



Ceragon Training Syllabus

FibeAir IP-20C e-Product Basic

e-Learning

[Ceragon Certified Support Associate]

Ceragon Training Services

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Introduction

The ***Ceragon FibeAir IP-20C 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-20C characteristics, features and functionality.

After this course, you will understand the key features and benefits of the FibeAir IP-20C, 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-20C platform;
4. Perform installations and commissioning of the IP-20C;
5. Configure Services and advanced radio and networking features;
6. Perform configuration and software management;
7. Execute performance management;
8. 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 8.5 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-20C Product Overview

- Evolution of Ceragon Radio Technology
- Changing the Network Paradigms
- MultiCore Architecture
- Capacity Innovations
- System Gain Benefits
- Capacity
- Transmission power
- Threshold level

3. IP-20C Housing

- Physical Dimensions
- I/O Interfaces
- Marketing Model
- Power Supply
- PoE Injector

4. IP-20C System Configuration

- MultiRadio Scenarios
- MultiCore Antenna Configurations

5. IP-20C Installation Guide

- Installation and Components
- MultiCore Mediation Devices (MCMD)
- Cable Installation and Grounding
- PoE Injector Installation and Connection
- Pole Mount Installation
- MultiCore 2+0 Dual Polarization Direct Mount
- MultiCore 2+0 Dual Polarization Remote Mount
- MultiCore 2+0 Single Polarization Direct Mount
- MultiCore 2+2 HSB Double Polarization Direct Mount
- MultiCore 2+2 HSB Double Polarization Remote Mount



- 2x MultiCore 2+0 Single Polarization Direct Mount
- 4x4 LoS MIMO Direct Mount
- Mediation Device Losses

6. IP-20C First login

- How to find out the IP-20C IP address
- CLI and Web login
- General commands
- Get IP address
- Set IP address
- Set to default
- Web GUI Management

7. IP-20C Link Parameters

- Radio Link Parameters
- MRMC scripts
- MRMC configuration – IP20C
- TX and RX frequency settings
- LINK ID
- Monitoring

8. IP-20C ACM

- ACM Introduction
- Mean Square Error (MSE)
- Calculating MSE
- MSE in digital modulation (Radios)
- Using MSE

9. Automatic Transmit Power Control – ATPC

- Why ATPC?
- How does ATPC works?
- ATPC Vs. MTPC
- ATPC Configuration

10. Radio Commissioning

- 1+0 – via Quick Configuration Wizard
- 1+0 Repeater (East-West) – via Quick Configuration Wizard
- 2+0 – via Quick Configuration Wizard – with & without XPIC
- 1+1 / 2+2 HSB
- 1+1 HSB with SD
- 2x2 MIMO
- 4x4 MIMO
- AFR 1+0
- 1+0 / 2+0 with SD



11. Introduction to Ethernet

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

12. 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

13. IP-20 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

14. IP-20C Activation Key

- Activation Key
- Demo Activation key
- IP-20C Activation key concept



- IP-20C Activation Key Scheme
- Licensed Features

15. IP-20C Configuration MNG and Software upgrade

- Backup and Restore
- Unit Information file
- Software Download&Upgrade

16. Basic Troubleshooting & Preventive Maintenance

- Frequent Installation Faults and Alarms
- LED meaning
- General troubleshooting

17. Course Evaluation and Feedback



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