



## Ceragon Training Syllabus

# FibeAir IP-20N e-Product Basic

e-Learning

**[Ceragon Certified Support Associate]**

***Ceragon Training Services***

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## Introduction

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

After this course, you will understand the key features and benefits of the FibeAir IP-20N, 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-20N platform;
4. Perform installations and commissioning of the IP-20N;
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. 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. It also contains laboratory demo's and product simulations.

## 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-20N Overview

- IP-20N Product Highlights
- Network topology with IP-20N
- IP-20N Overview
- 1U and 2U chassis
- TCC – Traffic Control Card
- RMC – Radio Modem Card
- ELIC – Ethernet Line Interface Card
- TDM Line cards
- IVM – Inventory Module
- PDC – Power Distribution Card
- Fan Module and Air Filter
- RFU – Radio Frequency Unit
- IP-20N Block Diagram

### 3. Radio Frequency Units with IF Cable

- Radio Frequency units for IP-20N
- RFU Selection Guide
- RFU-C
- RFU-A
- 1500HP / RFU – HP
- Split Mount Configuration and Branching
- New Outdoor Circulator Block OCB
- Split Mount Configurations
- Green mode



#### 4. **Radio Frequency Units with RF Interface Cable**

- Radio Frequency units for IP-20N with RF Interface
- RFU Selection Guide
- RFU-D
- RFU-D-HP
- RFU-S
- RFU-E

#### 5. **IP-20N Installation Guide**

- General Requirements
- Power Distribution
- Earth and Bonding of Equipment
- Indoor Grounding
- Indoor Unit Installation
- Cards replacement
- ODU to IDU connection
- Antenna Installation
- RFUs Installation

#### 6. **IP-20N First Login**

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

#### 7. **Shelf Management**

- Chassis Configuration

#### 8. **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

#### 9. **Radio Link Parameters**

- MRMC
- TX & RX Frequencies
- Link ID
- RSL
- MSE
- Current ACM Profile

#### 10. **Service Model IP-20N**

- IP-20N 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 (P2P)
- Multipoint Service (MP)
- Management Service
- Point to Multipoint Service
- Service Point in IP-20 Family Service Access Point (SAP)
- Service Network Point (SNP)
- Pipe Service Point
- Management Service Point
- Service Points classification and attributes
- Examples for Services and Service points
- Service Demo

## **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-20N Activation Key**

- Activation Key
- Demo Activation key
- IP-20N Activation key concept
- IP-20N Activation Key Scheme
- Features

## **14. IP-20N Configuration MNG and Software download**

- Backup and Restore
- Unit Information file
- Software Download



## **15. Troubleshooting and Preventive Maintenance**

## **16. Course Evaluation and Feedback**

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