss uses a variety of terrain and clutter databases, equipment files and local weather files.

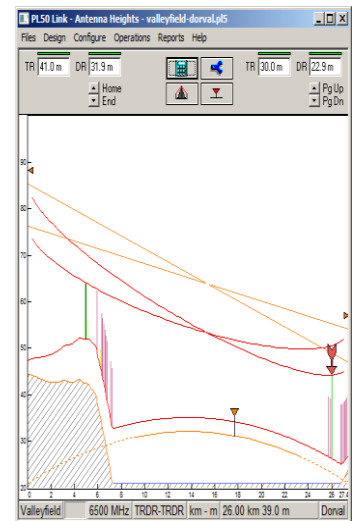
The program is organized into modules, covering all aspects of microwave communication network design. These include five path design modules. The network module, which integrates the radio paths and several operations that can be performed on a given network including: interference analysis, automatic link generation and design, PTMP design, and local and area coverage studies.

## OBJECTIVES

This training covers all aspects of Pathloss 5; therefore there are several objectives. First, it aims at creating a solid background of knowledge in the field of microwave theory. Second, it builds on that knowledge with the specifics of PTP design using the Pathloss software. Finally with the improvements in the coverage aspects of Pathloss 5, PTMP and coverage applications in the Land Mobile (P25, Tetra...) frequencies as well as higher frequency OFDMA applications such as WiMax will be discussed.

The new version of Pathloss has improved significantly; changing the way we work with it. Therefore, a specific course has been developed in order to help MW designers learn the concepts and develop a methodology for the Pathloss 5 software.

Microwave theory covers topics such as the basics of microwave communications systems, propagation, RF design methods and procedures. Software operation section of the training covers a variety of topics, ranging from software installation and upgrade to a module-by-module study and network designs and operations such as PTMP and coverage.



## TARGET AUDIENCE

Although Pathloss is a comprehensive step-by-step design tool, this YRH Pathloss training is specifically targeted to RF engineers and experienced RF technicians having some basic notions of microwave propagation.

## PRE-REQUISITES

Basic knowledge of RF communication networks required.

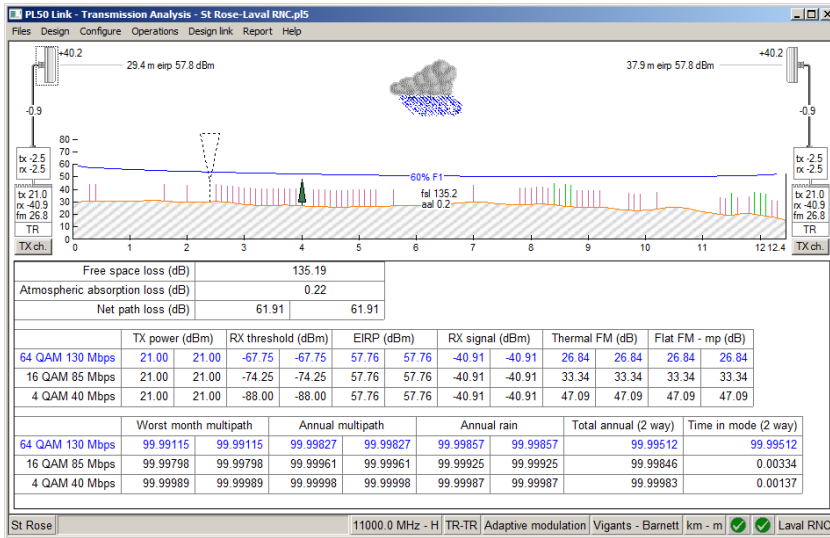
## ADDITIONAL PATHLOSS 5 TRAINING PACKAGES

- ☞ Pathloss 5 - 3 days: Point-to-multipoint (PTMP) and coverage software operation (PL5-01)
- ☞ Pathloss 5 - 3 days: Complete Point-to-point (PTP) software operation (PL5-02)
- ☞ Pathloss 5 - 2 days: For experienced PL4 users (PL5-03)
- ☞ Pathloss 5 - 4 days: Microwave theory and complete point-to-point (PTP) software operation (PL5-04)

## SCHEDULE AND FEES

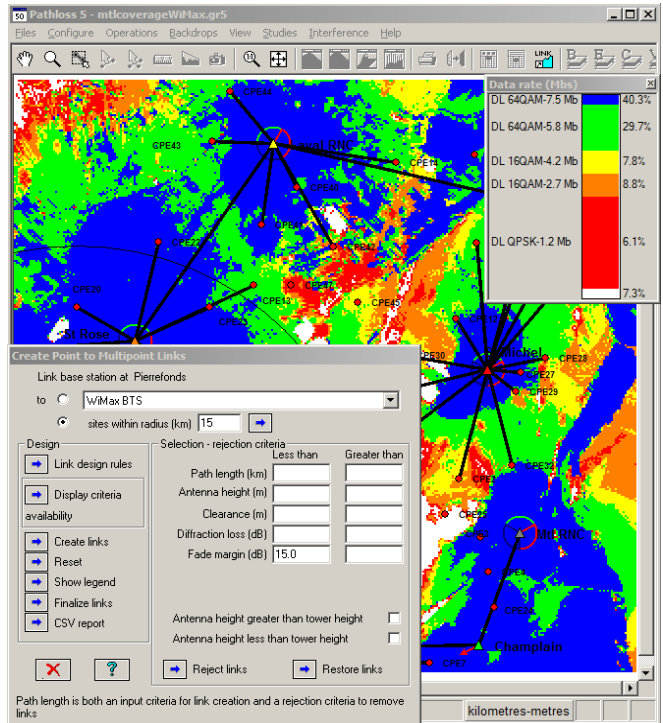
For more information about our Pathloss training program, please e-mail us at [telecom@YRH.com](mailto:telecom@YRH.com) or call at +1 514.934.3024.

## PATHLOSS 5 FEATURES

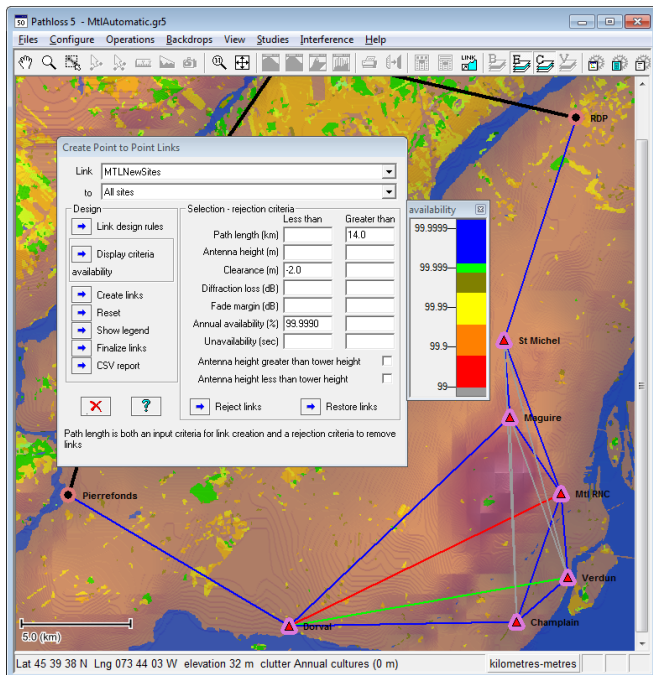


*Adaptive modulation calculations*

*Coverage and automatic PTMP link planning tools*



*Automatic link planning tools*



# COURSE CONTENTS

## DAY 1

- **Overview of microwave communications theory**
  - + Systems and components
  - + Propagation
  - + Reliability calculations and objectives
- **Software Installation and maintenance updates**
- **Overview of Software files**

## DAY 2

- **Network Options and Settings**
  - + Site and Link data entry
  - + Group Manager
  - + GIS setup
  - + Network display options

*Exercise:*

  - *Create a Network consisting of existing links and new sites*
- **Link Options and Settings**
  - + Default calculation methods and algorithms
  - + Program Options

*Exercises:*

  - *Setting default calculation and diffraction loss methods and algorithms*
  - *Setting default clearance criteria*
- **Equipment Files Formats and Setup**
  - + Setting equipment databases and Frequency Plans
  - + AntRad Program: Creating and editing radio and antenna files

*Exercises:*

  - *How to configure equipment database and Frequency Plans*
  - *How to create Adaptive Modulation, Land Mobile (VHF-UHF) Radio files and Land Mobile (VHF-UHF) antennas using the AntRad program*
- **Terrain data module**
  - + Generating terrain profile between two sites
  - + Inserting and editing clutter and structures

*Exercises:*

  - *How to generate a terrain profile*
  - *How to input obstacles manually or using clutter files*

## DAY 3

### – Antenna Heights Module

- + Setting antenna heights to meet clearance criteria for different antenna configurations

Exercises:

- How to verify and/or modify clearance criteria for a given path
- How to set antenna heights for main and diversity antenna configurations

### – Diffraction Loss Module

- + Calculating diffraction loss
- + Analyzing the Automatic and Manual Diffraction Algorithms

Exercise:

- Calculate and compare diffraction loss from manual and automatic methods

### – Multipath and Reflection Module

- + Variable and Constant Gradient Ray Trace
- + Reflective Plane and Ray Tracing Reflection Analysis
- + Optimal Space Diversity antenna heights

Exercises:

- Display the reflective characteristics of a path using constant and variable gradient
- Perform a reflection analysis and set optimal main and diversity antenna heights

## DAY 4

### – Transmission Analysis Module

- + Different ways of entering equipment parameters
- + Parameters for applications: Microwave, Adaptive Modulation, Land Mobile
- + XPIC and Space diversity calculations
- + Selecting calculation methods and algorithms

Exercises:

- Analyze a path using ITU & Vigants-Barnett Multipath fading algorithms
- Analyze a path using the Adaptive Modulation application
- Analyze a path using the Land Mobile application

### – Automatic Link Generation and Design

- + Network design of PTP links
- + Link Design Rules
- + Create PTP links
- + Design and modify PTP links
- + Frequency assignment

Exercises:

- Determine LOS and connectivity between new sites and existing network
- Automatically design new PTP links
- Assign frequencies on a network level

– **Interference**

- + Setting Intra-System Interference Parameters
- + Correlation options
- + Reading and analyzing Interference reports

Exercises:

- *How to perform an intra-system interference calculation*
- *How to solve potential cases of interference using several methods*

## DAY 5

– **Base Station Creation**

- + Creating Base Stations individually or as a batch
- + Adding Base Station and Mobile Specifications

Exercise:

- *Creating WiMax and/or Land Mobile (VHF-UHF) Base stations*

– **Automatic Point-to-Multipoint Link Generation and Design**

- + Network design of PTMP links
- + Link Design Rules
- + Create PTMP links
- + Design and modify PTMP links
- + Frequency assignment

Exercise:

- *Automatically create WiMax and/or Land Mobile (VHF-UHF) PTMP links*

– **Coverage (Local and Area Studies)**

- + Terrain and Clutter loss considerations
- + Propagation Parameters
- + Local and Area studies
- + Display criteria

Exercises:

- *Local and Area Coverage of a network*
- *Identifying marginal coverage areas and resolving coverage issues*

– **Network Batch Reports**

- + Batch and performance reports
- + Export to csv, Google Earth and MapInfo

– **Question period and review of modules of particular interest and overview of additional possibilities**

- + At customers request and if time permits