



Ceragon Training Syllabus

Installation, Commissioning and Field Maintenance

e-Learning

[Ceragon Certified Rollout Professional]

Ceragon Training Services

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Introduction

The **Installation, Commissioning and Field Maintenance** is a theoretical and simulated hands-on training that aims to provide the student with knowledge and practical experience in the installation, commissioning and field maintaining of Ceragon equipment.

After this course, you will understand how to transport, handle and install correctly the Ceragon Network elements and how to commission a new site. Also, routine maintenance and troubleshooting actions on site are subject to discussions.

Learning Objectives

Upon completion of this course the participants will know:

1. General safety rules and guidelines
2. General security guidelines
3. General heavy objects stacking and hoisting guidelines
4. General safety when using radio/microwave equipment, tools & power tools.
5. Safety rules for operating at high altitudes
6. General understanding of electrical currents.
7. Understanding general safety rules involved in the installation and commissioning of a link.
8. All the elements and equipment involved in an installation and commissioning procedure.
9. Rules of transportation, handling and hoisting for installation of Ceragon equipment.
10. The principles of operating Ceragon devices and radio antennas.
11. How to recognize the various types of installation: direct mount, split mount, full outdoor, full indoor and learning to perform all these types of hardware installation accordingly.
12. How to correctly install and align third party antennas used by Ceragon.
13. All the cables and connectors for complete installation.
14. How to install links in accordance with an RF plan and Acceptance documentation.
15. How to perform initial setup of the equipment: connecting to device, finding and changing the device's IP and configuring the radio parameters (s.a. RSL, MSE, XPIC, interface configuration) and management (in-band and out-of-band management).
16. How to setup a basic service to enable traffic passing through the link
17. How to perform periodic and preventive field maintenance

Target Audience

The Target audience for this course is:

Technicians, Supervisors for installation, commissioning, field maintenance.



Prerequisites

The participants should be familiar with general wireless access and/or transmission 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. **General Safety Guidelines**
 - General Safety Guidelines & Rules
 - Personal Protection Equipment
 - Guidelines for Working at Heights
2. **Installation Types:**
 - All outdoor installations
 - All indoor installation
 - Split Mount installation
3. **Transport and Receiving of goods**
 - Transportation & Storage
 - Bill of Materials
4. **Installation Documents:**
 - Pre-installation: Technical Site Survey
 - Site Ready for Installation
 - Link Budget
 - IP plan
 - Audit and Quality Assurance
 - Acceptance Procedure document
5. **Antennas:**
 - Assembly of antennas
 - Hoisting antennas
 - Tower Installation
 - Alignment of Antennas
 - Why do alignment



- Hop Data
- Antenna Support Equipment
- Azimuth and Elevation Range
- Coarse Alignment
- Tools
- Measuring with Multimeter
- Elevation
- Final Alignment
- Cross Polarization Adjustment

6. Towers, Earthing and Grounding Procedures

7. Cables, Connectors and Waveguides

- Preparations and Ducting [RG8, WG, ETH CAT5, CAT 6]
- Electrical Cables and Connectors
- Optical Cables and Connectors
- IF cables and connectors

8. FibeAir IP-20C-HP Product Overview

- FibeAir IP-20 Platform
- Network Topologies Examples
- IP-20C-HP Product Overview
- Hardware overview
- Radio features
- Ethernet features
- Sync features
- System configurations
- IP-20C-HP Unique features set
- IP-20C-HP Radio Parameters

9. FibeAir IP-20C-HP Housing

- Physical Dimensions
- I/O Interfaces
- Marketing Model
- Power Supply
- Power over Ethernet Injector
- Antenna Specifications
- Hardware Architecture

10. IP-20C-HP System Configurations

- **General:** MultiCore technology benefits
- **Filter based systems:**
 - 2x(2+0) Filter Based System
 - 3x(2+0) Filter Based System
 - 4x(2+0) Filter Based System
- **Diplexer based systems:**
 - 1+0/2+0 Dual Polarization



- 1+0/2+0 Single Polarization
- 2x(2+0) Single Polarization
- 2x(2+0) Dual Polarization
- 2+2 HSB Single Polarization
- 2+2 HSB Dual Polarization
- MIMO 4x4

11. IP-20C-HP Installation Guide[Detailed]

- **General installation instructions:**
 - General Notes Concerning All Installation Procedures
 - Torque Requirements
 - Cable preparation and Grounding
- **Filter based system installation:**
 - Installing the Filters Unit on the Radio
 - 2+0 Filter Based System
 - 4+0 Filter Based System
 - 6+0 Filter Based System
 - 8+0 Filter Based System
 - Installing IP-20C-HP on Third-Party Antenna Adaptors
 - Special Note on Converting ValuLine 3 Antennas
- **Diplexer based system installation:**
 - Installing the Diplexers Unit on the Radio
 - MultiCore 1+0/2+0 Dual Polarization Direct Mount
 - MultiCore 1+0/2+0 Single Polarization Direct Mount
 - MultiCore 1+0/2+0 Dual Polarization Remote Mount
 - MultiCore 2x(2+0) Single Polarization Direct Mount
 - MultiCore 2x(2+0) Dual Polarization Direct Mount
 - MultiCore 2x(2+0) Dual Polarization Remote Mount
 - MultiCore 2+2 HSB Dual Polarization Remote Mount

12. FibeAir IP-20C-HP Assembly and Direct Mount Installation

13. FibeAir IP-20C-HP Split Mount Assembly and Installation

14. Gland installation for the all-outdoor products and new RFUs

15. Commissioning & Acceptance Procedures

- Web login & Web Management
- TX & RX Frequencies
- MRMC Scripts & Current ACM Profile
- RSL, MSE
- Link ID
- In Band / Out of Band Management.
- Spectrum Utilization: ACAP, ACCP, CCDP (for XPIC configuration)
- XPIC Setting-up(if applicable)

16. CeraPlan Service Presentation & Demo

17. DEMO: IP-20 - Radio Link parameters setting for a 1+0 link

18. DEMO: IP-20 - Creating a Point 2 Point Ethernet Service

19. Basic Troubleshooting & On-Site Preventive Maintenance



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

20. Course Examination & Feedback



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Ceragon Networks Ltd. is the world's #1 wireless backhaul specialist. We help operators and other service providers worldwide increase operational efficiency and enhance end customers' quality of experience with innovative wireless backhaul solutions. Our customers include wireless service providers, public safety organizations, government agencies and utility companies, which use our solutions to deliver 4G, mission-critical multimedia services and other applications at high reliability and speed. Ceragon's unique multicore technology provides a highly reliable, high-capacity 4G wireless backhaul with minimal use of spectrum, power and other resources. It enables increased productivity, as well as simple and quick network modernization. We deliver a range of professional services that ensure efficient network rollout and optimization to achieve the highest value for our customers. Our solutions are deployed by more than 460 service providers, as well as hundreds of private network owners, in more than 130 countries.

