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</table>
**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:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Delivery Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Icon" /></td>
<td>Instructor Led Training (ILT)</td>
</tr>
<tr>
<td><img src="image2" alt="Icon" /></td>
<td>Seminar (SEM)</td>
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<td><img src="image3" alt="Icon" /></td>
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<td><img src="image6" alt="Icon" /></td>
<td>Short Article (SA)</td>
</tr>
<tr>
<td><img src="image7" alt="Icon" /></td>
<td>Streaming Video (SV)</td>
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<tr>
<td><img src="image8" alt="Icon" /></td>
<td>CD-ROM (CD)</td>
</tr>
<tr>
<td><img src="image9" alt="Icon" /></td>
<td>Structured Knowledge Transfer (SKT)</td>
</tr>
</tbody>
</table>

**Delivery Enablers**

- Remote Training Lab (RTL)
- Web Portal (WP)

**Ericsson Education E-Learning**

EEOnline @ [http://learning.ericsson.net/eeonline/](http://learning.ericsson.net/eeonline/)
Microwave Networks Overview

LZU108 6109 R3B

Description
Telecom networks of today employ a variety of technologies and products which at first can be difficult to get an overview of.

This course will help you to understand what a Transmission and Transport network is and how the Ericsson microwave transmission product families can be used to realize such networks in an efficient way. Main features and benefits of the products will be explained.

This course will on its own give an overall understanding of the products and techniques and the knowledge provided by it is a prerequisite for deeper studies in the subject.

Learning objectives
On completion of this course the participants will be able to:
1. Give typical applications for Ericsson Transmission and Transport products
2. Describe the main functions of each product family

Target audience
The target audience for this course is: Fundamentals
This audience requires an introduction to the Ericsson microwave portfolio

Prerequisites
The participants should be familiar with basic telecommunication and have basic data communication knowledge.

Duration and class size
The length of the course is 3 hours
Learning situation
This is a web-based interactive training course with multimedia content.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Microwave Networks Overview</td>
<td>3 hour</td>
</tr>
</tbody>
</table>
Microwave Networks System Survey

LZU 108 7348 R2A

Description
Are you interested in getting a basic knowledge about Ericsson Microwave Networks and its main features? This course will provide you with an understanding of the key features and benefits of the products forming the Ericsson Microwave Networks portfolio. After the course you will understand what equipment to use to meet different demands put on the transmission network.

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

1. Describe basic microwave and digital transmission theory
   1.1 Describe PDH, SDH, Ethernet and ATM
   1.2 Describe Microwave propagation
2. Describe the system features of the Ericsson microwave products
   2.1 List MINI-LINK TN R4 equipment
   2.2 List MINI-LINK E equipment
   2.3 List Marconi LH R2 equipment
3. Describe the system features of ServiceOn Microwave R8
4. From given data for the transmission network and with the help from customer documentation configure system hardware for microwave terminals

Target audience
The target audience for this course is: Fundamentals

Prerequisites
The participants should be familiar with basics in telecommunication and transmission.

Duration and class size
The length of the course is 2 days and the maximum number of participants is 16.
Learning situation
This course is based on theoretical instructor-led lessons given in a classroom environment.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Course introduction</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Technical introduction to transmission techniques and microwave propagation</td>
<td>1,5 hours</td>
</tr>
<tr>
<td></td>
<td>• Microwave Networks</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E system features</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK TN system features</td>
<td>2,5 hours</td>
</tr>
<tr>
<td>2</td>
<td>• MINI-LINK radio network, hardware features and overview of planning objectives</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Marconi LH system features</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• ServiceOn Microwave system features</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• System design exercise</td>
<td>1,5 hours</td>
</tr>
<tr>
<td></td>
<td>• Summing up of the course</td>
<td>0,5 hour</td>
</tr>
</tbody>
</table>
WinLink 1000 System Survey and Operations

Description
Are you about to include the WinLink 1000 into your transmission network? Whether it as last mile transmission to remote cellular end sites or as transmission media for a corporate network this is the course that will explain how to deploy the system. The course will explain how to design the radio path to meet certain transmission capacity and quality, how to install the system and how to manage the system.

This Web-based learning product will in some easy steps explain the possibilities of WinLink 1000, its included system components, how to plan, install and manage a link.

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

1. Describe the main user characteristics of the system components
   1.1 Indoor Units, IDU-C, IDU-E, PoE,
   1.2 Outdoor Units, ODU and Antenna.
2. Plan a link with respect to given traffic capacity and transmission quality
   2.1 Link Budget Calculator
3. Install and commission a link
   3.1 IDU and ODU installation
   3.2 Antenna alignment
   3.3 Commissioning
4. Operate the system
   4.1 WinLink Manager
   4.2 Management DCN

Target audience
The target audience for this course is: Network Design Engineers, Network Deployment Engineers, System Technicians, Service Technicians, System Engineers, Field Technicians,

Prerequisites
Telecom and transmission fundamentals

Duration and class size
The length of the course is 2 hours 15min.
Learning situation

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

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate. (This paragraph is mandatory).

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Application and Services</td>
<td>15min</td>
</tr>
<tr>
<td></td>
<td>• System Description</td>
<td>0,5h</td>
</tr>
<tr>
<td></td>
<td>• Installation and Basic Commissioning</td>
<td>0,5h</td>
</tr>
<tr>
<td></td>
<td>• Operations</td>
<td>0,5h</td>
</tr>
<tr>
<td></td>
<td>• Link Planning</td>
<td>0,5h</td>
</tr>
</tbody>
</table>
MINI-LINK E Operation & Maintenance

LZU 113 48 R6D

Description
Do you have the right knowledge in MINI-LINK E to work with operation and maintenance in the field in the most efficient way? If not, this course is the one to help you to do that. With the help of theoretical lectures and exercises a good knowledge in the MINI-LINK E product will be provided. During practical exercises under the guidance from experienced instructor a good knowledge in field installation, commissioning and maintenance of MINI-LINK E will be gained.

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

1. With the help of MINI-LINK customer documentation and SID on their own perform commissioning of a MINI-LINK E site
   1.1 Identify relevant set-up inputs
2. With the help of MINI-LINK customer documentation and SID on their own perform on site maintenance and fault correction
   2.1 Fault analyze process
   2.2 Unit replacement
   2.3 Identify possible fault correction actions
3. On their own and with help from customer documentation handle MINI-LINK E specific tools
   3.1 Working with MSM
   3.2 Proper use of MINI-LINK E HW tools
4. Identify possible MINI-LINK E configurations to perform a given transmission task.
   4.1 Indoor and outdoor HW
   4.2 Management network

Target audience
The target audience for this course is: System Technicians, Service Technicians, System Engineers, Service Engineers and Field Technicians.
This audience is responsible for field commissioning and maintenance.
Prerequisites
The participants should be familiar with the MINI-LINK concept in general, telecommunication and microwave transmission in general, working with Windows operating system and have an understanding of what it means to work in a field maintenance organization.

Successful completion of the following courses: MINI-LINK Installation LZU 108 6144 or Microwave Networks Overview, LZU 108 6109 (WBL) or have gained similar knowledge about MINI-LINK E installation.

Duration and class size
The length of the course is 4 days and the maximum number of participants is 8.

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.
Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Course introduction</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK microwave transmission network</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E radio network</td>
<td>2 hour 15 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E traffic network</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E site configuration exercise</td>
<td>1 hour 15 min</td>
</tr>
<tr>
<td>1</td>
<td>• MINI-LINK E site configuration exercise, continued</td>
<td>1 hour 15 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E management network</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Demonstration of products and accessories</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK E installation</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• MSM demonstrations and exercises</td>
<td>1 hour</td>
</tr>
<tr>
<td>3</td>
<td>• MSM demonstrations and exercises, continued</td>
<td>6 hour</td>
</tr>
<tr>
<td>4</td>
<td>• MSM demonstrations and exercises, continued</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Functional test</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Fault finding with MSM</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Summing up</td>
<td>30 min</td>
</tr>
</tbody>
</table>
MINI-LINK HC Operation & Maintenance

LZU 113 302 R2C

Description
Do you have the right knowledge in MINI-LINK HC to work with operation and maintenance in the field in the most efficient way? If not, this course is the one to help you to do that. With the help of theoretical lectures and exercises a good knowledge in the MINI-LINK E product will be provided. During practical exercises under the guidance from experienced instructor a good knowledge in field installation, commissioning and maintenance of MINI-LINK HC will be gained.

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

1. With the help of MINI-LINK customer documentation and SID on their own perform commissioning of a MINI-LINK HC site.
   1.1 Identify relevant set-up inputs
2. With the help of MINI-LINK customer documentation and SID on their own perform on site maintenance and fault correction
   2.1 Fault analyze process
   2.2 Unit replacement
   2.3 Identify possible fault correction actions
3. On their own and with help from customer documentation handle MINI-LINK HC specific tools
   3.1 Working with LCT
   3.2 Proper use of MINI-LINK HC HW tools
4. Identify possible MINI-LINK HC configurations to perform a given transmission task.
   4.1 Indoor and outdoor HW
   4.2 Management network

Target audience
The target audience for this course is: System Technicians, Service Technicians, System Engineers, Service Engineers and Field Technicians. This audience is responsible for field commissioning and maintenance.
Prerequisites
The participants should be familiar with the MINI-LINK concept in general, telecommunication and microwave transmission in general, IP addressing, working with Windows operating system and have an understanding of what it means to work in a field maintenance organization.

Successful completion of the following courses: MINI-LINK Installation LZU 108 6144, Microwave Networks Overview, LZU 108 6109 (WBL) or have gained similar knowledge about MINI-LINK HC installation

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

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.
**Time schedule**

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate. (This paragraph is mandatory).

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Course introduction</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK HC system overview</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK HC radio network</td>
<td>1 hour 45 min</td>
</tr>
<tr>
<td></td>
<td>• Synchronous transmission technique</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK HC traffic network</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>• IP DCN basics</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• IP addressing exercise</td>
<td>30 min</td>
</tr>
<tr>
<td>2</td>
<td>• MINI-LINK HC management network</td>
<td>1 hour 45 min</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK HC commissioning exercises with LCT</td>
<td>4 hour 15 min</td>
</tr>
<tr>
<td>3</td>
<td>• MINI-LINK HC maintenance theory</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• MINI-LINK HC maintenance exercise</td>
<td>3 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Functional test</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Sum-up of the course</td>
<td>30 min</td>
</tr>
</tbody>
</table>
MINI-LINK TN R3 Operations

Description
Are you about to introduce MINI-LINK TN R3 in your network? Do you have the right knowledge to deploy and commission the network elements? If not, this is the course for you. With the help of the theoretical lectures the attendees will get a good knowledge about the MINI-LINK TN R3 products. During the practical exercises and with guidance from the instructors the attendees will learn the most efficient ways of deploying MINI-LINK TN R3 network elements.

Learning objectives
On completion of this course the participants will be able to:
1. Have a basic knowledge about transmission fundamentals
2. Define the different parts in a MINI-LINK TN network element
   2.1 Name the indoor parts: Radio terminal and Basic Node
   2.2 Name the outdoor parts: Radio and antennas
   2.3 Name the traffic interfaces
3. Define the functionalities in the MINI-LINK TN concept
   3.1 Define traffic routing
   3.2 Define protection
   3.3 Define Multi/demultiplexer (PDH/SDH)
   3.4 Define Network Element synchronization
4. Recognize the MINI-LINK TN accessories
   4.1 Name the cables and connectors
   4.2 Name the traffic interface panels
   4.3 Name the installation accessories
5. List needed equipment by using defined parameters for a site
6. Have a basic IP knowledge
7. Have a basic knowledge about the DCN parts in a MINI-LINK network
   7.1 Describe routers
   7.2 Name different DCN interfaces: PPP, LAN ports, E1/DS1
   7.3 Describe OSPF and Static Routing
8. Recognize the Local Craft Terminal used for operation and maintenance
9. Configure a MINI-LINK TN network element
   9.1 Make initial settings for the Radio terminal and the Basic Node
   9.2 Set traffic routing
   9.3 Set up a ring protection on a E1/DS1 level
   9.4 Set the DCN settings and get the DCN up and running
**Target audience**
The target audience for this course is: Network Deployment Engineer

**Prerequisites**
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the MINI-LINK TN Installation Course (LZU1086895) and Microwave Networks Overview Course (LZU1086109). Moreover, they must be experienced in working with a PC and the Windows operating system.

**Duration and class size**
The length of the course is 3 days and the maximum number of participants is 8.

**Learning situation**
This course is based on Instructor Led Training. It includes instructor-led lessons using power point presentations, hardware and software demonstrations and practical exercises on the hardware and local craft terminal in a classroom with complete MINI LINK TN R3 equipment setup.

**Time schedule**
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>- Introduction</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>- Transmission Overview</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>- Radio Overview</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>- MINI-LINK TN System Description</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>- MINI-LINK TN System Configuration Exercise</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td>2</td>
<td>- MINI-LINK TN Features</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>- MINI-LINK TN IP Basics and DCN</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>- MINI-LINK TN Management Tools</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>- Local Craft Terminal (LCT) Demo and practical exercises</td>
<td>2 hours</td>
</tr>
<tr>
<td>3</td>
<td>- Local Craft Terminal (LCT) Demo and practical exercises</td>
<td>6 hours</td>
</tr>
</tbody>
</table>
MINI-LINK TN R3 Operation and Maintenance

Description
Do you have the right knowledge to work with operation and maintenance in a MINI-LINK TN network? If not, this is the course for you.

With the help of the theoretical lessons the attendees will get a good knowledge about the MINI-LINK TN products and functions. During the practical exercises and with guidance from the instructors the attendees will learn the most efficient ways of performing operation and maintenance of a MINI-LINK TN network.

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

1. Have a basic knowledge about transmission fundamentals
2. Define the different parts in a MINI-LINK TN network element
   2.1 Name the indoor parts: Radio terminal and Basic Node
   2.2 Name the outdoor parts: Radio and antennas
   2.3 Name the traffic interfaces
3. Define the functionalities in the MINI-LINK TN concept
   3.1 Define traffic routing
   3.2 Define protection
   3.3 Define Multi/de-multiplexer (PDH/SDH)
   3.4 Define Network Element synchronization
   3.5 Configure synchronization of a MINI-LINK Network
   3.6 Configure Ethernet traffic
   3.7 Configure ATM aggregation
   3.8 Describe Licenses
4. Recognize the MINI-LINK TN accessories
   4.1 Name the cables and connectors
   4.2 Name the traffic interface panels
   4.3 Name the installation accessories
5. Be able to list needed equipment by using defined parameters for a site
6. Have a basic IP knowledge
7. Have a good knowledge about the DCN parts in a MINI-LINK network
   7.1 Describe routers
   7.2 Name different DCN interfaces: PPP, LAN ports, E1/DS1
   7.3 Describe OSPF and Static Routing
8. Recognize the Local Craft Terminal used for operation and maintenance
9 Configure a MINI-LINK TN network element
9.1 Make initial settings for the Radio terminal and the Basic Node
9.2 Set traffic routing and Ethernet connections
9.3 Set up a ring protection on a E1/DS1 level
9.4 Set the DCN settings and get the DCN up and running
10 Perform maintenance of a MINI-LINK TN network element
10.1 Define alarms and remove them with help of fault finding
10.2 Perform a software upgrade on the MINI-LINK TN network element
10.3 Perform configuration backups
10.4 Exchange Plug-In-Units
10.5 Perform E1 fault finding by using the inbuilt BERT
10.6 Create license requests

Target audience
The target audience for this course is: System Engineer, Field Technician

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the MINI-LINK Installation Course (LZU1086144) or Microwave Microwave Networks Overview, LZU 108 6109 (WBL). Moreover, they must be experienced in working with a PC and the Windows operating system.

Duration and class size
The length of the course is 5 days and the maximum number of participants is 8.

Learning situation
This course utilizes Instructor Led Training.

The course consists of instructor-led lessons using power point presentations, hardware demonstrations and practical exercises in classroom and in lab environment using live MINI-LINK TN equipment.
Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction&lt;br&gt;• Transmission Overview&lt;br&gt;• MINI-LINK TN Radio Network&lt;br&gt;• MINI-LINK TN System Description&lt;br&gt;• MINI-LINK TN System Configuration Exercise</td>
<td>30 min&lt;br&gt;30 min&lt;br&gt;1.5 hour&lt;br&gt;1.5 hour&lt;br&gt;1.5 hour</td>
</tr>
<tr>
<td>2</td>
<td>• MINI-LINK TN Features&lt;br&gt;• IP Basics &amp; MINI-LINK TN DCN&lt;br&gt;• MINI-LINK TN Management Tools&lt;br&gt;• Local Craft Terminal (LCT) Demo and practical exercises</td>
<td>1 hour&lt;br&gt;45 min&lt;br&gt;45 min&lt;br&gt;3 hours</td>
</tr>
<tr>
<td>3</td>
<td>• Local Craft Terminal (LCT) Demo and practical exercises</td>
<td>6 hours</td>
</tr>
<tr>
<td>4</td>
<td>• MINI-LINK TN Radio Propagation Theory&lt;br&gt;• MINI-LINK TN Advanced Operations Theory&lt;br&gt;• MINI-LINK TN Maintenance Theory&lt;br&gt;• Local Craft Terminal (LCT) Demo and practical exercises</td>
<td>45 min&lt;br&gt;2 hours&lt;br&gt;2 hours&lt;br&gt;45 min</td>
</tr>
<tr>
<td>5</td>
<td>• Local Craft Terminal (LCT) Demo and practical exercises&lt;br&gt;• Summing up</td>
<td>5.5 hours&lt;br&gt;30 min</td>
</tr>
</tbody>
</table>
MINI-LINK TN R3 System Planning

LZU1086841 R1A

Description
A transmission network of today employ a variety of techniques, for example traditional PDH and SDH, New Generation SDH, ATM and Ethernet. With all offered possibilities it can be a challenging task to configure the transmission equipment in a complex transport network.

By lectures, classroom discussions, and configuration exercises this course will help the planner in how to configure MINI-LINK TN systems to meet different transport objectives.

MINI-LINK TN is the main focused product in this course but to minor extent it also covers MINI-LINK HC R1 and MINI-LINK E.

This course focuses on System configuration and planning for the different traffic cases of PDH, SDH, Ethernet over PDH and ATM over PDH.

For detailed knowledge in Management Network Design for MINI-LINK TN please refer to the course: Microwave Networks DCN Design, LZU 108 6146.

For detailed knowledge in Microwave Radio Design for MINI-LINK TN please refer to the course: Microwave Radio Network Design, LZU 108 6842.

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

1 Understand and describe how MINI-LINK TN can be used for transport of PDH, SDH, ATM and Ethernet.
2 From given network topology, traffic capacities and traffic types describe configuration possibilities for MINI-LINK TN, HC and E equipment.
2.1 Traffic related indoor equipment and configurations.
2.2 Licenses.
2.3 DC power.
2.4 Indoor environment
3 Understand how to estimate needed traffic capacity in cellular radio access networks; RAN.
3.1 Transmission in GSM RAN
3.2 Transmission in WCDMA RAN
4 Give examples of network topologies and be able to judge where a certain topology is suitable from a traffic point of view.
5 Understand and describe how to calculate needed number of spare units.
Target audience
The target audience for this course is: Network Design Engineer

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks Overview, LZU 108 6109 (WBL). Knowledge of transmission in cellular network would be advantageous.

Duration and class size
The length of the course is 3 days and the maximum number of participants is 8.

Learning situation
This course is based on theoretical instructor-led lessons given in a classroom environment. It holds network and equipment configuration exercises on paper to let the students practice knowledge gained from the theoretical lessons.
### Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK TN System Description</td>
<td>1 hour 45 min</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK TN Hardware Configuration</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK TN Feature Licenses</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK HC R1 System Description and Hardware Configuration</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK E System Description and Hardware Configuration</td>
<td>45 min</td>
</tr>
<tr>
<td>2</td>
<td>Access transport network, lecture and exercise</td>
<td>2 hour 45 min</td>
</tr>
<tr>
<td></td>
<td>TDM Traffic Routing and ATM VP/VC Cross-connect</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Synchronization Network</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>Ethernet Transport</td>
<td>1 hour</td>
</tr>
<tr>
<td>3</td>
<td>MINI-LINK Radio Network</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Spare part dimensioning</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Access Transport Network Design Exercise</td>
<td>3 hour 45 min</td>
</tr>
<tr>
<td></td>
<td>Summing up</td>
<td>30 min</td>
</tr>
</tbody>
</table>
MINI-LINK TN R4 Operation & Maintenance

LZU1087243 R2A, R3A, R4A

Description
Do you have the right knowledge to work with operation and maintenance in a MINI-LINK TN R4 network? If not, this is the course for you.

With the help of the theoretical lessons the attendees will get a good knowledge about the MINI-LINK TN R4 products and functions. During the practical exercises and with guidance from the instructors the attendees will learn the most efficient ways of performing operation and maintenance of a MINI-LINK TN R4 network.

LZU 108 7243 R2A meets MINI-LINK TN R.4.1 FP.
LZU 108 7243 R3A meets MINI-LINK TN R.4.2
LZU 108 7243 R4A meets MINI-LINK TN R.4.2 FP

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

1. Understand Transmission fundamentals.
2. Define the different parts in a MINI-LINK TN network element.
   - Name the indoor and outdoor parts.
   - Name the traffic interfaces.
   - Recognize the MINI-LINK TN accessories.
   - Work with the MINI-LINK Craft used for operation and maintenance.
3. Be able to list needed equipment by using defined parameters for a site.
4. Understand the functionalities of the MINI-LINK TN concept.
   - Define Traffic Routing.
   - Define protection.
   - Describe licenses.
   - Configure a MINI-LINK TN network element.
   - Configure Traffic Routing and ring protection on an E1/DS1 level.
5. Understand basic IP and DCN parts of a MINI-LINK TN network.
   - Name different DCN interfaces.
   - Describe static routing and OSPF.
   - Configure the DCN settings and make the DCN up and running.
6. Understand the SDH/SONET functionalities in the MINI-LINK TN
   - Configure the SDH/SONET radio terminal.
   - Configure the SDH Cross Connect.
7. Understand the ATM Aggregation functionalities in the MINI-LINK TN
   - Configure the ATM Aggregation.
   - Configure synchronization of a MINI-LINK TN network.
8. Understand the Ethernet functionalities in the MINI-LINK TN
   - Configure Layer 1 & 2 Ethernet traffic over PDH and SDH.
   - Configure Native Ethernet Radio links.
   Define alarms and remove them with help of fault finding.
   Perform Configuration backups.
   Perform a Software upgrade.
   Exchange Plug-In Units.
   Perform E1 fault finding by using the inbuilt BERT.
   Create license request.

Target audience
The target audience for this course is: Network Deployment Engineer, System Engineer, Field Technician

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the MINI-LINK TN Installation Course (LZU1086895 R1B), Microwave Networks Overview (LZU 1086109 R2A) or Microwave Networks System Survey (LZU1087348 R2A). Moreover, they must be experienced in working with a PC and the Windows operating system.

Duration and class size
The length of the course is 5 days and the maximum number of participants is 8.

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.
## Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Basic PDH Node</td>
<td>2,5 hours</td>
</tr>
<tr>
<td></td>
<td>• Radio Terminal</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• DCN and Management</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Site Configuration Exercise</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>• Practical Exercises</td>
<td>6 hours</td>
</tr>
<tr>
<td>3</td>
<td>• SDH/SONET Traffic Handling</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• SDH/SONET Configuration Exercise</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td>1,5 hour</td>
</tr>
<tr>
<td></td>
<td>• ATM Traffic Handling</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• ATM Aggregation Configuration Exercise</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td>1,5 hour</td>
</tr>
<tr>
<td>4</td>
<td>• Ethernet Traffic Handling</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>• Ethernet Configuration Exercise</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td>3 hours</td>
</tr>
<tr>
<td>5</td>
<td>• Radio Propagation Theory</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Maintenance Theory</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td>3.5 hours</td>
</tr>
<tr>
<td></td>
<td>• Summing up</td>
<td>0,5 hour</td>
</tr>
</tbody>
</table>
Description

Do you have the right knowledge to work with operation and maintenance in a MINI-LINK TN R4 network? If you already have the competence for MINI-LINK TN R3 but need to know the latest updates, this might be the right course for you.

With the help of the theoretical lessons the attendees will get a good knowledge about the O&M delta between MINI-LINK TN release 3 to release 4. During the practical exercises and with guidance from the instructors the attendees will learn the most efficient ways of performing MINI-LINK TN R4 specific operation and maintenance tasks.

LZU 108 7245 R2A covers the delta between MINI-LINK TN R.3 and R.4.1 FP
LZU 108 7245 R3A covers the delta between MINI-LINK TN R.3 and R.4.2
LZU 108 7245 R4A covers the delta between MINI-LINK TN R.3 and R.4.2 FP

Learning objectives

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

1. Define new MINI-LINK TN products
   1.1 Indoor parts: AMM’s and plug-in units
   1.2 Outdoor parts: Radio and antennas
   1.3 Traffic interfaces
2. Define the new functionalities in the MINI-LINK TN concept
   2.1 Enhanced Ethernet (Ethernet switching, enhanced QoS and O&M, increased speed)
   2.2 Enhanced SDH (integrated ADM, EoSDH and enhanced protection scheme)
3. Define new DCN feature in MINI-LINK TN
   3.1 Multivendor DCN support
4. Handle the new Local Craft Terminal 2.2 used for operation and maintenance
5. Configure and Maintain the new MINI-LINK TN R4.0 specific features/functions

Target audience

The target audience for this course is: System Engineer, Field Technician

Prerequisites

The participants should have participated in the MINI-LINK TN R3 Operation and Maintenance LZU 108 6840.

Duration and class size

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

This course utilizes Instructor Led Training.

The course consists of instructor-led lessons using power point presentations and practical exercises in classroom and in lab environment using live MINI-LINK TN R4 equipment.

**Time schedule**

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Basic Node</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Radio Terminal</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• DCN and Management</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• SDH Traffic handling</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• ATM Traffic handling</td>
<td>0,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Ethernet Traffic handling</td>
<td>3 hours</td>
</tr>
<tr>
<td></td>
<td>• Practical Exercises</td>
<td>5,5 hours</td>
</tr>
<tr>
<td></td>
<td>• Summing up</td>
<td>0,5 hour</td>
</tr>
</tbody>
</table>
MINI-LINK TN R4 System Planning

LZU 108 7244 R2A

Description

A transmission network of today employ a variety of techniques, for example traditional PDH and SDH, New Generation SDH, ATM and Ethernet. With all offered possibilities it can be a challenging task to configure the transmission equipment in a complex transport network.

By lectures, classroom discussions, and configuration exercises this course will help the planner in how to configure MINI-LINK TN R4 systems to meet different transmission challenges.

This course focuses on System configuration for different traffic cases of; PDH and Super PDH traffic, SDH traffic including ADM functionality, Ethernet traffic directly over radio (Native Ethernet) and over PDH and SDH Ethernet traffic handling in the embedded Layer 2 Switch, VLAN and priority functionality ATM cross connect and transport of ATM over PDH.

Synchronization issues.

Traffic dimensioning and network topology examples are taken from GSM and WCDMA Radio Access Networks.

This course covers and concentrates on functionality for MINI-LINK TN up to release 4.2 including Feature Pack. To a minor extent it also covers MINI-LINK E.

For detailed knowledge in Management Network Design please refer to the training course: Microwave Networks DCN Design, LZU 108 6146.

For detailed knowledge in designing the microwave radio network please refer to the training course: Short-haul Microwave Radio Network Design, LZU 108 6842.

Learning objectives

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

1. Understand and describe how MINI-LINK TN R4.2 FP can be used for transport of PDH, SDH, ATM and Ethernet
   1.1 ETSI and ANSI PDH transport and Traffic Routing
   1.2 SDH regenerator, Add-drop multiplexer, Cross-connector
   1.3 ATM over E1 and ATM Cross-connect.
   1.4 Ethernet over radio, PDH and SDH, Ethernet switching.
2. From given network topology, traffic capacities and traffic types describe configuration possibilities and requirements for MINI-LINK TN and E equipment
   2.1 Traffic related indoor equipment and configurations
   2.2 Feature licenses.
   2.3 DC power requirement
3. Understand how to estimate needed transmission capacity in cellular radio access networks.
3.1 GSM RAN built on TDM technology
3.2 WCDMA RAN over ATM
3.3 WCDMA RAN over Ethernet
4. Give examples of network topologies and be able to judge where a certain topology is suitable from a traffic point of view
5. Describe how to estimate needed number of spare units

**Target audience**

The target audience for this course is: Network Design Engineers, Network Deployment Engineers.

**Prerequisites**

Successful completion of the following courses: Microwave Networks Overview, LZU 108 6109.

**Duration and class size**

The length of the course is 3 days and the maximum number of participants is 16.

**Learning situation**

This course is based on theoretical instructor-led lessons given in a classroom environment. It holds network and equipment configuration exercises on paper to let the students practice knowledge gained from the theoretical lessons.
Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Course introduction.</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>2. Access Transport Network, GSM and WCDMA.</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>3. Access Transport Network Design exercise</td>
<td>2 hour 30min</td>
</tr>
<tr>
<td></td>
<td>4. MINI-LINK TN R4 Basic Node</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>5. MINI-LINK TN R4 Radio Terminals</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>6. MINI-LINK TN R4 TDM Traffic Handling</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>7. MINI-LINK TN R4 ATM Traffic Handling</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>8. MINI-LINK TN R4 SDH Traffic Handling</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>9. MINI-LINK TN R4 Ethernet Traffic Handling</td>
<td>2 hour</td>
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<tr>
<td></td>
<td>10. MINI-LINK TN R4 system configuration exercise.</td>
<td>2 hour 30min</td>
</tr>
<tr>
<td></td>
<td>11. MINI-LINK TN R4 Synchronization Network, lecture and exercise</td>
<td>1 hour</td>
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<tr>
<td></td>
<td>12. MINI-LINK TN R4 Feature Licenses, lecture and exercise</td>
<td>30 min</td>
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<tr>
<td></td>
<td>13. MINI-LINK E System Description, lecture and exercise</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>14. MINI-LINK Outdoor Units.</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>15. MINI-LINK Power Consumption</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>16. MINI-LINK Spare Part Dimensioning</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>17. Summing up</td>
<td>30 min</td>
</tr>
</tbody>
</table>
Marconi LH R2 Operation and Maintenance

LZU 108 6712 R2B

Description
Will the SDH Long Haul Microwave Radio System Marconi LH be part of your transport and transmission network? Do you have this system in your sphere of responsibility, but you are not able to operate or configure it reliably within the network? Each network element has specific procedures and special features and functions.

With the help of the training documentation provided in this course and the guidance of the instructors, the attendees will learn the most efficient ways of system operation, maintenance, commissioning, configuration and troubleshooting, hence saving time and money.

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

1. Describe the basic concepts of SDH microwave radio technologies
2. Explain the benefits of XPIC operation
3. Define the benefits and performance of the Marconi LH equipment
4. Clarify the difference to SDH microwave radio systems MDRS155E
5. Describe the channel branching network
6. Explain the waveguide and dehydrator technology
7. Discuss service channels supported
8. Understand all line and radio protection concepts
9. Explain the delta between release 2.5.3 and 2.5.4
10. Illustrate the upgrade of MDRS155E with Marconi LH
11. Operate the Marconi LH Local Craft Terminal
12. Connect the Local Craft Terminal to the equipment
13. Practice basic functions like data backup and software
14. Describe the Marconi LH DCN solution
15. Explain the basic concept of the SISA and SNMP technology
16. Describe and specify the benefits of all DCN operating
17. Configure the system
18. Practice all system configurations
19. Explain all equipment parameters
20. Manage line and radio protection switching solutions
21. Commissioning of the system
22. Practice the commissioning wizard
23. Operate and maintain the system
24. Back up and restore the equipment database
25. Monitor performance data and measuring values
26. Monitor alarms
27. Execute basic troubleshooting procedures
Target audience
The target audience for this course is: Network Deployment Engineer, Field Technician

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks Overview (LZU1086109). Moreover, they must be experienced in working with a PC and the Windows operating system. Basic knowledge of SISA and IP technology would be advantageous.

Duration and class size
The length of the course is 5 days and the maximum number of participants is 8.

Learning situation
This course is based on Instructor Led Training.
It includes instructor-led lessons using power point presentations, hardware and software demonstrations and practical exercises on the hardware and local craft terminal in a classroom with complete Marconi LH equipment setup.
Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction to SDH microwave radio technology</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>• Marconi LH System Performance</td>
<td>45 min</td>
</tr>
<tr>
<td></td>
<td>• Marconi LH Application Examples</td>
<td>1 hour 15 min</td>
</tr>
<tr>
<td></td>
<td>• Channel Branching Network</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>• Baseband Unit – Functional View</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Baseband Unit – Hardware Components</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>• Baseband Unit – Service Channel Applications</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>• Baseband Unit – Protection Switching</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>• Transceiver – Functional View and Interfaces</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• LMT – Local Maintenance Terminal Introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td>2</td>
<td>• Introduction to the SISA Technology</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Network management connection – Operating Modes</td>
<td>2 hours 30 min</td>
</tr>
<tr>
<td></td>
<td>• LMT – Local Maintenance Terminal – Basic Functions</td>
<td>2 hours</td>
</tr>
<tr>
<td>3</td>
<td>• System Configuration</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>• Measuring Values and Performance Data</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• Alarm Displays and Troubleshooting</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Commissioning Instructions</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td>4</td>
<td>• Introduction to IP and Routing Technology</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>• IP and Routing Configuration</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>• System Configuration</td>
<td>1 hour</td>
</tr>
<tr>
<td>5</td>
<td>• Troubleshooting and Replacement Instructions</td>
<td>3 hours</td>
</tr>
</tbody>
</table>
Marconi LH R2 System Planning

Description
Will the SDH Long Haul Microwave Radio System Marconi LH be part of your transport and transmission network? Would you like to ensure the optimum use of this system? Each network element has specific procedures and special features and functions.

With the help of the training documentation provided in this course and the guidance of the instructors, the attendees will learn the most efficient ways of system and station planning, hence saving time and money. Moreover, they will know how to ensure the optimum use of these systems.

The radio hop planning process is not part of this training course.

Learning objectives
On completion of this course the participants will be able to:
1. Describe the Marconi LH equipment
   1.1 Define the benefits and performance of the Marconi LH
   1.2 Illustrate the Marconi LH system application
2. Describe the microwave radio technologies
   2.1 Explain the ATPC, Diversity and XPIC operation
   2.2 Describe the channel branching network
   2.3 Explain the waveguide and dehydrator technology
3. Plan the Marconi LH subracks
   3.1 Describe the hardware components
   3.2 Understand all line and radio protection concepts
   3.3 Explain the delta between release 2.5.3 and 2.5.4
   3.4 Discuss service channels supported
4. Design the Marconi LH DCN solution
   4.1 Explain the basic concept of the SISA and SNMP technology
   4.2 Describe and specify the benefits of all DCN operating

Target audience
The target audience for this course is: Network Design Engineer

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks Overview Course (LZU 108 6109). Basic knowledge of SISA and IP technology would be advantageous.

Duration and class size
The length of the course is 2 days and the maximum number of participants is 16.
Learning situation

This course utilizes Instructor Led Training.

It includes instructor-led lessons using power point presentations, hardware demonstrations and planning exercises.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marconi LH System Performance</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Marconi LH Planning Examples</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Microwave radio technology (Diversity, XPIC, ATPC)</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Channel Branching Network</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>Waveguide and Dehydrator</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Hardware Components</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Hardware Components</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Service Channel Application</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Protection Concept</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>Introduction to the SISA and SNMP Technology</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Network management connection – QD2, OSI , IP</td>
<td>2 hours</td>
</tr>
<tr>
<td>2</td>
<td>Baseband Unit – Hardware Components</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Service Channel Application</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Baseband Unit – Protection Concept</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>Introduction to the SISA and SNMP Technology</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Network management connection – QD2, OSI , IP</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
MDRS155S R5 Operation and Maintenance

Description
Will the SDH Short Haul Microwave Radio System MDRS155S be a part of your transport and transmission network? Do you have this system in your share of responsibility, but you are not able to operate or configure reliably within the network? Each network element has specific procedures and special feature and functions.

With the help of the training documentation provided in this course, and the guidance of the Instructors, the attendees will be able to learn the most efficient ways of system operation, maintenance, commissioning, configuration and troubleshooting, hence saving time and money.

Learning objectives
On completion of this course the participants will be able to:
1. Describe the basic concepts of SDH microwave radio technologies
   1.1 Explain the benefits and characteristics of XPIC operation
   1.2 Explain the benefits and characteristics of protection variants
2. Describe the MDRS155S equipment
   2.1 Define the benefits and performance of the MDRS155S equipment
   2.2 Illustrate the MDRS155S system application
   2.3 Describe the channel branching network
   2.4 Describe the function and interfaces of all indoor unit versions
   2.5 Discuss service channels supported
   2.6 Describe the function and interfaces of all outdoor unit versions
3. Run the MDRS155S Local Craft Terminal
   3.1 Connect the Local Craft Terminal to the equipment
   3.2 Explain the basic LCT function
   3.3 Practice basic functions like data backup and software download
4. Describe the MDRS155S DCN solution
   4.1 Explain the basic concept of the SISA technology
   4.2 Describe and specify the benefits of all DCN operating modes
5. Configure the system
   5.1 Describe and practice all system configurations
   5.2 Explain all equipment parameters
   5.3 Manage protection switching options
6 System commissioning
6.1 Describe and practice the commissioning wizard
7 Operate and maintain the system
7.1 Back up and restore the equipment database
7.2 Monitor performance data and measuring values
7.3 Monitor alarms
7.4 Execute basic troubleshooting procedures

Target audience
The target audience for this course is: Network Deployment Engineer, Field Technician

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the MINI-LINK Installation (LZU1086144) and Microwave Networks Overview, LZU 108 6109 (WBL) Course. Moreover, they must be experienced in working with a PC and the Windows operating system. Basic knowledge of SISA and IP technology would be advantageous.

Duration and class size
The length of the course is 3 days and the maximum number of participants is 8.

Learning situation
This course is based on Instructor Led Training.
It includes instructor-led lessons using power point presentations, hardware and software demonstrations and practical exercises on the hardware and local craft terminal in a classroom with complete MDRS155S equipment setup.
**Time schedule**

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Introduction to SDH microwave radio technology</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>2. MDRS155S Application Examples</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>3. Channel Branching Network</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>4. Indoor Unit – Functional View</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>5. Indoor Unit – Hardware Components</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>6. Indoor Unit – Service Channel Applications</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>7. Indoor Unit – Protection Switching</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>8. Outdoor Unit – Functional View and Interfaces</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td>2</td>
<td>1. LMT – Local Maintenance Terminal Introduction</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>2. Measuring Values and Performance Data</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>3. Alarm Displays and Troubleshooting</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>4. System Configuration</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>5. Commissioning Instructions</td>
<td>1 hour</td>
</tr>
<tr>
<td>3</td>
<td>1. Introduction to the SISA Technology</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>2. Network management connection – Operating Modes</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>3. Introduction to IP and Routing Technology</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>4. IP and Routing Configuration</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>5. Troubleshooting and Replacement Instructions</td>
<td>1 hour 30 min</td>
</tr>
</tbody>
</table>
MDRS155E R2 Operation and Maintenance

LZU 108 6675 R1A

Description

Will the SDH Long Haul Microwave Radio System MDRS155E be a part of your transport and transmission network? Do you have this system in your sphere of responsibility, but you are not able to operate or configure reliably within the network? Each network element has specific procedures and special features and functions.

With the help of the training documentation provided in this course, and the guidance of the Instructors, the attendees will be able to learn the most efficient ways of system operation, maintenance, commissioning, configuration and troubleshooting, hence saving time and money.

Learning objectives

1. On completion of this course the participants will be able to:
   1.1 Describe the basic concepts of SDH microwave radio technologies
   1.2 Explain the benefits and characteristics of XPIC operation
   1.3 Explain the benefits and characteristics of protection variants
   1.4 Describe the MDRS155E equipment
   1.5 Define the benefits and performance of the MDRS155E equipment
   1.6 Illustrate the MDRS155E system application
   1.7 Describe the channel branching network
   1.8 Describe the function of subracks and hardware components
   1.9 Discuss service channels supported
   1.10 Run the MDRS155E LH Local Craft Terminal
   1.11 Connect the Local Craft Terminal to the equipment
   1.12 Explain the basic LCT function
   1.13 Practise basic functions like data backup and software download
   1.14 Describe the MDRS155E LH DCN solution
   1.15 Explain the basic concept of the SISA technology
   1.16 Describe and specify the benefits of all DCN operating modes
   1.17 Configure the system
   1.18 Describe and practise all system configurations
   1.19 Explain all equipment parameters
   1.20 Manage protection switching options
7 System commissioning
8 Operate and maintain the system
8.1 Back up and restore the equipment database
8.2 Monitor performance data and measuring values
8.3 Monitor alarms
8.4 Execute basic troubleshooting procedures

Target audience
The target audience for this course includes Network Deployment Engineers, Field Technicians.

Prerequisites
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks Overview, LZU 108 6109 (WBL). Moreover, they must be experienced in working with a PC and the Windows operating system. Basic knowledge of SISA and IP technology would be advantageous.

Duration and class size
The length of the course is 5 days and the maximum number of participants is 8.
### Learning situation

This course utilizes Instructor Led Training.

The course consists of instructor-led lessons using power point presentations, hardware and software demonstrations and practical exercises with the hardware and local craft terminal in classroom with complete set-up of MDRS155E equipment.

### Time schedule

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
</tr>
</thead>
</table>
| 1   | - MDRS155E system (System design and performance features; MDRS155E application examples; Protection concept and XPIC functionality; Mounting instructions; Practical exercises)  
     - Transmitter / Receiver (Functional view; Interfaces and technical characteristics) |
| 2   | - Modem Unit (Hardware components; Functional view and protection switching; Alarm displays and handling; Interfaces and technical characteristics; Practical exercises)  
     - RPS-C / RPS-H (Functional view and interfaces)  
     - Overhead Access Unit (Hardware components; service channels; Functional view and service channel applications) |
| 3   | - Network management connection (Introduction to the SISA technology; QD2 and OSI connection; IP connection (Routing); Examples and practical exercises)  
     - Overhead Access Unit (Hardware components; Network Management)  
     - MSP – Modular Service PC (Introduction to the MSP software; PC connection and remote access) |
| 4   | - MSP – Modular Service PC (Software structures; Software download and data backup; Measuring values and performance data; System configuration using the MSP)  
     - Commissioning instructions (Commissioning and practical exercises) |
| 5   | - Systematic troubleshooting on the system (Replacement instructions) |
Microwave Networks DCN Design

Description

To design a microwave radio transmission network is a delicate task. Besides design for traffic handling and microwave radio propagation the Planner must be familiar with how to design the management network.

To in a proper way design the management network is of great importance as network availability is becoming an increasingly important issue, both from customer demand and from economical reality. Furthermore the complexity of modern networks adds on to the Planner’s challenge in finding the optimal solution.

By lectures, classroom discussions, and exercises this course will give the participants a solid ground in how to design the Management Data Communication Network for the Ericsson Microwave Networks product range.

Basics about functionality, connectivity and dimensioning of the management tool ServiceOn Element Manager is included in this course. For detailed knowledge in how to administrate and operate this please refer to corresponding training courses.

Learning objectives

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

6 By help from customer documentation identify main Management properties and describe configuration possibilities for MINI-LINK TN, E, and Marconi LH R2.
7 Give examples of management DCN topologies and to judge where a certain topology is suitable.
8 Understand and describe how a management DCN for the above products can be designed.

Target audience

The target audience for this course is: Network Design Engineers

This audience is responsible for the design of the Management DCN in a microwave transmission network.

Prerequisites

The participants should be familiar with digital transmission fundamentals and the Ericsson Microwave Networks portfolio to the level of the Microwave Networks Overview Course, LZU1086109.
**Duration and class size**
The length of the course is 3 days and the maximum number of participants is 16

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

**Time schedule**
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Introduction</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>DCN introduction</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>DCN bearers, lecture and theoretical exercise</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Generic protocols; Ethernet, IP and OSI. Lecture and exercise</td>
<td>2.5 hour</td>
</tr>
<tr>
<td></td>
<td>DCN capacity dimensioning guidelines. Lecture and exercise.</td>
<td>1 hour</td>
</tr>
<tr>
<td>2</td>
<td>OSPF routing, fundamentals and design guidelines. Lecture and exercise.</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK TN R4 DCN specifics. Lecture and exercise.</td>
<td>2.5 hour</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK E DCN specifics. Lecture and exercise.</td>
<td>1.5 hour</td>
</tr>
<tr>
<td>3</td>
<td>Marconi LH R2 DCN specifics. Lecture and exercise.</td>
<td>1.5 hour</td>
</tr>
<tr>
<td></td>
<td>Interoperability with external equipment; Ericsson Marconi OMS 8xx, 12xx, 14xx, 16xx and verified third party routers.</td>
<td>0.5 hour</td>
</tr>
<tr>
<td></td>
<td>ServiceOn Element Manager, basic functionality and dimensioning.</td>
<td>0.5 hour</td>
</tr>
<tr>
<td></td>
<td>Management DCN design exercises</td>
<td>2.5 hour</td>
</tr>
<tr>
<td></td>
<td>Summing up</td>
<td>30 min</td>
</tr>
</tbody>
</table>
Short-haul Microwave Radio Design

LZU 113 6842 R1B

Description
To correctly design a microwave radio network is a task with the utmost importance to the functionality of a microwave transmission network. Often diversing demands from different legal administrations, needed transmission capacity, required Quality and Availability and equipment properties must be weighted together with atmospheric and geografical properties to find the optimum solution.

Even with the help from modern prediction tools it is in the end the Planner who has to judge if the solution is acceptable or if some of the parameters has to be changed.

This is a delicate but interesting task!

This course gives the participants a good understanding of what planning objectives are applied in a microwave radio network and what parameters influence the performances. By lectures, classroom discussions, and exercises the participants get a solid ground in how to design the microwave radio network to meet stated transmission quality and availability objectives.

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

1. Describe the workflow of a generic microwave radio design project
   1.1 Transmission target network model
   1.2 Nominal planning.
   1.3 Site acquisition
   1.4 Detailed planning
2. Describe what impact the inputs in prediction tools for equipment, topography and climate properties will have to the path performance.
   2.1 Hardware performance
   2.2 Free space loss and link budget
   2.3 Ground clearance
   2.4 Fading from rain and multi-path propagation.
   2.5 Ground reflections.
3. Describe the principles for frequency planning.
   3.1 Frequency allocation
   3.2 Obstacle loss
   3.3 Threshold degradation
   3.4 Cross polarization discrimination
   3.5 Automatic Transmit Power Control
4. Give examples of network topologies and judge where from a microwave radio design point of view a certain topology is suitable.
Allocate quality and availability objectives according to applicable ITU-T and ITU-R recommendations.

5.1 ITU-T recommendations G.821, G.826, G.827, G.828
5.2 ITU-R recommendations F.696, F.1668, F.1703.

By the help from user documentation use Ericsson microwave prediction tools MLPERF and TEMS LinkPlanner for designing small microwave networks.

Target audience
The target audience for this course is: Network Design Engineers.

Prerequisites
The participants should be familiar with transmission networks, with Ericsson microwave equipment and radio communication. (Microwave Networks Overview, LZU 108 6109 (WBL))

Duration and class size
The length of the course is 3 day and the maximum number of participants is 8

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.
### Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Microwave networks topologies</td>
<td>0.5 hour</td>
</tr>
<tr>
<td></td>
<td>MINI-LINK radio terminal hardware</td>
<td>1 hour 15 min</td>
</tr>
<tr>
<td></td>
<td>Quality and Availability objectives</td>
<td>1.5 hour</td>
</tr>
<tr>
<td></td>
<td>Microwave propagation in fading free conditions</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Exercise, Ground clearance</td>
<td>0.5 hour</td>
</tr>
<tr>
<td>2</td>
<td>Fading mechanisms in microwave networks</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Ground reflections</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Frequency planning and Interference calculation</td>
<td>2 hour</td>
</tr>
<tr>
<td></td>
<td>Microwave planning with ATPC</td>
<td>0.5 hour</td>
</tr>
<tr>
<td></td>
<td>Designing passive repeaters</td>
<td>1.0 hour</td>
</tr>
<tr>
<td>3</td>
<td>Introduction to MLPERF</td>
<td>0.5 hour</td>
</tr>
<tr>
<td></td>
<td>Exercise, Path prediction with MLPERF</td>
<td>2 hour 15 min</td>
</tr>
<tr>
<td></td>
<td>Introduction to TEMS LinkPlanner</td>
<td>15 min</td>
</tr>
<tr>
<td></td>
<td>Exercise, Network design with TEMS LinkPlanner</td>
<td>2 hour</td>
</tr>
<tr>
<td></td>
<td>Summing up</td>
<td>0.5 hour</td>
</tr>
</tbody>
</table>
TEMPS LinkPlanner User Course

LZU102151 R5A

Description
TEMPS LinkPlanner is Ericsson’s tool for microwave planning. It is a powerful PC-based tool for designing and optimizing radio transmission networks.

TEMPS LinkPlanner supports integrated planning of point-to-point and point-to-multipoint networks. Multi-vendor support is provided by its flexible way of defining equipment data and versatile planning functionality.

TEMPS LinkPlanner helps the transmission engineer to design and roll out a network with the desired quality and availability to the right cost. It assists the user in planning a radio transmission network that easily can be expanded in the future. Quality and availability in existing networks can be evaluated and the networks can be re-designed, optimized, and expanded in an efficient way.

TEMPS LinkPlanner includes advanced algorithms such as the latest ITU recommendations and other well-known radio algorithms, as well as Ericsson developed algorithms and concepts for radio transmission planning.

The advanced interference analysis ensures that available frequencies are used in the best possible way. It includes far-end interference analysis of combined point-to-point and point-to-multipoint networks.

TEMPS LinkPlanner supports single users on stand-alone machines, as well as multiple users simultaneously working as part of a team. It is easy and quick to install and to configure the tool to a working environment.

By participating in this course it is possible to improve your usage of TEMS LinkPlanner and enhance your daily work.
Learning objectives

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

1. Install and configure TEMS LinkPlanner software
2. Have basic knowledge in Radio wave propagation
3. Have basic knowledge in Map data coordinate systems
4. Make Line of sight diagrams, path profiles and manage presentation in the map window
5. Calculate Path quality
6. Calculate interference
7. Calculate radio coverage for point to multipoint planning
8. Use TLP tools
8.1 Table converter (imports network/equipment information from excel), TLP Map Converter (converts different map formats into TLP Geobox format), Labedit (create user defined labels), Path profile engineer (edit heights in a fixed path profile), NTC explorer (examines the TLP import/export files), Lucedit (edit colors and heights of the landuse map) and Vecpresedit (edit colors and line thickness of the vector map).

Target audience

The target audience for this course is: Network Design Engineers.
This audience is responsible for microwave planning within their company.

Prerequisites

The participants should be familiar with Microsoft XP/Vista and have basic knowledge about microwave planning.

Duration and class size

The length of the course is 3 days and the maximum number of participants is 16.

Learning situation

The course is based on instructor-led lessons and practical exercises using TEMS LinkPlanner in the classroom. Pcs is used for the students (1-2 on each pc).
### Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction about the product, features, installation, licensing, requirements etc</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>Radio wave propagation mechanisms, link budget</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Default table, parameter settings for the calculations and setting up the Map database</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Projects and versions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Map handling</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Managing projects, versions, paths, sites, groups, path profiles, line or sight diagrams, category’s etc</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Quality and availability. How to set targets, make path chain calculations</td>
<td>1 hour</td>
</tr>
<tr>
<td>2</td>
<td>Path calculations. Quality calculation reports, use network reports, views and diagnostics. Edit templates for reports (rt), creating labels.</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>Equipment. Setting up the equipment register</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Far interference calculations, Frequency allocation support and Diversity.</td>
<td>2 hours</td>
</tr>
<tr>
<td></td>
<td>Map data reference systems</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Using TLP tools: Table converter (imports network/equipment information from excel), TLP Map Converter (converts different map formats into TLP Geobox format), Labedit (create user defined labels), Path profile engineer (edit heights in a fixed path profile), NTC explorer (examines the TLP import/export files), and edit map presentation files</td>
<td>1 hour + 1 hour day 3</td>
</tr>
<tr>
<td>3</td>
<td>Point to multipoint planning. How to create multi sectors, radio terminals and composites. Perform radio coverage diagrams, interference and traffic calculations.</td>
<td>3 hours</td>
</tr>
<tr>
<td></td>
<td>Miscellaneous. User defined</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Path planning exercise</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
ServiceOn Element Manager R1 for Microwave Networks
Operation

Description
Is ServiceOn Element Manager your element management system? Or maybe it will be in the future. Then you may feel that your lack of knowledge stops you from using this system and its features. This course will give you the knowledge about it. You will get the information about the functions in theory but also by using the system in realistic situations.

With a combination of theoretical lessons, demonstrations and a lot of practical exercises we make sure that you gain the most out of your training.

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

1. Manage and operate network elements using ServiceOn Element Manager
   1.1 Outline the purpose of a network management system
   1.2 Define the role of the ServiceOn Element Manager within the TMN architecture
   1.3 Identify the features provided by SO EM
   1.4 Specify HW and SW platforms
2. Configure the network element representation in SO EM
   2.1 Set up the network representation
   2.2 Monitor the state of network elements in the underlying network infrastructure
3. Realign the SO EM database with the network elements
4. Explain how SO EM is communicating with the NE’s
5. Manage alarm monitoring
   5.1 Monitor the alarms using the RTAM
   5.2 Display the alarm history log files and alarm counters
6. Manage performance monitoring facilities
   6.1 Monitor the performance using the PM viewer
   6.2 Display the performance history log files and counters
7. Manage inventory monitoring facilities
   7.1 Monitor the inventory using the Inventory Viewer
8. Be able to understand the mechanics of a NE backup/Restore, Remote software upgrade and TN Licenses
Target audience

The target audience for this course is: System Technician, Service Technician, System Engineer, Service Engineer

Prerequisites

The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks System Overview (WBL) Course (LZU1086109).

Duration and class size

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

Learning situation

This course utilizes Instructor Led Training. It includes instructor-led lessons using power point presentations, software demonstrations and practical exercises on the hardware and network management software in a classroom. This course could be held at customer premises.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• System Description</td>
<td>1,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Operation (CM)</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• CM Exercise</td>
<td>1,5 hour</td>
</tr>
<tr>
<td>2</td>
<td>• Operation (FM)</td>
<td>1,5 hour</td>
</tr>
<tr>
<td></td>
<td>• FM Exercise</td>
<td>2 hour</td>
</tr>
<tr>
<td></td>
<td>• Operation (PM)</td>
<td>1,5 hour</td>
</tr>
<tr>
<td>3</td>
<td>• PM Exercise</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Inventory</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Inventory Exercise</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• License Handling</td>
<td>2 hour</td>
</tr>
</tbody>
</table>
ServiceOn Network Manager Operations

LZU 108 7328 R2A

Description
The efficient use of a network manager in the network is vital to maintain reliable services at a minimum cost.
With the help of this training the attendees will understand the features of the ServiceOn Network Manager and will learn the guidelines to set-up the representation of the traffic networks built with Ericsson network elements in a quick and efficient way.
This is the introductory course to the ServiceOn Network Manager application; it is a prerequisite for the ServiceOn Network Manager training path.

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

9 Outline the purpose of a network management system.
9.1 Explain the role of the ServiceOn Network Manager within the management system.
9.2 Describe that the management system provides in the controlled network
9.3 Discuss the hardware and software platforms.

10 Access the network manager interface.
10.1 Explain the main features of the HP-CD Environment and execute the network manager software set-up operations.
10.2 Navigate the Graphical User Interface areas and the main icons.

11 Configure the network representation in the network manager system.
11.1 Configure the network manager resources involved in the network representation.
11.2 Set-up the network representation.
11.3 Maintain the alignment between network manager and underlying element manager systems.
11.4 Monitor the state of network elements in the underlying network infrastructure.
11.5 Realign the network manager database with the network elements in the underlying network infrastructure.

Target audience
The target audience for this course is: System Technicians and System Engineers.
Prerequisites

The participants should have a good working knowledge of PDH, SDH and WDM principles, the capabilities and features of typical PDH, SDH and WDM network elements.

Duration and class size

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

Learning situation

This course is based on theoretical and practical instructor-led lessons given in a classroom environment. This course can be conducted at the Customer premises.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Purpose of the network management system</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Network manager interface</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Configuration of the network</td>
<td>4 hours</td>
</tr>
</tbody>
</table>
ServiceOn Network Manager R3 for Microwave Networks Operations

LZU 108 6844 R1B

Description
This course is designed for people working with the configuration and operation of a microwave network (e.g. MINI-LINK TN, MINI-LINK HC, Marconi LH) from the ServiceOn Network Management system.

The course contents will provide the information to manage the system but it will also give the attendant the possibility to work with the tools on real equipment. The students will connect to the Network Manager application in order to setup connections and links and in order to work with alarms and performance data.

Learning objectives
On completion of this course the participants will be able to:
1. Work with the different GUIs in the system
2. Connect the Network Manager to Element Managers
   2.1 Structure the network view
3. Configure the traffic
4. Configure the circuits
5. Configure the VC-4 paths
   5.1 Configure the protections
6. Monitor the network alarms
7. Configure the performance collection

Target audience
The target audience for this course is: System Engineers, System Technicians.

Prerequisites
The participants should have attended the ServiceOn Element Manager R1 for Microwave Networks Operation (LZU 108 7614) and also MINI-LINK TN R4 Operation and Maintenance (LZU 108 7243) to learn about cross-connections etc.
Duration and class size
The length of the course is 2 days and the maximum number of participants is 8.

Learning situation
This course is based on theoretical and practical instructor-led lessons given in a classroom environment. The course can also be delivered remotely.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction to the SONM system</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Application User Login</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>• Configuration of the sub-networks, adding network</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>elements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Configuration of the links, traffic circuits, traffic</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>structure, VC-4 paths</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>• Configuration of different protections</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Working with alarms</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Working with performance</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Summing up</td>
<td>0.5</td>
</tr>
</tbody>
</table>
ServiceOn Microwave R8 Operations

LZU1086793 R1D

Description
Is ServiceOn Microwave your network management system? Or maybe it will be in the future. Then you maybe feel that your lack of knowledge stops you from using this system and its features. Then this course will give you the knowledge about it. Here you will get the info about the functions in theory but also by really using the system in a realistic situation.

With a combination of theoretical lessons, demonstrations and a lot of practical exercises we make sure that you gain the most out of your training.

Learning objectives
On completion of this course the participants will be able to:
1. Manage and operate a network using ServiceOn Microwave
   1.1 Outline the purpose of a network management system
   1.2 Define the role of the ServiceOn Microwave within the management system
   1.3 Identify the services provided by the manager system
   1.4 Specify hardware and software platforms
2. Configure the network representation in the network manager system
   2.1 Describe the network manager resources involved in the network representation
   2.2 Set-up the network representation
   2.3 Monitor the state of network elements in the underlying network infrastructure
3. Realign the network manager database with the network elements in the underlying network infrastructure
4. Explain who ServiceOn Microwave is communicating to the NE’s
   4.1 Configure the ServiceOn Microwave system
5. Manage alarms monitoring facilities
   5.1 Monitor the alarms using the RTAM
   5.2 Display the alarm history log file and counters
6. Manage performance monitoring facilities
   6.1 Monitor the performance using the PM viewer
   6.2 Display the performance history log file and counters
7. Manage inventory monitoring facilities
   7.1 Monitor the inventory using the Inventory Viewer

Target audience
The target audience for this course is: System Technician, System Engineer
**Prerequisites**
The participants should be familiar with digital transmission fundamentals and the subjects/contents of the Microwave Networks Overview Course (LZU1086109).

**Duration and class size**
The length of the course is 3 days and the maximum number of participants is 8.

**Learning situation**
This course utilizes Instructor Led Training. It includes instructor-led lessons using power point presentations, software demonstrations and practical exercises on the hardware and network management software in a classroom. This course could be held at customer premises.

**Time schedule**
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• System Description</td>
<td>1,5 hour</td>
</tr>
<tr>
<td></td>
<td>• Operation (CM)</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• CM Exercise</td>
<td>1,5 hour</td>
</tr>
<tr>
<td>2</td>
<td>• Operation (FM)</td>
<td>1,5 hour</td>
</tr>
<tr>
<td></td>
<td>• FM Exercise</td>
<td>2 hour</td>
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<td></td>
<td>• Operation (PM)</td>
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<tr>
<td>3</td>
<td>• PM Exercise</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Inventory</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Inventory Exercise</td>
<td>1 hour</td>
</tr>
</tbody>
</table>
ServiceOn Access R7 Operation

LZU1087120 R1B

Description
The operator of a ServiceOn Access system typically performs tasks such as network surveillance, resource administration and configuration, service administration and configuration, corrective and preventive maintenance etc. This course highlights those functions in ServiceOn Access implemented for supporting the Operation Centre personnel in accomplishing their complex tasks in an easy and effective way.

We start by introducing the system creating a comprehensive view and then we continue unwrapping the system's functionality, focusing on those applications and functions relevant for the Operation Centre personnel.

This course is developed for the Linux version of ServiceOn Access R7.1

Learning objectives
On completion of this course the participants will be able to:
12 Understand the architecture and concept of ServiceOn Access
13 Work with kernels and kernel compounds in SOA
14 Configure the topology views
14.1 Instantiate network elements
15 Configure the network views
15.1 Reference network elements
16 Understand the concepts of SISA DCN and Qd2
17 Work with function blocks
18 Use templates and macros to set up the network element views
19 Configure the documentation of cabling in SOA
20 Work with cable trunks and line jumpering from a SOA perspective
21 Work with fault management in SOA
22 Be able to use object lists
23 Monitor performance data

Target audience
The target audience for this course is: System Technician, System Engineer.

This audience is responsible for network surveillance, restoration and preventive maintenance, resource management, provisioning and configuration of network nodes.
Prerequisites

The participants should be familiar with the digital transmission fundamentals and the subjects of a transmission network.

The participants must have experience from working with graphical user interfaces in a computer environment.

For the sake of the participants’ future tasks and assignments in a Network Operation Centre they must also participate in courses on how to operate and configure the various network nodes.

Duration and class size

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

Learning situation

This course is instructor-led with a task-oriented learning.

There will be one SOA server for each group of two students.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SOA Introduction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Work Environment</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DCN Architecture</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Topology Views</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Function Blocks</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Network Views</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Cabling Documentation</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Performance Management</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Object List</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fault Management</td>
<td>3</td>
</tr>
</tbody>
</table>
ServiceOn Access R7 Configuration Marconi LH and MDRS

LZU1086845 R1B

Description
Is ServiceOn Access your network management system for Marconi LH, MDRS155E or MDRS155S? Do you have this network element in your sphere of responsibility, but you are not able to operate or configure it reliably within the network? Each network element has specific procedures and special features and functions.

With the help of the training documentation provided in this course and the guidance of the instructors, the attendees will learn the most efficient ways of system operation, maintenance, monitoring and configuration, hence saving time and money.

Learning objectives
On completion of this course the participants will be able to:
1. Describe the Marconi LH and MDRS equipment
   1.1 Illustrate the Marconi LH and MDRS system application
   1.2 Describe the Marconi LH and MDRS subracks and hardware components
   1.3 Describe the basics concepts of the involved technologies
2. Describe the Marconi LH and MDRS DCN solution
   2.1 Explain the basic concept of the SISA technology
   2.2 Describe and specify the benefits of all DCN operating modes
3. Configure the Marconi LH and MDRS equipment
   3.1 Describe and practice all system configurations
   3.2 Explain all equipment parameters
   3.3 Manage line and radio protection switching solutions
   3.4 Configure the IP router
4. Operate and maintain the Marconi LH and MDRS equipment
   4.1 Back up and restore the equipment database
   4.2 Upgrade the system software
   4.3 Monitor performance data and measuring values
   4.4 Monitor alarms and execute basic troubleshooting procedures

Target audience
The target audience for this course is: System Engineer
Prerequisites
The participants should be familiar with digital transmission technology and must have already completed the ServiceOn Access R7 Operations Course L7U 108 7120. Basic knowledge of SISA and IP technology would be advantageous.

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

Learning situation
This course utilizes Instructor Led Training.
It includes instructor-led lessons using power point presentations, hardware and software demonstrations and practical exercises on the hardware and network management software in a classroom with complete Marconi LH and MDRS equipment setup.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marconi LH and MDRS subracks, hardware components and system application</td>
<td>3 hours</td>
</tr>
<tr>
<td></td>
<td>Microwave radio technology (Radio protection, Diversity, XPIC, ATPC)</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Introduction to ServiceOn Access</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Back up and restore the equipment database /Software upgrade</td>
<td>1 hours</td>
</tr>
<tr>
<td>2</td>
<td>Marconi LH and MDRS DCN solution</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>System configurations</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>Performance data and measuring values</td>
<td>1 hour 30 min</td>
</tr>
<tr>
<td></td>
<td>Alarms and troubleshooting procedures</td>
<td>1 hour 30 min</td>
</tr>
</tbody>
</table>
ServiceOn Integrator R3 Operations

LZU1087246 R1A

Description
This course covers the basics of ServiceOn Integrator. The course is the generic introductory course for further studies of the additional SOI applications on all three management layers: Element, Network and Service. It’s generic in the sense that it will highlight tasks independent of whether you work in the front office or back office of a Network Operation Centre (NOC).

ServiceOn Integrator is a cross domain management system enabling the operator to view the complete broadband network. It consists of a number of components facilitating integrated management.

There are three basic components: Security Management, System Management and Telco Management. In the Telco Management component three layers are defined where you find applications used for various tasks. In the Element Management Layer you will have access to the Element Manager systems integrated in SOI. In the Network Management Layer you have the Client Circuit Centre application (CCC) and in the Service Management Layer you’ll find the Broadband Activator (BBA). CCC and BBA are covered in separate courses.

The Fault Management functionality of ServiceOn Integrator facilitates the possibility to centrally collect, display, and administrate alarms from all the integrated element management systems. It is displayed by means of a register in the ServiceOn Integrator Portal main window.

The Inventory Management functionality is used to load network element data from one or more ServiceOn Access systems. The data is saved to the SOI database.

This course is developed for the Linux version of ServiceOn Integrator R3.1 and we will use ServiceOn Access systems as element managers of choice.

The target audience could be responsible for a vast number of tasks, e.g. network surveillance, restoration and preventive maintenance, resource management, provisioning and configuration of network nodes and/or administration, configuration and maintenance of the ServiceOn systems in the Element Management Layer.
Learning objectives

On completion of this course the participants will be able to:
1. Know the basic concept of SOI
2. Login to the SOI Portal
3. Use the basic functions and features of SOI
4. Configure the personal and public desktops
5. Find his way through the resource directory structure
6. Use the central alarm list and the log book application
7. Administrate the users in SOI
8. Know what UNIX/Linux processes that need to be started for the underlying systems to be fully integrated into SOI
9. Connect to and work with the SOA management systems from SOI

Target audience

The target audience for this course is: System Technician, System Engineer, System Administrator

Prerequisites

The participants must have experience from working with graphical user interfaces in a computer environment. They should have experience from working with ServiceOn Access/ServiceOn Optical systems or similar.

Successful completion of ServiceOn Access and/or ServiceOn Optical courses is desirable.

Duration and class size

The length of the course is 1 day and the maximum number of participants is 8.
Learning situation

This course is based on Instructor Led Training.

It includes instructor-led lessons using power point presentations and software demonstrations and practical exercises on the hardware in a lab environment with complete ServiceOn Integrator equipment setup.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SOI Introduction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SOI System Management</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SOI Security Management</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SOI Configuration</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>SOI Telco Management</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SOI Fault Management</td>
<td>1</td>
</tr>
</tbody>
</table>
ServiceOn Access R7 System Administration

LZU1086691 R3A

Description
A System Administrator typically administers many different systems in a company's server park. This course highlights the import tasks a System Administrator needs to accomplish in order to administrate and maintain the ServiceOn Access (SOA) system. We start from scratch when the system is installed but not yet commissioned and running. We pedagogically unwrap the system so that the System Administrator has a good understanding of SOA in order to start working with the system instead of having to spend hours trying to plough through the thousand pages of manuals. We put emphasis on the backing up of the complete system and on the so called kernels, the SOA databases.

This course is developed for the Linux version of ServiceOn Access R7.1

This target audience is responsible for administration, configuration and maintenance of the ServiceOn Access system.

Learning objectives
On completion of this course the participants will be able to:
24 Understand System Architecture and Concept of ServiceOn Access
25 Know some Linux basics
26 Use Ethereal (Wireshark)
27 Understand the basics of Multicasting, the way SOA communicates
28 Administrate ServiceOn Access
28.1 Stop/Start SOA Processes
28.2 Add/Delete Users
29 Configure ServiceOn Access
29.1 Add Device Drivers
29.2 Set up NE Connectivity
29.3 Set up a Kernel System Compound (expanding SOA)
30 Maintain ServiceOn Access
30.1 Back up SOA Kernels (databases)
30.2 Back up SOA System
30.3 Handle Log Files

Target audience
The target audience for this course is: System Administrators
Prerequisites
The participants must be familiar with System Administration of UNIX/Linux systems and Operation and Support Systems (OSS) in general. Successful completion of the following course: ServiceOn Access Operation, LZU 108 7120, is desirable.

Duration and class size
The length of the course is 4 days and the maximum number of participants is 8.

Learning situation
This course is based on Instructor Led Training.
It includes instructor-led lessons using power point presentations and software demonstrations and practical exercises on the hardware in a lab environment with complete ServiceOn Access equipment setup.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• SOA Introduction</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Linux Introduction</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Multicast Introduction</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>• Ethereal Introduction</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Process Management</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• User Administration</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Kernel System Compound</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>• Connectivity Management</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• Device Drivers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• SOA Kernel Backups</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>• SOA System Backups</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>• Administration of Fault Management</td>
<td>3</td>
</tr>
</tbody>
</table>
ServiceOn Element Manager R1 Administration (Linux)

LZU 108 7616 R1A

Description

Are you going to be responsible for the administrative part of the management tool ServiceOn Element Manager or you maybe just want to know some more about the tool. Then attend this course to learn about how to manage your servers such as making backups, creating users and overall maintenance. This course ensures that the administrators learn the basics to handle and customize the processes of the ServiceOn Element Manager applications in an efficient, quick and cost effective way.

With a combination of theoretical lessons, demonstrations and practical exercises we make sure that you gain the most out of your training.

The audience is System Administrators, typically working at an OMC (operation and maintenance center) or similar, taking care of all the maintenance and administrative work of the system.

Learning objectives

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

1. From the information given identify the role of the ServiceOn Element Manager
   1.1 Know the system architecture (HW)
   1.2 Distinguish between the stand-alone and distributed installation
2. On a basic level explain what LINUX SuSE is
   2.1 Recognize the LINUX structure configuration
   2.2 Use the most common LINUX commands
3. Install and setup a WEB Client
4. Create users and administrate users
5. Create and administrate domains
6. Make a software upgrade of Network Elements
7. Create backups of data in the ServiceOn Element Manager system
   7.1 Create NE data backups
   7.2 Create system data backups
   7.3 Create Ingress database backups
8. Create backups of the entire ServiceOn Element Manager system

Target audience

The target audience for this course is: System Administrator, System Engineer, and System Technician.
Prerequisites
The participants should have attended one of the ServiceOn Element Manager R1 Operations courses and shall be familiar with working in LINUX environments.

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

Learning situation
This course utilizes Instructor Led Training.
It includes instructor-led lessons using power point presentations, software demonstrations and practical exercises on the hardware and network management software in a classroom.
This course can also be delivered remotely.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Introduction</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>• Basic LINUX</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>• LINUX exercises</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Initial SO EM setup exercise</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Backups (System , Network Elements)</td>
<td>2</td>
</tr>
<tr>
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<td>• Restore (System , Network Elements)</td>
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<td>• Security and Users Exercise</td>
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<td>• SW upgrade of NE from SO EM</td>
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<tr>
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<td>• System backup</td>
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<td></td>
<td>• Summarize</td>
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