



Ceragon Training Syllabus

FibeAir IP-50E e-Product Basic

e-Learning

[Ceragon Certified Support Associate]

Ceragon Training Services

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Introduction

The **Ceragon FibeAir IP-50E Basic e-learning** is a product oriented theoretical and simulated hands-on course that aims to provide you with an understanding of the key radio and networking protocols relevant to microwave transmission networks with a focus on the IP-50E characteristics, features and functionality.

After this course, you will understand the key features and benefits of the FibeAir IP-50E, how to perform advanced configuration, operation and maintenance, performance management and troubleshooting.

Learning Objectives

Upon completion of this course the participants will be able to:

1. Understand the microwave networks radio interface principles and parameters;
2. Understand the Ethernet networking protocol and key concepts;
3. Recognize the benefits and values of the IP-50E platform;
4. Perform installations and commissioning of the IP-50E;
5. Understand the radio features (ACM, ATPC, Adaptive TX Power etc.)
6. Describe the Ceragon Service Model;
7. Configure Services and advanced radio and networking features;
8. Manage Activation Keys;
9. Perform configuration and software management;
10. Execute performance management;
11. Basic Troubleshooting & Preventive maintenance.

Target Audience

The Target audience for this course is:

System Engineer, Service Engineer, Network Deployment Engineer, Network Design Engineer, Service Design Engineer.

Prerequisites

The participants should be familiar with general telecom technologies.

Successful completion of the following course: **Ceragon System and Technology Overview** (ILT or WBL).



Learning Situation

This course is a theoretical e-Learning course with a duration of 7 hours.

Course Content

The topics to be discussed during this training are:

1. Introduction to Radio Systems

- Radio Relay Principles
- Parameters affecting propagations:
 - Dispersion
 - Humidity/gas absorption
 - Multipath/ducting
 - Atmospheric conditions (refraction)
 - Terrain (flatness, type, Fresnel zone clearance, diffraction)
 - Climatic conditions (rain zone, temperature)
 - Rain attenuation
- Modulation

2. IP-50E Overview

- IP-20 Platform Introduction
- IP-50E features
- IP-50E Specifications

3. IP-50E Housing Overview

- Mechanical Specifications & dimensions
- Environmental Requirements
- IP-50E variants
- Common Interfaces
- Power over Ethernet and Power Adaptor
- Marketing Model

4. IP-50E System Configurations & Installation Guide

- Mechanical Specifications & dimensions
- Environmental Requirements
- IP-50E variants
- Common Interfaces
- Power over Ethernet and Power Adaptor
- Marketing Model

5. IP-50E First Login & Menu Overview

- CLI and Web login
- General commands
- Get IP address
- Set IP address
- Set to default



6. IP-50E Link Parameters

- Radio Link Parameters
- MRMC scripts
- MRMC configuration – IP50E
- TX and RX frequency settings
- LINK ID
- Monitoring

7. Adaptive Coding and Modulation ACM & Mean Square Error MSE

- Adaptive Coding and Modulation
- Using MSE with ACM
- What is MSE?
- Link Commissioning with MSE
- Triggering ACM with MSE

8. IP-50E Commissioning | Multiband Commissioning

9. Service Model IP-50E

10. IP-50E Ethernet Capabilities

11. Service Model in General

- 11.1. What is a Service?
- 11.2. What is a Service point?

12. Services in IP-20 Family & Services attributes

- 12.1. Point to Point Service (P2P)
- 12.2. Multipoint Service (MP)
- 12.3. Management Service
- 12.4. Point to Multipoint Service

13. Service Point in IP-20 Family Service Access Point (SAP)

14. Service Network Point (SNP)

15. Pipe Service Point

16. Management Service Point

17. Service Points classification and attributes

18. Examples for Services and Service points

19. Service Demo

20. Introduction to Ethernet

- Local Area Network (LAN)
- Network Devices
- OSI Layers
- Ethernet Frame
- VLAN concept

21. Service Model in IP-20

- IP-20 Ethernet Capabilities
- Service Model in General
 - What is a Service?
 - What is a Service point?
- Services in IP-20 Family & Services attributes



- Point to Point Service
- Multipoint Service
- Management Service
- Service Point in IP-20 Family
 - Pipe Service Point
 - Service Access Point (SAP)
 - Service Network Point (SNP)
 - Management Service Point (MNG)
- Service Points classification and attributes
- Examples for Services and Service points
- Logical VS. Physical Port

22. IP-50E Activation Key

- Activation Key
- Demo Activation key
- IP-50E Activation key concept
- IP-50E Activation Key Scheme
- Features

23. IP-50E Configuration MNG and Software download

- Backup and Restore
- Unit Information file
- Software Download

24. IP-50E Quick Configuration & CeraPLAN

25. IP-50E Performance Monitoring

- Radio Counters
- Radio Signal Level
- Radio Aggregate
- Radio MSE
- Radio MRMC
- Radio Traffic
 - Capacity
 - Throughput
 - Utilization
 - Frame error rate
- Header Compression counters
- Ethernet PM & Statistics
 - RMON
 - Port TX
 - Port RX

26. Basic Troubleshooting and On-site Preventive Maintenance

- Introduction
- Basic Troubleshooting
- Routine Maintenance Program



- Activities Prior to the On-site Visit
- Safety first
- Activities Description
 - Physical verification
 - Tower and Mast
 - Antenna and feeders
 - RFU
 - Coaxial Cable
 - Flexible Waveguide
 - Elliptical Waveguide
 - Dehydrator
- Equipment Verification
 - RSL
 - Alarms
 - Event Log
 - Configuration (Correct Time and Date)
 - Rectifier and Batteries
- Maintenance Protocol
- Activities after maintenance

27. Course Evaluation and Feedback



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