

# Microwave Transmission Link Design & Network Planning

*Rome (Italy)*

*16 - 20 December 2024*

UK Training

# PARTNER



# Microwave Transmission Link Design & Network Planning

Code: GC28 From: 16 - 20 December 2024 City: Rome (Italy) Fees: 4700 Pound

## Introduction

Microwave transmission Link design and network planning training course provide a strong background in the area of planning telecommunication transmission networks using modern Microwave systems. It covers in detail all the important aspects of microwave signal propagation, starting from free-space loss, absorption loss, and others, followed by statistical analysis of various phenomena impairing microwave reception process like rain, multipath fading both flat and selective, Fresnel zones, K-factor variation and ducting based on ITU-T/ITU-R standards. Also, this course will introduce basic parameters that identify the microwave link like antenna characteristics, Tx/Rx power, modulation coding, and others. All the above can be explained and applied practically upon students' needs with pathloss 5 including interference study and PtMP coverage map preparation.

## Training Objectives of Microwave Transmission Link Design & Network Planning

- Concept and characteristics of digital microwave communications
- Functions and principles of each component of digital microwave equipment
- Common networking modes and application scenarios of digital microwave equipment
- Propagation principles of digital microwave communication and various types of fading
- Anti-fading technologies
- Microwave link budget calculation for Point-to-Point PtP and Point-to-Multi-Point PtMP, and network planning
- Procedure and key points in designing microwave transmission link
- Microwave link design, PtMP coverage map and interference study with Pathloss 5

## Training Outlines of Microwave Transmission Link Design & Network Planning

### Day 1

#### Microwave Communication Overview

- What is Microwave?
- Microwave Vs Fiber Optics
- Microwave History
- Digital Microwave Communication
- Microwave Frequency Band Selection
- RF Channel Configuration
- Digital Microwave Communication Modulation and coding



- Microwave Frame Structure
- Trunk Microwave Equipment
- All Outdoor Microwave Equipment
- Split Mount Microwave Equipment
- Outdoor Unit ODU / Indoor Unit IDU
- Microwave Antenna
- Antenna Adjustment

## Day 2

### Microwave Networking, Application, Propagation and Link Budget

- Networking modes of Digital Microwave
- Types of Digital Microwave Stations
- Relay Stations
- Active Relay station / Passive Relay Station Parabolic and Plane Reflector
- Application of Digital Microwave
- Key Parameters in Microwave Propagation
- Fresnel Zone
- Fresnel Zone Radius
- Clearance Factors Affecting Microwave Propagation, LOS survey process.
- Atmosphere Types of Fading in Microwave Propagation, Free Space Loss, Absorption Fading, Rain Fading
- Ground Reflection and Multipath
- Radio path link budget and Fade Margins

## Day 3

### Anti-Fading Techniques

- Frequency domain equalization
- Time-domain equalization
- Automatic transmit power control ATPC
- Adaptive Coding & Modulation ACM
- Cross-polarization interference cancellation XPIC
- Diversity technologies
- Frequency diversity
- Space diversity
- Some useful Anti-fading tips
- Protection Modes of Digital Microwave Equipment

## Day 4

### Frequency planning, Availability, and Recommendation

- Frequency planning for different network topologies
- Interference study
- Quality and Availability
- Practical Recommendations
- BoQ Planning



- Towards 4G/5G

## Day 5

### Microwave network planning and link design with Pathloss 5

- What's Pathloss.
- PtP microwave link design.
- PtMP microwave link design and coverage map.
- Interference study.
- Reports.





## Blackbird Training Cities

### Europe

izmir



Podgorica (Montenegro)



Stockholm (Sweden)



Lyon (France)



Copenhagen (Denmark)



Bordeaux (France)



Annecy (France)



Oslo (Norway)



Edinburgh (UK)



Glasgow (Scotland)



Malaga (Spain)



London (UK)



Istanbul (Turkey)



Amsterdam (Netherlands)



Düsseldorf (Germany)



Paris (France)



Barcelona (Spain)



Munich (Germany)



Geneva (Switzerland)



Prague (Czech)



Vienna (Austria)



Rome (Italy)



Brussels (Belgium)



Madrid (Spain)



Berlin (Germany)



Lisbon (Portugal)



Manchester (UK)



Milan (Italy)

### USA & Canada



Los Angeles (USA)



Florida (USA)



Online



Boston (USA)



Washington (USA)



Miami (USA)



New York (USA)



Toronto (Canada)



## Blackbird Training Cities

### Asia



Baku (Azerbaijan)



Maldives (Maldives)



Manila (Philippines)



Bali (Indonesia )



Bangkok (Tailand)



Beijing (China)



Moscow (Russia )  
(Malaysia)



Singapore (Singapore )



Sydney (Australia)



Tokyo (Japan)



Dubai (UAE)



Kuala Lumpur



Jakarta (Indonesia)

### Africa



Kigali (Rwanda)



Cape Town (South Africa)



Accra (Ghana)



Lagos (Nigeria)



Marrakesh (Marocco)



Nairobi (Kenya)



Cairo (Egypt)



Sharm El-Sheikh (Egypt)



Casablanca (Morocco)



Tunis (Tunisia)



## Blackbird Training Clients



UK Training  
**PARTNER**





## Blackbird Training Categories

### Management & Admin

- Professional Skills
- Finance, Accounting, Budgeting
- Media & Public Relations
- Project Management
- Human Resources
- Audit & Quality Assurance
- Marketing, Sales, Customer Service
- Secretary & Admin
- Supply Chain & Logistics
- Management & Leadership
- Agile and Refinement

### Technical Courses

- Hospital Management
- Public Sector
- Special Workshops
- Oil & Gas Engineering
- Telecom Engineering
- IT & IT Engineering
- Health & Safety
- Law and Contract Management
- Customs & Safety
- Aviation
- C-Suite Training



 International House 185 Tower Bridge  
Road London SE1 2UF United Kingdom

 +44 7401 1773 35  
+44 7480 775526

 [training@blackbird-training.com](mailto:training@blackbird-training.com)

 [www.blackbird-training.com](http://www.blackbird-training.com)

