MobileComm Technologies (India) Pvt. Ltd.
A MobileComm Professionals, Inc. Company
774 Udyog Vihar, Phase V
Gurgaon-122 001 (Haryana), India
Tel: +91-124-4682600
Fax: +91-124-4262757
www.mcpsinc.com

Workshop on Fundamentals of Transmission (1 Day)

Upon completing the course, the participant will be able to:

- Understand Basic Concepts
- Describe Transmission types
- Define Networks & Network Models
- Explain optical & microwave transmission

1). Introduction of Transmission (1 hour)

- Overview of Transmission
- Types of Signal
    - Analog Signals
    - Digital Signals
- Transmission System
- Media Characteristic
- Usage in networks
- Components of a Transmission System

2). Modulation Schemes (1 hour)

- Modulation
- AM systems
- FM systems
- Modulation schemes presentation
    - QPSK
    - QAM
    - PCM
- Modulation techniques over fading channels

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Ch. 3: Antenna System Considerations (1 hour)

- Antenna classifications
- ODU unit
- IDU Unit
- Connections
- Splitters / Couplers

Ch. 4: Equipment Protection Schemes (1 hour)

- 1+1 Hot Stand By (HSB) protection
- Microwave 1+1 Space Diversity (SD) protection
- Microwave 1+1 Frequency Diversity (FD) protection
- Sub-network connection protection (SNCP)
- Cross-connect and clock unit (PXC) active/standby protection

Chapter 5: Microwave Network Planning (1 hour)

- Network Topology Planning
  - Ring Configuration
  - Star Configuration
  - Chain Configuration
  - Spur Configuration
- Line-of-Sight Considerations
  - Fresnel Zone
  - K factor (Earth Curve)
  - Tower height Calculations
- Link Budget
  - Transmission Power
  - Antenna Gain
  - Free Space Losses
  - Rx Level

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- Fading
  - Multipath fading
  - Rain fading
  - Refraction-Diffraction fading
- Fade Margin
- Interference
  - C/I Objectives

Ch. 6: Multiplexing and PDH/SDH Basics (1 hour)

- Multiplexing
- Media and Media Characteristics,
- PDH Fundamentals
  - Structure of E1 and T1 signals
  - Multiplexing of 2 Mbps into 8 Mbps (E2)
  - multiplexing of 8 Mbps into 34 mbps (E3)
- Introduction to SDH
- STM-1 Frame Structure
- RSOH, MSOH and payload
  - Multiplexing structure of SDH
  - Multiplexing of 34 Mbps (E3)
  - Multiplexing of 140 Mbps (E4)