



Microwave and Fronthaul 2019

Training Programs

Catalog of Course Descriptions



Catalog of Course Descriptions

INTRODUCTION	4
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - ADAPTIVE MODULATION AND SPECTRAL EFFICIENCY CLASSES	5
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - FADING	7
MICROWAVE TRANSMISSION TECHNOLOGY ENHANCEMENTS - NLOS	8
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - RADIO PROPAGATION.....	9
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - REGULATION.....	10
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - ANTENNAS	12
MICROWAVE TRANSMISSION TECHNOLOGY FUNDAMENTALS - EQUIPMENT	13
MICROWAVE TRANSMISSION TECHNOLOGY OVERVIEW	15
TRANSMISSION TECHNOLOGY FUNDAMENTALS - MANAGEMENT DCN	16
TRANSMISSION TECHNOLOGY FUNDAMENTALS - PDH AND SDH	18
TRANSMISSION TECHNOLOGY FUNDAMENTALS - PHASE AND TIME SYNC	19
TRANSMISSION TECHNOLOGY FUNDAMENTALS - SYNC	20
TRANSMISSION TECHNOLOGY FUNDAMENTALS - TDM OVER PACKET	21
ERICSSON MICROWAVE PRODUCTS OVERVIEW	22
MINI-LINK 6600 FUNDAMENTALS - CONCEPT AND COMPONENTS	24



MINI-LINK 6600 FUNDAMENTALS - SOFTWARE AND LICENSES	25
MINI-LINK RADIO UNIT FUNDAMENTALS.....	26
MINI-LINK 6351 FUNDAMENTALS	27
MINI-LINK 6352 FUNDAMENTALS	28
MINI-LINK 6366 FUNDAMENTALS	29
MINI-LINK ALL-OUTDOOR PRODUCTS - PACKET TRAFFIC HANDLING FUNDAMENTALS.....	30
SWITCH 6391 FUNDAMENTALS.....	31
5G TRANSPORT OVERVIEW.....	32
5G RAN TRANSPORT SOLUTION AND DESIGN OVERVIEW	34
FRONTHAUL 6020 R19 OPERATION AND MAINTENANCE	36
MINI-LINK 6600 M19 ADVANCED ETHERNET OPERATIONS	38
MINI-LINK 6600 M19 COMMISSIONING AND BASIC OPERATIONS	40
MINI-LINK 6600 M19 IP OPERATIONS.....	42
MINI-LINK 6600 M19 MAINTENANCE AND TROUBLESHOOTING.....	43



Introduction

Ericsson has developed a comprehensive Training Programs service to satisfy the competence needs of our customers, from exploring new business opportunities to expertise required for operating a network. The Training Programs service is delineated into packages that have been developed to offer clearly defined, yet flexible training to target system and technology areas. Each package is divided into flows, to target specific functional areas within your organization for optimal benefits.

Service delivery is supported using various delivery methods including:

Delivery Method

Instructor Led Training (ILT)

Web-based Learning (WBL)



Microwave Transmission Technology Fundamentals - Adaptive Modulation and Spectral Efficiency Classes

LZU1420444 R1A

Description

This course introduces the functioning and benefits of adaptive modulation for Microwave and discusses Spectral Efficiency Classes for fixed and adaptive modulation.

Learning objectives

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

- 1 The benefits of Adaptive Modulation
- 2 Modulation switch criteria
- 3 Spectral Efficiency Classes
- 4 Reference Spectral Efficiency Class
- 5 Transmitter spectrum masks

Target audience

This course is suitable for anyone who is required to be familiar with Microwave Transmission technology enhancements.

Prerequisites

Successful completion of the following courses:

Microwave Transmission Technology Overview - LZU 102 2081

Microwave Transmission Technology Fundamentals - Fading - LZU 102 2211

Microwave Transmission Technology Fundamentals - Radio Propagation - LZU 102 2057

Microwave Transmission Technology Fundamentals - Regulation - 102 2056

**Duration and class size**

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Fundamentals - Fading

LZU1022211 R1A

Description

This course explains fading phenomena in microwave radio propagation: Rain fading, multipath fading and ground reflections.

Learning objectives

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

- 1 The frequency dependency of rain and multipath fading
- 2 Examples of how multipath fading may arise
- 3 The significance of reflection coefficients.

Target audience

This course is suitable for anyone who is required to be familiar with fading phenomena in microwave radio propagation.

Prerequisites

Successful completion of the following courses:

Microwave Transmission Technology Overview - LZU 102 2081

Duration and class size

The length of the course is 20 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Enhancements - NLOS

LZU1022369 R1A

Description

This course shows how point-to-point microwave links can be deployed in non-line-of-sight applications. NLOS techniques diffraction, reflection and penetration are described as well as link budget and spectrum considerations.

Learning objectives

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

- 1 Principles of point to point links in small cell non-line-of-sight applications
- 2 Main non-line-of-sight techniques: diffraction, reflection and penetration
- 3 How link budget reserves make non-line-of-sight feasible and
- 4 What the spectrum considerations are

Target audience

This course is suitable for anyone who is required to be familiar with Microwave Transmission technology enhancements in NLOS.

Prerequisites

Successful completion of the following courses:

Microwave Transmission Technology Overview - LZU 102 2081

Duration and class size

The length of the course is 25 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Fundamentals - Radio Propagation

LZU1022057 R1A

Description

This course introduces microwave propagation: Radio wave properties, atmospheric influences, free space loss and line of sight.

Learning objectives

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

- 1 The main properties of radio waves: Frequency, polarization, power and bandwidth
- 2 How the atmosphere influences the propagation by bending the radio signal
- 3 How to reach free line of light
- 4 Distance-related free space loss

Target audience

This course is suitable for anyone who is required to be familiar with Microwave Transmission technology Enhancements in radio propagation.

Prerequisites

Successful completion of the following courses:

Microwave Transmission Technology Overview - LZU 102 2081

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Fundamentals - Regulation

LZU1022056 R1A

Description

This course covers regulation and spectrum use for Microwave systems:

- Standards
- Regulation Authorities
- Regulated and unregulated spectrum
- Channels- Frequency licenses

Learning objectives

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

- 1 International Spectrum Recommendations
- 2 Equipment Standards applicable to Microwave Transmission Systems
- 3 The role of National Regulation Authorities
- 4 Spectrum Licenses and the License Application Process
- 5 Radio Channels

Target audience

This course is suitable for anyone who is required to be familiar with regulation in Microwave Transmission technologies.

Prerequisites

Successful completion of the following courses:

Microwave Transmission Technology Overview - LZU1022081



Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Fundamentals - Antennas

LZU1022059 R1A

Description:

This learning module covers parabolic antenna technology for Microwave Transmission systems, from antenna gain, pattern and half-power beam width to ETSI antenna classes, ways to connect the antenna to the radio and installation with alignment.

Learning objectives:

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

- 1 Know the different ways to connect a microwave radio to the antenna
- 2 Understand how antennas give a signal gain
- 3 Understand the importance of proper installation and antenna alignment.

Target audience:

This course is suitable for anyone who is required to be familiar with microwave transmission technologies.

Prerequisites:

Successful completion of the following courses:

Microwave Transmission Technology Overview LZU1022081

Duration and class size:

The length of the course is 37 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Fundamentals - Equipment

LZU1022058 R1A

Description:

This learning module explains the basic functional units of a Microwave Transmission system. Different types of systems for indoor and outdoor installation, protection techniques as well as technologies to improve throughput and availability of the radio link are also discussed.

Learning objectives:

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

- 1 Know the Principle Architecture of a Microwave radio system
- 2 Understand the functionality of modulation
- 3 Know the different building principles and protection modes available for microwave radio systems
- 4 Understand the importance of reducing the power consumption
- 5 Know different improvements factors for the microwave path
- 6 Know the importance of DCN and Network Management.

Target audience:

This course is suitable for anyone who is required to be familiar with Microwave Transmission Technologies.

Prerequisites:

Successful completion of the following courses:

Microwave Transmission Technology Overview LZU1022081



Duration and class size:

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



Microwave Transmission Technology Overview

LZU1022081 R1A

Description

Introductory course on Microwave Transmission Technology.

Learning objectives

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

- 1 Typical Applications, why is Microwave used?
- 2 Types of Equipment
- 3 Carried Traffic
- 4 Path Planning and the Use of the Radio Spectrum

Target audience

This course is suitable for anyone who is required to be familiar with Microwave Transmission Technology.

Prerequisites

Successful completion of the following courses:

None

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Transmission Technology Fundamentals - Management DCN

LZU1420262 R1A

Description

This Course falls under technical foundation portfolio. A basic introduction to management DCNs for transmission networks.

Learning objectives

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

- 1 Understand the purpose of Management DCN networks.
- 2 Know main types of DCN entities.
- 3 Know the most common ways that DCN traffic is carried in networks, in-band and out of band.
- 4 Know typical transport-specific implementations of DCN, e.g. for SDH, Ethernet, IP and MPLS.
- 5 Understand basic issues of DCN security.
- 6 See the need for DCN design and know the main tasks to be done

Target audience

This course is suitable for anyone who is required to be familiar with the management of DCNs for transmission networks



Prerequisites

Successful completion of the following courses:

None.

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Transmission Technology Fundamentals - PDH and SDH

LZU1022367 R1A

Description

This course explains the basics of PDH and SDH/SONET transmission technology, including 64kbit/s streams, DS1s and E1s, multiplex hierarchies, SDH network elements and protection.

Learning objectives

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

- 1 How voice is converted for transport in digital networks,
- 2 Basics of PDH, including E1 channels and multiplex hierarchy,
- 3 Basics of SDH, including multiplex hierarchy, different mux levels, overheads and protection,
- 4 Typical applications for PDH and SDH and
- 5 Some key differences between ETSI and ANSI regarding PDH and SDH/Sonet.

Target audience

This course is suitable for anyone who is required to be familiar with Transmission technology fundamentals of PDH and SDH.

Prerequisites

Successful completion of the following courses:

None.

Duration and class size

The length of the course is 25 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Transmission Technology Fundamentals - Phase and time sync

LZU1420230 R1A

Description

This course gives an introduction to the precision time protocol, PTP, as defined by IEEE 1588, and the recommendations for deployment in telecommunications networks from ITU-T.

Learning objectives

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

- 1 The relevant IEEE and main ITU standards.
- 2 IEEE and ITU network functionalities and clock types.
- 3 How PTP transports time stamp information.
- 4 How this information is used to recover the local clock.

Target audience

This course is suitable for anyone who is required to be familiar with Transmission technology fundamentals of phase and time sync.

Prerequisites

Successful completion of the following courses:

Transmission Technology Fundamentals - Synchronization - LZU1022572

Duration and class size

The length of the course is 25 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Transmission Technology Fundamentals - Sync

LZU1022572 R1A

Description

This Course falls under Technical Foundation Portfolio. This course introduces synchronization over transport networks. It shows why synchronization is necessary and explains different technologies to provide it.

Learning objectives

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

- 1 Why synchronization is needed.
- 2 The difference between frequency, phase and time synchronization.
- 3 The basics for the main technologies to provide synchronization over transport networks.
- 4 Synchronization requirements in mobile networks.

Target audience

This course is suitable for anyone who is required to be familiar with Transmission technology fundamentals in synchronization over transport networks.

Prerequisites

Successful completion of the following courses:

None.

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Transmission Technology Fundamentals - TDM over Packet

LZU1022590 R1A

Description

This course explains how TDM services can be transported over packet networks using SAToP and CESoPSN protocols.

Learning objectives

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

- 1 Applications of TDM transport over packet networks
- 2 Different protocols for TMD transport over packet networks
- 3 Differences between Layer 2 (Ethernet) and Layer 3 (IP/MPLS) CES transport
- 4 Latency and capacity issues
- 5 Synch solutions for TDM over packet

Target audience

This course is suitable for anyone who is required to be familiar with Transmission Technology fundamentals on TDM.

Prerequisites

Successful completion of the following courses:

None.

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



Ericsson Microwave Products Overview

LZU1088322 R5A

Description:

Introduction to Ericsson's Microwave product portfolio:

- Use of Microwave systems & market trends
- Which Microwave products does Ericsson have?
- Short introduction to each Microwave product
- Deployment examples

Learning objectives:

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

- 1 Describe what the Ericsson Microwave products are and for what use they are commonly deployed.
- 2 Describe what type of traffic can be transported.
- 3 List the product families.
- 4 Describe the product families' main functional properties.
- 5 Give typical application scenarios for the product families.
- 6 Describe how management of a MINI-LINK network is arranged.

Target audience:

This course is suitable for anyone who is required to be familiar with microwave products.

Prerequisites:

Successful completion of the following courses:

None



Duration and class size:

The length of the course is 1 hour and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



MINI-LINK 6600 Fundamentals - Concept and Components

LZU1421394 R3A

Description:

This course covers the MINI-LINK 6600 key concept and indoor components. The course covers the product release MINI-LINK 6600 1.5.

Learning objectives:

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

- 1 The MINI-LINK 6600 key concepts
- 2 The MINI-LINK 6600 main system components

Target audience:

This course is suitable for anyone who is required to be familiar with MINI-LINK 6600.

Prerequisites:

Successful completion of the following courses:

Ericsson Microwave Products Overview LZU1088322

Duration and class size:

The length of the course is 42 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



MINI-LINK 6600 Fundamentals - Software and Licenses

LZU1421395 R3A

Description:

This course covers the MINI-LINK 6600 software architecture and licenses. The course covers the product release MINI-LINK 6600 1.5.

Learning objectives:

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

- 1 The MINI-LINK 6600 software architecture
- 2 The MINI-LINK 6600 licensing of functions and hardware capacities

Target audience:

This course is suitable for anyone who is required to be familiar with MINI-LINK 6600.

Prerequisites:

Successful completion of the following courses:

Ericsson Microwave Products Overview LZU1088322

Duration and class size:

The length of the course is 26 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



MINI-LINK Radio Unit Fundamentals

LZU1082365 R1A

Description

This course covers the MINI-LINK outdoor radio units used together with indoor units MINI-LINK 6600, MINI-LINK TN and MINI-LINK CN.

Learning objectives

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

- 1 MINI-LINK radio units
- 2 Main functionality and properties.
- 3 Sub-band index structure.

Target audience

This course is suitable for anyone who is required to be familiar with MINI-LINK Radio Unit.

Prerequisites

Successful completion of the following courses:

MINI-LINK Fundamentals courses

Duration and class size

The length of the course is 30 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



MINI-LINK 6351 Fundamentals

LZU1420963 R1A

Description

A technical introduction to MINI-LINK 6351 covering key concept, hardware, software, microwave radio and licensing. The course is updated to MINI-LINK 6351 release 2.9.

Learning objectives

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

- 1 The MINI-LINK 6351 key concepts
- 2 The MINI-LINK 6351 hardware architecture
- 3 The MINI-LINK 6351 software architecture
- 4 The MINI-LINK 6351 microwave radio
- 5 The MINI-LINK 6351 licensing structure

Target audience

This course is suitable for anyone who is required to be familiar with MINI-LINK 6351.

Prerequisites

Successful completion of the following courses:

- Microwave Transmission Technology Overview - LZU1022081
- Ericsson Microwave Products Overview - LZU1088322

Duration and class size

The length of the course is 35 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



MINI-LINK 6352 Fundamentals

LZU1420964 R1A

Description

A technical introduction to MINI-LINK 6352 covering key concept, hardware, software, microwave radio and licensing. The course is updated to MINI-LINK 6352 release 2.9.

Learning objectives

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

- 1 The MINI-LINK 6352 key concepts
- 2 The MINI-LINK 6352 hardware architecture
- 3 The MINI-LINK 6352 software architecture
- 4 The MINI-LINK 6352 microwave radio
- 5 The MINI-LINK 6352 licensing structure

Target audience

This course is suitable for anyone who is required to be familiar with MINI-LINK 6352.

Prerequisites

Successful completion of the following courses:

- Microwave Transmission Technology Overview - LZU1022081
- Ericsson Microwave Products Overview - LZU1088322

Duration and class size

The length of the course is 50 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



MINI-LINK 6366 Fundamentals

LZU1421578 R1A

Description:

A technical introduction to MINI-LINK 6366 covering key concept, hardware, software, microwave radio and licensing.

This course is updated to MINI-LINK 6366 release 1.5.

Learning objectives:

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

- 1 The MINI-LINK 6366 key concepts
- 2 The MINI-LINK 6366 hardware architecture
- 3 The MINI-LINK 6366 software architecture
- 4 The MINI-LINK 6366 microwave radio
- 5 The MINI-LINK 6366 licensing structure

Target audience:

This course is suitable for anyone who is required to be familiar with MINI-LINK 6366.

Prerequisites:

Successful completion of the following courses:

Ericsson Microwave Products Overview LZU1088322

Duration and class size:

The length of the course is 33 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



MINI-LINK All-Outdoor Products - Packet Traffic Handling Fundamentals

LZU1421186 R1A

Description:

This course describes how Ethernet traffic is handled in the Ericsson Microwave all-outdoor products MINI-LINK PT 2020, MINI-LINK 6351, MINI-LINK 6352, and Switch 6391, release 2.7.

Learning objectives:

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

- 1 Understand how the traffic is handled from ingress to egress for different network scenarios.

Target audience:

This course is suitable for anyone who is required to be familiar with MINI-LINK All-outdoor.

Prerequisites:

Successful completion of the following courses:

MINI-LINK PT Fundamentals, LZU1088553
MINI-LINK 6351 Fundamentals, LZU1420963
MINI-LINK 6352 Fundamentals, LZU1420964
Switch 6391 Fundamentals, LZU1421002

Duration and class size:

The length of the course is 35 minutes and the maximum number of participants per session is 1

Learning situation:

This is a web-based interactive training course with multimedia content.



Switch 6391 Fundamentals

LZU1421002 R1A

Description

A technical introduction to Switch 6391 covering key concept, hardware, software and licensing. The course is updated to Switch 6391 release 2.9.

Learning objectives

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

- 1 The Switch 6391 key concepts
- 2 The Switch 6391 hardware architecture
- 3 The Switch 6391 software architecture
- 4 The Switch 6391 licensing structure

Target audience

This course is suitable for anyone who is required to be familiar with Switch 6391 .

Prerequisites

Successful completion of the following courses:

Ericsson Microwave Products Overview - LZU1088322.

Duration and class size

The length of the course is 20 minutes and the maximum number of participants per session is 1

Learning situation

This is a web-based interactive training course with multimedia content.



5G Transport Overview

LZU1082662 R1A

Description:

Are you starting your journey towards 5G? This course will give you an overview of 5G and 5G transport. It will outline the requirements 5G have on transport, and the how mobile operators can build a transport network to meet these requirements. It will give an overview of Ericsson's offering for 5G transport with Ericsson Radio System, and it will give you an insight to some of the 5G related features available in the Ericsson transport nodes.

Learning objectives:

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

- 1 Understand 5G transport on an overview level
 - 1.1 Market drivers
 - 1.2 Use cases
 - 1.3 The 5G journey
- 2 Describe requirements that 5G will put on transport
 - 2.1 More Bandwidth
 - 2.2 More Connections
 - 2.3 More Security
 - 2.4 Lower Latency
 - 2.5 New Interfaces
 - 2.6 New Concepts
 - 2.7 Synchronization
 - 2.8 TCO
- 3 Describe Ericsson's 5G transport offering
 - 3.1 The Ericsson 5G platform
 - 3.2 Ericsson Radio System
 - 3.3 Complete 5G Ready Transport
 - 3.4 Management system
 - 3.5 Partner products

Target audience:

Overview training - This course is suitable for anyone who is required to be familiar with 5G transport

**Prerequisites:**

Successful completion of the following courses:

General understanding of mobile networks and the transport segment.

Duration and class size:**Learning situation:**

This is a web-based interactive training course with multimedia content.



5G RAN Transport Solution and Design Overview

LZU1082661 R1A

Description:

The course covers the basic 5G architecture, technical concepts and functionality for transport networks.

Learning objectives:

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

- 1 Describe the basic concepts, drivers, architecture and deployment scenarios for 5G
- 2 Describe the transport functionality in Baseband
 - 2.1 Physical port capability
 - 2.2 Layer 2/Layer 3 capabilities
 - 2.3 QoS
 - 2.4 Performance monitoring including TWAMP
 - 2.5 Troubleshooting
- 3 Describe Ericsson's backhaul product portfolio
 - 3.1 Baseband
 - 3.2 Router 6000
 - 3.3 Fronthaul 6000
 - 3.4 MINI-LINK
- 4 Describe the RAN security solution
 - 4.1 Transport and OAM Security
 - 4.2 Node hardening
 - 4.3 Certificate management
- 5 Describe the synchronization solution
 - 5.1 Frequency, and time and phase
 - 5.2 Synchronization options for NR NSA: PTP and GNSS
 - 5.3 Synchronization reference solutions
- 6 Describe the NR NSA Transport Network Dimensioning method
- 7 Describe the 5G NR NSA connectivity reference solutions

**Target audience:**

This course is suitable for anyone who is required to be familiar with 5G RAN Transport Solution and Design

Prerequisites:

Successful completion of the following courses:

None

Duration and class size:

The length of the course is 1 day and the maximum number of participants per session is 16

Learning situation:

This course is based on theoretical instructor-led lessons given in a classroom environment.



Fronthaul 6020 R19 Operation and Maintenance

LZU1082849 R1A

Description:

Do you have the Fronthaul 6020 in your network, as part of the Ericsson Radio System? Operating the commissioning, configuration and maintenance of Fronthaul 6020 can be a complex and resource-consuming task, if your personnel does not have the appropriate tools and knowledge.

With the aid of this course, your personnel will get full information of the Fronthaul 6020 equipment features and system architecture.

The basic procedures for equipment start up, configuration and maintenance are explained. Furthermore, the course material includes step by step procedures that are much helpful in the competence transfer and in the following revision of the learned concepts.

Learning situation:

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools which can be optionally accessed from remote. In case no real equipment is available, the exercises will be explained with the aid of films showing the step by step procedures.

This course can be conducted at the Customer premises.

Learning objectives:

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

- 1 Discuss the WDM technology
 - 1.1 Name the main WDM technologies
 - 1.2 Describe the DWDM Network components
- 2 Introduce the fronthauling and the Fronthaul 6020
 - 2.1 Recall the concepts of the "fronthauling".
 - 2.2 Summarize the characteristics of the Fronthaul 6020 solution
- 3 Discuss the Fronthaul 6020 system description
 - 3.1 Discuss the possible network configurations
 - 3.2 Explain the traffic mapping and the management architecture
 - 3.3 Explain the position of the equipment hardware parts and the front panel devices
- 4 Access the Fronthaul 6020 Local Craft Terminal (LCT) and CLI interfaces
 - 4.1 Discuss the Fronthaul equipment management architecture
 - 4.2 Navigate the LCT working areas
 - 4.3 Access the Fronthaul via CLI interface



- 5 Operate the initial system set-up
 - 5.1 Name the commissioning steps
 - 5.2 Provision the WDM Services
- 6 Analyze the alarms and performance data
 - 6.1 Describe the alarms recognition
 - 6.2 Analyze the performance data and the optical measurement
- 7 Perform the main maintenance procedures
 - 7.1 Monitor the equipment inventory
 - 7.2 Back-up and restore the equipment configuration
 - 7.3 Upgrade the equipment software
 - 7.4 Understand the main system debugging procedures

Target audience:

This course is suitable for anyone who is required be able to configure/operate/maintain the Fronthaul 6020 equipment as part of the radio network.

Prerequisites:

The participants must be familiar with the radio network technologies. Knowledge of the optical transport is preferred.

Duration and class size:

The length of the course is 2 days and the maximum number of participants is 8.



MINI-LINK 6600 M19 Advanced Ethernet Operations

LZU1082859 R1A

Description:

Are you ready to start the evolution towards 5G? MINI-LINK 6600 will support you in taking the next step with your network.

Learning situation:

This course is based on theoretical and practical instructor-led lessons given in both classroom and in a technical environment using equipment and tools.

Learning objectives:

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

- 1 Describe how to operate advanced Ethernet traffic configurations in MINI-LINK 6600
 - 1.1 Admission control and Switch port roles
 - 1.2 Traffic classification
 - 1.3 Policing and Color marking
 - 1.4 Provider Bridging
 - 1.5 QinQ Bridging
 - 1.6 Traffic Class mapping
 - 1.7 Buffer size
 - 1.8 Scheduling
 - 1.9 Active and Passive queue management
 - 1.10 Hierarchical QoS
- 2 Describe how to implement Ethernet traffic protection functions
 - 2.1 Rapid Spanning Tree (RSTP)
 - 2.2 Link Aggregation (LAG)
 - 2.3 Ethernet Ring Protection (ERP)
- 3 Describe how to operate and how to take advantage of Capacity Booster technologies
 - 3.1 Multi-Layer Header Compression
 - 3.2 Multi-Band Booster
- 4 Describe how to operate synchronization over packet in MINI-LINK 6600
 - 4.1 Phase and Time synchronization 1588v2

**Target audience:**

This course is suitable for anyone who is required to use MINI-LINK 6600 M19

Prerequisites:

Successful completion of the following courses:

MINI-LINK 6600 Commissioning & Basic Operations - LZU1082868

Duration and class size:

The length of the course is 3 days and the maximum number of participants is 8



MINI-LINK 6600 M19 Commissioning and Basic Operations

LZU1082868 R1A

Description:

Are you maintaining or working with deployment of MINI-LINK 6600 in a network? Do you feel you have the right competence to perform your duties? If not sure, this is the course for you. With the help of both the Web Based Courses, videos as well as the theoretical lessons in this course, the attendees will get a solid knowledge about MINI-LINK 6600 configurations and functions.

Learning situation:

This is a Blended Learning.

The WBL component(s) is self-paced interactive learning with multimedia content, delivered online and the ILT component is based on theoretical and practical instructor-led lessons given in a technical environment using equipment and tools.

Learning objectives:

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

- 1 Know how to configure a MINI-LINK 6600/6366 network element using Node GUI
- 2 Know how to configure Radio Link parameters and TDM traffic
 - 2.1 Hybrid and packet unprotected radio hop parameters
 - 2.2 Hybrid and packet protected radio hop parameters
 - 2.3 PDH traffic, Traffic Routing, and Ring Protection
- 3 Know how to configure basic Ethernet traffic
 - 3.1 Ethernet WAN ports
 - 3.2 Layer 1 packet traffic
 - 3.3 Layer 2 packet traffic
 - 3.4 Radio Link Bonding
- 4 Know how to configure the Management Network, DCN using Node GUI
 - 4.1 DCN over VLAN
 - 4.2 Routed DCN
- 5 Know how to configure Layer 1 network synchronization using Node GUI
- 6 Know how to set up Multiband booster with MINI-LINK 6352



Target audience:

This course is suitable for anyone who is required be able to configure/operate/maintain MINI-LINK 6600.

Prerequisites:

Successful completion of the following courses:

None

Duration and class size:

The length of WBL component(s) is approximately 3 hours.

The length of ILT component is 2 days and the maximum number of participants per session is 8.



MINI-LINK 6600 M19 IP Operations

LZU1082858 R1A

Description:

Are you ready to start the evolution towards 5G?
MINI-LINK 6600 will support you in taking the next step with your network.
This course is focusing on the Layer 3 (IP) services in MINI-LINK 6600.

Learning situation:

This is an Instructor-Led Training.

This course is based on theoretical and practical instructor-led lessons given in a technical environment using equipment and tools.

Learning objectives:

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

- 1 Describe Layer 3 (IP) services and support in MINI-LINK 6600
 - 1.1 Layer 3 services
 - 1.2 Routing protocol support
- 2 Operate and configure IP/MPLS and VPN functionalities
 - 2.1 IP/MPLS
 - 2.2 Layer 3 VPN
 - 2.3 Hand-on: IP/MPLS VPN exercises

Target audience:

Network Deployment Engineers, System Engineers, Field Technicians, System Technicians

Prerequisites:

Successful completion of the following courses:

MINI-LINK 6600 M19 Commissioning and Basic Operations, LZU1082868 R1A

MINI-LINK 6600 M19 Advanced Ethernet Operations, LZU1082859 R1A

Duration and class size:

The length of the course is 1 day and the maximum number of participants per session is 8.



MINI-LINK 6600 M19 Maintenance and Troubleshooting

LZU1082857 R1A

Description:

By lectures and practical exercises and with guidance from the instructors, the attendees will learn how to interpret performance data and how to perform maintenance, troubleshooting tasks in MINI-LINK 6600 Network Elements.

Theoretical lessons will help the attendees to get a deep knowledge about the units and their functions. The practical exercises and instructor's guidance will help the attendees to learn how to think and what actions to take to find and correct errors in a MINI-LINK network.

Learning situation:

This is an Instructor-Led Training.

This course is based on theoretical and practical instructor-led lessons given in a technical environment using equipment and tools.

Learning objectives:

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

- 1 Perform maintenance of MINI-LINK 6600 network elements
 - 1.1 Work with alarms
 - 1.2 Be able to activate Performance Counters and find the results
 - 1.3 Handle ordering of new licenses
 - 1.4 Describe how the software of the node is handled
- 2 Recognize the most common hardware faults and how to deal with them
 - 2.1 Recognize the most common hardware faults originating from installation
 - 2.2 Describe Indoor Units backplane architecture
 - 2.3 Understand the importance of correct installations
 - 2.4 Understand cooling importance and node behavior once high/excessive temperatures are reached
- 3 Know the procedure and tools for trouble shooting with MINI-LINK GUI
 - 3.1 Have knowledge about the most common alarm situations
 - 3.2 Know the most common alarms and know where they originate from
 - 3.3 Describe how the MINI-LINK is built up in a more detailed way
 - 3.4 Know how to think when doing fault finding of Ethernet problems
 - 3.5 Describe how to use available tests and loops to localize faults
 - 3.6 Know how and when to collect data with help of the Data Collection Guideline



- 4 Know how to replace faulty hardware
 - 4.1 Know how to assure compatibility between hardware and software
 - 4.2 Describe what can happen if the correct software is not loaded to a replacement unit
 - 4.3 Know the procedure of how to exchange hardware correctly
- 5 Configure and troubleshoot DCN and Network Synchronization for MINI-LINK 6600
 - 5.1 Understand main MINI-LINK DCN design guidelines
 - 5.2 Access MINI-LINK CLI and execute commands
 - 5.3 Access MINI-LINK nodes in different ways
 - 5.4 Configure and troubleshoot MINI-LINK nodes Network Synchronization
- 6 Identify and troubleshoot radio propagation problems
 - 6.1 List the different fading mechanisms.
 - 6.2 Describe how the fading mechanisms influence the performance of the microwave radio hop and how it relates to frequency.
 - 6.3 List examples of how to improve the path performance.
 - 6.4 Give basic design guidelines for space and frequency diversity.
 - 6.5 Describe what interference is and how it affects radio links.
 - 6.6 Investigate if the links are affected by interference.
 - 6.7 Describe the different ways of dealing with interference.

Target audience:

This course is suitable for anyone who is required be able to maintain/troubleshoot MINI-LINK 6600.

Prerequisites:

Successful completion of the following courses:

MINI-LINK 6600 M19 Commissioning and Basic Operations LZU1082867
Further all participants should have basic IP and transmission knowledge.

Duration and class size:

The length of the course is 2 days and the maximum number of participants per session is 8.