



# GSM RAN R10 Training Programs

## Catalog of Course Descriptions



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## APG40 Installation and Configuration

LZU 108 5871 R1A

### Description

This course will prepare participants for installation and configuration tasks on the APG40. After the course the students will be able to install and put an APG40 into operation.

### Learning objectives

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

- 1 Start up and Test the APG40
- 2 Follow the Test Instruction, Start up and Test of APG40 to install and configure the APG40 for operation
- 3 Change the site parameters
- 4 Understand the domain concept and know how a MUD can be set up and used
- 5 Use the User manager for domains to Add trusts between domains
- 6 Add user accounts to the system
- 7 Add users with different access rights to the APG40 and to the CP
- 8 Know about the different restore procedures
- 9 Understand when to use single node restore, cluster restore or Disaster Recovery and how a Node Change can be performed
- 10 Migrate to APG40 from IOG20
- 11 Undefine the IOG20 and move all operations to APG40
- 12 Configure the Antivirus for APG40
- 13 Schedule Virus scans and update the virus definitions

### Target audience

The target audience for this course is personnel working with Network Maintenance, Network Operation, Network Development and System Administration.

### **Prerequisites**

The participants should be familiar with Windows NT and have AXE knowledge equal to the following courses:

AXE Survey, LZU 108775

APG 40 Installation and Configuration, LZU 108 5871

### **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 both classroom and in a technical environment using equipment and tools, which are accessed remotely.

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# APG40 Operation and Maintenance

LZU 108 5870 R1A

## Description

This course will introduce students to operation as well as maintenance issues on the APG40 platform. After attending the course the students will be able to work practically with common APG40 handling tasks.

## Learning objectives

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

- 1 Describe the APG40 Hardware and Software on an overview level
- 2 Know the characteristics of all hardware boards and connections
- 3 Understand how the APG40 is built up
  
- 4 Be able to use different interfaces to connect to the APG40 platform
- 5 Connect to the APG40 using Telnet, WinFiol or pcANYWHERE
  
- 6 Describe the Alarm System on an overview level
- 7 Understand how the AEH, ALH, and PRC co-operates to raise alarms
  
- 8 Use the GOH to send data
- 9 Use the CDH, AFP and DBO for transfer of data to remote systems
  
- 10 Collect statistics using STS
- 11 Configure the STS on AP to request counter data from the CP
  
- 12 Have a basic understanding of the concept AD-devices
- 13 Be able to use AD-devices for command input and for routing of printouts
  
- 14 Load the CP from the APG40
- 15 Use CPT to perform an initial load of the AXE-CP
  
- 16 Perform backup and restore of the APG40 platform
- 17 Use burbackup and burrestore commands according to OPIs
  
- 18 Upgrade the APG40 system
- 19 Use Hard Function Change and Soft Function Change to install new software and/or update parameters

## Target audience



The target audience for this course is personnel working with Network Maintenance, Network Operation, Network Development and System Administration.

### **Prerequisites**

The participants should be familiar with Windows NT and have AXE knowledge equal to the following course:

AXE Survey LZU 108 775

### **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, which are accessed remotely.

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## APZ 212 30/33 Delta

LZU 108 1446 R1B

### Description

This course describes the differences between APZ 212 20 and APZ 212 30/33 Central Processor hardware and functionality from the operations and maintenance perspective. The course is designed for delivery to students who already possess a good knowledge of APZ, and are interested in the differences between the above mentioned processors.

### Learning objectives

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

- 1 Describe the differences in the hardware structure between APZ 212 20 and 212 30/33
- 2 Describe the hardware structure of APZ 212 33
- 3 Describe the new store structure of APZ 212 30/33
- 4 List the new commands introduced with the APZ 212 30/33
- 5 Perform Operation & Maintenance activities on APZ 212 30/33

### Target audience

The target audience for this course is all technical staff working on operation and maintenance activities on the different variants of the APZ 212 Central Processor.

### Prerequisites

The participant should be familiar with handling of older APZ 212 versions.

### 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 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.

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	<ul style="list-style-type: none"><li>• Chapters 1,2 and 3      Exercise 1,2 and 3(if time permits)</li></ul>	All Day

## Automated O&M using Operation Procedure Support

LZU 108 5149 R1A

### Description

This course makes familiar with the Operation Procedure Support (OPS) scripting language necessary for Remote Function Change and Automatic Correction Deployment of an AXE. It introduces scripted solutions and works with the OPS Graphical User Interface.

### Learning objectives

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

- 1 Work with the OPS Graphical User Interface
- 2 Explain the structure of the OPS script language including the structure of subroutines
- 3 Understand and write OPS scripts
- 4 Find and react on script errors

### Target audience

The target audience for this course is Ericsson employees and Ericsson customers working in the technical operation area of the GSM/WCDMA network represented by network engineers.

### Prerequisites

The participants should be familiar with AXE 10 (MML commands, ALEX) and UNIX.

### 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 both classroom and in a technical environment using equipment and tools, which are accessed 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.

Day	Short description of the topics in the course	Estimated time
1	OPS GUI / NUI	1,0h
1	OPS Scripting	2,0h
1	Exercises: - OPS GUI	3,0h
	- OPS Script Language Basics	
	- OPS Script Language	
2	OPS Subroutines	1,0h
2	Exercises: - OPS Script Language - OPS Tasks	5,0h

## AXE 10 Emergency Handling Periodic Refresh Training

LZU 108 094 R1A

### Description

The purpose of the AXE Emergency Handling course is to provide the students with knowledge required to recover the AXE from fault situations, including stoppage.

### Learning objectives

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

- 1 Understand the hardware structure of the APZ 212 30
- 1 Describe the functionality of the APZ 212 30
- 2 Interpret restart data and error related printouts

### Target audience

The target audience for this course is Core Network Field Technicians (and engineers if required) with at least six months' experience in maintenance of WCDMA R3 MSC, who need further competence in the maintenance area.

NMC/OMC personnel with at least six months' experience in directing these WCDMA maintenance personnel from a remote position, who need further competence in the maintenance area. This is not the primary target group, though.

### Prerequisites

Successful completion of the following courses:

- WCDMA Maintenance MSC Extended, LZU 108 5031/1

Or

- GSM Maintenance MSC/BSC Extended, LZU 108 5031/2

Or

- AXE Hardware Maintenance, LZU 108 6131

### 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.

## AXE 810 Data Transcript

LZU 108 6134 R1A

### Description

This course will develop the student's current knowledge and understanding of exchange data to a point where he/she will be able to interpret exchange requirements and write the data transcript for an AXE 810.

The student will have the opportunity for discussion about data transcript production, inputs, flow and ideas. Generally, theoretical lessons will be followed by practical work giving the student the opportunity to write data transcript from exchange requirements.

### Learning objectives

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

- 1 Explain the inputs and outputs of the Data Transcript (DT) process
- 2 Perform a Size Alteration
- 3 Define A-number Analysis
- 4 Define Pre B-Number Analysis
- 5 Define Access-Barring Analysis
- 6 Define Time-Supervision Analysis
- 7 Define B-Number Analysis
- 8 Define Route Data
- 9 Define Routing Case Analysis
- 10 Define End-of-Selection Analysis
- 11 Define Equal Access
- 12 Define Charging Data
- 13 Define Subscriber Data

### Target audience

The target audience for this course is personnel in network planning or network configuration in the area of Data Transcript. The target audience is represented by:

- Core Network Engineer
- Core Network Specialists
- Core Network Planning Engineers

### Prerequisites

Successful completion of the following courses:



For the WCDMA customer

- WCDMA MSC/VLR Operation & Configuration FAB 102 1320

And/or

- WCDMA User Database & Authentication Operation FAB 102 1321

For the GSM customer

- GSM MSC/VLR Configuration LZU 108 5448/2

### **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.

## AXE 810 Configuration Delta

LZU 108 5412 R3A

### Description

The focus of this course is how to configure the new hardware in AXE810 (BYB 501 1.5). It gives a theoretical survey of the main differences, on a high level, between BYB 501 1.4 and the new hardware.

### Learning objectives

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

- 3 Describe the new AXE810 on a basic level
- 3.1 Understand the market and the drivers behind AXE810.
- 3.2 Account for differences in metrics such as floor space, power consumption and capacity.
- 3.3 Introduction to the new hardware parts.
- 4 Describe changes and improvements on APZ level
- 4.1 Explain the main changes within APZ 212 33/33C/40.
- 4.2 Find and use new OPIs and commands.
- 5 Describe changes and improvements on APT level
- 5.1 Account for the main changes in APT.
- 5.2 Definitions in GEM.
- 5.3 Connection of reused GDMs.
- 6 Describe new functionalities introduced with AXE810
- 6.1 Account for the main changes in Operation and Maintenance.
- 6.2 ISP, In-Service Performance.
- 6.3 NNRP, explain how extensions to existing BYB 501 1.4 nodes can be made.
- 7 Be able to configure the AXE810 hardware
- 7.1 Give examples of node layouts and explain capacity for a number of model exchanges based upon mobile and fixed lines applications.
- 7.2 Explain configuration of hardware.
- 7.3 Know how to use the new OPIs/CODs/PODs.

### Target audience

The target audience for this course are all technical personnel working with earlier AXE hardware releases BYB 501 1.4. Examples are personnel working with Field Maintenance, Network Surveillance and Network Operation and Configuration.



**Prerequisites**

The participants should be familiar with operation and configuration of AXE BYB 501 1.4.

Successful completion of any of the following courses will achieve this:

LZU 108 6131, AXE Hardware Maintenance.

LZU 108 6145, AXE Operation and Configuration

For GSM: LZU 108 5024/2, GSM AXE Operation,

For WCDMA: LZU 108 5024/2, WCDMA AXE Operation,

**Duration and class size**

The length of the course is three days and the maximum number of participants is eight.

**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).*

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Introduction</li><li>• APZ</li><li>• APT</li><li>• Functionalities</li></ul>	7 h
2-3	<ul style="list-style-type: none"><li>• Configuration</li><li>• Exercises, configuration of AXE810</li></ul>	14 h

## Fault Management On-Site Workshop

LZU 108 5150 R2A

### Description

The course covers three aspects of Fault Management:

- Work Procedures
- Application handling
- System Administration and configuration

All three aspects are closely connected and will be covered in the Workshop, but to a varying degree. Prior to the Workshop or during the first day, it is important to identify which aspect(s) to focus on, since each customer is unique in terms of experience and needs.

### Learning objectives

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

1. Describe the existing procedures regarding Fault Management
2. Tune and configure the relevant applications to ensure that the OSS is utilized in an optimized way
3. Handle alarms and configure the way they are presented
4. Describe the process of receiving information for the alarm supervision in general, recognize an AXE alarm text and know which information that is used for AXE supervision
5. Use the graphical alarm presentation, i.e. to interpret the different object symbols and take appropriate action
6. Set up and use all available alarm presentation possibilities
7. Describe the internal checks and messages and their impact on the supervision of the network element
8. State it is possible to change the ordinary translation of alarm information and that symbols may be changed
9. Describe where and how FMX is used in the management system and understand the purpose of FMX
10. Describe the most common Fault Management system administration tasks
11. Describe how to maintain and administrate the system within the FM area
12. Use TBS processes
13. Describe the FMA database structure
14. Use Log Administration
15. Administer Alarm Text Routing Subscriptions
16. Configure GNIP/ASV and ALV
17. Use Information Model Instance Manager
18. Describe the procedure of troubleshooting on a basic level

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**Target audience**

This workshop is intended for NMC/OMC operators and system administrators working within the Fault Management area.

**Prerequisites**

GSM Network Fundamentals (FAB 102 1465)

GSM Network Surveillance LZU 108 5471/2

**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, which are accessed 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.

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• The Fault Management process</li> <li>• Application training</li> </ul>	1 hour 3 hours 2 hours
2	<ul style="list-style-type: none"> <li>• Application training</li> </ul>	6 hours
3	<ul style="list-style-type: none"> <li>• Application training</li> </ul>	6 hours
4	<ul style="list-style-type: none"> <li>• Fault Management Administration</li> </ul>	6 hours
5	<ul style="list-style-type: none"> <li>• Flexible</li> </ul>	6 hours

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## GPRS BSS Operation

LZU 108 5953 R2A

### Description

The purpose of this learning product is to build up competence to perform operational procedures in the BSS of a GPRS Network.

### Learning objectives

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

1. Understand the impact of GPRS on the GSM Radio Network
2. Manage the configuration and operation of GPRS functions in the BSC
3. Handle performance management in the BSS

### Target audience

This course is intended for configuration management personnel, GSN and BSS Support Engineers

### Prerequisites

Successful completion of the following:

- GSM Network Fundamentals (FAB 102 1465)
- GSM AXE Operation, 108 5024/2
- GSM BSC Operation, LZU 108 625

### 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 both classroom and in a technical environment using equipment and tools, which are accessed 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.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li></ul>	



## GPRS/EDGE Overview (WBL)

LZU 108 3944 R2A

### Description

Participants attending the GPRS Overview WBL course will be given a basic introduction to the 2nd generation Systems based on GSM. The GPRS core and radio network extension to the GSM network and possible GPRS services are explained on an overview level. The role of the GPRS nodes in WCDMA networks is discussed as well as the influence of the EDGE to the GPRS air interface. The focus is on general principles rather than specific technical details.

### Learning objectives

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

- 1 Understand the purpose of implementing packet switching in the existing GSM/WCDMA system
- 2 Understand how a terminal (Laptop or Smart Phone) uses the GPRS system to access other networks such as corporate LAN or the internet
- 3 List and explain GPRS system architecture
- 4 Explain on overview level the air interface in GPRS covering the GSM systems and/or WCDMA System
- 5 Explain the influence of EDGE to the GPRS network in terms of infrastructure requirements, Air Interface and end-user service enhancements.

### Target audience

This course is the starting point for courses related to the GSM and WCDMA in the area of GPRS.

### Prerequisites

The participants should be familiar with mobile telecommunications, especially, it is an advantage to be familiar with the 2G mobile systems

### 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.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li></ul>	

## GPRS Signaling

LZU 108 5931 R2A

### Description

This course handles the protocols and the signaling in the GPRS system. It also handles mapping and allocation of the GPRS channels and the main features of the air interface. The course includes traffic cases handling both the core network and the air interface.

The course together with the practical part (i.e. exercises) is a complement of the “GPRS system survey” and will extend the areas described in this survey.

### Learning objectives

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

- 1 Describe the architecture of the GPRS Network
- 2 Explain the signaling between the nodes and the protocols.
- 3 Describe the logical channels and the messages sent on these channels
- 4 Give an overview of the air interface (features and protocols)
- 5 Give an overview of the Gb interface
- 6 Describe the different types of interface in the core network
- 7 Describe how different traffic cases are handled by the system.

### Target audience

The target audience for this course is technical customer staff, who need a global understanding of GPRS Network, such as:

- Cell planners
- Technical support
- Network designers

### Prerequisites

The participants should be familiar with GPRS on a System Survey level.

### Duration and class size

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



## Learning situation

This is an instructor-led theory course (ILT) including theoretical lessons and theoretical exercises.

A classroom with whiteboard, flip chart and overhead- and data projector is needed for the delivery of this course. PC with TEMS is preferred for each group to evaluate logs. A pocket calculator is needed for each student.



## GPRS/EDGE Radio Dimensioning and Performance Workshop

LZU 108 5402/1 R3A

### Description

This course enables the students to plan, dimension and measure the performance of a GSM GPRS network. The course includes the planning of parameters as well as the dimensioning for the GSM radio network nodes including EDGE.

### Learning objectives

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

- 1 Dimension the GRPS radio network
- 2 Measure the GPRS radio network performance and analyze the results to improve the performance
- 3 Analyze TEMS printouts
- 4 Dimension PCU for Ericsson BSCs

### Target audience

The target audience, Ericsson external customer, is:

- Network Systems Specialist

### Prerequisites

Successful completion of the following courses:

GSM GSN Operation	FAB 102 1356
GSM RAN Statistics Introduction	LZU 108 5079

### 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 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.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>•</li><li>•</li></ul>	
2	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	
3	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	

## GPRS System Survey (ILT or VCT)

LZU 108 876 R3A

### Description

This course procures a basic introduction to the GPRS technology, the air interface for GSM, including EDGE and WCDMA. The course includes traffic cases and the Ericsson's products within this field are presented. The focus is on general principles rather than specific technical details.

### Learning objectives

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

- 1 Understand the purpose of implementing packet switching in the existing GSM/WCDMA system
- 2 Understand the differences between circuit switching and Packet switching principles.
- 3 Understand some of the GPRS Applications
- 4 Describe GPRS terminal features
- 5 Describe GSM/GPRS/WCDMA network Architecture
- 6 Understand how a terminal (Laptop or Smart Phone) uses the GPRS system to access other networks such as corporate LAN or the internet
- 7 List and explain GPRS system architecture
- 8 Explain on overview level the air interface in GPRS covering the GSM, including EDGE and/or WCDMA System
- 9 Know GPRS Radio resource management including:
  - 10 Dedicated or on-demand PDCH's,
  - 11 UL/DL resource allocation,
  - 12 Multi slot allocation,
  - 13 Radio resource management for UL/DL packet transfer
- 14 Understand GPRS throughput announcement, Coding schemes, Number of timeslots allocated, Protocol headers added to payload and Cell changing in GPRS
- 15 Describe the User plane bearers for WCDMA Systems
- 16 Describe the traffic cases in GSM/WCDMA Systems:
  - 17 Location Update
  - 18 Combined LA/RA update
  - 19 Cell update
  - 20 Paging
  - 21 PDP context Activation
- 22 Describe the functions and hardware for the WPP based SGSN for both GSM and WCDMA Systems as well as GGSN based on J20:
  - 23 CGSN G 3.0
  - 24 SGSN W 4.0
  - 25 SGSN G 5.0



- 26 SGSN G/W 5.5
- 27 GGSN J20 R2
- 28 List the Software and Hardware required for GPRS in GSM / WCDMA
- 29 Understand the protocol stacks associated with GSM Systems and WCDMA Systems

### **Target audience**

The target audience for this course is personnel starting to work in the GSM and/or WCDMA Systems area.

### **Prerequisites**

The participants should be familiar with telecommunication technology in general, and have preferential a background in 2G mobile systems.

### **Duration and class size**

Duration and class size depend on the course being delivered in either version.

#### 1. Instructor Led Training (ILT) Version:

The length of the course is 2 days and the maximum number of participants is 16.

#### 2. Virtual Classroom Training (VCT) Version:

The length of the course is 2 days (one day self study training including WBLs and one day VCT) and no more than 16 students participating in the VCT Sessions are recommended. Ericsson does not recommend Centra Sessions longer than 3 hours a day.

### **Learning situation**

The Learning situation varies depending on the course being delivered in either version.

#### 1. Instructor Led Training (ILT) Version:

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

#### 2. Virtual Classroom Training (VCT) Version:

This is a theoretical course given in a virtual classroom over the net by an instructor. The course contains exercises and self-paced studies and tests given both over the net and asynchronous. It is mandatory to study the student book before hand.

### Time schedule

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

#### Instructor Led Training

Day	Short description of the topics in the course	Estimated time
1	• GSM/WCDMA Network Overview for GPRS	2 h
	• GSM Air Interface for GPRS, including EDGE	2 h
	• WCDMA Air Interface	2 h
2	• Transport and Traffic Management	2 h
	• SGSN and GGSN Hardware	2 h
	• BSS Architecture	1 h
	• RAN Architecture	1 h

#### Virtual Classroom Training

Session	Short description of the topics in the course	Estimated time
1	• GSM and WCDMA Air Interface	3 h
2	• Transport and Traffic Management	3 h
	• SGSN and GGSN Hardware	
	• BSS Architecture for GPRS	
	• RAN Architecture for GPRS	

## GSM AXE Operation

LZU 108 5448/2 R3A

### Description

This course gives the students the ability to operate the functions of the AXE 10 that are common to all AXE application especially in the MSC and BSC of GSM R10 Networks.

More advanced operational subjects, which are related to setting up for example MSC traffic cases, are not covered in this course, but in GSM MSC/VLR Configuration LZU 108 5448/2.

This course is meant for the work area "Network Operation" in a task-oriented Learning Product Program. With this learning product students, who have GSM Network Surveillance, get the prerequisites and knowledge for the more advanced GSM MSC/VLR Configuration LZU 108 5448/2, or courses on similar level.

### Learning objectives

- 1 On completion of this course the participants will be able to:
- 2 Efficiently make use of command files and log files in daily routines, using the OSS RC applications Command File Developer and Command Handling.
- 3 Fetch exchange related documentation from the system databases.
- 4 Explain how the control path is realized in the switch by defining the corresponding units.
- 5 Explain how the switching path is implemented by following a call through the GS and setting the necessary exchange data to establish the connections in the node.
- 6 Configure HW for new routes.
- 7 Define routes and connect/disconnect devices.
- 8 Describe the units and concepts related to number # 7 signaling.
- 9 Perform system backups (IOG 20 or APG 40).
- 10 Handle the file transfer (IOG 20 or APG 40).
- 11 Understand and modify the file system of an AXE 10 (IOG 20 or APG 40).
- 12 Collect Data on Request as input to Trouble Reports to Ericsson FSC.
- 13 Set supervision data on DIP, SNT and SS7
- 14 Modify Size Alteration Events on request from a work order
- 15 Retrieve Statistics from MSC/BSC
- 16 Perform changes in the pre-analysis and B-number analysis tables.
- 17 Perform changes in the routing analysis table.
- 18 Perform changes in the Charging analysis tables.
- 19 Analyze EOS and Cause codes.
- 20 Trace and solve faults related to the analysis tables.
- 21 Handle the charging analysis and charging output.
- 22 Solve a Managed Object (MO) Fault upon alarm



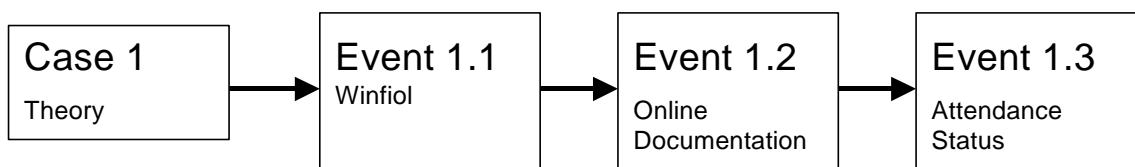
## Learning Product Plan

The task-oriented course is divided into 3 different modules:

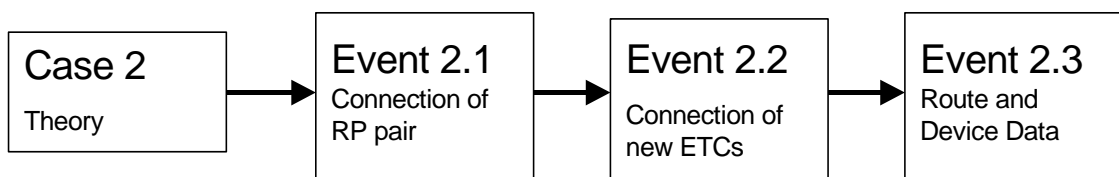
- AXE General module
- MSC Basic Operation
- BSC Basic Operation

AXE General

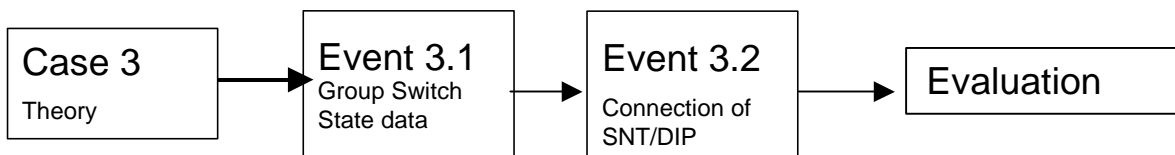
Introduction, day 1



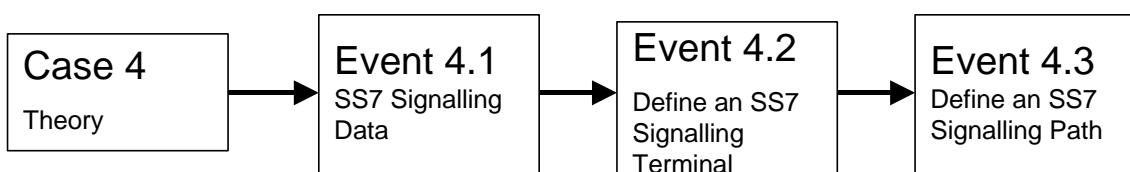
Route and Device Data, Day 2



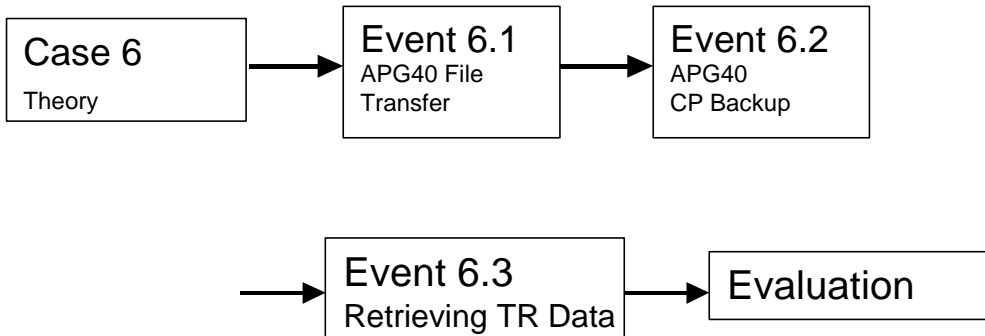
Group Switch Subsystem, Day 3



Signaling System No. 7, Day 4

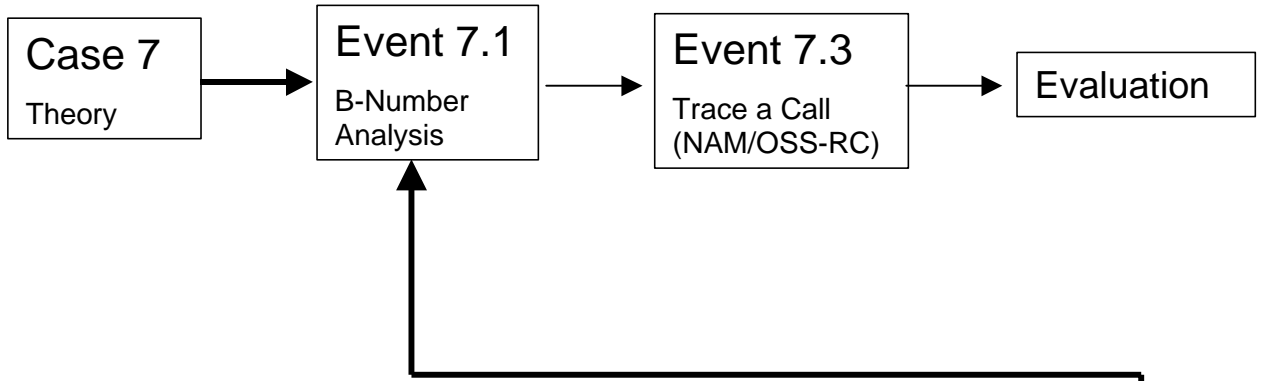


APG 40, Day 5

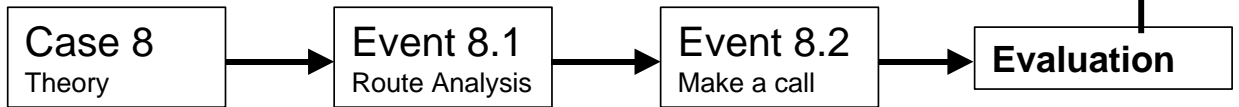


**MSC Basic Operations**

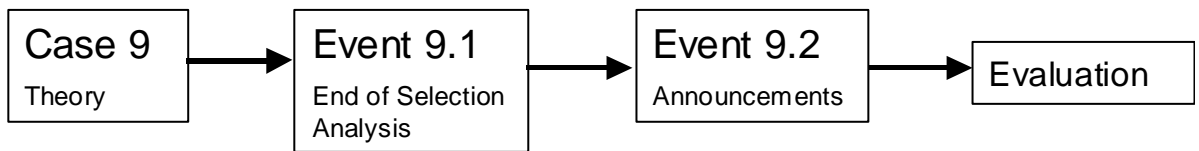
B-Number Analysis, Day 6



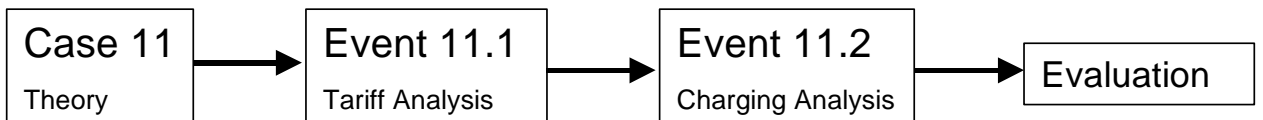
Route Analysis



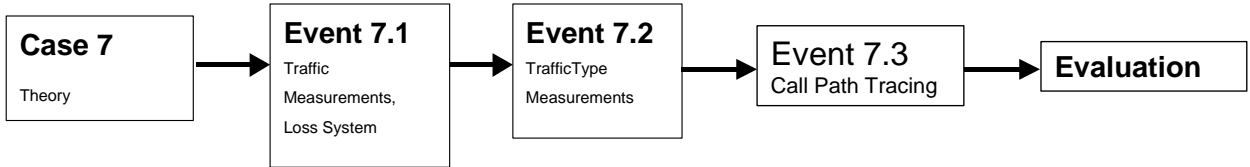
EOS Analysis, Day 7



Charging Analysis, Day 8

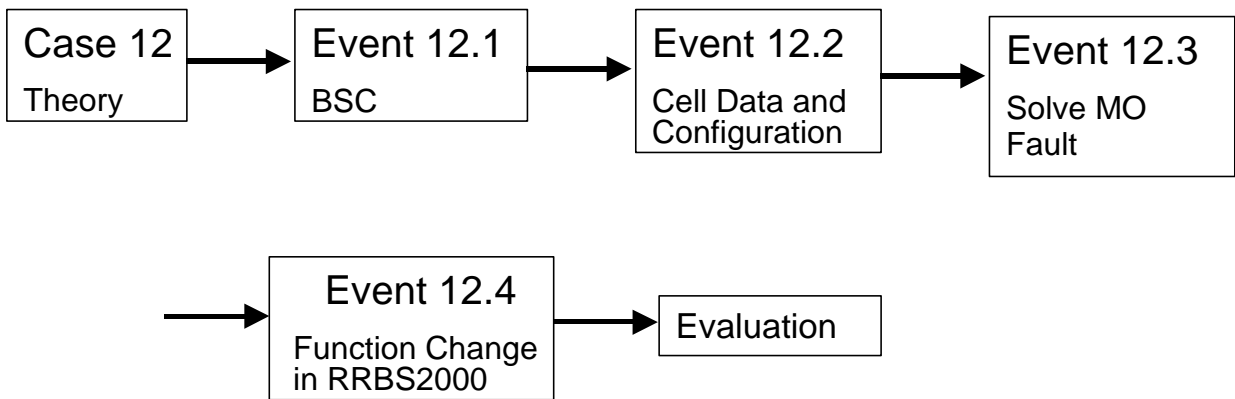


Statistics and Traffic Measurements



BSC Basic Operations

Day 9



## GSM BSC Maintenance

LZU 108 5458/5 R2A

### Description

The learning product enables the students to perform hardware maintenance on the BSC of the GSM R10. The course will provide radio network technicians and radio network engineers with basic abilities to act on hardware faults, do hardware replacement, and follow maintenance routines using the system documentation and local Operation and Maintenance (O&M) tools.

The course is modular, being built up of cases, each case consisting of one or more related events. A sufficient pool of cases and events is provided so that maintenance of all supported GSM BSC R10 hardware configurations may be trained.

Specifically, cases and events may be selected from the learning product to train configurations built up of the following hardware elements:

#### AXE Central Hardware Elements

- APZ 212 20
- APZ 212 25
- APZ 212 30 and 33
- IOG 20
- APG 40

#### AXE Subordinate Hardware Elements

- 128K GS
- RPs, EMs, RPGs
- BSC-specific elements (TRAU R5, SRS)

### Learning objectives

On completion of this course the participants will be able to (after completing all WCDMA Systems events in the case / event pool for the learning product):

1. Generate printouts according to a Work Order, using local Operation and Maintenance (O&M) tools and on-line system documentation
2. Log and save printouts, using local O&M tools
3. Locate and identify GSM hardware units, using online documentation
4. Determine the order number and release revision of hardware elements, using the Alex library

5. Generate printouts per the Work Order, using local O&M tools and online documentation
6. Exchange subordinate hardware elements, using online documentation
7. Perform repair sequences on GDM hardware elements (RPs, EMs), using WinFIOL / OSS-RC, online documentation, and data from a Work Order
8. Determine the order and release revision of AXE central elements, using online documentation
9. Exchange hardware units in AXE central elements, using online documentation
10. Perform repair sequences on AXE central hardware elements, using WinFIOL/ OSS-RC, online documentation, and data from a Work Order
11. Generate status printouts of AXE central elements per a Work Order, using local O&M tools and online documentation
12. Determine APZ system status, using visible hardware indicators
13. Locate and identify IOG 20 / APG 40 hardware units, using online documentation
14. Generate printouts of IOG 20 / APG 40 system status and hardware elements, using local O&M tools and online documentation
15. Perform repair sequences on IOG 20 / AOG 40 hardware elements, using WinFIOL/ OSS-RC, online documentation, and data from a Work Order
16. Save a system backup copy on removable media, using online documentation and Work Order data
17. Generate printouts according to a Work Order, using local O&M tools and online documentation
18. Transfer a file from removable media to hard disk, using online documentation and Work Order data
19. Test load a system backup copy, using online documentation and Work Order data
20. Perform routine preventive maintenance on the AXE, using online documentation
21. Perform repair sequences on BSC-specific hardware elements (TRAU, SRS), using WinFIOL/OSS-RC, online documentation, and data from a Work Order

### Target audience

The target audience for this course consists of Raio Network Technicians and Radio Network Engineers that will be working with maintenance tasks and NMC/OMC personnel that have to be able to direct the maintenance personnel from a remote position.

### Prerequisites

Successful completion of the following course before entering the GSM R10 path:

GSM Network Fundamentals

FAB 102 1465

### Duration and class size

The length of the course is 7 days and the maximum number of participants is 8.

Depending on the customer scenario the modules can be left out and the duration can be shortened to 5 days.

The duration of an AXE 810 only delivery is 5 days.



### **Learning situation**

This is a task-oriented learning course based on tasks in the work process given in a technical environment using equipment and tools. Working in groups of two for most events, students are issued various Work Orders to resolve hardware faults, perform hardware replacement, and follow simple non-fault related maintenance routines using the system documentation. The instructor acts as facilitator, helping students to obtain the required competency

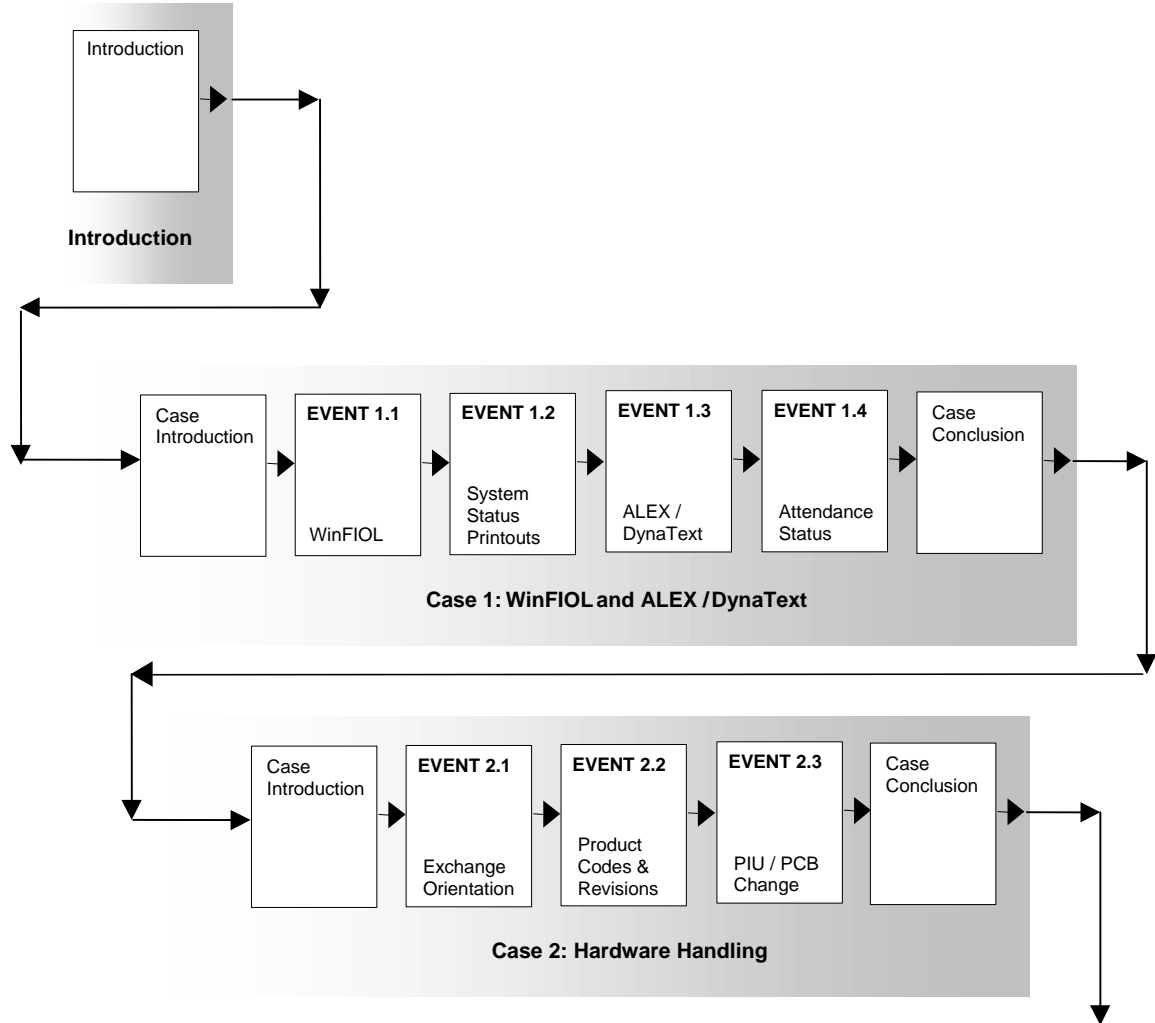
Wherever possible, the group size will be limited to two students, though larger groups may be required from time to time.

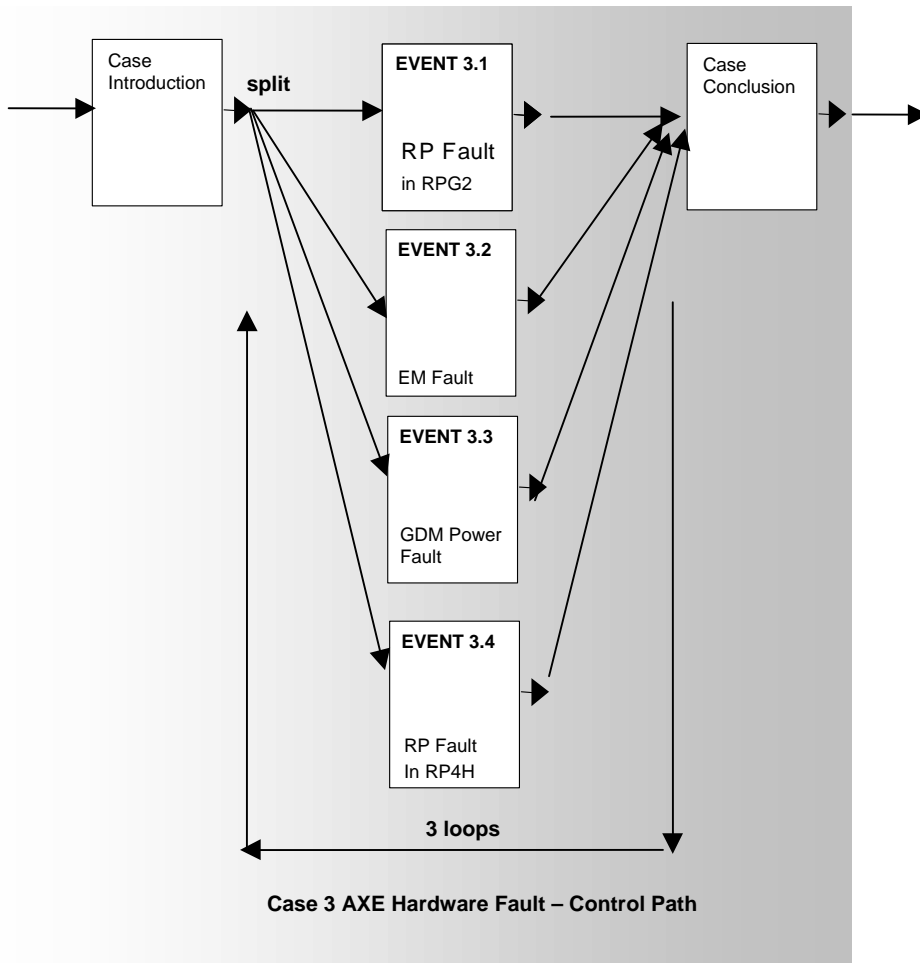
The instructor in general acts as guide or facilitator, allowing the students to proceed independently, assisting only where necessary to ensure that the students obtain the necessary competence. Infrequently, the instructor will also present instructional material, either to preface an event or in summation. Instances of pure lecture, however, are limited.

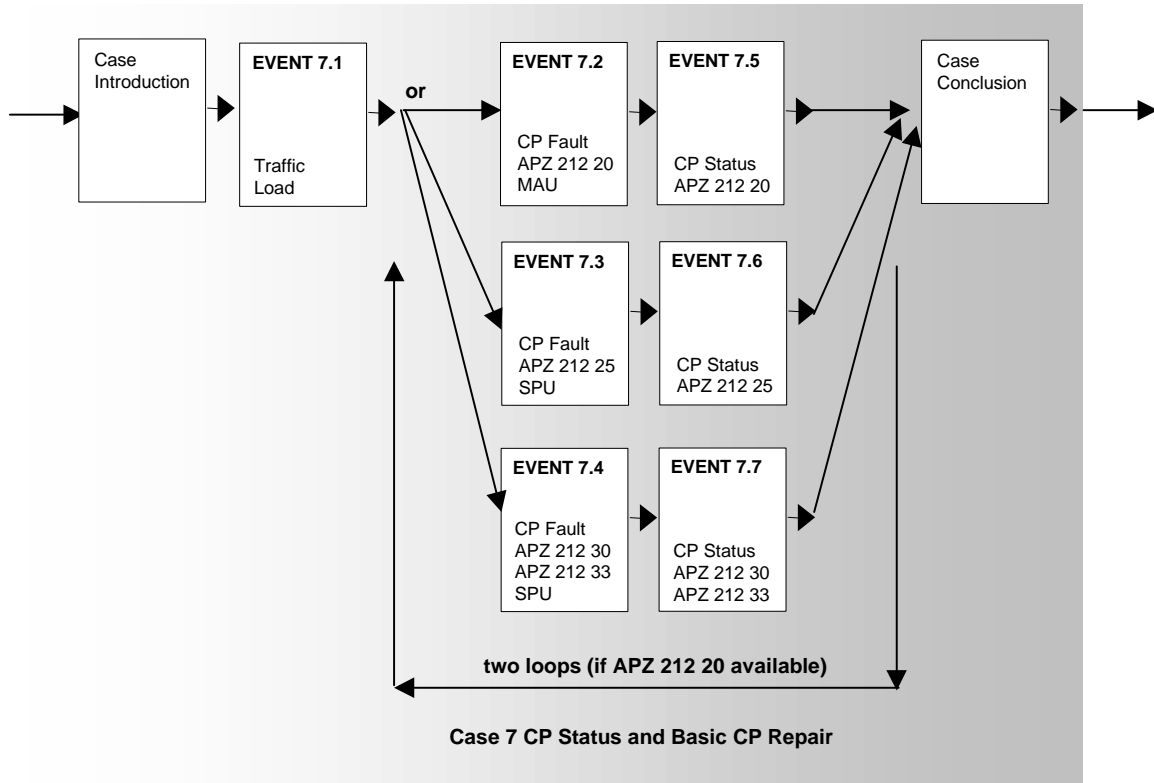
### **Time schedule**

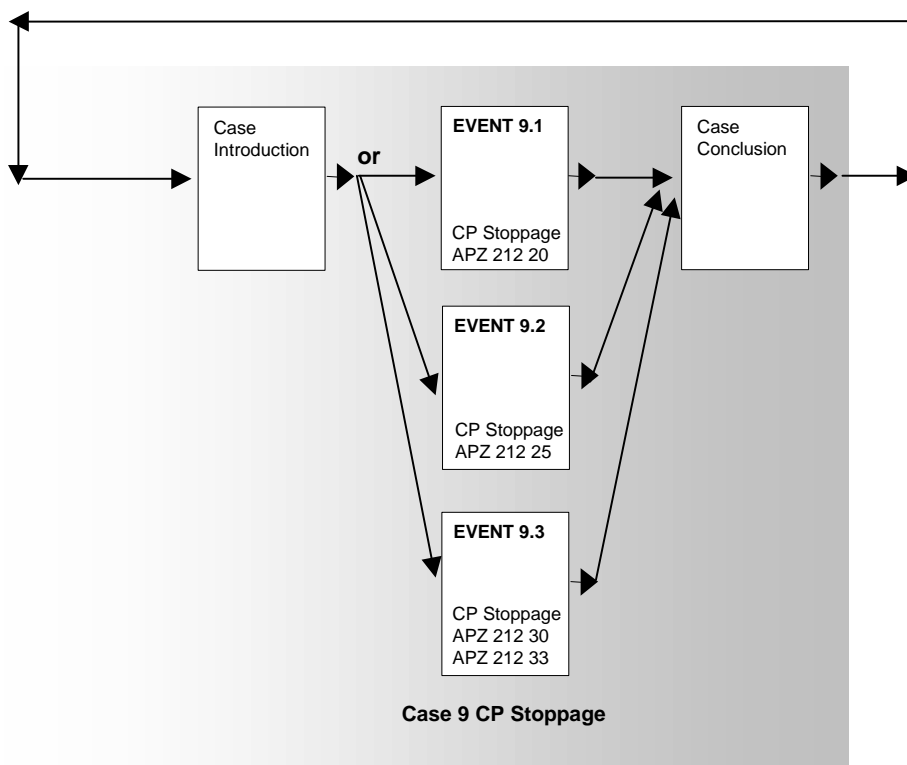
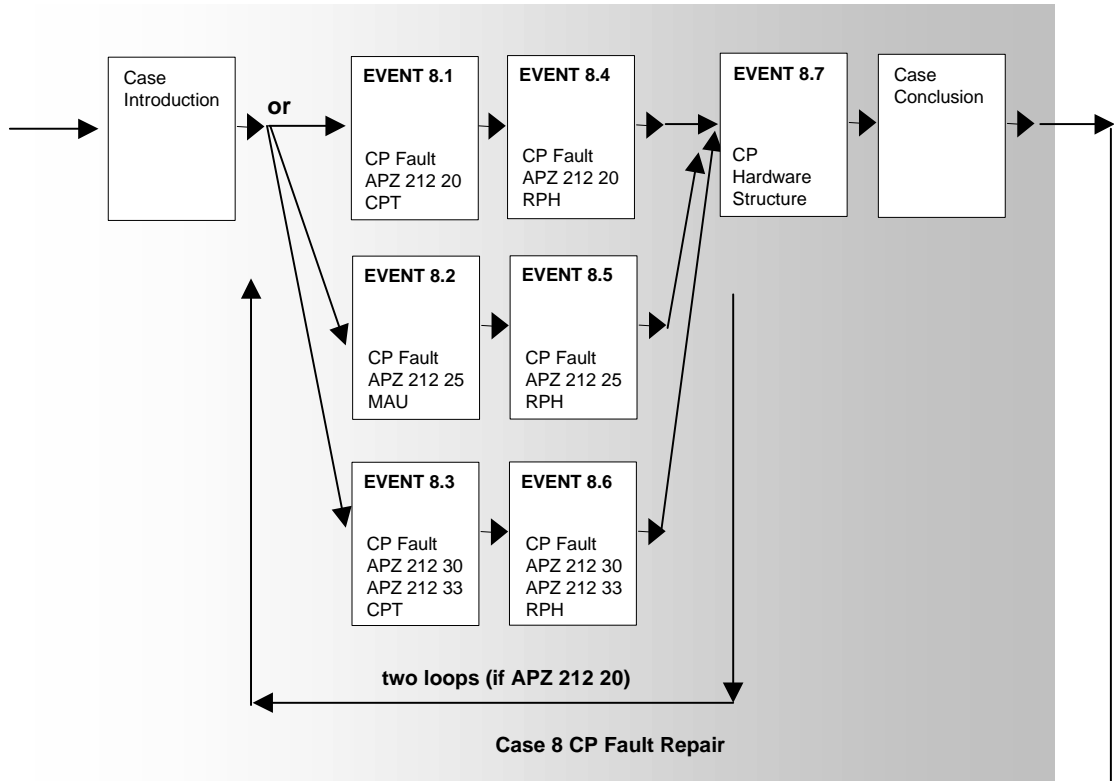
The time required always depends on the knowledge of the attending participants and the hours / days stated below can be used as estimate.

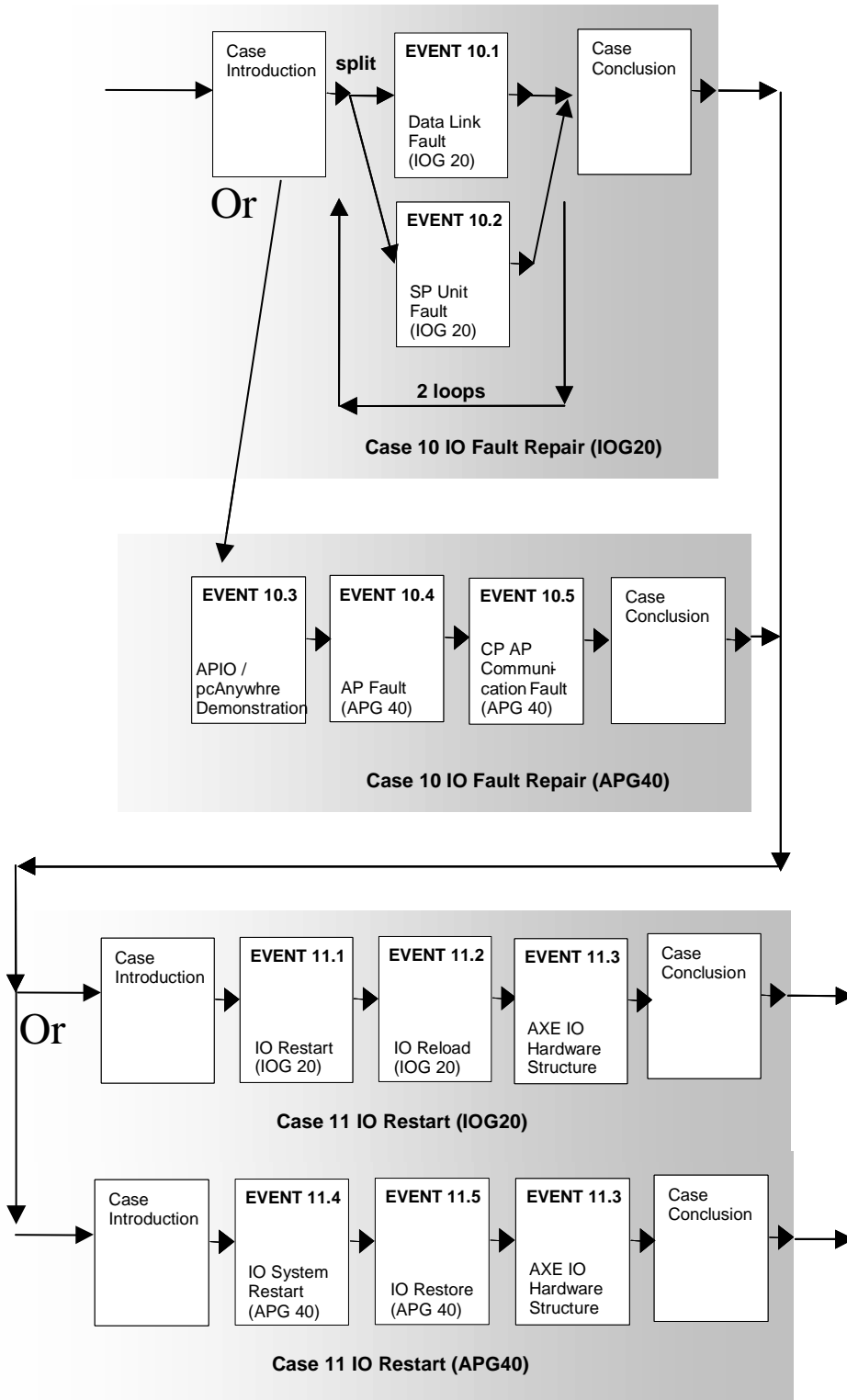
# GSM BSC Maintenance LPP

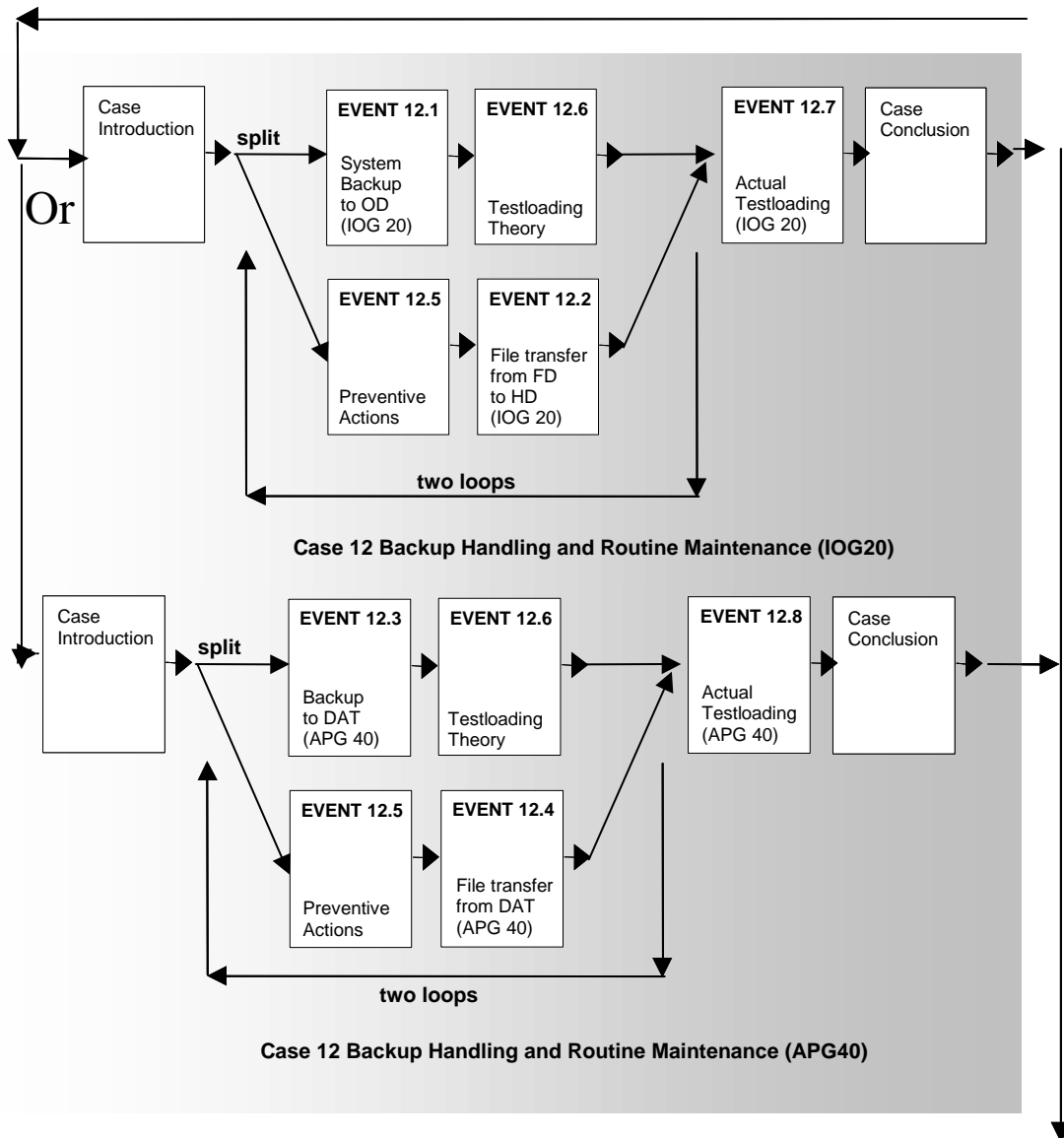


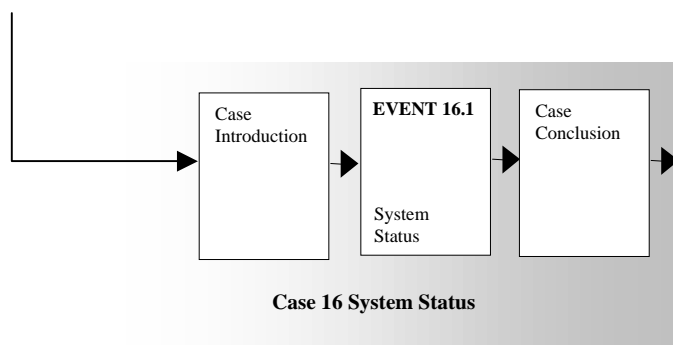
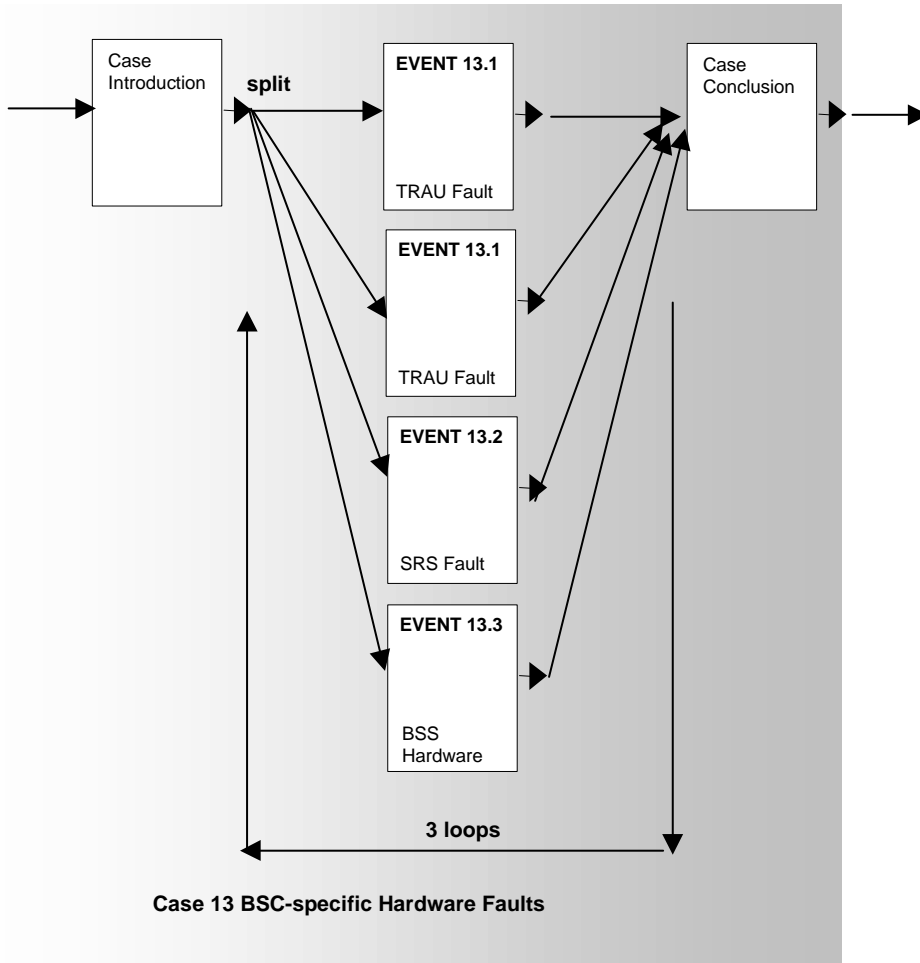


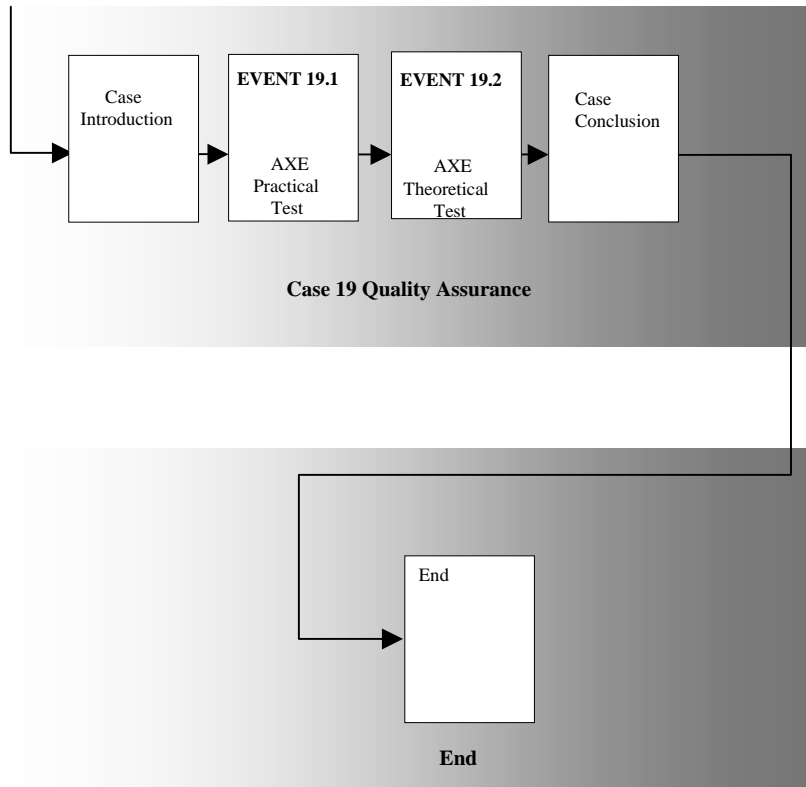












## GSM BSC Operation

LZU 108 625 R5A

### Description

This course is designed to provide participants with the skills and knowledge to operate and configure the GSM BSS. The course covers configuration activities in the BSC/ TRC nodes, the interfaces to the core network nodes MSC and SGSN, the interface to the RBS and maintenance activities in the BSC. Participants will complete practical configuration and fault-finding exercises using on-line documentation and OSS or Winfiol.

### Learning objectives

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

- 1 Describe the Network Nodes of an Ericsson GSM System
- 2 Explain the purpose of the logical channels used on the Air Interface for GSM and GPRS
- 3 Describe the EGPRS Coding Schemes and the EGPRS interface to RBS equipment
- 4 Describe the measurement procedure used by GSM terminal equipment
- 5 Explain the purpose of System Information in GSM
- 6 Configure the Hardware and Interfaces of the BSC using MML commands and parameters
- 7 Configure RBS 200 and 2000 equipment in the BSC using MML commands and parameters
- 8 Explain the purpose of BSC Cell parameters and the effects these have on the GSM Radio Access Network
- 9 Configure the radio network in the BSC using MML commands and parameters
- 10 Define supervision and recording processes in the BSC
- 11 Handle practical fault-finding on BSC hardware using On-line documentation
- 12 Explain the RBS Alarm Information displayed in the BSC
- 13 Handle diagnosis of fault conditions on RBS 200 and 2000 equipment using On-line documentation

### Target audience

The target audience for this course is personnel who work with operation and maintenance in the BSC. This includes staff undertaking the following activities:

- Configuration of the BSC towards MSC, RBS and SGSN
- Routine maintenance and fault-finding in BSC
- Working with field staff replacing units and fault-finding on RBS 200 and 2000 equipment
- Performance monitoring in BSS



### **Prerequisites**

The students should have completed the following courses:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Network Surveillance (LZU 108 5471/2)
- GSM AXE Operation (LZU 108 5024/2)

### **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, which are accessed remotely.

## Time schedule

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

<b>Day 1</b>	<b>Estimated time</b>
• GSM/GPRS Network Description	1 hr
• Channel Concept GSM / GPRS	3 hrs
• Measurement Procedure	1 hr
• System Information	1 hr
<b>Day 2</b>	<b>Estimated time</b>
• BSS Configuration	3 hrs
- Hardware structure of the BSC	
- Functions of the BSC-TRC / BSC-MSC / BSC-RBS interfaces	
- Purpose of Managed Objects	
- Configuration of RBS 200 and 2000 equipment in BSC	
• BSS Configuration Exercises	
- Define and configure a Transceiver Group	3 hrs
<b>Day 3</b>	<b>Estimated time</b>
• Radio Network	4 hrs
- Definition and configuration of a Cell	
- Cell Parameters	
- Describe the Locating Algorithm	
• Radio Network Exercises	2hrs
- Define and configure a Cell	
<b>Day 4</b>	<b>Estimated time</b>
• Radio Network Exercises	2 hrs
• Performance Measurement & Supervision	1 hrs
• BSS Operation	
- BSC hardware maintenance	1 hr
• BSS Operation Exercises	2 hrs



**Day 5**

**Estimated time**

- BTS Maintenance 2 hrs
  - RBS 200 and 2000 Alarm Indications in the BSC
  - Testing and fault-finding of RBS equipment in the BSC
- BTS Maintenance Exercises 2 hrs
- Certification Test 2 hrs
- Course Summary and Evaluation 20 min



# GSM Cell Planning Principles 1

LZU 108 3273 R6A

## Description

This course enables participants to understand wave propagation principles, frequency planning and traffic dimensioning. The participants will also be able to make a nominal cell plan and get an understanding of various radio network features.

## Learning objectives

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

1. Explain the major steps in cell planning
  - 1.1 Perform traffic and coverage analysis
  - 1.2 Perform nominal Cell Plan
  - 1.3 Perform surveys
  - 1.4 Perform system Design and Implementation
  - 1.5 Perform system Tuning
2. Explain the functions of the three major systems
  - 2.1 Describe Switching System, Base station System and Operation and Support System
3. Describe the channel concept
  - 3.1 Explain the mapping of logical channels on the BCCH-carrier
  - 3.2 Explain how information is superimposed on radiowaves
4. Discuss radiowave propagation
  - 4.1 Perform pathloss calculations
  - 4.2 Discuss signal variations
5. Estimate the cell size from a signal strength point of view
  - 5.1 Perform a system balance
  - 5.2 Explain well known radio wave propagation models
6. Estimate the cell size from a capacity point of view
  - 6.1 Define the term "traffic"
  - 6.2 Discuss GoS and channel utilization
7. Frequency planning
  - 7.1 List and describe a number of channel plans such as 3/9 and 4/12 reuse
  - 7.2 Discuss co- and adjacent channel interference
  - 7.3 Define the term re-use distance
8. Produce a nominal cell plan
  - 8.1 Plan for coverage, capacity and low interference in a specific area

9. Discuss radio equipment used on site
  - 9.1 RBSs and CDUs provided by Ericsson
  - 9.2 Discuss different antenna properties
  
10. List and describe some tools provided by Ericsson
  - 10.1 For example TEMS CellPlanner, TEMS Investigation, FAS/FOX, NCS/NOX, MRR and TET
  
11. Explain how to increase capacity in an existing network
  - 11.1 Discuss cell split, multiple re-use patterns and fractional load planning
  
12. Describe some radio network features
  - 12.1 List and describe the different processes involved in idle mode
  - 12.2 Explain the purpose of the locating algorithm
  - 12.3 Explain some auxiliary radio network features
  - 12.4 Explain quality related features

### **Target audience**

The target audience for this course is personnel who need a general understanding of the cell planning process.

For example, radio network engineers and radio network tuning engineers.

### **Prerequisites**

The participants should be familiar with the GSM network or successful completion of the following course:

GSM Network Fundamentals (FAB 102 1465)

### **Duration and class size**

The length of the course is 4 days and the maximum number of participants is 16.

### **Learning situation**

The course is instructor-led with lecture, student exercises and group work.



**Time schedule**

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

**Day 1**

- Cell planning introduction
- System description
- Radio wave propagation
- Coverage predictions

**Estimated time**

- 1 hour
- 1 hour
- 2 hours
- 2 hours

**Day 2**

- Traffic
- System balance
- Channel planning
- Design case

**Estimated time**

- 1 hour
- 1 hour
- 1 hour
- 3 hours

**Day 3**

- Design case cont.
- Implementation
- Site survey
- System expansion

**Estimated time**

- 2 hours
- 2 hours
- 1 hour
- 1 hour

**Day 4**

- Tools
- Radio Network Features

**Estimated time**

- 1 hour
- 5 hours

## GSM Cell Planning Principles 2

LZU 108 5032 R5A

### Description

This course is intended for radio network engineers involved in planning of GSM radio networks. The purpose of the course is to provide the participants with extensive theory about cell planning. The main focus is to give the participant necessary theoretical knowledge to work as a cell planner.

### Learning objectives

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

- 1 Explain the basic function of a GSM system
  - 1.1 List the network nodes of a GSM system and their function
  - 1.2 Explain general terms used in the GSM system
  - 1.3 Explain the differences between the three major systems of the GSM network
  - 1.4 List the more important GSM air interface parameters
- 2 Perform power/system balances and macro cell predictions
  - 2.1 Calculate link budgets and perform a system/power balance
  - 2.2 Derive design criteria for macro cell coverage predictions
  - 2.3 Explain how design criteria relates to coverage predictions and field measurements
- 3 Perform dimensioning of logical channels
  - 3.1 Perform dimensioning of logical channels in different scenarios
  - 3.2 Perform dimensioning of Location Areas with regard to paging capacity
- 4 Describe antenna properties and recognise and choose different type of antennas in different type of environments
  - 4.1 Explain the meaning of concepts such as gain, directivity, downtilt and null fill-in
  - 4.2 Explain the meaning of intermodulation and how to avoid it
  - 4.3 Explain the difference between space- and polarisation-diversity
- 5 Discuss different RBS configurations that Ericsson supports
  - 5.1 Recognise scenarios where a repeater solution might be appropriate
  - 5.2 Explain the function and usage of different types CDUs
  - 5.3 Discuss different RBS configurations
- 6 Explain basic map data and GPS
  - 6.1 Describe the concepts geoid, ellipsoid, datum and map projections
  - 6.2 List the most important data about GPS, the limitations of the system and the use of a GPS receiver
- 7 Explain the principles behind Ericsson's macro and micro cell propagation prediction models
  - 7.1 Explain the principles behind Ericsson's macro cell propagation prediction algorithm 9999 and list the different types of input data the algorithm needs

- 7.2 Explain the principles behind Ericsson's urban model and list the different type of indata the algorithm needs
- 8 Explain all aspects of a proper site survey
  - 8.1 Describe the instruments used for site survey
  - 8.2 Describe necessary pre-site survey procedures
  - 8.3 Describe the procedure for a complete site survey.
- 9 Explain the use of different cell planning tools
  - 9.1 Describe Ericsson's product portfolio TEMS optimisation solution
  - 9.2 Perform data logging and some analysis using TEMS Investigation
  - 9.3 Discuss some basic features of Ericsson's cell planning tool, TEMS CellPlanner
  - 9.4 Explain the use of CNA in OSS for the purpose of viewing, reconfiguring, and implementing cells
  - 9.5 Explain how RNO in OSS can be used as implementation help (FAS/FOX, NCS/NOX), performance monitoring (MRR) and hot spot finding (TET)
- 10 Explain the principles and procedures for in-building installation
  - 10.1 Choose between different types of configurations for indoor coverage
  - 10.2 Derive design criteria for coverage predictions of in-building installation
  - 10.3 Calculate linkbudgets and EiRP for different types of feeder configurations
  - 10.4 Estimate indoor coverage from an in-building installation using a modified version of Keenan-Motley's propagation algorithm
  - 10.5 Design a simple in-building installation
- 11 Explain and evaluate different frequency planning strategies
  - 11.1 Discuss different ways of increasing the capacity in a radio network
  - 11.2 Discuss different scenarios where MRP or FLP might be advantageous
- 12 Explain the radio network features which give direct implications on the radio planning
  - 12.1 Describe different way of configure the cell regarding the number of channel groups
  - 12.2 Discuss frequency hopping (B.B/S.Y) and the use of MAIO planning (unsynchronised and synchronised networks)
  - 12.3 Discuss the feature Discontinuous Transmission and it's implications
  - 12.4 Discuss the impact of BTS/MS power control
  - 12.5 Discuss the feature Adaptive Multirate and it's impact on the radio planning
  - 12.6 Discuss the effect of Antenna Hopping
  - 12.7 Discuss the effect of Interference Rejection Combining
- 13 Explain the impact of GPRS on the radio network
  - 13.1 Explain the system parts specific to GPRS
  - 13.2 Explain the GPRS radio interface
  - 13.3 Describe the radio resource handling
  - 13.4 Explain the concept radio block
  - 13.5 Perform GPRS radio network dimensioning
  - 13.6 Explain the impact of GPRS on the radio network

**Target audience**

The target audience for this course is newly recruited cell planners as well as radio network engineers actively working with cell planning issues.

**Prerequisites**

Successful completion of the following courses:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Cell Planning Principles 1 (LZU 108 3273)

**Duration and class size**

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

**Learning situation**

The course is instructor-led training with theoretical exercises. The student is expected to actively participate in the exercises.

A TEMS Investigation and log files, a GPS receiver and some maps are needed for demonstrations.

**Time schedule**

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

<b>Day 1</b>	<b>Estimated time</b>
• Course introduction and pre-test	1 hour
• System description	2 hours
• RF-guidelines	3 hours
<b>Day 2</b>	<b>Estimated time</b>
• Dimensioning of logical channel	3 hours
• Antennas	1 hour
• Antenna near products	2 hours
<b>Day 3</b>	<b>Estimated time</b>
• Map data basics and GPS	1 hour



- Ericsson propagation algorithms 2 hours
- Site Survey 1 hours
- Tools 1 hours
- Indoor Cell Planning 1 hours

**Day 4**

**Estimated time**

- Indoor Cell Planning cont. 2 hours
- Network Expansion 2 hours
- Radio Network Features (related to planning) 2 hours

**Day 5**

**Estimated time**

- Radio Network Features cont. 4 hours
- GPRS Impact on the Radio Network 2 hours

## GSM Cell Planning Workshop

LZU 108 3287 R6A

### Description

This course is intended for radio network engineers involved in planning of GSM radio network. The purpose of the course is to provide the participants with extensive theory about cell planning and practical experience from radio network design by using cell-planning tools. After attending this course the participants will be able to perform cell planning of GSM radio networks.

### Learning objectives

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

- 1 Perform power/system balances and macro cell predictions
  - 1.1 Calculate link budgets and perform a system/power balance
  - 1.2 Derive design criteria for macro cell coverage predictions
  - 1.3 Explain how design criteria relates to coverage predictions and field measurements
- 2 Perform dimensioning of logical channels
  - 2.1 Perform dimensioning of logical channels in different scenarios
  - 2.2 Perform dimensioning of Location Areas with regard to paging capacity
- 3 Describe antenna properties and recognise and choose different type of antennas in different type of environments
  - 3.1 Explain the meaning of concepts such as gain, directivity, downtilt and null fill-in
  - 3.2 Explain the meaning of intermodulation and how to avoid it
  - 3.3 Explain the difference between space- and polarisation-diversity
- 4 Discuss different RBS configurations that Ericsson supports
  - 4.1 Recognise scenarios where a repeater solution might be appropriate
  - 4.2 Explain the function and usage of different types CDUs
  - 4.3 Discuss different RBS configurations
- 5 Explain basic map data and GPS
  - 5.1 Describe the concepts geoide, ellipsoide, datum and map projections
  - 5.2 List the most important data about GPS, the limitations of the system and the use of a GPS receiver
- 6 Explain the principles behind Ericsson's macro and micro cell propagation prediction models
  - 6.1 Explain the principles behind Ericsson's macro cell propagation prediction algorithm 9999 and list the different types of indata the algorithm needs
  - 6.2 Explain the principles behind Ericsson's urban model and list the different type of indata the algorithm needs
- 7 Explain all aspects of a proper site survey
  - 7.1 Describe the instruments used for site survey

- 7.2 Describe necessary pre-site survey procedures
- 7.3 Describe the procedure for a complete site survey.
  
- 8 Explain the use of different cell planning tools
  - 8.1 Describe Ericsson's product portfolio TEMS optimisation solution
  - 8.2 Perform data logging and some analysis using TEMS Investigation
  - 8.3 Discuss some basic features of Ericsson's cell planning tool, TEMS CellPlanner
  - 8.4 Explain the use of CNA in OSS for the purpose of viewing, reconfiguring, and implementing cells
  - 8.5 Explain how RNO in OSS can be used as implementation help (FAS/FOX, NCS/NOX), performance monitoring (MRR) and hot spot finding (TET)
  
- 9 Explain the principles and procedures for in-building installation
  - 9.1 Choose between different types of configurations for indoor coverage
  - 9.2 Derive design criteria for coverage predictions of in-building installation
  - 9.3 Calculate linkbudgets and EiRP for different types of feeder configurations
  - 9.4 Estimate indoor coverage from an in-building installation using a modified version of Keenan-Motley's propagation algorithm
  - 9.5 Design a simple in-building installation
  
- 10 Explain and evaluate different frequency planning strategies
  - 10.1 Discuss different ways of increasing the capacity in a radio network
  - 10.2 Discuss different scenarios where MRP or FLP might be advantageous
  
- 11 Explain the radio network features which give direct implications on the radio planning
  - 11.1 Describe different way of configure the cell regarding the number of channel groups
  - 11.2 Discuss frequency hopping (B.B/S.Y) and the use of MAIO planning in booth an unsynchronised and synchronised networks
  - 11.3 Discuss the feature Discontinuous Transmission and it's implications
  - 11.4 Discuss the impact of BTS/MS power control
  - 11.5 Discuss the feature Adaptive Multirate and it's impact on the radio planning
  - 11.6 Discuss the effect of Antenna Hopping
  - 11.7 Discuss the effect of Interference Rejection Combining
  
- 12 Explain the impact of GPRS on the radio network
  - 12.1 Explain the system parts specific to GPRS
  - 12.2 Explain the GPRS radio interface
  - 12.3 Describe the radio resource handling
  - 12.4 Explain the concept radio block
  - 12.5 Perform GPRS radio network dimensioning
  - 12.6 Explain the impact of GPRS on the radio network
  
- 13 Use TEMS CellPlanner to create nominal cellplan
  - 13.1 Design a network with macrocells and create frequency plan  
Different approach to frequency planning will be discussed and implemented in the tool  
Booth network without and with frequency hopping (B.B/ S.Y) will be implemented

- 13.2 Use TEMS CellPlanner for predictions of coverage, capacity and interference in the network
- 13.3 Expand an existing network with new sites for improved coverage and capacity
- 13.4 Make changes in the frequency plan when new sites are introduced
- 13.5 Expand an existing network with new sites (microcells) in a dense urban area for improved coverage and capacity
- 13.6 Use the urban model for predictions of coverage
- 13.7 Perform automatic tuning of algorithm 9999
- 13.8 Define a GPRS plan for coverage and capacity
- 13.9 Make traffic analysis for both voice and data traffic

### **Target audience**

The target audience for this course is radio network engineers working with cell planning issues.

### **Prerequisites**

Successful completion of the following courses:

GSM Network Fundamentals (FAB 102 1465)  
GSM Cell Planning Principles 1 (LZU 108 3273)  
GSM TEMS Cell Planner Universal (LZU 108 3886)

### **Duration and class size**

The length of the course is 10 days and the maximum number of participants is 16.

### **Learning situation**

The course is based on instructor-led lessons with exercises and practical cases using TEMS Cell Planner. A TEMS Investigation and log files, a GPS receiver and some maps are needed for demonstrations.

One PC for each group of two students is mandatory. TEMS CellPlanner must be installed on the PCs.



### Time schedule

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

#### Day 1

Introduction  
System Description  
Radio Frequency Guidelines  
Dimensioning of Logical Channels

#### Estimated time

1 hour  
1 hour  
2 hours  
2 hours

#### Day 2

Antennas  
Study Case 1, macrocell network  
Theoretical presentation

#### Estimated time

2 hours  
4 hours

#### Day 3

TEMS Cellplanner Introduction  
Study Case 1 cont.

#### Estimated time

2 hours  
4 hours

#### Day 4

Study Case 1, Practical Presentation  
Antenna near products  
Map Data Basics and GPS  
Site Survey

#### Estimated time

2 hours  
1 hours  
1 hours  
2 hours

#### Day 5

Radio Network Features (Related to planning)

#### Estimated time

6 hours

#### Day 6

Study Case phase 2  
Ericsson Propagation Algorithms

#### Estimated time

3 hours  
3 hours



**Day 7**

Study Case, automatic tuning of 9999  
Indoor Cell Study case

**Estimated time**

2 hours  
4 hours

**Day 8**

Network Expansion  
Study case phase 3, microcells

**Estimated time**

2 hours  
4 hours

**Day 9**

GPRS impact on the radio network  
Study Case GPRS

**Estimated time**

3 hours  
3 hours

**Day 10**

Study Case GPRS cont.  
Cell Parameters  
Evaluation

**Estimated time**

3 hours  
3 hours

## GSM/WCDMA Core Network Overview (WBL)

LZU 108 5201 R2A

### Description

This course provides students with an overview of the GSM/WCDMA Core Network, with all its components, functions and characteristics.

### Learning objectives

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

- 14 Provide an overview of the telephony, packet and transport domains in Global System for Mobile communication (GSM) / Wideband Code Division Multiple Access (WCDMA) Core Network (CN)
- 15 Explain the split architecture in GSM/WCDMA Core network
- 16 Provide an overview of the GSM/WCDMA Core Network
- 17 Name the OSS-RC capabilities

### Target audience

The target audience for this course is all Ericsson customers in WCDMA related activities.

### Prerequisites

Successful completion of the course:

No Specific

### Duration

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 but assuming the prerequisites are fulfilled, the whole course can be worked through within 3 hours.

## GSM Maintenance MSC/BSC Extended

LZU 108 5031/2 R3A

### Description

The learning product enables the students to perform hardware maintenance on an intermediate difficulty level on the AXE nodes of the GSM R10 MSC and BSC.

The course will provide core network field technicians and core network engineers with abilities to act on hardware faults and follow maintenance routines of an intermediate difficulty level using the system documentation and local Operation and Maintenance (O&M) tools.

The course is modular, being built up of cases, each case consisting of one or more related events. A sufficient pool of cases and events is provided so that maintenance of all new GSM R10 hardware configurations may be trained. The new Group Switch in the AXE810 product (GS890) is covered in this course

Specifically, cases and events may be selected from the learning product to train extended maintenance tasks on AXE configurations built up of the following hardware elements:

- AXE Central Hardware Elements
- APZ 212 20
- APZ 212 30
- APZ 212 33
- APZ 212 40
- IOG 20
- APG 40
- AXE Subordinate Hardware Elements
- 128K Group Switch

### Learning objectives

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

- 1 Identify the hardware components and interconnections of the Group Switch (GS), using O&M tools and online documentation.
- 2 Detect and solve intermediate level faults in GS hardware and GS exchange data, using O&M tools and online documentation.
- 3 Identify the hardware components and interconnections of the Input / Output (IO) configuration, using O&M tools and online documentation.
- 4 Detect and solve intermediate level faults in IO hardware, using O&M tools and online documentation.

- 5 Access and use IO logging functions in the detection and analysis of system faults, using O&M tools and online documentation.
- 6 Access and use IO file processing functions to gather and distribute essential exchange data, using O&M tools and online documentation.
- 7 Determine the actions of the Maintenance Subsystem (MAS) in supervising CP hardware and handling CP faults, using O&M tools, exchange printouts, and online documentation.
- 8 Determine the MAS actions in CP software supervision and recovery, using O&M tools, online documentation, and direct observation.
- 9 Handle CP software recovery alarms, using O&M tools and online documentation.
- 10 Handle an intermediate level CP stoppage, using O&M tools, online documentation, and the CP Test (CPT) system.

### Target audience

The target audience for this course is both:

- Core Network Field Technicians (and engineers if required) with at least six months' experience in maintenance of GSM R10 MSC or BSC, who need further competence in the maintenance area.
- NMC/OMC personnel with at least six months' experience in directing these GSM maintenance personnel from a remote position, who need further competence in the maintenance area. This is not the primary target group, though.

### Prerequisites

Successful completion of the following courses:

- GSM Core Network Maintenance                      LZU 108 5458/2

### Duration and class size

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

### Learning situation

This is a task-oriented learning course based on tasks in the work process given in a technical environment using equipment and tools. Working in small groups, students are issued various Work Orders to resolve AXE hardware faults of intermediate difficulty level, and follow hardware and software maintenance procedures, using the system documentation. Wherever possible, the group size will be limited to two students, though larger groups may be required from time to time.

The instructor in general acts as guide or facilitator, allowing the students to proceed independently, assisting only where necessary to ensure that the students obtain the



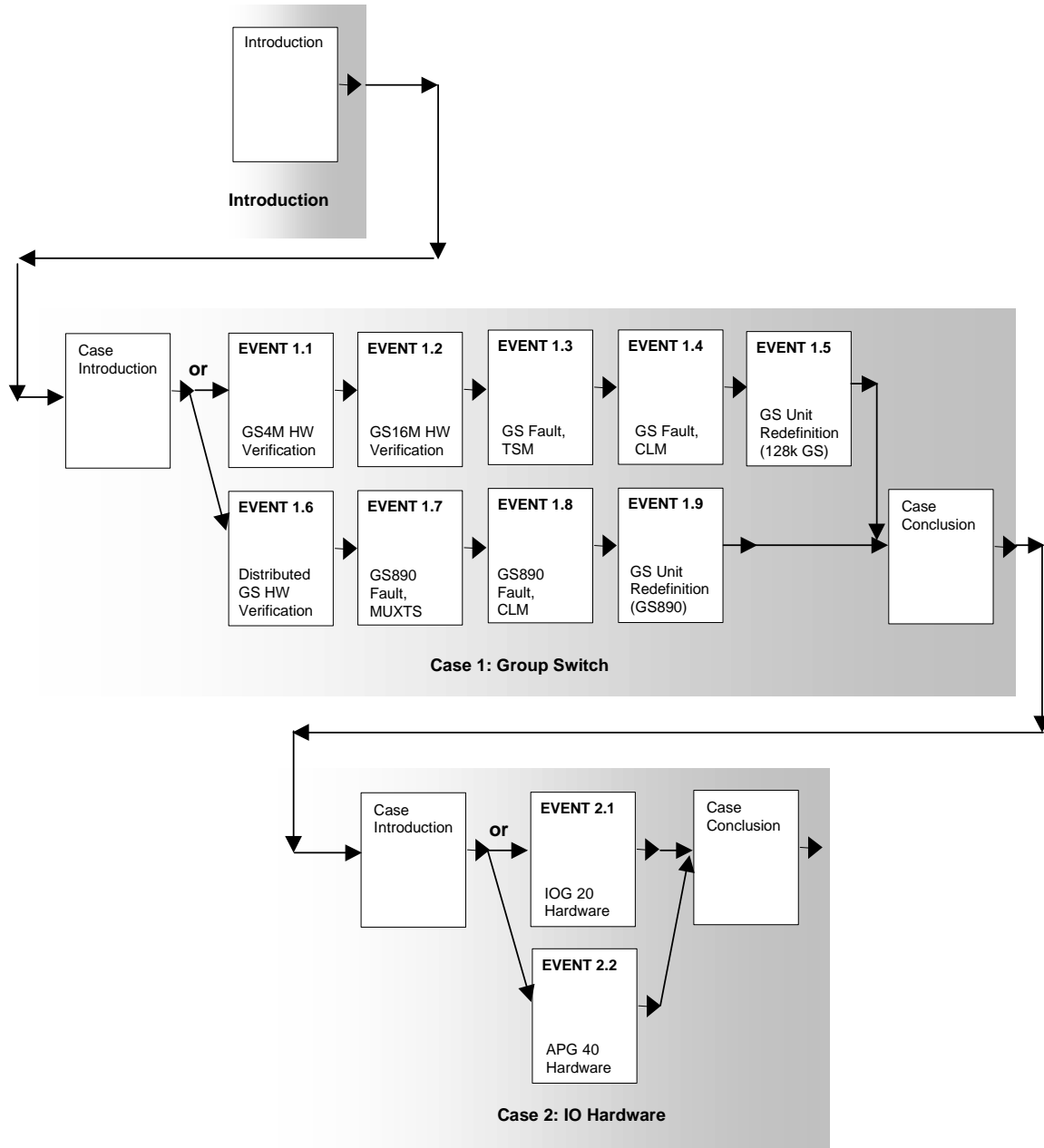
necessary competence. Infrequently, the instructor will also present instructional material, either to preface an event or in summation. Instances of pure lecture, however, are limited.

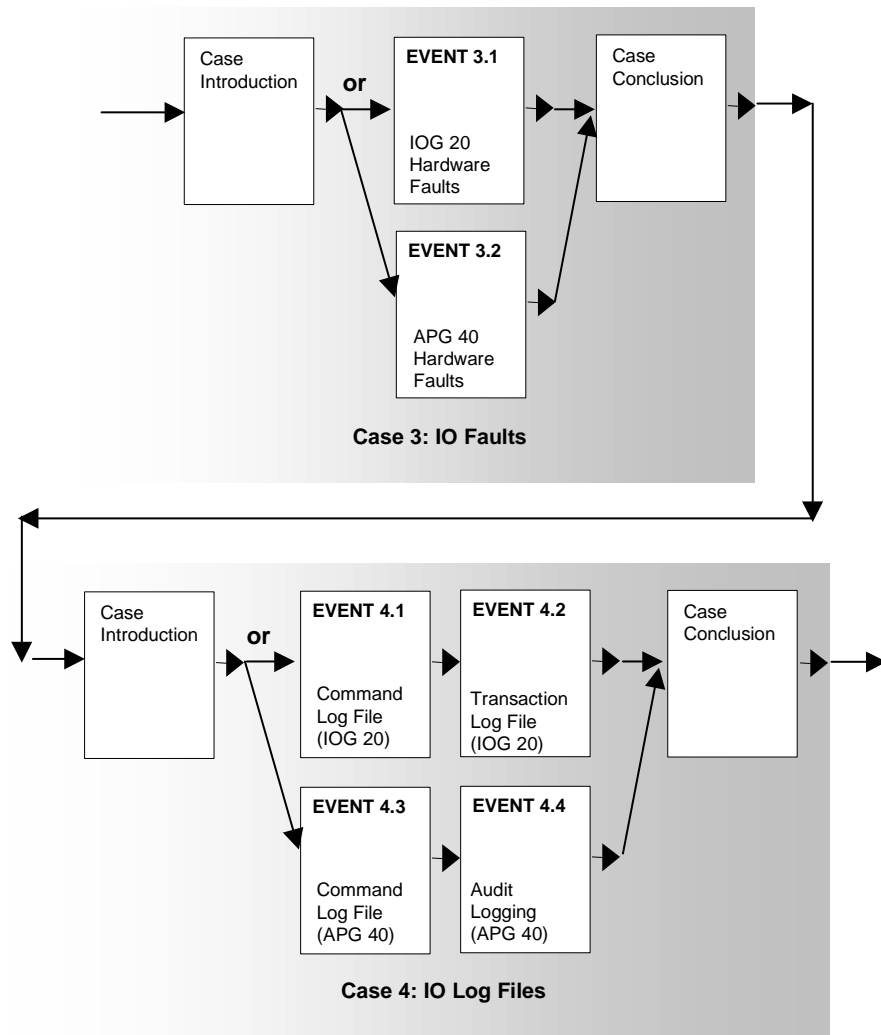
**Time schedule**

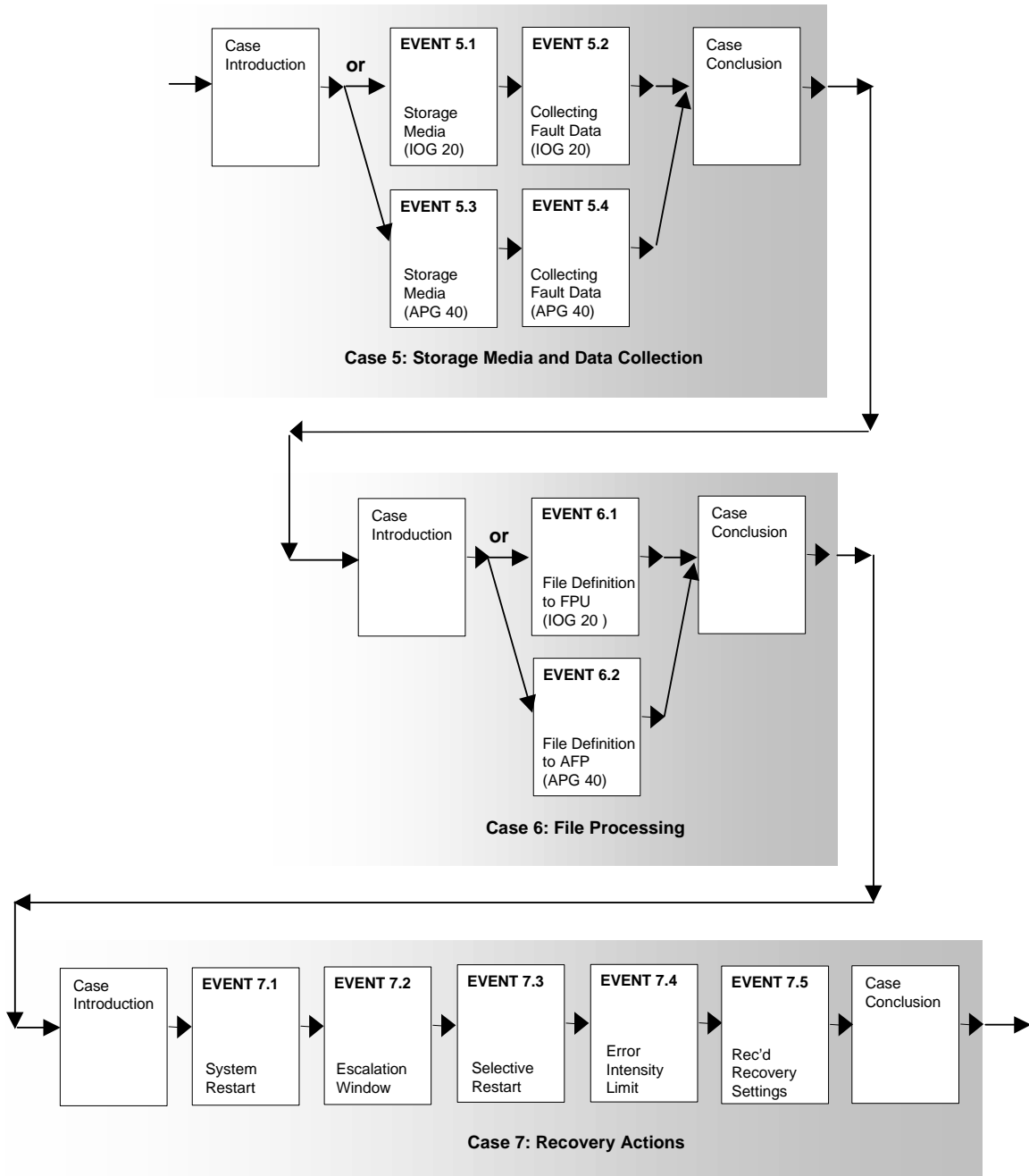
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

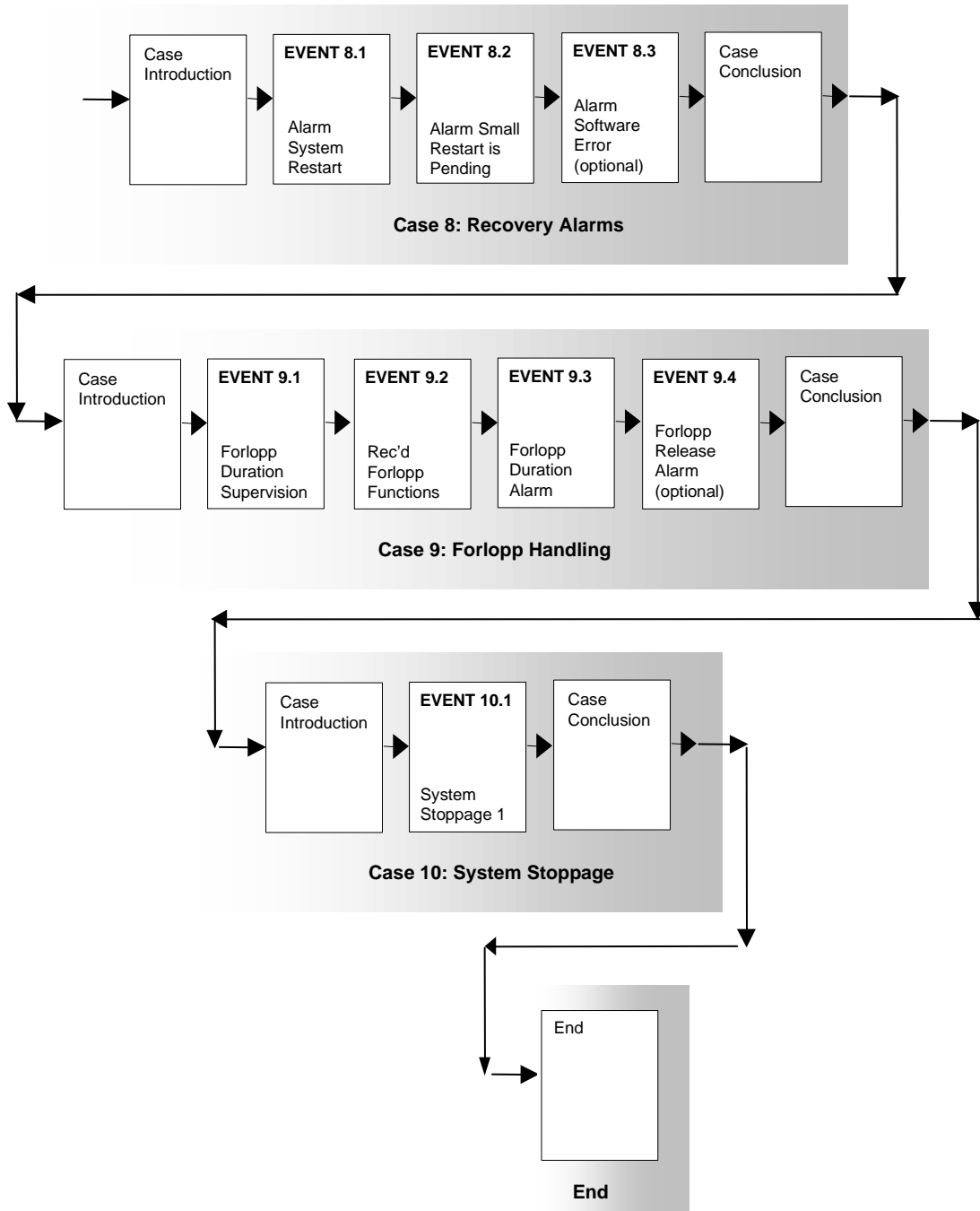
*See following detailed Learning Product Plan*

Learning Product Plan for GSM Maintenance MSC/BSC Extended









## GSM Network Surveillance (VCT or ILT)

LZU 108 5471/2 R2A - ILT

LZU 108 5471/9 R2A - VCT

### Description

This course provides the customers with training for their surveillance personnel, working with alarm handling as well as monitoring tasks on a basic level.

The course is task-oriented and focuses on the daily work of the target group. It will use a problem-oriented pedagogical method involving real-life situations, where the students have to work more actively than in traditional training. The focus is on learning standard procedures rather than covering every possible alarm situation, enabling the students to react on new situations in a well-defined way.

### Learning objectives

- 1 On completion of this course the participants will be able to:
- 2 Use the applications of the management systems involved in network surveillance tasks.
- 3 Use the system documentation efficiently for network surveillance tasks.
- 4 Perform basic alarm supervision with OSS-RC or Winfiol
- 5 Handle the most common alarm situations with OSS-RC or Winfiol
- 6 Explain the different applications in the sub-network management system OSS that are used for Network Surveillance tasks.
- 7 Initiate a system back up on node level
- 8 Monitor the status of performance measurement programs
- 9 On receiving a work order retrieve statistics by using the correct application in OSS
- 10 On receiving a work-order, run a script on a node and report the result
- 11 Handle some of the most common alarm situations

### Target audience

The target audience for this course is:

- Network engineers
- Network technicians

Starting with Network Surveillance work at an NMC

### Prerequisites

Successful completion of the following courses:



- GSM Network fundamentals (FAB 102 1465)

### **Duration and class size**

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

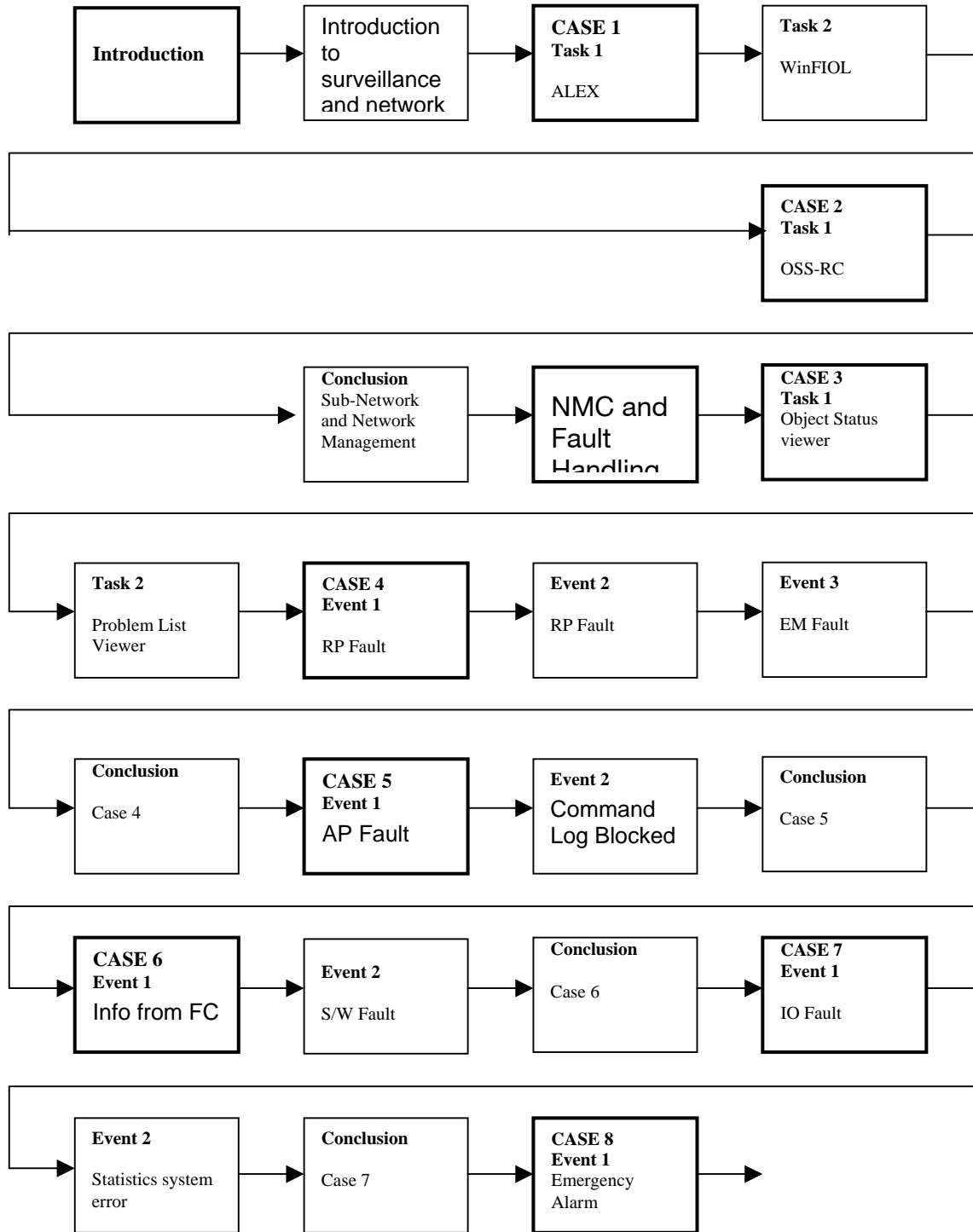
### **Learning situation**

This is a task-oriented learning course based on tasks in the work process given in a technical environment using equipment and tools. Working in small groups, students are issued various Work Orders to resolve AXE; GSN and MGW hardware faults of intermediate difficulty level, and follow hardware and software maintenance procedures, using the system documentation. Wherever possible, the group size will be limited to two students, though larger groups may be required from time to time.

The instructor in general acts as guide or facilitator, allowing the students to proceed independently, assisting only where necessary to ensure that the students obtain the necessary competence. Infrequently, the instructor will also present instructional material, either to preface an event or in summation. Instances of pure lecture, however, are limited.

### **Time schedule**

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



# GSM OSS Radio Network Optimizers

LZU 108 5963 R1B

## Description

This course deals with the GSM OSS tools for surveillance, optimization and troubleshooting of the GSM radio network. The course focus is on how to use the tools for setting up new measurements and how to generate and customize reports. Some important Radio Network characteristics are explained and some examples of how to interpret results and reports are discussed.

Guidelines for optimization of the radio network and cell parameter settings are not covered during this course.

## Learning objectives

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

1. Run R-PMO – Real Time Performance Monitoring
  - 1.1 Activate R-PMO reports
  - 1.2 Monitor real time events e.g Speech Quality, Drop rate, Handover Success.
  - 1.3 Configure user defined Reports
  
2. Handle common RNO functions
  - 2.1 Sort and filter data for recordings and results
  - 2.2 Create Cell sets
  - 2.3 Create Frequency sets
  - 2.4 Create recordings
  - 2.5 Schedule recordings
  - 2.6 Configure and customize reports
  
3. Run MRR – Measurement Result Recording
  - 3.1 Handle MRR reports
  - 3.2 Use MRR for signal quality surveillance
  - 3.2 Use MRR for trouble shooting
  
4. Run NCS/NOX – Neighboring cell support/Neighboring Optimization eXpert
  - 4.1 Use NCS to find new possible neighbors
  - 4.2 Use NCS to identify poor neighbor relations
  - 4.3 Handle NOX change order recommendation
  - 4.4 Handle the Barring Matrix
  
5. Run FAS/FOX – Frequency Allocation Support/Frequency Optimization eXpert
  - 5.1 Use FAS for recording of uplink Interference

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- 5.2 Use FAS for estimation of downlink interference
- 5.3 Use FOX in recommendation or automatic mode

## 6. Run TET – Traffic Estimation Tool

### 6.1 Interpret Traffic level and off load reports

## 6. Run RNR – Radio Network Recordings

### 6.1 Define:

- MTR recordings (Mobile Traffic Recording)
- CTR recordings (Cell Traffic Recording)
- CER recordings (Cell Events Recording)

### 6.2 Create:

- MTR reports
- CTR reports
- CER reports

## Target audience

The target audience for this course is:

- Radio Network Designers
- Radio Network Operators

## Prerequisites

Successful completion of the following courses:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Radio Network Features (LZU 108 3704)
- GSM Radi0 Network Tuning (LZU 108 3298)



### **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, which are accessed 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.

#### Day 1

- Introduction
- R-PMO
- RNO common functions
- MRR

#### Estimated time

1 h  
2 h  
1,5 h  
1,5 h

#### Day 2

- NCS/NOX
- FAS/FOX

#### Estimated time

3 h  
3 h

#### Day 3

- TET
- RNR

#### Estimated time

2  
2,5 h

## GSM OSS Network Statistics

LZU 108 5962 R2A

### Description

This course deals with the following Network Statistics applications (used both in GSM OSS and CN-OSS):

SMIA, SGw, SDM, PSA and NWSA/Business Objects MIA and PMT.

These applications support centralized collection, processing and storage of statistical data generated in BSC/MSC, GSN, MGw and ATM network elements.

The course will cover aspects of how to set up measurements to generate reports using these applications.

For generation and manipulation of reports, a third party product, Business Objects, is used. Handling of this application will be covered.

### Learning objectives

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

1. Use the NWS applications in GSM OSS to set up STS/OMS measurements in AXE network elements and collect statistical data for the purpose of generating Ericsson predefined reports.
2. Use the PMT and MIA tools to set up measurements in IP nodes like Juniper
3. Describe the performance management flow in Network Statistics, i.e., how statistical data is processed from NE's to final reports in NWS.
4. Use the predefined Ericsson reports to get statistics on their network and also to be able to make own basic reports on collected data.
5. Configure thresholds for statistical alarms

The course does not cover:

How to understand/interpret the values in the reports or how to create own advanced customized reports.

### Target audience

The target audience for this course are:

Network Planners

Radio Network Tuning Engineers

Statistics Engineers

Technical Managers



### **Prerequisites**

Successful completion of the following courses:

GSM Network Fundamentals (FAB102 1465)

GSM Statistics Introduction (LZU 108 5079)

### **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 both classroom and in a technical environment using equipment and tools, which are accessed remotely.

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## Time schedule

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

Day	Short description of the topics in the course	Estimated time
1	• Introduction and NWS overview	1h
	• SMIA - Measurement initiation in AXE IOG20 and/or APG40	1h
	• SGw Statistical Gateway - Verify collection of data	1h
	• SDM - Statistics Data Mart, Data storage	2h
	• Business Objects - Generation of reports and modification of reports	1h
2	• Continue: Business Objects - Generation of reports and modification of reports	2h
	• MIA - Measurement initiation Administration in WPP (GSN) and Cello (MGw)	1h
	• PMT - Measurement initiation in IP nodes like Juniper (GSN), AXD (ATM) switches	1h
	• Verify collection of data from GSN, MGw and ATM nodes.	1h
	• Summary Case: Set up measurements and produce output in a report	1h

## GSM Radio Network Features

LZU 108 3704 R6A

### Description

This course is intended for RF engineers involved in tuning activities of GSM networks. The purpose of the course is to provide RF engineers with knowledge of the different radio network features, the parameters governing them, and, where applicable, up to date recommendations of parameter settings.

### Learning objectives

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

1. Explain the Idle Mode behavior of the GSM network
  - 1.1 Decide the values of Idle Mode parameters
2. Explain the Locating algorithm
  - 2.1 Decide and tune the parameters that controls Locating
  - 2.2 Explain the impact other auxiliary radio network features have on Locating
3. Explain Channel Administration
  - 3.1 Decide the values of Channel Administration parameters
  - 3.2 Explain how AMR Full Rate and AMR Half Rate impact the network planning
  - 3.2 Decide the values of AMR parameters
4. Explain Idle Channel Measurement
  - 4.1 Decide the values of Idle Channel Measurement parameters
5. Explain the auxiliary radio network features
  - 5.1 Decide the values of Intra-cell Handover parameters
  - 5.2 Decide the values of Overlaid/Underlaid subcell parameters
  - 5.3 Explain how BCCH in Overlaid Subcell is used
  - 5.4 Decide the values of Multi Band Cell parameters
  - 5.5 Decide the values of Hierarchical Cell Structures parameters
  - 5.6 Decide the values of Cell Load Sharing parameters
  - 5.7 Decide the values of Assignment to Another Cell parameters
6. Explain the quality related features
  - 6.1 Decide the values of Dynamic BTS/MS Power Control parameters
  - 6.2 Decide the values for AMR Power Control parameters
  - 6.3 Decide the values for Dynamic Half Rate Allocation and Adaptation
  - 6.4 Decide the values of Frequency Hopping parameters
  - 6.5 Explain and plan MAIO Management in Synchronized networks
  - 6.6 Decide the values of DTX parameters
7. Explain some optional features



- 7.1 Decide the values of Adaptive Configuration of Logical Channels parameters
- 7.2 Decide the values of Extended Range parameters
- 7.3 Explain GSM-UMTS Cell Selection and handover

8. Explain GPRS/EGPRS related features

- 8.1 Decide the values of GPRS/EGPRS Channel Administration parameters
- 8.2 Decide the values of GPRS/EGPRS Cell Selection parameters
- 8.3 Explain how Network Assisted Cell Change (NACC) works
- 8.4 Decide the values of GPRS/EGPRS Paging and DRX parameters
- 8.5 Decide the values of GPRS/EGPRS MS Power Control
- 8.6 Describe GPRS/EGPRS Quality of Service

**Target audience**

The target audience for this course is RF engineers involved in different aspects of RF engineering, in particular, radio network optimisation.

**Prerequisites**

The participants should be familiar with the GSM network and successful completion of the following:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Cell Planning Principles 1 (LZU 108 3273)

**Duration and class size**

The length of the course is 5 days and the maximum number of participants is 16.

**Learning situation**

The course is instructor-led, with theoretical exercises and discussions.



### Time schedule

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

<b>Day 1</b>	<b>Estimated time</b>
<ul style="list-style-type: none"><li>• Introduction</li></ul>	0,5 hour
<ul style="list-style-type: none"><li>• Idle Mode Behavior</li></ul>	2,5 hours
<ul style="list-style-type: none"><li>• Locating</li></ul>	3,0 hours
<b>Day 2</b>	<b>Estimated time</b>
<ul style="list-style-type: none"><li>• Auxiliary radio network features</li></ul>	6,0 hours
<b>Day 3</b>	<b>Estimated time</b>
<ul style="list-style-type: none"><li>• Immediate Assignment on TCH</li></ul>	0,25 hour
<ul style="list-style-type: none"><li>• Channel Administration</li></ul>	1,25 hours
<ul style="list-style-type: none"><li>• Adaptive Multirate</li></ul>	0,5 hour
<ul style="list-style-type: none"><li>• Quality Related Features</li></ul>	4,0 hours
<b>Day 4</b>	
<ul style="list-style-type: none"><li>• Optional Features</li></ul>	6,0 hours
<b>Day 5</b>	<b>Estimated time</b>
<ul style="list-style-type: none"><li>• GPRS Introduction and EDGE</li></ul>	1,5 hour
<ul style="list-style-type: none"><li>• GPRS/EGPRS Channel Administration</li></ul>	1,5 hour
<ul style="list-style-type: none"><li>• GPRS/EGPRS Cell Selection</li></ul>	1,0 hour
<ul style="list-style-type: none"><li>• GPRS/EGPRS Paging and DRX</li></ul>	1,0 hour
<ul style="list-style-type: none"><li>• GPRS/EGPRS MS Power Control</li></ul>	0,5 hours
<ul style="list-style-type: none"><li>• GPRS/EGPRS Quality of Service</li></ul>	0,5 hours

## GSM R10 Radio Network Features Delta

LZU 108 6103 R1A

### Description

This course is intended for RF engineers involved in tuning activities of GSM networks. The purpose of the course is to provide RF engineers with knowledge of the updates of existing features and new features in R10.

### Learning objectives

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

- 1 Explain the major changes (from R9) in the following Radio Network Features
  - 1.1 Adaptive Multirate
  - 1.2 BTS/MS Power Control for AMR FR
  - 1.3 Intra cell Handover
  - 1.4 Dynamic MS Power Control
  - 1.5 Overlaid/Underlaid Subcells
  
- 2 Explain the major changes (from R9) in the GPRS/EGPRS related features
  - 2.1 GPRS/EGPRS Cell Reselection
  - 2.2 EGPRS Link Quality Control
  - 2.3 GPRS/EGPRS Quality of Service
  - 2.4 GPRS/EGPRS Channel Administration
  
- 3 Explain the new Radio Network Features in R10
  - 3.1 Multi Band Cell
  - 3.2 Synchronized Radio Networks
  - 3.3 Interference Rejection Combining (IRC)

### Target audience

The target audience for this course is RF engineers involved in different aspects of RF engineering such as radio network optimisation and planning.

### Prerequisites

The participants should be familiar with the GSM network and successful completion of the following course:

GSM Radio Network Features R9 (LZU 108 3704)



**Duration and class size**

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

**Learning situation**

The course is instructor-led, with theoretical exercises and discussions.

**Time schedule**

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

**Day 1**

- Introduction
- Major changes in existing R9 features
- Major changes in GPRS/EGPRS related features
- New Features in R10

**Estimated time**

- 0,25 hour
- 2,0 hours
- 2,25 hours
- 1,5 hours

## GSM Radio Network Overview (WBL)

LZU 108 6235 R1A

### Description

Participants attending the GSM Radio Network Overview WBL course will be given a basic introduction to the Radio Access part of GSM.

### Learning objectives

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

- 1 Describe the Radio Network components, their functions, features and required specifications
- 2 Explain that the BSC controls the radio resources for the RBS
- 3 Outline the main working functions of a BSC, TRC and RBS
- 4 List the different versions of RBS's
- 5 Outline that an RBS contains a transmitter and a receiver and is the interface towards the MS
- 6 Explain the influence of EDGE to the Radio Network in terms of infrastructure requirements, Air Interface and end-user service enhancements.
- 7 Describe briefly the 3 different positioning methods available with Flexible Positioning Support CGI+TA, E-OTD and A-GPS positioning.

### Target audience

This course is the starting point for courses related to the GSM System

### Prerequisites

The participants should be familiar with mobile telecommunications.

### 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 but assuming the prerequisites are fulfilled, the whole course can be worked through within 3 hours.

## GSM Radio Network Tuning

LZU 108 3298 R6A

### Description

This course is intended for RF engineers involved in tuning activities of GSM networks. The purpose of the course is to provide RF engineers with both theoretical and practical competence of parameter settings and tuning activities. After attending this course the participants will be able to handle various tuning activities for GSM radio networks.

### Learning objectives

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

1. Plan and dimension a GSM radio network
  - 1.1 Perform a power balance and calculate nominal cell size
  - 1.2 Calculate design criteria for different environments
  
- 2 Describe the general tuning processes and performance indicators in a GSM network
  - 2.1 List different views of quality and which parts generally are considered
  - 2.2 Describe some key performance Indicators for accessibility, retainability and service integrity
  - 2.3 Explain the difference between BSA, SPR and RNI
  
- 3 Dimension logical channels
  - 3.1 Perform dimensioning of SDCCH channels in different scenarios
  - 3.2 Explain what impact AGBLK and the SDCCH configuration have on the size of a Location Area
  - 3.3 Estimate an upper limit of a Location Area
  
- 4 Tune radio networks
  - 4.1 Perform analyzis of statistical data and problems
  - 4.2 Perform change of cell borders, hysteresis and offsets
  - 4.3 Perform change of thresholds for HCS
  - 4.4 Optimize radio network features
  
- 5 Analyze TEMS Investigation field measurements
  - 5.1 Explain some different aspects of field measurements with TEMS
  - 5.2 Explain the SQI, Speech Quality Index in TEMS
  - 5.3 Identify some common problems in a network using TEMS
  - 5.4 Analyze and evaluate TEMS Investigation logfiles
  
- 6 Interpret statistics and some key performance indicators

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- 6.1 Explain the difference between peg counters and status counters
  - 6.2 Explain some of the counters that can be retrieved from STS
  - 6.3 Evaluate some different user formulas for dropped calls
  - 6.4 Calculate some user formulas for the key performance indicators
  - 6.5 Analyze and evaluate a number of key performance indicators
- 7 Describe the main radio network recording applications in OSS
- 7.1 Describe the usage of the radio network recording applications in OSS (MTR, CTR and CER)
  - 7.2 Describe the usage of the radio network optimization applications in OSS (MRR, NCS/NOX, FAS/FOX and TET)

### **Target audience**

The target audience for this course is RF engineers involved in radio network tuning.

### **Prerequisites**

Successful completion of the following courses:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Cell Planning Principles 1 (LZU 108 3273)
- GSM Radio Network Features (LZU 108 3704)

### **Duration and class size**

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

### **Learning situation**

The course is based on instructor-led lessons with exercises and practical radio network tuning cases using a BSC simulator.

One PC for each group of three or four students is mandatory for the radio network tuning cases and for the TEMS Investigation case. TEMS Investigation must be installed on the PCs.



**Time schedule**

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

**Day 1**

	<b>Estimated time</b>
Introduction	
Radio Network dimensioning	0,5 hour
Network Performance Evaluation & Tuning	1,0 hour
RF Guidelines	0,5 hour
Dimensioning of Logical Channels	1 hour
Parameter repetition	1 hour
Radio tuning case 1	2 hours

**Day 2**

	<b>Estimated time</b>
Parameter repetition	1 hour
Radio tuning case 2	2 hours
Parameter repetition	1 hour
Radio tuning case 3	2 hours

**Day 3**

	<b>Estimated time</b>
Parameter repetition	1,0 hour
Radio tuning Case 4	2 hours
TEMS Investigation	0,5 hour
System information	0,5 hour

*1.1 CASE STUDY TEMS INVESTIGATION*

**Day 4**

	<b>Estimated time</b>
Radio Network Statistics	1,0 hour
Case study RNS	1,0 hour
Radio Network Optimization	2,0 hours
Final study case	2 hours

## GSM RAN Delta R10

LZU 108 6104 R1A - ILT  
LZU 108 6104/9 R1A - VCT

### Description

This course describes all the new and enhanced features in the R10 release of the Ericsson GSM Radio Access Network (RAN).

### Learning objectives

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

1. Explain in general terms how new datacom applications will be enabled and launched, facilitated through Streaming and QoS improvements.
2. Describe how the GPRS/EGPRS bearer has been enhanced through features such as GPRS/EGPRS improvements/end-user performance and network assisted cell change.
3. Outline how the new and enhanced features for Adaptive Multi-Rate (AMR) improve overall GSM RAN radio performance and capacity.
4. Describe how new and enhanced features such as Multi-band Cell; Synchronized Radio Networks, Interference Rejection Combining, Dynamic OL/UL Subcells and Antennae Hopping improve radio capacity in GSM RAN R10.
5. List how new and enhanced R10 features improve traffic handling in the GSM RAN, for example Call Queuing, Re-Use of frequencies in cell, increased SDCCH capacity and flexible SDCCH allocation.
6. List changes in infrastructure in GSM RAN R10 and features to improve radio network operation such as Self Configuring Transcoder Pools, APZ 212 33C, RBS 2308 and reduced restart times and other GSM RAN R10 System Improvements.

### Target audience

The target audience for this course is operation and maintenance engineers and others who may require knowledge of the new and enhanced features in GSM RAN R10 and their implementation.

### Prerequisites

The participants should be familiar with the GSM R9.1 release of the Ericsson GSM System or have successfully completed the following:

GSM Network Fundamentals (FAB 102 1465)

GSM BSC Operation (LZU 108 625)

### Duration and class size

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

## Learning situation

The course is based on instructor-led 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.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"> <li>• Introduction of the key strategic features in the GSM RAN R10 System, that is wireless datacomm, AMR, Traffic Handling, Infrastructure and Radio Network Capacity &amp; Operations</li> </ul>	15 mins
	<ul style="list-style-type: none"> <li>• Describe the benefit of implementing the Network assisted cell change feature.</li> </ul>	15 mins
	<ul style="list-style-type: none"> <li>• Explain how GPRS/EGPRS End-User Performance improvements are achieved.</li> </ul>	25 mins
	<ul style="list-style-type: none"> <li>• List the improvements to QoS and Scheduling and it's implications.</li> </ul>	10 mins
	<ul style="list-style-type: none"> <li>• Describe how the new feature 'Streaming' can enable the launch of new datacom applications</li> </ul>	10 mins
	<ul style="list-style-type: none"> <li>• Explain the enhancements to EDGE on the uplink.</li> </ul>	10 mins
	<ul style="list-style-type: none"> <li>• Describe the feature Advanced Single Slot Allocation</li> </ul>	15 mins
	<ul style="list-style-type: none"> <li>• List the GPRS/EGPRS System Improvements</li> </ul>	15 mins
	<ul style="list-style-type: none"> <li>• State in general how AMR is enhanced including support of TRA R5B &amp; R6 and Support of the RBS 2000 Family</li> </ul>	20 mins
	<ul style="list-style-type: none"> <li>• Describe new AMR features such as AMR Power control, Intra-cell Handover, Locating, AMR Half rate, dynamic FR/HR Adaption. Describe the enhanced feature Dynamic HR allocation</li> </ul>	45 mins
	<ul style="list-style-type: none"> <li>• Explain how the following new improve radio network capacity: Multi-band cell, Synchronized radio networks, IRC, Antennae Hopping, and advanced frequency handling.</li> </ul>	40 mins
	<ul style="list-style-type: none"> <li>• List the enhancements to Dynamic Overlaid/Underlaid subcells and Dynamic MS power control in R10</li> </ul>	10 mins



- Explain how the following features improve traffic handling in GSM RAN R10. Re-use of frequencies in cell, call queuing, increased SDCCH capacity and flexible SDCCH allocation, extended call release reporting and enhancements to paging. 30 mins
- State the features of APZ 212 33C and RBS 2308 introduced in the GSM RAN R10. 15 mins
- List GSM RAN R10 System Improvements. 20 mins
- Describe how features such as high-speed signaling links, battery test, self-configuring transcoder pools and restart reduction times improve GSM RAN efficiency 35 mins
- Outline enhanced traffic features such as active BA List recording, FAS, real time event data, speech quality supervision and Measurement reporting statistics 30 mins

## GSM RAN Integration for Field Maintenance

LZU 108 871 R2A

### Description

This course brings the students to a level where they are able to support the BSC by the integration of new sites. The course also covers the structure of the BSC and the interworking between the BSC and RBS.

### Learning objectives

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

- 1 Perform the most common integration tasks
- 2 Configure an RBS 2000 using the on-line documentation
- 3 Identify individual components in the GSM RAN sub-system, both in the BSC and RBS
- 4 Appreciate the ways in which the different components interwork
- 5 Handle practical fault-finding using the on-line documentation

### Target audience

The target audience for this course is personnel that work with operation and maintenance of the RBS, and are involved in the integration process. This can either be personnel working with the RBS Site Maintenance, or personnel doing the RBS installation and Testing.

### Prerequisites

Successful completion of the following course:

- RBS 2000 O&M (LZU 108 3269) and 3 months working practice

Or

- RBS 2102/2202 Maintenance (LZU 108 874) and 3 months working experience

Or

- RBS 2x06/2x07 Maintenance (LZU 108 5741) and 3 months working experience

### Duration and class size

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

### Learning situation

The course combines instructor-led lessons, group work and theoretical and practical exercises using a BSC with R9 software running; 4 OSS or WinFiol Terminals, 2 macro and 2 micro RBS 2000, GSM RAN library, B-Modules (online), 2 TEMS Mobiles with SIM cards, 2 PCs with OMT SW and TEMS software.



### Time schedule

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

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Not available yet.</li></ul>	

## GSM RBS 2102/2202 Maintenance

LZU 108 874 R1C

### Description

The purpose with this course is to supply newly employed BTS Field Maintenance personnel with competence needed for basic Maintenance procedures on RBS 2102/2202. It can be combined with other learning products such as, GSM RBS 2106/2206 Maintenance Delta, Mini-Link E Maintenance, and DXX/DXC Maintenance, to provide BTS site competence.

### Learning objectives

After the course the participants will be able to:

- 1 Perform fault localization on RBS equipment and antenna system
- 2 Perform simple repair procedures and replace faulty hardware units
- 3 Perform test after corrective action (e.g. test call, test of external alarms, climate system test and antenna system test)
- 4 Perform preventive maintenance routines on RBS 2102/2202 and the antenna system
- 5 Configure and install correct Installation Data Base, IDB using the Operation & Maintenance Terminal, OMT
- 6 Monitor internal and external alarms using the OMT
- 7 Monitor the fault status of the RBS using the OMT
- 8 Work according to the "RBS maintenance process" and interpret a work order from NMC/OMC
- 9 Upgrade the RBS with EDGE TRU
- 10 Be aware of BSS R10 Features and their impact on RBS
- 11 Perform preventive maintenance on the RBS and antenna system
- 12 Fill in a Repair Delivery Note ("Blue Tag") and a trouble report
- 13 Handle replaced units in a proper manner

### Target audience

Target group of this course is the GSM Operators BTS field maintenance staff working with maintenance of RBS equipment.

### Prerequisites

The participants should be familiar with radio- and microwave technique and successful completion of the course GSM Network Fundamentals (FAB 102 1465).

**Duration and class size**

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

**Learning situation**

The course is based on instructor-led lessons and practical exercises (task-oriented learning). The practical exercises are held in a lab environment similar to an ordinary radio site.

**Time schedule**

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

<b>Day</b>	<b>Topics</b>	<b>Estimated time hours:min</b>
1	• Course introduction	0:30
	• RBS 2000 Library	0:15
	• BSS Overview	0:30
	• RBS HW-architecture	1:00
	• Maintenance process, OMT and MMI (Case 1)	3:00
2	• Review day 1 (Case 2)	0:30
	• Climate System and Battery Backup System	1:00
	• Trouble Shooting Power & Climate (Case 3)	2:45
	• Preventive Maintenance (Case 4)	1:00
3	• Antenna Systems	0:30
	• Filter- and Hybrid Combiner System (CDUs) & RBS 2102/2202 Configurations	0:45
	• Trouble shooting Radio Part (Case 5)	3:20
	• Trouble Shooting DXU (Case 6)	1:00
	• Course Conclusion and Evaluation	0:30

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## GSM RBS 2102/2202 Maintenance Extended

LZU 108 5749 R2A

### Description

This course focuses on the advanced maintenance practices of the Macro Radio Base Stations. RBS 2302 Micro (including Maxite) and RBS 2401 Pico are excluded.

### Learning objectives

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

- 1 Use the System Documentation for information and guidelines
- 2 Describe the function of the hardware units in an Macro RBS 2000 cabinet on block diagram level
- 3 Describe the main signaling and bus systems within the RBS 2000 hardware system
- 4 Assemble, rebuild and commission RBS configurations, including Master Extension
- 5 Configure, commission and maintain Multi-Drop configurations
- 6 Use the Operation and Maintenance Terminal (OMT) software tool for collecting advanced information concerning RBS performance and configuration
- 7 Find and correct complex faults within the RBS software and hardware with the help of OMT, fault codes and the log files of the hardware units

### Target audience

The target audience for this course will be made up of RBS technicians that are responsible for performing advanced maintenance of the RBS 2000 equipment.

### Prerequisites

The participants should have completed either the GSM RBS 2000 Operation and Maintenance (LZU 108 3269) or GSM RBS 2000 Maintenance (LZU 108 874). The participants should also have at least one year of experience in field maintenance of RBS 2000 systems.

### 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 casework, which includes instructor-led lessons and practical teamwork. Theoretical parts of the course are held in a classroom near the training equipment.

### Time schedule

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

Day	Short description of the topics in the course	Estimated time
1	Course Introduction	1 hour
	Case 1: GSM BSS	.5 hours
	Case 2: RBS 2000 Signal Path and Busses	1.5 hours
	Case 3: RBS Configurations	2 hours
2	Finishing Case 3 includes repetition of Day 1	1 hour
	Case 4: Advanced Information with OMT	1.5 hours
	Case 5: More than one RBS: Master/Extension and Multi-Drop	1 hour
	Case 6: Advanced Troubleshooting	1.5 hours
	Conclusion	1 hour

## GSM RBS 2x06/2207 Maintenance and Maintenance Delta

LZU 108 5741 R2A

LZU 108 5741/1 R1A

### Description

The purpose of the course LZU 108 5741 R2A, 2 Maintenance is to supply newly employed BTS Field Maintenance personnel with competence needed for basic Maintenance procedures on RBS 2106/2206 and 2207.

The purpose of the course LZU 108 5741/1 R1A, GSM RBS 2x06/2207 Maintenance Delta is to introduce the new product family to field technicians with experience from RBS 2102/2202.

### Learning objectives

After the course the participants will be able to:

- Perform fault localization on RBS equipment and antenna system
- Perform simple repair procedures and replace faulty hardware units
- Perform test after corrective action (e.g. test call, test of external alarms, climate system test and antenna system test)
- Configure and install correct Installation Data Base, IDB, using the OMT
- Monitor internal and external alarms using the OMT
- Monitor the fault status of the RBS using the OMT
- Work according to the RBS maintenance process and interpret a work order from NMC/OMC
- Perform preventive maintenance on the RBS and antenna system
- Fill in a Repair Delivery Note, Blue Tag, and a trouble report
- Handle replaced units in a proper manner

### Target audience

Target group is the GSM Operators BTS field maintenance staff working with maintenance of RBS equipment.

### Prerequisites

The participants should be familiar with radio- and microwave technique and successful completion of the course GSM System Survey, LZU 108 852, or MBL GSM System Survey, LZU 108 4513/1C. On the GSM RBS 2x06/2207 Maintenance the participants should be



familiar with RBS 2102/2202 or participate in GSM RBS 2102/2202 Maintenance Course (LZU 108 874)

**Duration and class size**

The length of the 2x06/2207Maintenance course is 3 days while the 2x06/2207Maintenance Delta is 2 days with the maximum number of participants of 8.

**Learning situation**

The course is based on instructor-led lessons and practical exercises (case based learning). The practical exercises are held in a lab environment similar to an ordinary radio site.

**Time schedule**

The schedule is valid on 2x06/2207Maintenance of the required time always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics	Estimated time hours:min.
1	• Course introduction	0:15
	• RBS 2000 Library	0:15
	• GSM/BSS Overview	0:30
	• RBS Functional Overview	3:00
	• Site Equipment Technical Data	1:00
	• RBS Configurations	2:00
2	• Installation and Integration	1:30
	• OMT and Maintenance and Preventive Maintenance Procedures	3:00
	• Antenna Test	1:30
3	• OMT and Operation and Maintenance Exercises	3:00
	• Operation and Maintenance Cases	3:00
	• Course Conclusion and Evaluation	0:30

## GSM RBS 2308 Implementation & Maintenance

LZU108 6106 R1A

### Description

This course is intended to give the participants knowledge of how to install, perform testing and maintenance of the RBS 2308.

### Learning objectives

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

- 1 Install, perform testing and maintenance of the RBS 2308 according to procedures described by Customer Product Information, CPI.
- 2 Course introduction
- 3 Product introduction
- 3.1 Detailed Learning Objective
- 3.2 Detailed Learning Objective
- 4 Installation of the RBS 2308
- 5 Perform testing of the RBS 2308
- 5.1 Perform Site Installation Test
- 6 Perform maintenance of the RBS 2308
- 6.1 Use the Operation Maintenance Terminal, OMT to perform faultfinding

### Target audience

The target audience for this course is technical personal involved with installation, testing and maintenance.

### Prerequisites

The participants should be familiar with installation testing and maintenance of GSM RBSs or Successful completion of the following courses: GSM Network Fundamentals (FAB 102 1465)

### Duration and class size

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



**Learning situation**

The course is based on both instructor-led lesson and task based learning. The course could be delivered at customer site only if the number of participants per RBS is not overused (recommendation 3 per RBS).

**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).*

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Course introduction</li><li>• System introduction</li><li>• Product introduction</li><li>• Installation procedures</li><li>• Installation exercise</li></ul>	
2	<ul style="list-style-type: none"><li>• Testing procedures</li><li>• Testing exercises</li><li>• Maintenance procedures</li><li>• Maintenance exercises</li><li>• Course summary</li></ul>	

## GSM RBS 2x06 Configuration and Expansion

LZU 108 3791 R2A

### Description

This course addresses the handling of the Ericsson RBS 2106 and 2206 systems when changing the configuration of the cabinet and the radio system, with emphasis on how to practically expand and configure RBS 2x06 sites. The discussion of the systems structure and components is included in the course concept.

### Learning objectives

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

- 1 Explain the structure of the RBS 2x06 systems, including the function of the system components
- 2 Explain the main functions of the different RBS components on a block diagram level
- 3 Describe the main difference between CDU-G and CDU-F and the impact on possible radio configurations
- 4 Perform expansion and configuration of RBS 2x06 systems according to given specifications
- 5 Explain basic RBS antenna configurations on a block diagram level
- 6 Install RUs according to Ericsson recommendations
- 7 Explain which connections to establish when changing the RBS configuration
- 8 Describe the various co-siting solutions, their use and specific criteria

### Target audience

The target audience for this course is personnel involved with expansion and configuration of RBS 2x06 series. The course is primarily designed for field technicians that will perform the expansion and reconfiguration.

### Prerequisites

GSM RBS Field Maintenance (FAB 102 1326)

### Duration and class size

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



**Learning situation**

This course consists of five modules which include instructor-led lessons and practical teamwork. Theoretical parts of the course are held in a classroom near the training equipment.

**Time schedule**

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

Day	Short description of the topics in the course	Estimated time
1	Introduction	1 hour
	Module 1: RBS 2x06 Hardware Components and Function	1.5 hours
	Module 2: RBS 2x06 Antenna Configurations	1.5 hours
	Module 3: RU Installation	1 hour
2	Module 4: RBS 2x06 Connections	1.5 hours
	Module 5: Co-siting solutions	4 hours
	Conclusion	1 hour

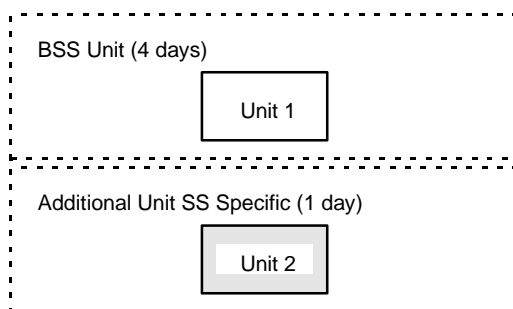
## GSM Signaling

LZU 108 857 R6A

### Description

This course provides students the ability to explain and describe the signaling taking place between nodes within the GSM system.

The course consists of two Learning Units. Unit 1 should be seen as a product specifically adapted for the needs of personnel requiring signaling knowledge limited to the Base Station System part of GSM. The additional Learning Unit, Unit 2, contains additional information for personnel also needing the knowledge of signaling in the Switching System part of GSM. In such a case student should attend the full 5 days flow.



### Learning objectives

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

1. List the nodes in the GSM system and the protocols used in GSM.
  - 1.1. Explain the Channel concept, and the contents of control channels.
  - 1.2. Describe the mapping of the logical channels in the Multi-frame structure.
  - 1.3. Calculate the paging group of the mobile.
2. Explain System Information messages and how they are transmitted to the mobile.
  - 2.1. Describe the contents and the different system information messages.
  - 2.2. Describe the general format of layer 3 messages on the radio and the message format in the air interface.
  - 2.3. Describe when messages of different groups: MM, RR and CM, are used.
3. Describe the format of the data link layer protocol (LAPDm) messages used on the Um interface.
  - 3.1. Describe how the layer 1 functions on the radio are implemented.
  - 3.2. Describe the contents of the control channels like SCH, RACH and FCCH.
4. Describe activities performed by MS

- 4.1. In idle mode - cell selection and reselection.
- 4.2. In active mode - providing measurement report.
- 4.3. Explain the contents of the measurement report.
5. Describe how the information carried between the BSC and the BTS is mapped onto the time slots of the PCM lines between them.
6. Explain the AMR, MPS and DTX functions.
7. Describe the general format of the layer 2 protocol (LAPD) messages used on the A-bis interface.
8. Describe the format of an MSU (Message Signal Unit).
9. Describe when the BSSAP protocol (MSC-BSC) is used on the A interface.
10. Describe when the BTAP protocol (BSC-TRC) is used on the Ater interface
11. Describe which messages are sent on each interface (Um, Abis, A) and what each message contains, in the case of call set-up.
12. Describe which messages are sent on each interface (Um, Abis, A) and what each message contains, in case of location updating.

### Target audience

The target audience for this course is:

Experienced network engineers

Network tuning personnel

Network planning personnel

Anybody with GSM network working experience who needs a deep technical knowledge of GSM system.

Unit 1 only is recommended for personnel only dealing with the Base Station System part of GSM. Personnel also requiring knowledge of Switching System part of GSM both Unit 1 and Unit 2 is intended.

### Prerequisites

Successful completion of the following courses:

GSM System Survey (LZU 108 852)

The participants should be familiar with the GSM network.

### Duration and class size

The length of the course is 4 days (Unit 1 only) or 5 days (Units 1 & 2) and the maximum number of participants is 16.

### Learning situation

The course is based on instructor-led lessons and practical exercises in the classroom.



### Time schedule

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

<b>Day 1</b>	<b>Estimated time</b>
Introduction to GSM nodes and protocols.	1 hour
Channel concept and contents of logical channels .	2 hour
Mapping of logical channels in the multiframe structure.	1 hour
Bursts structure, TDMA frame up to Hyperframe structure	1 hour
Paging group.	1 hours

<b>Day 2</b>	<b>Estimated time</b>
Traffic cases in GSM.	2.5 hour
What is System information and how is it transmitted to the mobile.	0.5 hour
Contents of the system Information messages	0.5 hour
Description of CM, MM and RR messages.	0.5 hour
Layer 3 format of CM, MM and RR messages.	0.5 hour
Understand what is done in Layer 2 or LAPDm	1 hour
Understand what is done in Layer 1 and contents of SCH, RACH and FCCH	0.5 hour

<b>Day 3</b>	<b>Estimated time</b>
Idle mode behavior	1 hour
Measurement report in Active mode	0.5 hour
Format of a measurement report and measurement result	0.5 hour
Describe AMR, MPS and DTX functions	0.5 hour
Describe Abis interface.	1.5 hour
Describe the general format of LAPD used in Abis Layer 2	1 hour
Decoding of a LAPD message	1 hour

<b>Day 4</b>	<b>Estimated time</b>
Study of logfiles from a protocol analyzer over Abis-interface	1 hour
Describe FISU, LSSU and MSU	1 hour
Study of logfiles from a protocol analyzer over A-interface	1 hour
Describe BSSAP/BTAP protocol	1 hour



Call set-up in GSM	1 hour
Location updating in GSM	1 hour

**Day 5**

**Estimated time**

Introduction to SS7	0.5 hours
The Message Transfer Part	1.5 hours
SCCP	2 hours
TCAP	1 hour
MAP	1 hour

## GSM Statistics Introduction

LZU 108 5079 R1A

### Description

This course introduces the basics behind statistics for GSM. This will be accomplished by setting up reports for Statistics and Traffic Measurement Subsystem (STS) and Operation and Maintenance Subsystem (OMS).

### Learning objectives

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

1. Collect data for STS.
2. Store data for STS.
3. Process data for STS, which includes creating formulas.
4. Present alphanumeric or file reports for STS.
5. Order reports for OMS.
6. Initiate Active BA-List Recording (ABA).

### Target audience

This course is intended for:

- Technical Managers
- Network Engineers who plan, optimize, and improve networks on radio and switching (node and transmission)
- Those who fetch statistics
- Operations staff who need to spot potential problems in the radio network

### Prerequisites

Successful completion of the following courses:

- GSM Network Fundamentals FAB 102 1465
- GSM BSC Operation and Configuration (FAB 102 1320)

### Duration and class size

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

### Learning situation

The course is based on instructor-led including theoretical lessons and practical exercises.

A running AXE exchange and valid software (WINFIOL and Command Handling) loaded on terminals is required.



## Time Schedule

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

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Not available</li></ul>	

## GSM System Survey

LZU 108 852 R5A

### Description

This course focuses on providing participants with knowledge about Ericsson's GSM based systems, GSM 800/900/1800/1900. The course focuses on GSM terminology, wireless concepts, functions of network nodes, and the Ericsson implementation of those network nodes.

### Learning objectives

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

- 1 Describe the GSM network at an overview level
  - 1.1 List one benefit of having a standard
  - 1.2 Describe the history of GSM development
  - 1.3 List three network components and briefly describe their functionality
  - 1.4 Describe the GSM geographical network structure
  - 1.5 List the GSM frequency bands
  - 1.6 List three subscriber services provided in the GSM network
  
- 9 Describe Ericsson's implementation of a GSM network
  - 9.1 List three network components in Ericsson's GSM system and briefly describe their functionality
  - 9.2 List three optional additional network entities and briefly describe their function
  
- 10 Understand the basic concepts of wireless communication
  - 10.1 Briefly describe the Time Division Multiple Access technique (TDMA)
  - 10.2 List 2 transmission problems and their solutions
  - 10.3 Understand how Adaptive Multi-Rate (AMR) can increase capacity
  
- 11 Outline the main features of the air interface in GSM networks
  - 11.1 Understand the difference between a physical channel and a logical channel
  - 11.2 Name 3 logical channels
  - 11.3 List one important piece of information sent on each of 3 different logical channels
  - 11.4 Briefly describe the idea of mapping
  
- 12 Describe basic AXE principles and the main components and features
  - 12.1 Describe briefly the function of APZ and APT
  - 12.2 Describe the different functions that can be implemented using AXE platform modularity
  - 12.3 Explain briefly how the group switch switches calls
  - 12.4 Describe the structure of a PCM link
  - 12.5 Describe the AXE 810 hardware structure
  
- 13 Describe each node's function in the GSM switching system

- 13.1 Name 3 nodes in the Switching System
- 13.2 List which two nodes are contacted for the security procedure in the GSM system.
- 13.3 Briefly explain the purpose of Authentication, Ciphering and Equipment Check.
  
- 14 Describe BSS Components, their functions, features and required specifications
  - 14.1 Explain that the BSC controls the radio resources for the RBS
  - 14.2 Outline the main working functions of a BSC, TRC and RBS
  - 14.3 Outline that an RBS contains a transmitter and a receiver and is the interface towards the MS
  - 14.4 Describe briefly the 3 different positioning methods available with Flexible Positioning Support CGI+TA, E-OTD and A-GPS positioning,
  
- 15 Describe the function of the GSM Mobile Station
  - 15.1 List two important pieces of information stored on the SIM-card
  - 15.2 List one advantage of having a separation between telephony equipment (ME) and subscription (SIM-card)
  - 15.3 Describe the product categories of the Mobile Station (MS)
  
- 16 Describe the interaction between network elements in different traffic cases
  - 16.1 List one purpose per GSM ID-number (MSISDN, IMSI, TMSI, MSRN, LAI)
  - 16.2 Briefly explain the meaning of handover, locating and location updating.
  - 16.3 Briefly explain how a traffic case works: mention three nodes, their role and in what order they are involved.
  
- 17 Describe cell planning principles in GSM networks
  - 17.1 Describe 3 stages in the cell planning process
  - 17.2 Explain the terms 'Grade of Service' (GOS) and 'Erlang'
  - 17.3 Name 2 types of Interference
  - 17.4 Re-Use of Frequencies within a Cell
  - 17.5 Understand what is meant by the term 'Hierarchical Cell Structure'
  - 17.6 Describe briefly the feature 'BCCH in Overlaid Subcell'
  
- 18 Describe the tools used for operation and maintenance functions in GSM networks
  - 18.1 Describe the Telecommunications Management and Operations Support philosophy
  - 18.2 Describe the functions and architecture of Operations and Support System
  - 18.3 Describe the implementation of the Service Order Gateway
  - 18.4 Describe the implementation of the Billing Gateway
  
- 19 Describe the subscriber services offered by GSM
  - 19.1 List the different types of services available in the network
  - 19.2 Identify one of each of the following service types in the network: teleservices, bearer services and supplementary services
  - 19.3 Identify one of the Ericsson innovative services in the network
  - 19.4 Briefly describe the mobile intelligent network (MIN) services available with Ericsson's GSM systems



- 19.5 Briefly describe the MIN nodes, SSP, SCP, SDP and SRF
- 19.6 Understand the need and advantages of the CAMEL system.
  
- 20 Outline the charging system in GSM networks
  - 20.1 Understand the charging principles
  - 20.2 Explain the future of billing
  
- 21 Describe the future functionality of GSM based systems
  - 21.1 Describe the data transmission services which GSM offers
  - 21.2 Describe a GSM data traffic case
  - 21.3 Describe the data transmission services which GPRS offers
  - 21.4 Describe a GPRS data traffic case
  
- 22 Describe the possible future functionality of GSM based systems
  - 22.1 Describe the evolution of GSM to WCDMA systems
  - 22.2 Describe the technologies that will bridge these 2 systems including HSCSD, EDGE and GPRS
  - 22.3 Describe the 3G system

**Target audience**

The target audience for this course is intended for personnel requiring a technical introduction to Ericsson's GSM systems.

**Prerequisites**

The participants should have general telecoms knowledge.

**Duration and class size**

The length of the course is 4 days and the maximum number of participants is 16.

**Learning situation.**

The course is a classroom based instructor-led course. The exercises are theoretical, covering each topic of the course.

**Time schedule**

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

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	Course Introduction & pre-course test	0.75
1	Introduction to Mobile Telecommunications and GSM	1.5
1	Overview of Ericsson's GSM Systems	.5
1	Introduction to AXE	1.5
1	Switching System	1.5
2	Base Station System	1.5
2	Mobile Station	.5
2	Wireless Concepts	2.25
2	Channel Concepts	2.0
3	Traffic Cases	2.5
3	Cell Planning	1.5
3	Operation and Maintenance tools	1.0
3	Mobile IN and Subscriber Services	1.0
4	Charging and accounting	.5
4	GPRS and Data Services	2
4	The future of GSM – Migration to WCDMA	2
4	Optional Components (Appendix A-B)	1
4	Post-course Test	0.5

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## GSM TEMS Cell Planner Universal user

LZU 108 3886 R5B

### Description

This course enables participants to use TEMS Cell Planner for 2G and 2,5G planning.

### Learning objectives

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

1. Start TEMS Cell Planner and Create a new project
2. Create site template
  - Define a 9999 prediction model
  - Make coverage predictions
  - Create coverage arrays
  - Define filters
3. Add carriers to the project
  - Define frequency reuse patterns
  - Create neighbour relations
  - Create interference table
  - Make automatic frequency plans
4. Define coding schemas
  - Create GPRS/EGPRS best sever arrays
  - Make traffic analysis for both voice and data traffic
5. Use the urban model for coverage predictions
6. Generate various reports
7. Tune the propagation model 9999

### Target audience

The course is intended for radio network engineers actively working with cell planning issues.

### Prerequisites

The participants should be familiar with the GSM network or successful completion of the following courses:



GSM Network Fundamentals (FAB 102 1465)  
GSM-Cell Planning Principles 1 (LZU 108 3273)

**Duration and class size**

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

**Learning situation**

The course is a mix between instructor led training and work with the tool.

**Time schedule**

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

	<b>Estimated Time</b>
<b>Day 1</b>	
Setting up a new project, chapter 1	1 H
Nominal Cell Plan, chapter 2	5 H
<b>Day 2</b>	
Frequency Planning, chapter 3	4 h
GPRS Planning, chapter 4	2 h
<b>Day 3</b>	
GPRS Planning cont.	1 h
Urban Modelling, chapter 5	2 h
Model Tuning, chapter 7	2 h
Report Generation, chapter 6	1 h

## GSM/WCDMA Traffic Cases (WBL)

LZU 108 5942 R1A

### Description

This course is a web-based course and explains on overview level data and speech traffic cases. It illustrates with signaling diagrams the call setup and mobility management procedures.

The web-based course presentation visualizes animated message flows and an information area where the explanatory text is shown. Different levels of details are presented.

After the course the improved knowledge of the student can be tested in a question and answer session.

The participant will explore each traffic case and follow on the screen the respective signaling flow. In the introduction to each case the concepts and terms are explained and the flow is visualized in detail.

The information window and the pop-up windows will provide additional information about the current message and explanation of what happens in the receiving party when the message is received.

### Learning objectives

On completion of this course the participants will be able to list and explain the signaling interfaces involved and the respective message flow on overview level for the following traffic cases:

- 1 WCDMA Mobile Originated speech call
- 2 WCDMA Mobile Terminated speech call
- 3 WCDMA Mobile to Mobile speech call
- 4 WCDMA GPRS attach
- 5 WCDMA GPRS detach
- 6 WCDMA PDP Context Activation
- 7 WCDMA PDP Context Deactivation
- 8 WCDMA MS originated/ terminated Payload Traffic
- 9 WCDMA Intra and inter SGSN Routing Area Update
- 10 GSM IMSI attach
- 11 GSM IMSI detach
- 12 GSM Location update



- 13 GSM MS originated speech call
- 14 GSM MS terminated speech call
- 15 GSM Intra- and Inter-MSC Handover
- 16 GSM GPRS attach
- 17 GSM GPRS detach
- 18 GSM PDP Context Activation
- 19 GSM PDP Context Deactivation
- 20 GPRS Location update procedures
- 21 Explain the signaling and payload paths in horizontal network architecture.
- 22 Search and find information in the WBL about the main nodes involved in the traffic case.

### Target audience

The target audience for this course is customer personnel in GSM and WCDMA. The course is mandatory for the following job categories:

- Core Network Engineer
- Core Network Technician
- Core Network Specialist GSN
- GSN System Administrator
- Core Network Engineer Statistics
- Core Network Engineer Charging
- Core Network Engineer Planning

### Prerequisites

The participants should be familiar with GSM to at least system overview level. The student should have equivalent knowledge to the following course:

- |  |              |
|--|--------------|
| • GSM/WCDMA Core Network Overview (3 hours WBL)      | LZU 108 5201 |
| • GSM/WCDMA Transport Network Overview (3 hours WBL) | LZU 108 6114 |
| • GSM Radio Network Overview (3 hours WBL)           | LZU 108 6154 |

### Duration

The length of the course is 4 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 but assuming the prerequisites are fulfilled, the whole course can be worked through within 4 hours.

## NWS On-Site Workshop

LZU 108 5954 R2A

### Description

The purpose of this service is to increase the customer's ability to improve the performance of the network by using data from the reports generated by NWS.

This workshop course will cover aspects of, based on the customer needs, how to create customer specific reports and universes.

### Learning objectives

On completion of this workshop the participants should be able to:

1. Create customer specific reports.
2. Add, delete and change information in NWS Universes.
3. Create new Universes for certain user groups.
4. Use an efficient process for system administration tasks related to NWS

### Target audience

The target audience for this course are:

Network Planners  
Radio Network Tuning Engineers  
Statistics Engineers  
Technical Managers

### Prerequisites

Successful completion of the following courses:

GSM Network Fundamentals (FAB 102 1465)  
GSM Statistics Introduction (LZU 108 5079)  
GSM OSS Network Statistics (LZU 108 5962)

### Duration and class size

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



### **Learning situation**

The workshop is based on customer requirements that form cases.. The cases are mainly task oriented where the participant is expected to investigate applications, find his/her own solutions rather than following step-by-step instructions

The workshop takes place at customer site. Requirements on Customer site:

- Business Objects and Sybase Open Client installed on the participants' PCs.
- One PC per maximum two participants.
- A table to work at and access to the OSS system (NWS installed and working).
- Access to a conference room where theoretical session may be performed.  
Ideally it shall include; a Whiteboard and a PC-projector

### **Time schedule**

Does not exist due to the fact that the content is customer specific

## OSS RC On Site Introduction Workshop

LZU 108 6164 R1A

### Description

This course is to give the customer an introduction of OSS RC on customer site after system commissioning or upgrade in terms of functionalities, applications and operation procedures (workflows). After the course, the participant should be able to have a basic understanding in how to use the applications and proceed the application details by himself or continue with the advanced training courses.

The contents are customized based on applications installed and customer's demands and focus. It can be customized to focus on GSM customers or WCDMA customers.

### Learning objectives

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

- 1 Understand the functionalities of the applications
- 2 Understand the operation procedures with the applications
- 3 Use the applications in basics

### Target audience

The target audience for this course is personnel working with OSS RC, requiring an introduction in how to use OSS RC for network management purposes, within their respective work area.

### Prerequisites

The participants should be familiar with GSM network or WCDMA network.

### Duration and class size

The length of the course is 5 days as recommendation. It can be customized according to customer needs. The maximum number of participants is 8.

### Learning situation

The course is based on instructor-led lessons and practical exercises on customer site with a live network. The contents are based on the modules chosen by the customer as well as the scope of the modules.



### Time schedule

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

List of modules available in the course.

<b>Modules</b>	<b>Estimated time</b>
• Introduction	1 hour
• Common Components (EMT, Job Manager, FM, NWS, SMO)	11 hours
• GSM RAN Components (CNA, BSM, RNO, R-PMO, PMR)	12 hours
• Core Components (GCM, GPRS Management)	6 hours

## OSS RC R1.1, Delta

LZU 108 6105 R1A - ILT

LZU 108 6105/9 R1A – VCT

LZU 108 6105/1 R1A - Workshop

### Description

This course describes new and enhanced features/functions in OSS RC 1.1 The course addresses the following work areas: System Administration, Fault Management, Configuration Management and Performance Management & Optimization.

The course focuses on changes compared to GSM OSS R9.1 and CN-OSS R2, and does not introduce or discuss OSS applications or GSM Networks in general.

### Learning objectives

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

- 1 Explain how System Administration is affected in OSS RC.
- 2 Explain the new and enhanced Fault Management features (Radio and Core)
- 3 Describe the software and hardware managers (Radio and Core)
- 4 Explain the new and enhanced Configuration Management features (Radio and Core)
- 5 Explain the new and enhanced Network Statistics features (Radio and Core)

### Target audience

The target audience for this course is:

- Operation and Maintenance staff
- Network planners
- System Administrators
- NMC/OMC Managers
- Staff using GSM OSS for surveillance, configuration, optimisation or system administration of GSM Networks.

### Prerequisites

The participants should be familiar with GSM OSS and GSM Networks or successfully have completed the following courses:



- GSM Network Fundamentals (FAB 102 1465)

### **Duration and class size**

The length of the ILT and VCT versions of the course are 1 day and the maximum number of participants is 16. The length of the Workshop version of the course is 3 days and the maximum number of participants is 8.

### **Learning situation**

There are three versions of this course.

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

**VCT Version:** This is a theoretical course given in a virtual classroom over the net by an instructor. The course contains modules like slide presentations, exercises, self-paced studies and tests.

**Workshop Version:** This course is based on theoretical instructor-led lessons given in a classroom environment and includes hands on 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.

**ILT Version:**

Day	Short description of the topics in the course	Estimated time
1	• System Administration	2 hour
	• Fault Management	0,5 hour
	• Software and Hardware Managers	1 hour
	• Configuration Management	1,5 hour
	• Network Statistics and Radio Network Optimizers	1 hour

**VCT Version:**

Session	Short description of the topics in the course	Estimated time
1	• System Administration	1,5 hour
	• Fault Management	0,5 hour
2	• Software and Hardware Managers	0,5 hour
	• Configuration Management	1 hour
	• Network Statistics and Radio Network Optimizers	0,5 hour

**Workshop Version:**

Day	Short description of the topics in the course	Estimated time
1	• Introduction	1 hour
	• Fault Management	1 hours
	• Network Statistics and Radio Network Optimizers	4 hours

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	<ul style="list-style-type: none"><li>• Software and Hardware Managers</li></ul>	2 hours
2	<ul style="list-style-type: none"><li>• RAN Configuration Management</li><li>• Core Configuration Management</li></ul>	4 hours
3	<ul style="list-style-type: none"><li>• System Administration</li></ul>	8 hours

## OSS RC Overview (WBL)

LZU 108 6231 R1A

### Description

Participants attending the OSS RC Introduction WBL course will be given a basic introduction to the Operation and Support System (OSS). The OSS is used for centralized Operation and Maintenance of mobile networks. OSS RC can manage Radio- (GSM) and Core Network (GSM and WCDMA) nodes.

### Learning objectives

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

- 1 Describe the purpose of OSS and its architecture
- 2 Describe the process of alarm handling.
- 3 List the different applications used in Fault Management
- 4 List the different application used for configuration of Radio and Core Network elements.
- 5 Describe the function of SMO.
- 6 Describe briefly how Network Elements (NE) can be displayed using GNIP and GCC.
- 7 Explain the difference between long-term and short-term statistics.
- 8 Describe how statistics are fetched from the NE, stored and displayed in OSS.
- 9 List the applications used for Radio Network Optimization.

### Target audience

This course is the starting point for courses related to the GSM System.

### Prerequisites

The participants should be familiar with mobile telecommunications.

### 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 but assuming the prerequisites are fulfilled, the whole course can be worked through within 3 hours.

## OSS RC 1.1 System Administration

LZU 108 6165 R1A

### Description

This course will give the student thorough knowledge about administration of the OSS RC 1.1 system. After the course the students will be able to handle network element connections, administration of the applications and both standard and corrective maintenance of the system. The student will gain knowledge about how to manage processes, errors and authority issues in the OSS system.

The course consists of modules with both theoretical and practical sessions. The theoretical parts explain the structure of the OSS system and the network environment. In the practical sessions the students will be presented with the tasks required to administer and maintain an OSS system. The students solve the tasks on a training system, using the on-line documentation. The tasks are always concluded by an instructor-led discussion.

It should be noted that this is not an OSS operations course where the applications are operated, and neither does it give any information on how to operate or administer different network elements.

### Learning objectives

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

1. Describe the overall structure of an OSS system
  - 1.1. Describe the disk, volume and file system structure
  - 1.2. Describe how database servers are used by OSS
  - 1.3. Describe how the OSS is located in the LAN, WAN and X25 networks
  - 1.4. Use the online documentation to find out how to perform system administrator tasks
2. Handle Authority Administration in the OSS system
  - 2.1. Add new users to the OSS system
  - 2.2. Describe the structure of the Administrative Model
  - 2.3. Use TSS Authority Administration to administer users, targets and activities
  - 2.4. Use TSS Password Administration
3. Manage processes in the OSS system
  - 3.1. Describe the boot process in the OSS
  - 3.2. Use the dedicated interfaces for process and error management, e.g. TBS, CORBA, Open Fusion etc.
  - 3.3. Describe related processes and configuration files, e.g. PDB maps, XML files etc.
  - 3.4. Describe how CORBA is used in the OSS system
  - 3.5. Handle the database server processes
4. Handle network element connections

- 4.1. Describe the different network element connection cases for the OSS
- 4.2. Setup connections in the OSS to AXE/IOG-20, AXE/APG-40 and GSN
- 4.3. Handle routing in AXE/IOG-20, AXE/APG-40 and GSN for alarms and files
5. Use and describe the main components in the fault management system
  - 5.1. Describe the flow of alarms from network elements to the alarm viewer applications
  - 5.2. Configure the alarm viewer applications
  - 5.3. Use Alarm Text Routing to forward incoming alarms to e.g. mail
  - 5.4. Describe the flow of internal errors into the fault management system
6. Handle backup and restore in the system
  - 6.1. Describe and use included tools for file system and database backup and restore
  - 6.2. Perform full and partial backup and restore of file systems and databases
7. Statistics
  - 7.1. Describe the flow of statistical measurement files from the network elements through the OSS
  - 7.2. Verify the setup of statistical measurements
8. Perform regular maintenance in the OSS system
  - 8.1. Perform system maintenance
  - 8.2. Handle the scripts scheduling in the crontab
9. Troubleshooting
  - 9.1. Describe and use troubleshooting tools in OSS, UNIX and Sybase
  - 9.2. Isolate problems and retrieve information about problems in the system
  - 9.3. Describe the most common problem areas in the OSS
  - 9.4. Perform troubleshooting on common problem areas in the OSS

### Target audience

The target audience for this course is OSS administrators-to-be who need to know the OSS RC system and how to perform standard and corrective maintenance in the system.

### Prerequisites

The participants should be familiar with GSM OSS application systems handling

Suitable courses:

WCDMA Systems Overview	LZU 108 5418
GSM System Survey	LZU 108 852
GSM Network Surveillance	LZU 108 5471/2
OSS RC Onsite Introduction workshop	LZU 108 6164

Successful completion of the following external courses or equivalent knowledge:

Sybase: Fast track to Adaptive Server Enterprise

Sun: Solaris System Administration I and II

The participants should also be familiar with Veritas Volume Management and have general knowledge of TCP/IP, X25 and SNMP.



**Duration and class size**

The length of the course is 10 days and the maximum number of participants is 8.

**Learning situation**

The course is based on instructor-led lessons and case-oriented exercises in a classroom equipped with an LCD-projector and a training environment where each group of two students use one OSS server with the possibility to connect to either real or simulated IOG20, APG40 and GSN type network elements.



**Time schedule**

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

**Day 1-2**

- System administration introduction
- GSM OSS system structure
- On-line documentation
- User administration
- The administrative model

**Estimated time**

0.5 day

1 day

**Day 2-3**

- Processes in the OSS
- Process management

**Estimated time**

1 day

**Day 3-4-5**

- element connection overview
- element setup

**Estimated time**

Network  
2 days  
Network

**Day 5**

- 
- ASM configuration
- Internal errors

**Estimated time**

Alarm flow  
0.5 day  
GNIP, ALV,

**Day 6-7**

- restore

**Estimated time**

Backup and  
1.5 days

**Day 7**

- Statistics

**Estimated time**

0.5 day



**Day 8**

- Regular maintenance

**Estimated time**

0.5 day

**Day 8-9-10**

- Troubleshooting

**Estimated time**

2.5 days

## Remote SW Handling using SMO

LZU 108 6107 R1A

### Description

This course deals with the Software Management Organizer (SMO). SMO is a common application for remote software handling activities towards different types of network elements. This course handles software for AXE-10 based nodes and GSM RBS's.

With the graphical user interface of SMO, you can supervise parallel activation jobs towards multiple network elements from a single terminal.

SMO provides the following functions for the operator:

- Software inventory, including compare between network elements
- Software distribution from OSS to network elements
- Remote software upgrade
- Monitor upgrade jobs towards multiple network elements in parallel
- Backup administration, including transfer of backups to OSS
- Uniform handling of different network element types

The course also deals with Operations Procedure Support (OPS) development and run-time control of MML command files. In this way the application provides support for automation and control of the network operator's processes.

In OPS the following functions are available:

- Operation Procedure Support GUI
- OPS Script Language
- OPS Script Progress monitoring

### Learning objectives

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

1. Use SMO graphical user interface
  - 1.1 Import and unpack software packages into SMO file store
  - 1.2 Retrieve information about software installed in different Network Elements
  - 1.3 Execute and monitor update jobs
  - 1.4 Handle backup administration
2. Handle OPS scripts
  - 2.1 Explain the structure of the OPS script language including the structure of subroutines
  - 2.2 Understand and write OPS scripts
  - 2.3 Find and react on script errors
3. Understand the update procedure of an AXE10
  - 3.1 Explain and prepare the necessary steps to update an AXE 10 in GSM R9.1
  - 3.2 Explain and perform the update
4. Handle GSM RBS software
  - 4.1 Download and activate GSM RBS software

**Target audience**

The target audience for this course is internal personnel and also customers working in the technical operation area of the GSM network represented by network engineers.

**Prerequisites**

The participants should be familiar with RBS Software configuration, AXE 10 SW and with the procedure of an AC-A packet implementation.

**Duration and class size**

The length of the course is three days and the maximum number of participants is eight.

**Learning situation**

The course is based on instructor-led lessons, demonstrations and hands-on exercises. The exercises are mainly case oriented where the participant is expected to investigate applications and find their own solutions rather than following step by step instructions.

The course should be conducted at an Ericsson training center. For hands-on exercises, one computer is needed for every two participants.

**Time schedule**

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

Day	Short description of the topics in the course	Estimated time
1	Introduction to SMO	3
1	Adjust, Handling files with SMO	3
2	Introduction to OPS	1,5h
2	Subroutines	0,5h
2	DESPERADO	0,5h
2	Practical Exercise: OPS Scripting	3,5h
3	Introduction to Updates	1,0h
3	Preparation of Update	1,0h
3	Practical Exercise: Update	3,0h
3	GSM RBS Download and activation of software	1,0h

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## RNO On-site Workshop

LZU 108 5953 R1A

### Description

This workshop deals with the GSM OSS tools for surveillance, optimization and troubleshooting of the GSM radio network. The workshop focus is on how to use the tools for setting up new measurements and how to generate and customize reports. Some important Radio Network characteristics are explained and some examples of how to interpret results and reports are discussed.

Guidelines for optimization of the radio network and cell parameter settings are not covered during this workshop.

### Learning objectives

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

1. Handle common RNO functions
  - 1.1 Sort and filter data for recordings and results
  - 1.2 Create Cell sets
  - 1.3 Create Frequency sets
  - 1.4 Create recordings
  - 1.5 Schedule recordings
  - 1.6 Configure and customize reports
2. Run MRR – Measurement Result Recording
  - 2.1 Handle MRR reports
  - 2.2 Use MRR for signal quality surveillance
  - 2.3 Use MRR for trouble shooting
3. Run NCS/NOX – Neighboring cell support/Neighboring Optimization eXpert
  - 3.1 Use NCS to find new possible neighbors
  - 3.2 Use NCS to identify poor neighbor relations
  - 3.3 Handle NOX change order recommendation
  - 3.4 Handle the Barring Matrix
4. Run FAS/FOX – Frequency Allocation Support/Frequency Optimization eXpert
  - 4.1 Use FAS for recording of uplink Interference
  - 4.2 Use FAS for estimation of downlink interference
  - 4.3 Use FOX in recommendation or automatic mode
5. Run TET – Traffic Estimation Tool
  - 5.1 Interpret Traffic level and off load reports



## 6. Run RNR – Radio Network Recordings

### 6.1 Define:

- MTR recordings (Mobile Traffic Recording)
- CTR recordings (Cell Traffic Recording)
- CER recordings (Cell Events Recording)

### 6.2 Create:

- MTR reports
- CTR reports
- CER reports

## 7. Run R-PMO – Real Time Performance Monitoring

### 7.1 Activate R-PMO reports

7.2 Monitor real time events e.g Speech Quality, Drop rate, Handover Success.

### **Target audience**

The target audience for this workshop is:

- Radio Network Designers
- Radio Network Operators
- Radio Network engineers

### **Prerequisites**

Successful completion of the following courses:

GSM Network Fundamentals (FAB 102 1317)  
GSM Radio Network Features (LZU 108 3704)  
GSM Radio Network Tuning (LZU 108 3298)

### **Duration and class size**

The Workshop is usually scheduled for 2-4 days, but the length depends on the number of applications included in the Workshop. The maximum number of participants is 8.



### Learning situation

The workshop is based on instructor-led lessons, demonstrations and hands-on exercises. The exercises are mainly case oriented where the participant is expected to investigate applications and find their own solutions rather than following step by step instructions.

The workshop is conducted at customer site. For hands-on exercises, one computer is needed for every two participants. Exercises benefit from being run on a live network.

### Time schedule

The time required to accomplish the Workshop always depends on the knowledge of the attending participants and the number of applications included. The time schedule below will illustrate approximately how much time that is needed for each application.

	<b>Estimated time</b>
Introduction	1 h
RNO common functions	2 h
MRR	3 h
NCS	4 h
NOX	2 h
FAS	4 h
FOX	2 h
TET	1 h
R-PMO	2 h
MTR/CTR/CER	3 h

## Using the FMX tool

LZU 108 5148 R1A

The name of the course is "Using the FMX Tool", and it is based upon the release of FM 4.x with FMX. The student will gain knowledge about the purpose of FMX regarding the contents, functionality and the connection to other applications in the management system.

The course will discuss the use of FMX as a tool to develop and maintain an expert system for intelligent alarm handling, that is, to embody and apply expertise knowledge in rules, which are put into FMX modules. The main focus will be on how to create, develop and administrate FMX modules and rules.

In a safe training environment the students are guided through structured exercises, where mistakes are turned into a learning situation instead of network problems. The course can also be delivered On-Site.

### Learning objectives

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

- 1 Describe what FMX is
  - 1.1 Describe where and how FMX is used in the management system and understand the purpose of FMX
  - 1.2 Describe the general flow of an alarm record when FMX is used
  - 1.3 Describe the concepts of module, event discriminator and rule
- 2 Use the FMX user interfaces and tasks
  - 2.1 Create and maintain FMX modules
  - 2.2 Create rules in the FMX Rule editor
  - 2.3 Test FMX modules and their contents
  - 2.4 Work according to a workflow
- 6 Use tools for rule design
  - 2.5 Use and configure the different building blocks in the Rule Editor
  - 2.6 Design and create own FMX alarms
  - 2.7 Describe the concept of object and attributes used in FMX
- 7 Use more advanced features and rule implementation
  - 2.8 Create more advanced FMX rules and modules
  - 2.9 Use advanced scripts to execute actions and retrieve results between FMX and a network element
- 2.10 Use FMX for interaction with the UNIX environment

### Target audience

The target audience for this course is intended for future FMX developers, who need to know the FMX concept and how to develop and maintain FMX modules. However, anyone who will come in contact with FMX can also benefit from this course. FMX administrators and FM users in a system with FMX installed and running.



### Prerequisites

The student should have:

- GSM Network Fundamentals (FAB 102 1465)
- GSM Network Surveillance (LZU 108 5471/2)
- Experience in object oriented programming

### Duration and class size

The length of the course is 4 days and the maximum number of participants is 8

### Learning situation

This learning product is delivered by an instructor. The instructor works with the student to implement knowledge. The role of the instructor is to assist and guide the personnel to solve their own problems, using existing methods, tools, and routines.

### Time schedule

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

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• What is FMX?</li><li>• Working with FMX</li><li>• Tools for Rule Design</li></ul>	1 h 3 h 2 h
2	<ul style="list-style-type: none"><li>• FMX Rule Design</li></ul>	6 h
3	<ul style="list-style-type: none"><li>• FMX Rule Design</li></ul>	6 h
4	<ul style="list-style-type: none"><li>• Features and Rule Implementation</li></ul>	6 h