Training Proposal for Transmission Network Product Technology Training Project

HUAWEI Learning Service
2015
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1 Training Solution

1.1 Background Introduction

1.2 Overview

1.3 Transmission Network Training Path

1.3.1 WDM Training Path

- **WDM Principle Introduction**
  - WBT (Pre-Learning) 1H

- **OTN Introduction**
  - WBT (Pre-Learning) 3H

- **WDM Fundamental Training**
  - ILT/LVC 1D

- **Ethernet Fundamental Training**
  - ILT/LVC 2D

- **ASON Fundamental Training**
  - ILT/LVC 1D

- **OptiX WDM Equipment Installation Training**
  - ILT 2D

- **OptiX MDS 6630 Optical Power Commissioning Training**
  - ILT 2D
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<td>OptiX WDM Network Expansion Training</td>
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The WBT indicates optional module.
# 1.3.2 RTN Training Path

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- OptiX RTN 900 Network Planning Basic Training: ILT/LVC, 2D
- OptiX RTN 900 Network Planning Training: ILT/LVC, 4D
- OptiX RTN 900 Network Planning Advanced Training: ILT/LVC, 2D

Prerequisites:
- Network Planning & Design
- OptiX RTN 300 Network Planning Training: ILT/LVC, 2D

Digital Microwave Principle Introduction
- WBT (Pre-Learning), 2H

OptiX RTN 900 Hardware Description
- WBT (Pre-Learning), 1H

OptiX RTN 900 L3 VPN Features Introduction
- WBT (Pre-Learning), 2H
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*The WBT indicates optional module*
1.3.3 MSTP Training Path

**Prerequisites**
- SDH Principle Introduction (WBT Pre-Learning) 2.5H
- Ethernet Basis (WBT Pre-Learning) 1H
- IP Basis (WBT Pre-Learning) 1H
- OptiX OSN 15002503607500 Hardware Description (WBT Pre-Learning) 1H

**Installation & Commissioning Engineer**
- OptiX OSN NG SDH & OCS Installation Training (ILT) 2D

**OMM Engineer**
- OptiX OSN 500/550/580 (TDM) Hardware Description (WBT Pre-Learning) 1H

**OptiX NG SDH Equipment (TDM)**
- Commissioning Training (ILT/LVC) 5D

**OptiX NG SDH Equipment (Packet)**
- Commissioning Training (ILT/LVC) 5D

**OptiX NG SDH & OCS Equipment (TDM)**
- Commissioning Training (ILT/LVC) 2D

**OptiX NG SDH & OCS Equipment (TDM) 1st Line Maintenance Training** (ILT) 20D
- OptiX NG SDH & OCS Equipment (TDM) 2nd Line Maintenance Training (ILT) 15D
- OptiX NG SDH & OCS Equipment (TDM) 3rd Line Maintenance Training (ILT) 13D
- OptiX NG SDH Equipment (Packet) 1st Line Maintenance Training (ILT) 20D
- OptiX NG SDH Equipment (Packet) 2nd Line Maintenance Training (ILT) 12D
- OptiX NG SDH Equipment (Packet) 3rd Line Maintenance Training (ILT) 10D
- OptiX NG SDH Equipment (Packet+TDM) 1st Line Maintenance Training (ILT) 30D
- OptiX NG SDH Equipment (Packet+TDM) 2nd Line Maintenance Training (ILT) 18D
- OptiX NG SDH Equipment (Packet+TDM) 3rd Line Maintenance Training (ILT) 11D

**OptiX OSN 500/550/580**
- Operation and Maintenance Training (ILT) 40D
- Operation and Maintenance Training (ILT) 80D

**OptiX SDH Ethernet Advanced Operation and Maintenance Training** (ILT) 40D

**OptiX ASON(SDH) Operation and Maintenance Training** (ILT) 3D

**OptiX OSN 15002503607500**
- Operation and Maintenance Training (ILT) 8D

**TP-Assist Operation and Maintenance Training (Hybrid MSTP)** (ILT) 1D
### Network Optimization Engineer

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### 1.3.4 Transmission OSS Training Path

#### Operation and Maintenance

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*The WBT indicates optional module.*
1.4 Required Training Programs

For this project, the whole training solution is designed into the following programs. List of Training Program(s) for Transmission Network Project:

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**MSTP Products Training**

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<td>OptiX NG SDH Equipment (Packet) NMC Operation Training</td>
<td>II</td>
<td>10</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX NG SDH Equipment (Packet) 2nd Line Maintenance Training</td>
<td>II</td>
<td>12</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX NG SDH Equipment (Packet+TDM) Commissioning Training</td>
<td>II</td>
<td>8</td>
<td>6 ~ 12</td>
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<td>OptiX NG SDH Equipment (Packet+TDM) 1st Line Maintenance Training</td>
<td>I</td>
<td>3</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX NG SDH Equipment (Packet+TDM) NMC Operation Training</td>
<td>II</td>
<td>15</td>
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<tr>
<td>Course Description</td>
<td>Level</td>
<td>Duration</td>
<td>Certification</td>
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<td>OptiX NG SDH Equipment (Packet+TDM) 2nd Line Maintenance Training</td>
<td>II</td>
<td>18</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX OSN 500/550/580 (TDM) Operation and Maintenance Training</td>
<td>II</td>
<td>4</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX OSN 500/550/580 (Packet) Operation and Maintenance Training</td>
<td>II</td>
<td>5</td>
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<tr>
<td>OptiX OSN 500/550/580 (Packet+TDM) Operation and Maintenance Training</td>
<td>II</td>
<td>8</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX SDH Ethernet Advanced Operation and Maintenance Training</td>
<td>III</td>
<td>4</td>
<td>6 ~ 12</td>
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<tr>
<td>OptiX ASON(SDH) Operation and Maintenance Training</td>
<td>II</td>
<td>3</td>
<td>6 ~ 12</td>
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<tr>
<td>TP-Assist Operation and Maintenance Training (Hybrid MSTP)</td>
<td>II</td>
<td>1</td>
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**Transmission Network OSS Training**

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Level</th>
<th>Duration</th>
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<tbody>
<tr>
<td>iManager U2000 Monitoring Training (Transmission Network only)</td>
<td>I</td>
<td>2</td>
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<tr>
<td>iManager U2000 LCT Operation Training</td>
<td>II</td>
<td>1</td>
</tr>
<tr>
<td>iManager N2510 OLS Operation and Maintenance Training (Transmission)</td>
<td>II</td>
<td>1</td>
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<tr>
<td>iManager U2000 Operation and Maintenance Training for NOC FO (Transmission)</td>
<td>I</td>
<td>2</td>
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<tr>
<td>iManager U2000 Operation and Maintenance Training for NOC BO (Transmission)</td>
<td>II</td>
<td>3</td>
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<tr>
<td>iManager U2100 Operation and Maintenance Training</td>
<td>II</td>
<td>5</td>
</tr>
<tr>
<td>iManager uTraffic Network Performance Monitoring Training (Transmission Network Only)</td>
<td>II</td>
<td>2</td>
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**Transmission Engineer Certification**

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Level</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Huawei Certified Network Associate-Transmission Technologies and Device Training</td>
<td>II</td>
<td>15</td>
</tr>
<tr>
<td>Huawei Certified Network Professional-Building Carrier MSTP Transmission Network Training</td>
<td>III</td>
<td>10</td>
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<tr>
<td>Huawei Certified Network Professional-Building Carrier OTN Transmission Network Training</td>
<td>III</td>
<td>10</td>
</tr>
</tbody>
</table>
Level Description: I: Basic Course  II: Intermediate Course  III: Advanced Course  IV: Expert Course
1.5 Transmission Network Evolution and Trends Training

1.5.1 IP-oriented Transport Solution Training

Training Path

- Hybrid MSTP Network Overview
  - OTA08 Lecture 0.5d
- All IP Transport Network Solution
  - OTA19 Lecture 0.5d
- Metro OTN Solution
  - OTC09 Lecture 0.5d
- OptiX RTN Microwave Network Overview
  - OTF48 Lecture 0.5d

Target Audience

Technical manager
Personnel who requires a general understanding of Huawei OptiX RTN equipment and solution

Prerequisites

- Having the basic knowledge about telecommunications network, especially transmission network.
- Having the experience for telecommunications equipment

Objectives

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

- Describe the background of OptiX Hybrid MSTP
- Explain the service characters of OptiX Hybrid MSTP
- Describe the networking characters of OptiX Hybrid MSTP
- Outline the difference of OptiX Hybrid MSTP network from other network technology
- List the trend of Metro transmission network
- Illustrate the features of OTN
- Describe the application of Huawei OTN products
- List the equipment types of OptiX RTN
- Outline main functions of OptiX RTN equipment
Describe typical networking and protection of OptiX RTN equipment
Know the typical solutions of OptiX RTN equipment
Outline the technologies of the transmission network for All-IP service
Describe the solutions for All-IP network
Compare the All-IP transport solutions and figure out the difference

Training Content

OTA08 Hybrid MSTP Network Overview
  • OptiX Hybrid MSTP Network Overview
    ■ Background of OptiX Hybrid MSTP
    ■ Evolution of OptiX Hybrid MSTP
    ■ Network Characters of OptiX Hybrid MSTP
    ■ Comparison with Other Network Solutions

OTA19 All IP Transport Network Solution
  • All IP Transport Network Solution
    ■ Challenge of the transmission network
    ■ Technologies of transmission network for All-IP service
    ■ Transmission solution for All-IP network

OTC09 Metro OTN Solution
  • Metro OTN Transport Solution
    ■ Trend of metro network
    ■ IP-oriented OTN network
    ■ Huawei metro OTN transport solution products introduction
    ■ Creating value for customers

OTF48 OptiX RTN Microwave Network Overview
  • OptiX Packet Microwave Network Overview
    ■ Microwave Challenges and Trend
    ■ Key Features and Highlights
    ■ Product Introduction
    ■ Successful Story

Duration
  2 working days

Class Size
  Min 6, Max 12
1.5.2 40G/100G Coherent OTU Technology

Training Path

Target Audience

Technical manager

Prerequisites

- Having the basic knowledge for communication network

Objectives

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

- Describe the key technologies for 40G/100G transmission
- Describe the PDM-BPSK and PDM-QPSK modulation method
- Describe the basic principle of coherent detection
- List the main functions and features of the 40G/100G coherent OTU board

Training Content

OTC81 OptiX WDM 40G100G Coherent OTU Technology

- OptiX WDM 40G100G Coherent OTU Technology
  - 40G/100G Technology Overview
  - 40G/100G OTU Functions and Features
  - 40G/100G System Network Application

Duration

0.5 working day

Class Size

Min 6, Max 12
1.5.3 Transmission Based T-SDN Introduction

Training Path

<table>
<thead>
<tr>
<th>OTC156</th>
<th>Lecture</th>
<th>0.5d</th>
</tr>
</thead>
</table>

Target Audience

Technical manager

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Understand the development and origin of T-SDN
- Describe the T-SDN structure
- Understand the application scenarios of T-SDN

Training Content

OTC156 Transmission Based T-SDN Introduction

- Transmission Based T-SDN Introduction
  - Move towards SDN
  - Huawei T-SDN Solution
  - Huawei T-SDN Progress

Duration

0.5 working day

Class Size

Min 6, Max 12
1.5.4 Introduction to 400G Technology

Training Path

<table>
<thead>
<tr>
<th>Introduction to 400G Technology</th>
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<tbody>
<tr>
<td>OTC157  Lecture  0.5d</td>
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</table>

Target Audience

Technical manager

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Understand the key technologies of 400G

Training Content

OTC157 Introduction to 400G Technology

- Introduction to 400G Technology
  - 400G technologies

Duration

0.5 working day

Class Size

Min 6, Max 12
1.5.5 OptiX OSN 1800 Based Metro Network Solution Training

Training Path

OTC181 OptiX OSN 1800 Based Metro Network Solution
Lecture 0.5d

Target Audience

Technical manager

Prerequisites

● Having working experience in WDM transmission network
● Upon completion of OptiX OSN 1800 2nd Line Maintenance Training or having equivalent knowledge
● Be familiar with Windows operating system

Objectives

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

● List the future direction of Transmission network.
● List the value of OptiX OSN 1800 product.
● Describe the application solutions of OptiX OSN1800 product.

Training Content

OTC181 OptiX OSN 1800 Based Metro Network Solution

● OptiX OSN 1800 Network Solution
  ■ Bottleneck and future direction of Transmission network
  ■ OptiX OSN1800’s position and value in Transmission network
  ■ Application solution and successful cases

Duration

0.5 working day

Class Size

Min 6, Max 12
1.6 Mobile Backhaul Evolution and Trends Training

1.6.1 Microwave Backhaul Solution Evolution

Training Path

- Microwave Backhaul Solution Evolution
  - OTF87 Lecture 0.5d

Target Audience
- Technical manager

Prerequisites
- Having the basic knowledge for communication network

Objectives
- On completion of this program, the participants will be able to:
  - Describe mobile backhaul trends
  - Describe the mobile backhaul evolution strategy based on the current network
  - Describe the microwave backhaul solution

Training Content
- OTF87 Microwave Backhaul Solution Evolution
  - Microwave Backhaul Solution Evolution
    - Mobile backhaul trends and challenge
    - Microwave mobile backhaul solution introduction

Duration
- 0.5 working day

Class Size
- Min 6, Max 12
1.6.2 Huawei Microwave Solution Overview

Training Path

| Huawei Microwave Solution Overview | OTF88 | Lecture | 0.5d |

Target Audience

Technical manager

Prerequisites

- Having the basic knowledge for communication network

Objectives

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

- Describe microwave evolution trend
- Describe huawei microwave solution
- Outline the features of huawei microwave products

Training Content

OTF88 Huawei Microwave Solution Overview

- Huawei Microwave Solution Overview
  - Microwave Evolution Trend
  - Huawei Microwave Solution
  - Huawei Microwave Product introduction

Duration

0.5 working day

Class Size

Min 6, Max 12
1.6.3 Microwave Small Cell Backhaul Solution

Training Path

![Microwave Small Cell Backhaul Solution](OTF89 Lecture 0.5d)

Target Audience

Technical manager

Prerequisites

- Having the basic knowledge for communication network

Objectives

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

- Describe the small cell features
- Outline Huawei microwave small cell backhaul solution

Training Content

- OTF89 Microwave Small Cell Backhaul Solution
  - Microwave Small Cell Backhaul Solution
    - Why small cell
    - Features of small cell
    - Huawei microwave small cell backhaul solution

Duration

0.5 working day

Class Size

Min 6, Max 12
1.7 Transmission Network Planning and Design Training

1.7.1 OptiX SDH Network Design Basic Training

Training Path

OptiX SDH Network Design Basics
OTA13 Lecture, Lab 1d

OptiX NG SDH & OCS System Description
OTA28 Lecture 1d

Target Audience

SDH network junior planning & design engineer

Prerequisites

- Having the basic knowledge of telecommunications and SDH network

Objectives

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

- Describe the structure of SDH network
- Outline the service types of SDH network
- Illustrate the common protection mechanism of SDH network
- List the procedures of SDH network design
- Describe the basic factors that should be involved in the SDH network design
- Accomplish the SDH/PDH service design
- Illustrate the networking applications of the OptiX NG SDH & OCS equipment
- Describe the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection schemes of the OptiX NG SDH & OCS equipment

Training Content

OTA13 OptiX SDH Network Design Basics

- SDH Network Design Basics Case Study
  - Requirement
  - SDH Network Design Steps
  - SDH Network Design Case
- SDH Network Design Basics
  - SDH Network Design Process
  - SDH Network Data Collection
  - SDH Network Architecture Design
SDH Network Service Design
SDH Network Station Design
OTA28 OptiX NG SDH & OCS System Description
  • OptiX NG SDH & OCS System Description
    • OptiX NG SDH & OCS Product Introduction
    • Cabinet, Sub-rack, Boards
    • Equipment Features

Duration

2 working days

Class Size

Min 6, Max 12
1.7.2 OptiX MSTP Network Design Training

Training Path

Target Audience

SDH network planning & design engineer

Prerequisites

- Having the basic knowledge of telecommunications and MSTP network
- Having working experience in the planning and design of MSTP networks

Objectives

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

- Describe the application of OptiX NG SDH & OCS system
- Outline the equipment capacity of OptiX NG SDH & OCS system
- Choose the right equipment according to the service demand
- List the procedures of SDH network design
- Outline network protection types
- Describe the key point of complicated network design
- Figure out the details of network reliability design
- Perform SDH network design including the network reliability and clock trace design
- List the factors of data service design
- Describe the key point of the data service planning according to the bandwidth requirement
- Perform data service design in the SDH network

Training Content

OTA44 OptiX MSTP Network Design

- OptiX NG-SDH & OCS Equipment Capacity Planning and Management
  - Equipment capacity of OptiX NG SDH/OCS
  - Networking capacity of OptiX NG SDH/OCS
  - Equipment protection of OptiX NG SDH/OCS

- MSTP Network Planning & Design
  - MSTP Network Planning Consideration(Networking layers, traffic demand and distribution, traffic growth forecast, bandwidth of networking, fiber routes, networking topologies & protection mechanism, choosing the equipment and device protection, synchronization in SDH networking, order-wire planning, NMS and DCN planning, auxiliary ports planning)
  - MSTP Network Design Procedure
  - MSTP Networking Example
MSTP Network Design Case Study

- Service requirement introduction
- Service Planning

Duration

3 working days

Class Size

Min 6, Max 12
1.7.3 OptiX Hybrid MSTP Network Design Training

Training Path

Target Audience

Hybrid MSTP network planning & design engineer

Prerequisites

- Having the basic knowledge of telecommunications and Hybrid MSTP network
- Having working experience in the planning and design of Hybrid MSTP networks

Objectives

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

- Describe the application of OptiX NG SDH system
- Outline the equipment capacity for packet service access of OptiX NG SDH system
- Outline the common boards for packet service of OptiX NG SDH equipment
- Choose the right equipment according to the service demand
- Consider all the required main points for planning a Hybrid MSTP network
- List the procedure for designing the Hybrid MSTP network
- Perform the Hybrid MSTP network design

Training Content

OTA47 OptiX Hybrid MSTP Network Design

- OptiX Hybrid MSTP Network Design Case Study
  - Service requirement introduction
  - Hybrid MSTP network design
- OptiX NG SDH Equipment Capacity Planning and Management (Packet)
  - Network location of OptiX NG SDH product
  - TDM access capacity of OptiX NG SDH product
  - Packet capability of OptiX NG SDH product
- OptiX Hybrid MSTP Network Design
  - OptiX Hybrid MSTP network overview
  - OptiX Hybrid MSTP network design workflow
  - OptiX Hybrid MSTP network structure design
  - OptiX Hybrid MSTP network service design
  - OptiX Hybrid MSTP site design

Duration

3 working days
Class Size

Min 6, Max 12
1.7.4 OptiX MDS 6600 ASON(SDH) Network Planning and Design Training

Training Path

Target Audience

OptiX SDH ASON senior network planning & design engineer

Prerequisites

- Having the basic knowledge of telecommunications and SDH network
- Having a general knowledge of ASON
- Having working experience in the planning and design of SDH networks

Objectives

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

- Describe the structure of iManager MDS 6600
- List the configuration of iManager MDS 6600
- Describe the characters of iManager MDS 6600
- Perform SDH ASON network design through iManager MDS 6600
- Describe the considerations of ASON planning
- List the steps of ASON planning
- Describe the function of ASON planning tool
- Accomplish SDH ASON network design according to the service demand
- Perform data import/export operation between iManager MDS 6600 and NMS
- Verify the import/export operation

Training Content

OTA33 iManager MDS 6600 ASON (SDH) Network Design

- OptiX MDS 6600 System Introduction
  - Product Structure and Configuration
  - OptiX MDS 6600 functions and characters
  - OptiX MDS 6600 planner functions and characters
  - OptiX MDS 6600 modeler functions and characters

- OptiX MDS 6600 System Practice Guide
  - Engineering Topology and Requirement
  - Network Planning Steps of OptiX MDS 6600 Planner
  - System Simulation and Optimization Steps of OptiX MDS 6600 modeler

- ASON Network Design
  - ASON Review
  - ASON Planning Considerations
ASON Planning Steps
- Case Analysis

Duration
4 working days

Class Size
Min 6, Max 12
1.7.5 OptiX WDM/NG WDM Network Design Basic Training

Training Path

Target Audience

WDM network junior planning
design engineer

Prerequisites

- Having a general understanding of telecommunications

Objectives

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

- Describe the function module and network structure of WDM system
- Outline the characteristics of various fibers
- Explain the functions and characteristics of various optical components
- Explain the key technologies of WDM system, for example optical source, optical amplifiers, etc
- Describe the characteristics of optical interface in WDM system
- Outline the functions and features of the different units in OptiX WDM/NG WDM products
- Illustrate the main factors involved in WDM network planning, such as power budget, dispersion compensation, OSNR calculation and nonlinearity
- Outline the design process of WDM network

Training Content

OTC47 OptiX WDM/NG WDM Network Design Basics

- WDM Principle
  - WDM Overview
  - Transmission Media
  - Key Technologies
  - Technical Specifications
- OptiX WDM series Equipment Overview
  - OptiX WDM series Equipment Development and Network Application
  - OptiX WDM series Equipment Overview
  - OptiX WDM Common Boards Introduction
- OptiX WDM Network Design Basics
  - WDM Network Overview
  - WDM Network Designing Factors
  - WDM Network Designing Process Overview
Duration

2 working days

Class Size

Min 6, Max 12
1.7.6 OptiX WDM Network Design Training

Training Path

Target Audience

WDM network planning
design engineer

Prerequisites

- Having basic knowledge of telecommunications

Objectives

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

- Outline the functions and features of the different units in OptiX WDM products
- Evaluate the WDM networks including the network architecture, protection mechanism, signal flow and network capacity
- Analyze typical configuration of OptiX WDM series products
- Analyze the design process of WDM network
- Design a complete OptiX WDM network according to requirements

Training Content

OTC03 OptiX WDM Network Design

- OptiX WDM series Equipment Introduction
  - OptiX BWS 1600G system introduction
  - OptiX Metro 6100/6040 system introduction
- OptiX WDM Network Design
  - WDM network overview
  - Major designing process of OptiX BWS 1600G/ Metro 6100 network
  - Other designing of OptiX BWS 1600G/ Metro 6100 network
- OptiX WDM series Equipment Capacity Management
  - OptiX BWS 1600G/ Metro 6100 hardware review
  - OptiX BWS 1600G/ Metro 6100 system capacity and transmission distance
  - OptiX BWS 1600G/ Metro 6100 typical configuration rules
  - OptiX BWS 1600G/ Metro 6100 case discussion
- OptiX WDM Network Design Case Discussion
  - OptiX BWS 1600G network designing information introduction
  - OptiX BWS 1600G network designing exercises
  - OptiX BWS 1600G network design summary and share
Duration
  3 working days
Class Size
  Min 6, Max 12
1.7.7 OptiX NG WDM Network Design Training

Training Path

OTC31 OptiX NG WDM Network Design

Target Audience
OptiX NG WDM network planning & design engineer

Prerequisites
- Having working experience in the planning and design of WDM products
- Upon completion of OptiX WDM/NG WDM Network Design Basic Training or having equivalent knowledge

Objectives
On completion of this program, the participants will be able to:
- Describe OSN 8800/6800/3800 product networking
- Outline OSN 8800/6800/3800 product functions
- Describe OSN 8800/6800/3800 product capacity and features
- Describe WDM network topologies and system applications
- Outline the designing procedure of WDM network
- Fulfill the hardware configuration of OptiX NG WDM
- Memorize the OptiX OSN 6800/8800 system capacity with different traffics
- Apply the OptiX OSN 6800/8800 system functions and configuration principles in network planning
- Describe the designing procedure of NG WDM FOADM network
- Fulfill the hardware configuration of NG WDM FOADM network

Training Content
OTC31 OptiX NG WDM Network Design

- OptiX NG WDM System Description
  - OptiX NG WDM network application
  - OptiX NG WDM product functions and features
  - OptiX NG WDM product architecture and capacity

- OptiX NG WDM Network Design
  - OptiX NG WDM network overview
  - Major designing process of OptiX NG WDM network
  - Other designing of OptiX NG WDM Network

- OptiX NG WDM Capacity Management
  - OptiX NG WDM system capacity
  - Planning OptiX NG WDM hardware
Planning OptiX NG WDM services
OptiX NG WDM NE configuration principle for the DWDM system
OptiX NG WDM NE configuration principle for the CWDM System
Principle of OptiX NG WDM protection configuration

- OptiX NG WDM Network Design Case Discussion (FOADM)
  - OptiX NG WDM FOADM network designing information introduction
  - OptiX NG WDM FOADM network designing exercises
  - OptiX NG WDM FOADM network design summary and share

- OptiX NG WDM Network Design Case Discussion (ROADM)
  - OptiX NG WDM ROADM network designing information introduction
  - OptiX NG WDM ROADM network designing exercises
  - OptiX NG WDM ROADM network design summary and share

Duration

3 working days

Class Size

Min 6, Max 12
1.7.8 OptiX MDS 6600 ASON (WDM) Network Planning and Design Training

Training Path

Target Audience

OptiX NG WDM ASON senior network planning & design engineer

Prerequisites

- Having working experience in the planning and design of WDM products
- Upon completion of OptiX WDM/NG WDM Network Design Basic Training or having equivalent knowledge

Objectives

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

- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON
- Describe NG WDM ASON network features
- Outline NG WDM ASON network planning steps
- Complete the NG WDM ASON network node design
- Understand the special topics of NG WDM ASON network planning and design
- Understand NG WDM ASON network features
- Outline NG WDM ASON network planning steps
- Complete the NG WDM ASON network node design
- Describe features and functions of the iManager MDS 6600 WDM Planner
- Plan WDM network
- Fulfill the MDS 6600 WDM Planner operation
- Implement the WDM network plan by the MDS 6600 WDM Planner
- Outline system architecture of iManager MDS 6600
● Describe features and functions of the iManager MDS 6600 WDM Designer
● Complete WDM network design
● Fulfill the MDS 6600 WDM Designer operation
● Implement the WDM network design by the MDS 6600 WDM Designer

Training Content

OTC36 OptiX NG WDM ASON Network Planning & Design
● OptiX NG WDM ASON Application
  ■ ASON Overview
  ■ System structure of OptiX NG WDM ASON
  ■ Features of OptiX NG WDM ASON
● OptiX NG WDM ASON Network Planning and Design
  ■ Background of OptiX NG WDM ASON network
  ■ Introduction to OptiX NG WDM ASON network
  ■ Planning process of OptiX NG WDM ASON network
  ■ Node design of OptiX NG WDM ASON network
  ■ Special topics
  ■ Case analysis
● OptiX NG WDM ASON Planning & Design Case Study
  ■ Project background
  ■ OptiX NG WDM ASON network planning
  ■ OptiX NG WDM ASON node design

OTC74 iManager MDS 6600 WDM Planner Operation
● iManager MDS 6600 WDM Planner Guide
  ■ iManager MDS 6600 WDM Planner overview
  ■ Planning WDM network operation flow
  ■ Planning a WDM network
  ■ Other functions of iManager MDS 6600 WDM Planner
● iManager MDS 6600 WDM Planner Practice Guide
  ■ Planning a WDM network with survivability against two cable faults at the optical layer
  ■ Planning a WDM network with survivability against one cable faults at the electrical layer
  ■ Planning a WDM network with survivability against two cable faults at the optical and electrical layer

OTC75 iManager MDS 6600 WDM Designer Operation
● iManager MDS 6600 WDM Designer Guide
  ■ iManager MDS 6600 overview
  ■ New WDM network design process
  ■ Other functions of iManager MDS 6600 WDM Designer
● iManager MDS 6600 WDM Designer Practice Guide
  ■ Designing a new WDM network
  ■ Simulation of the ASON WDM network
Duration

4 working days

Class Size

Min 6, Max 12
1.7.9 OptiX RTN Network Planning Basic Training

Training Path

Target Audience

Microwave network junior planning engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of IP, MPLS and QinQ
- Having the general knowledge of Ethernet and QoS

Objectives

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

- Describe the concept and characters of digital microwave communication
- Describe the theory and function of every part in the digital microwave system
- List the networking application for digital microwave system
- List the fadings in microwave propagation
- List the common technologies of antifading
- Familiar with the microwave network design contents
- Know the basic information about microwave planning

Training Content

OTF01 Digital Microwave Communication Basics

- Digital Microwave Communication Principle
  - Concept and characters of digital microwave communication
  - Theory and function of every part in the digital microwave system
  - Networking application for digital microwave system
  - Fadings in microwave propagation
  - Common technologies of antifading

OTF40 OptiX RTN Network Planning Basic

- OptiX RTN Network Planning Process
  - RTN Network Planning Process Overview
  - RTN Network Planning Process Introduction
- OptiX RTN Network Planning Basic
  - Preparations
  - Route Design
  - Capacity Design
  - Frequency Design
  - DCN Design
  - Interference Analysis
- OptiX RTN Network Planning Basic Case Analysis
  - Basic principle of frequency planning and operation procedure
  - Skills and methods of how to reduce the relay station

Duration

2 working days

Class Size

Min 6, Max 12
1.7.10 OptiX RTN 900 Network Planning Training

Training Path

```
OptiX RTN Network Planning
OTF49 Lecture 1.5d

OptiX RTN Network Service Planning (Hybrid)
OTF59 Lecture 0.5d

OptiX RTN Network Service Planning (Packet)
OTF60 Lecture 0.5d

OptiX RTN Clock & DCN Planning
OTF51 Lecture 1d

OptiX RTN Network Planning Case Analysis
OTF61 Lecture 0.5d
```

Target Audience

Microwave network planning engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of IP, MPLS and QinQ
- Having the general knowledge of Ethernet and QoS

Objectives

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

- Familiar with the microwave network design contents
- Describe the theory and function of every part in the digital microwave system for details
- Know the microwave planning principles
- Familiar the interference analysis methods
- Familiar with the principles for Ethernet service and TDM service planning
- Know how to select the proper equipment type and functions for different scenarios
- Implement network design according to the guideline to ensure the high and efficient hybrid service delivery
• Familiar with the principles for Ethernet service, CES service, ATM/IMA service and MPLS tunnel planning
• Implement network design according to the guideline to ensure the high and efficient packet service delivery
• Familiar with the working mechanism of clock & DCN
• Know how to select the proper clock & DCN mode for different scenarios
• Familiar with the clock & DCN planning guidelines
• Implement clock & DCN design according to the guideline to ensure the high and efficient planning delivery
• Understand basic principle of frequency planning and operation procedure.
• Master planning to reduce the skills and methods of relay station.
• Master planning method, which design appropriate SD spacing to improve the reliability of the link by planning software antenna.

Training Content

OTF49 OptiX RTN Network Planning
• OptiX RTN Network Planning
  ▪ Network planning preparations
  ▪ Route Design
  ▪ Frequency Design
  ▪ DCN Design
  ▪ Interference Analysis
• OptiX RTN Network Protection Planning
  ▪ Equipment-level protection
  ▪ Link-level protection
  ▪ Service-level protection
• OptiX RTN Network AM Planning
  ▪ AM overview
  ▪ AM planning guidelines
  ▪ AM planning procedures
  ▪ AM compatibility

OTF59 OptiX RTN Network Service Planning (Hybrid)
• OptiX RTN Network Hybrid Service Planning
  ▪ TDM service and networking planning
  ▪ Ethernet boards selecting
  ▪ Ethernet service and networking planning
  ▪ Port parameters for Ethernet boards setting
  ▪ Protection schemes for Ethernet ports planning

OTF60 OptiX RTN Network Service Planning (Packet)
• OptiX RTN Network Packet Service Planning
  ▪ Network architecture and type selection
  ▪ Application scenarios
- MPLS tunnel planning
- Service planning

OTF51 OptiX RTN Clock & DCN Planning
- OptiX RTN Network Clock Planning
  - Clock transmission overview
  - Clock Bearer & Injection modes
  - Clock planning guidelines
- OptiX RTN Network DCN Planning
  - DCN overview
  - HWECC planning
  - IP over DCC planning
  - OSI over DCC planning
  - DCC transparent transmission planning
  - DCC transmission through the external clock port planning
  - Inband DCN planning

OTF61 OptiX RTN Network Planning Case Analysis
- OptiX RTN Network Planning Basic Case Analysis
  - Basic principle of frequency planning and operation procedure
  - Skills and methods of how to reduce the relay station
- OptiX RTN Network Planning Case Analysis
  - Network planning case analysis

Duration

4 working days

Class Size

Min 6, Max 12
1.7.11 OptiX RTN 900 Network Planning Advanced Training

Training Path

![OptiX RTN Clock & DCN Planning](OTF51 Lecture 1d)

![OptiX RTN Network Planning Case Analysis](OTF61 Lecture 0.5d)

![OptiX RTN Network QoS Planning](OTF62 Lecture 0.5d)

Target Audience

Microwave senior network planning engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of IP, MPLS and QinQ
- Having the general knowledge of Ethernet and QoS
- Be familiar with RTN product

Objectives

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

- Familiar with the working mechanism of clock & DCN
- Know how to select the proper clock & DCN mode for different scenarios
- Familiar with the clock & DCN planning guidelines
- Implement clock & DCN design according to the guideline to ensure the high and efficient planning delivery
- Understand basic principle of frequency planning and operation procedure.
- Master planning to reduce the skills and methods of relay station.
- Master planning method, which design appropriate SD spacing to improve the reliability of the link by planning
- Familiar with the principles for Ethernet service, CES service, ATM/IMA service and MPLS tunnel planning
- Know how to select the proper equipment type and functions for different scenarios
- Implement network design according to the guideline to ensure the high and efficient packet service delivery
Training Content

OTF51 OptiX RTN Clock & DCN Planning
  - OptiX RTN Network Clock Planning
    - Clock transmission overview
    - Clock Bearer & Injection modes
    - Clock planning guidelines
  - OptiX RTN Network DCN Planning
    - DCN overview
    - HWECC planning
    - IP over DCC planning
    - OSI over DCC planning
    - DCC transparent transmission planning
    - DCC transmission through the external clock port planning
    - Inband DCN planning

OTF61 OptiX RTN Network Planning Case Analysis
  - OptiX RTN Network Planning Basic Case Analysis
    - Basic principle of frequency planning and operation procedure
    - Skills and methods of how to reduce the relay station
  - OptiX RTN Network Planning Case Analysis
    - Network planning case analysis

OTF62 OptiX RTN Network QoS Planning
  - OptiX RTN Network QoS Planning
    - QoS overview & specifications
    - QoS planning principles
    - QoS planning scenarios

Duration

  2 working days

Class Size

  Min 6, Max 12
1.7.12 OptiX RTN 300 Network Planning Training

Training Path

OptiX RTN 300 Network Planning
OTF101 Lecture 1d

OptiX RTN 300 Network Service Planning
OTF102 Lecture 0.5d

OptiX RTN 300 Network Planning Case Study
OTF103 Lecture 0.5d

Target Audience

RTN 300 Network planning engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having a good foundation of Ethernet knowledge
- Having the general knowledge of RTN 300 product

Objectives

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

- Familiar with the RTN 300 network design contents
- Know the microwave planning principles
- Familiar the interference analysis methods
- Familiar with the principles for protection and AM planning
- Familiar with the principles for Ethernet service planning
- Understand basic principle of frequency planning and operation procedure
- Implement network design after the case analysis to ensure the high and efficient service delivery

Training Content

OTF101 OptiX RTN 300 Network Planning
- OptiX RTN 300 Network Planning
  - Network planning preparations
  - Route Design
  - Frequency Design
  - DCN Design
Interference Analysis

- OptiX RTN 300 Network AM Planning
  - AM overview
  - AM planning guidelines
  - AM planning procedures
  - AM compatibility

- OptiX RTN 300 Network Protection Planning
  - Link-level protection
  - Service-level protection

OTF102 OptiX RTN 300 Network Service Planning

- OptiX RTN 300 Network Service Planning
  - Network architecture and type selection
  - Application scenarios
  - Service planning

OTF103 OptiX RTN 300 Network Planning Case Study

- OptiX RTN 300 Network Planning Case Study
  - Network planning case analysis

Duration

2 working days

Class Size

Min 6, Max 12
1.7.13 OptiX BWS 1600S (unrepeatered) Planning and Design Training

Training Path

Target Audience
OptiX BWS 1600S senior network planning and design engineer

Prerequisites

- Upon completion of OptiX WDM/NG WDM Network Design Basic Training or having equivalent knowledge

Objectives

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

- Describe the functions and features of OptiX BWS 1600S products
- Describe OptiX BWS 1600S system access capacity
- Identify wavelength distribution and service process ability for OptiX BWS 1600S products
- Evaluate the network resilience, which include network architecture, protection mechanisms, signal flow and network capacity
- Outline the designing procedure of OptiX BWS 1600S network
- Fulfill the hardware configuration of OptiX BWS 1600S products
- Complete the exercises of OptiX BWS 1600S network design

Training Content

OTC71 OptiX BWS 1600S (unrepeatered) Planning and Design

- OptiX BWS 1600S Capacity Management
  - Hardware review
  - System capacity and transmission distance
  - Typical configuration rules
- OptiX BWS 1600S (unrepeatered) Network Design
  - 1600S Equipment Network Overview
  - Major Designing Process of 1600S Equipment Network
  - Other Designing of 1600S Equipment Network
- OptiX BWS 1600S (unrepeatered) Network Design Case Discussion
  - Submarine Network Designing Information Introduction
  - Submarine Network Designing Exercises

Duration

3 working days
Class Size

Min 6, Max 12
1.7.14 OptiX NG WDM Packet Network Planning and Design Training

Training Path

[Image]

Target Audience

OptiX NG WDM packet network planning and design engineer

Prerequisites

- Having working experience in the planning and design of NG WDM Packet Network

Objectives

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

- Describe the application of OptiX NG WDM packet system
- Outline the equipment capacity for packet service access of OptiX NG WDM system
- Outline the common boards for packet service of OptiX NG WDM equipment
- Choose the right equipment according to the service demand
- Consider all the required main points for planning a OptiX NG WDM packet network
- List the procedure for designing the OptiX NG WDM packet network
- Perform the OptiX NG WDM packet network design

Training Content

OTC110 OptiX NG WDM Packet Network Planning and Design

- OptiX NG WDM Equipment Capacity Planning and Management(Packet)
  - Network location of OptiX NG WDM packet product
  - Packet capability of OptiX NG WDM packet product
- OptiX NG WDM Packet Network Design
  - OptiX NG WDM packet network overview
  - OptiX NG WDM packet network design workflow
  - OptiX NG WDM packet network structure design
  - OptiX NG WDM packet network service design
  - OptiX NG WDM packet network site design
- OptiX NG WDM Packet Network Design Case Study
  - Service requirement introduction
  - OptiX NG WDM packet network design

Duration

3 working days
Class Size

Min 6, Max 12
1.7.15 OptiX OSN 1800 Network Design Training

Training Path

OptiX OSN 1800 Network Design

OTC145 Lecture, Lab 3d

Target Audience

OptiX OSN 1800 network planning and design engineer

Prerequisites

- Having working experience in the planning and design of WDM/MS-OTN products
- Upon completion of OptiX WDM/NG WDM Network Design Basic Training or having equivalent knowledge

Objectives

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

- Describe OptiX OSN 1800 product networking
- Outline OptiX OSN 1800 product functions
- Describe OptiX OSN 1800 product capacity and features
- Describe OptiX OSN 1800 network topologies and system applications
- Outline the designing procedure of OptiX OSN 1800 network
- Fulfill the hardware configuration of OptiX OSN 1800
- Memorize the OptiX OSN 1800 system capacity with different traffics
- Apply the OptiX OSN 1800 system functions and configuration principles in network planning
- Describe the designing procedure of OptiX OSN 1800 FOADM network

Training Content

OTC145 OptiX OSN 1800 Network Design

- OptiX OSN 1800 Hardware Description
  - OptiX OSN 1800 system overview
  - OptiX OSN 1800 chassis
  - OptiX OSN 1800 boards
- OptiX OSN 1800 Network Design
  - OptiX OSN 1800 Network Overview
  - Major Designing Process of OptiX OSN 1800 SDH Network
  - Major Designing Process of OptiX OSN 1800 MS-OTN Network
  - Major Designing Process of OptiX OSN 1800 WDM Network
  - Other Designing of OptiX OSN 1800 Network
- OptiX OSN 1800 Capacity Management
  - OptiX OSN 1800 System Capacity
- OptiX OSN 1800 Planning Hardware
- OptiX OSN 1800 Planning Services
- OptiX OSN 1800 NE Configuration Principle for the WDM System
- OptiX OSN 1800 System Principle of Protection Configuration
- OptiX OSN 1800 Network Design Case Discussion
  - OptiX OSN 1800 Network Designing Information Introduction
  - OptiX OSN 1800 Network Designing Exercises
  - OptiX OSN 1800 Network Design Summary and Share

Duration

3 working days

Class Size

Min 6, Max 12
1.7.16 iManager MDS 6600 (WDM Designer) Operation Training

Training Path

Target Audience

OptiX WDM network planning and design engineer

Prerequisites

- Having working experience in the planning and design of WDM products
- Upon completion of OptiX WDM/NG WDM Network Design Basic Training or having equivalent knowledge

Objectives

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

- Outline system architecture of iManager MDS 6600.
- Describe features and functions of the iManager MDS 6600 WDM Designer.
- Complete WDM network design.
- Simulate the fault and analyze the survivability for ASON network

Training Content

OTC31 OptiX NG WDM Network Design

- OptiX NG WDM System Description
  - OptiX NG WDM network application
  - OptiX NG WDM product functions and features
  - OptiX NG WDM product architecture and capacity

- OptiX NG WDM Network Design
  - OptiX NG WDM network overview
  - Major designing process of OptiX NG WDM network
  - Other designing of OptiX NG WDM Network

- OptiX NG WDM Capacity Management
  - OptiX NG WDM system capacity
  - Planning OptiX NG WDM hardware
  - Planning OptiX NG WDM services
  - OptiX NG WDM NE configuration principle for the DWDM system
  - OptiX NG WDM NE configuration principle for the CWDM System
Principle of OptiX NG WDM protection configuration

OTC149 iManager MDS 6600 (WDM Designer) Operation

- iManager MDS 6600 WDM Designer Guide
  - iManager MDS 6600 overview
  - New WDM network design process
  - Other functions of iManager MDS 6600 WDM Designer
- iManager MDS 6600 WDM Designer Practice Guide
  - Designing a new WDM network
  - Simulation of the ASON WDM network

Duration

4 working days

Class Size

Min 6, Max 12

1.8 Transmission Network Assessment and Optimization Training

1.8.1 OptiX SDH Network Assessment Training

Training Path

<table>
<thead>
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<th>SDH Network Assessment</th>
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<td>OTA93 Lecture, Case 3d</td>
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Target Audience

OptiX SDH network optimization engineer or senior maintenance engineer

Prerequisites

- Be familiar with OptiX SDH equipment
- Having working experience with at least 2 years in the maintenance of optical transport network

Objectives

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

- List the main items of SDH network resource
- List the main items of SDH network assessment
- Describe the requirement of SDH network resource assessment
- Describe the main contents about SDH service capacity and efficiency assessment
- Describe the items and contents about SDH network security assessment
- Describe the measures about SDH survivable network assessment
- List the methods about trail usability assessment
- Describe the items and contents about SDH network O&M assessment
- Describe the methods about ECC subnetwork assessment
- Describe the methods about clock subnetwork assessment
Training Content

OTA93 SDH Network Assessment

- Assessment of SDH Network Services
  - Overview
  - Statistics on Network Resources
  - Analysis of Service Requirements
  - Assessment of SDH Network Services

- SDH Service Support Capacity Assessment Case Study
  - Assess SDH Network service support capability, network security, clock survivability, ECC support ability, etc
  - Provide the assessment report based on network analyze result

- SDH Network Security Assessment
  - Problems Facing SDH Network Contents of SDH Network Security Assessment
  - Items of SDH Network Security Assessment
  - Process and Tools for SDH Network Security Assessment
  - Network Overview
  - Network Statistic
  - Assessment and Analysis

- SDH Network Operation and Maintenance Assessment
  - SDH Network clock, ECC and DCN support ability assessment key point
  - ECC assessment methods
  - Clock assessment methods
  - Spare board assessment methods

Duration

3 working days

Class Size

Min 4, Max 8
1.8.2 OptiX SDH Network Optimization Training

Training Path

Target Audience

OptiX SDH network optimization engineer or senior maintenance engineer

Prerequisites

- Be familiar with OptiX SDH equipment
- Having working experience with at least 2 years in the maintenance of optical transport network
- Upon completion of OptiX SDH Network Assessment Training

Objectives

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

- Describe the causes and effects of discrete services
- Recognize the discrete services of the network
- Eliminate discrete services
- Optimize the lower level cross-connection of SDH equipment
- Optimize the trails to improve the network usage efficiency
- Describe the items and contents about SDH network security optimization
- Describe the measures about SDH survivable network optimization
- List the methods about trail usability optimization
- Describe the items and contents about SDH network O&M optimization
- Describe the methods about ECC subnetwork optimization
- Describe the methods about clock subnetwork optimization
- Describe the methods about spare part optimization

Training Content

OTA94 SDH Network Optimization

- SDH Service Support Capacity Optimization
  - The formation factors and impact of discreted service
  - Discreted service analysis and recognition
  - Clear-up of discreted service
  - Optimization for SDH lower order cross-connection
  - Trail optimization

- SDH Network Security Optimization
  - SDH network security optimization items and rules
  - Network survivability optimization methods
  - Trail availability optimization methods
- SDH Network Operation and Maintenance Optimization
  - SDH network O&M optimization items and rules
  - ECC optimization methods
  - Clock optimization methods
  - Spare boards optimization methods
- SDH Network Optimization Case Study
  - Network information introduction
  - Given assessment
  - Given optimization suggestion based on the network status
  - Develop the optimization report in network security, service and network support field

Duration
3 working days

Class Size
Min 4, Max 8
1.8.3 OptiX SDH Network Expansion and Reconstruction Training

Training Path

Target Audience

OptiX SDH network optimization engineer or senior maintenance engineer

Prerequisites

- Having working experience in the maintenance of SDH products
- Having been attend SDH series 2nd Line maintenance training

Objectives

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

- Outline the scenario of SDH network expansion
- List the key point of network expansion
- Interpret the operation of SDH network expansion
- Perform SDH network expansion and verify the service interconnection
- Outline the scenario of SDH network reconstruction
- List the key point of network reconstruction
- Interpret the operation of SDH network reconstruction
- Perform SDH network reconstruction and verify the service interconnection

Training Content

OTA43 SDH Network Expansion & Reconstruction

- SDH Network Expansion
  - SDH network expansion scenario
  - Common operation method in SDH network expansion
  - SDH network expansion solution production elements

- SDH Network Expansion Practice Guide
  - Adding node in SDH protection subnet
  - Link capability update in SDH network
  - Add extended subrack

- SDH Network Reconstruction
  - SDH network reconstruction scenario
  - Common operation method in SDH network reconstruction
  - SDH network reconstruction solution production elements

- SDH Network Reconstruction Practice Guide
  - SDH Network from non-protected to protected ring
  - SDH ring split
- Remove node from SDH network

Duration

3 working days

Class Size

Min 4, Max 8
1.8.4 OptiX WDM Network Assessment Training

Training Path

OptiX WDM Network Assessment

OTC72 Lecture, Case 2d

Target Audience

OptiX WDM network optimization engineer or senior maintenance engineer

Prerequisites

- Completion of OptiX OSN 6800/8800(OTN) Second Line Maintenance Training program or OptiX BWS 1600G Second Line Maintenance Training program

Objectives

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

- Describe methods of assessing WDM network design performance
- Analyze and assess WDM network design performance
- Provide suggestions on optimizing WDM network design performance
- Describe methods of assessing running performance of a WDM network
- Analyze and assess running performance of a WDM network
- Provide suggestions for optimizing running performance of a WDM network

Training Content

OTC72 OptiX WDM Network Assessment

- OptiX WDM Network Design Basics
  - WDM Network Overview
  - WDM Network Designing Factors
  - WDM Network Designing Process Overview
- OptiX WDM Network Design Performance Assessment
  - WDM Network Assessment and Optimization Overview
  - Split Links
  - Assess Line Attenuation
  - Assess Dispersion
- OptiX WDM Network Design Performance Assessment Case Study
  - Information and Data to Be Obtained Before Assessment
  - Dividing Links
  - Assessing Line Attenuation
  - Assessing Chromatic Dispersion on a Link
- OptiX WDM Network Running Performance Assessment
  - Overview
  - Assess OA Optical Power of Links
- Assess OA Optical Power Flatness of Links
- Assess OTU Receiving Performance
- OptiX WDM Network Running Performance Assessment Case Study
  - Assessing Optical Power of OA Boards on a Link
  - Assessing Receive-End Performance of OTU Boards

Duration

2 working days

Class Size

Min 4, Max 8
1.8.5 OptiX WDM Network Optimization Training

Training Path

[Diagram: OptiX WDM Network Optimization: OTC73 Lecture, Lab 1d]

Target Audience

OptiX WDM network optimization engineer or senior maintenance engineer

Prerequisites

- Completion of OptiX OSN 6800/8800(OTN) Second Line Maintenance Training program or OptiX BWS 1600G Second Line Maintenance Training program

Objectives

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

- Describe the method for optimizing design performance of a WDM network
- Describe the procedure for designing a solution to design performance optimization of a WDM network
- Complete the solution to the design performance optimization of a WDM network
- Describe how to optimize operating performance of a WDM network
- Describe the process of optimizing operating performance of a WDM network
- Design solutions to optimizing operating performance of a WDM network

Training Content

OTC73 OptiX WDM Network Optimization

- OptiX WDM Network Design Performance Optimization
  - WDM Network Assessment and Optimization Overview
  - Optimization Objectives
  - Optimization Project Design
  - Optimization Implementation
- OptiX WDM Network Design Performance Optimization Case Study
  - Network and Service Introduction
  - Contents and Objective of Network Design Performance Optimization
  - Practice & Summary
- OptiX WDM Network Running Performance Optimization
  - WDM Network Assessment and Optimization Overview
  - Optimization Objectives
  - Optimization Project Design
  - Optimization Implementation
- OptiX WDM Network Running Performance Optimization Case Study
  - Network and Service Introduction
Contents and Objective of Network Running Performance Optimization
- Practice & Summary

Duration
- 1 working day

Class Size
- Min 4, Max 8
1.8.6 OptiX WDM Network Expansion Training

Training Path

OptiX WDM Network Expansion

OTC51 Lecture, Lab 2d

Target Audience

OptiX WDM network optimization engineer or senior maintenance engineer

Prerequisites

- Completion of OptiX OSN 6800/8800(OTN) Second Line Maintenance Training program or OptiX BWS 1600G Second Line Maintenance Training program or OptiX Metro 6100 Second Line Maintenance Training program

Objectives

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

- Illustrate OptiX WDM system optical power calculation
- Outline the process of OptiX WDM network expansion
- Implement the indices testing during network expansion
- Complete the OptiX WDM network service expansion of OTM/OADM stations

Training Content

OTC51 OptiX WDM Network Expansion

- **OptiX BWS 1600G Optical Power Calculation**
  - Optical power calculation basics
  - OptiX BWS 1600G common power indices
  - OptiX BWS 1600G power calculation of OSC
  - OptiX BWS 1600G power calculation of Traffic Channel

- **OptiX Metro WDM Optical Power Calculation**
  - Optical power calculation basics
  - OptiX Metro 6100 common power indices
  - OptiX Metro 6100 power calculation of OSC
  - OptiX Metro 6100 power calculation of Traffic Channel

- **OptiX NG WDM Optical Power Calculation**
  - Review of the OptiX NG WDM signal flow
  - Basic concepts
  - Power calculation of OptiX NG WDM OSC
  - Power calculation of OptiX NG WDM main Path

- **OptiX WDM Network Expansion Special Topic**
  - OptiX WDM network expansion preparative
  - OptiX WDM network expansion implementation
OptiX WDM Network Expansion Special Topic Practice Guide

Duration

2 working days

Class Size

Min 4, Max 8
1.8.7 OptiX WDM Network Reconstruction Training

Training Path

OTC52 OptiX WDM Network Reconstruction
Lecture, Lab 3d

Target Audience

OptiX WDM network optimization engineer or senior maintenance engineer

Prerequisites

- Completion of OptiX OSN 6800/8800(OTN) Second Line Maintenance Training program or OptiX BWS 1600G Second Line Maintenance Training program

Objectives

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

- Describe OptiX WDM system upgrade & reconstruction methods, which include 2 5G upgrading to 10G, 10G upgrading to 40G and 400G upgrading to 800G
- Describe OptiX WDM equipment software upgrade methods
- Describe OptiX WDM network reconstruction methods, which include the site type reconstruction, the protection type reconstruction and wavelength reconstruction
- Complete the OptiX WDM network reconstruction

Training Content

OTC52 OptiX WDM Network Reconstruction

- OptiX WDM System Upgrade & Reconstruction
  - OptiX WDM system capacity upgrade
  - OptiX WDM system bit rate level upgrade
  - OptiX WDM service type and network function upgrade
- OptiX WDM System Upgrade & Reconstruction Practice Guide
- OptiX WDM Network Reconstruction
  - OptiX WDM network protection reconstruction
  - OptiX WDM node type reconstruction
  - OptiX WDM wavelength channel reconstruction
- OptiX WDM Network Reconstruction Practice Guide

Duration

3 working days

Class Size

Min 4, Max 8
1.9 Transmission Network Assessment and Optimization Training

1.9.1 OptiX RTN Network Assessment Training

Training Path

- Microwave Network Performance Assessment
  - OTF63 Lecture 0.5d
- Microwave Network General Assessment
  - OTF64 Lecture 0.5d
- Microwave Network Assessment Case Analysis
  - OTF65 Case Study 1d

Target Audience

OptiX RTN network optimization engineer or senior maintenance engineer

Prerequisites

- Be familiar with OptiX RTN series equipment
- Having working experience with at least 1 years in the maintenance of microwave transport network

Objectives

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

- Describe methods of assessing microwave network performance
- Analyze and access microwave network performance
- Complete microwave network performance assessment
- Describe the methods about capacity assessment
- Describe the methods about frequency assessment
- Describe the methods about reliability assessment
- Describe the methods about NMS DCN assessment
- Complete microwave network performance assessment
- Complete microwave network capacity assessment
- Complete microwave network frequency assessment
- Complete microwave network reliability assessment
- Complete microwave network NMS DCN assessment

Training Content

OTF63 Microwave Network Performance Assessment
• Microwave Network Performance Assessment
  ■ Microwave Network Assessment Overview
  ■ Performance Assessment

OTF64 Microwave Network General Assessment
• Microwave Network General Assessment
  ■ Microwave Network Assessment Overview
  ■ Capacity Assessment
  ■ Frequency Assessment
  ■ Reliability Assessment
  ■ NMS DCN Assessment
  ■ Summary

OTF65 Microwave Network Assessment Case Analysis
• Microwave Network Assessment Case Analysis
  ■ Assessment Network Introduction
  ■ Network Outline
  ■ Network Assessment
  ■ General Comments

Duration

2 working days

Class Size

Min 4, Max 12
1.9.2 OptiX RTN Network Optimization Training

Training Path

Microwave Network Optimization

OTF66 Lecture 0.5d

Microwave Network Optimization Case Analysis

OTF67 Case Study 0.5d

Target Audience

OptiX RTN network optimization engineer or senior maintenance engineer

Prerequisites

- Be familiar with OptiX RTN equipment
- Having working experience with at least 2 years in the maintenance of microwave transport network
- Upon completion of OptiX RTN Network Assessment Training

Objectives

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

- Describe the microwave network optimization procedure
- Complete the solution to the design performance optimization of a RTN network
- Describe how to optimize the capacity of a RTN network
- Describe the methods about frequency optimization
- Describe the methods about topology optimization
- Describe the methods about NMS DCN optimization
- Complete microwave network performance optimization
- Complete microwave network capacity optimization
- Complete microwave network frequency optimization
- Complete microwave network reliability optimization
- Complete microwave network NMS DCN optimization

Training Content

OTF66 Microwave Network Optimization

- Microwave Network Optimization
  - Microwave Network Optimization Overview
  - Optimization High Level Design
  - Optimization Low Level Design
  - Optimization Solution Implementation

OTF67 Microwave Network Optimization Case Analysis
Microwave Network Optimization Case Analysis
- Network information Introduction
- Defining the Optimization Task List
- Given optimization suggestion based on the network status
- Develop the optimization report in RTN network

Duration
1 working day

Class Size
Min 4, Max 12
1.10 Transmission Network Principle Training

1.10.1 SDH Fundamental Training

Training Path

Target Audience
SDH series equipment operation and maintenance engineer
SDH series equipment operation and maintenance engineer

Prerequisites
- NA

Objectives
On completion of this program, the participants will be able to:
- Describe the structure of the SDH frame
- Illustrate the multiplexing procedure of PDH signal to SDH signal
- Outline the function of section and path overhead
- Explain the working mechanism of the pointer
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of linear MSP
- Explain the protection mechanism of MS shared protection ring
- Explain the protection mechanism of SNCP in ring/mesh topology
- Analyze the service signal flow before/after the protection switch takes place

Training Content

OTA01 SDH Principle
- SDH Principle
  - SDH Overview
  - Frame Structure & Multiplexing Methods
  - Overheads & Pointers
  - Mechanism of the pointer
- SDH Principle (Manual)

OTA02 SDH Networking and Protection
- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection
- SDH Networking and Protection (Manual)

Duration

2 working days

Class Size

Min 6, Max 12
1.10.2 WDM Fundamental Training

Training Path

Target Audience

WDM network operation and maintenance engineer

Prerequisites

- Having working experience in the planning and design of WDM networks
- Upon completion of OptiX WDM/NG WDM Network Design Basic Training and OptiX NG WDM Network Design Training or having equivalent knowledge

Objectives

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

- Describe the function module and network structure of WDM system
- Outline the characteristics of various fibers
- Explain the functions and characteristics of various optical components
- Explain the key technologies of WDM system, for example optical source, optical amplifiers, etc
- Describe the characteristics of optical interface in WDM system

Training Content

OTC01 WDM Basics
- WDM Principle
  - WDM Overview
  - Transmission Media
  - Key Technologies
  - Technical Specifications

Duration

1 working day

Class Size

Min 6, Max 12
1.10.3 Ethernet Fundamental Training

Training Path

<table>
<thead>
<tr>
<th>Ethernet Basics</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTA03 Lecture 2d</td>
</tr>
</tbody>
</table>

Target Audience

Personnel who requires a general knowledge of Ethernet over SDH technology

Prerequisites

- Having a general knowledge of data telecommunications

Objectives

On completion of this program, the participants will be able to:
- Outline the types and applications of Ethernet
- Explain the technical background of the Ethernet and its basic concepts
- Illustrate the Ethernet frame structure
- Describe the function of VLAN and L2 switching
- Outline the classification of Ethernet service
- Explain the function and applications of different types Ethernet service
- Outline the basic concepts of data traffic
- List basic concepts of network and internet
- Describe the applications of familiar protocol and standard
- Illustrate basic structure of IP network
- Tell the basic knowledge of IP address

Training Content

OTA03 Ethernet Basics

- Ethernet Basics
  - Categories of Ethernet
  - Basic Principle of Ethernet
  - Ethernet Port Technology
  - VLAN Basis & L2 Switching
- Ethernet Principle (Manual)
- Ethernet Service Introduction
  - Basic Concepts
  - EPL
  - EVPL
  - EPLAN
  - EVPLAN
- IP Basics
- Data Traffic Basis
- Brief Introduction of Network and Internet
- Protocol and Standard
- Basic Architecture of IP Network
- IP Address Introduction
- Tell the basic knowledge of IP address

Duration

2 working days

Class Size

Min 6, Max 12
1.10.4 ASON Fundamental Training

Training Path

![Training Path Diagram]

Target Audience

Technical manager, ASON operation and maintenance engineer

Prerequisites

- Having a general knowledge of SDH and data telecommunications basics

Objectives

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

- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON

Training Content

OTA07 ASON Basics

- ASON Introduction
  - Background of ASON
  - System Structure of ASON
  - Networking Characters of ASON
  - Service Characters of ASON
  - ASON Network Functions

Duration

1 working day

Class Size

Min 6, Max 12
1.10.5 Hybrid MSTP Fundamental Training

Training Path

Target Audience

Hybrid MSTP operation and maintenance engineer
Hybrid MSTP novice

Prerequisites

- Having a general knowledge of SDH and Ethernet communications basics

Objectives

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

- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Outline the QinQ application scenarios of OptiX Hybrid MSTP
- Describe the basic concepts of PWE3
- Outline the typical PWE3 encapsulation format for Ethernet
- Outline the typical PWE3 encapsulation format for TDM E1
- Describe OptiX Hybrid MSTP product networking
- Outline the protection types of OptiX Hybrid MSTP product
- Classify the service types of Ethernet
- Outline the types and applications of Ethernet

Training Content

OTA45 Hybrid MSTP Technology Introduction
- OptiX Hybrid MSTP Technologies Introduction
  - TCP/IP Protocol Overview
  - IP Address Introduction and Configuration
  - MPLS Overview
  - MPLS LSP Introduction
  - MPLS-TP Introduction
  - MPLS Tunnel Network Application
- QinQ Overview
- PWE3 Overview
- Ethernet PWE3
- TDM E1 PWE3

OTA46 Hybrid MSTP Network Application
- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction (E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

Duration

2 working days

Class Size

Min 6, Max 12
1.11 WDM Products Training

1.11.1 OptiX OSN 8800(OTN) 1st Line Maintenance Training

Training Path

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>OptiX NG WDM System Description</td>
<td>0.5d</td>
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<tr>
<td>OTC24</td>
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<tr>
<td>OptiX NG WDM (OTN) Field Maintenance</td>
<td>1.5d</td>
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<tr>
<td>OTC29</td>
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</tbody>
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Target Audience

OptiX NG WDM equipment field maintenance engineer

Prerequisites

- Be familiar with Windows operating system
- Having a general knowledge of WDM basics

Objectives

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

- Describe the position of OptiX OSN 8800(OTN) systems in an optical transport network
- Describe the functions and features of OptiX OSN 8800(OTN) systems
- Illustrate the functions of different units in OptiX OSN 8800(OTN) systems, which include OTU, MUX/DEMUX, OA, OSC/ESC, XCS etc
- Describe the protection and features of OptiX OSN 8800(OTN) systems
- Describe the status of OptiX OSN 8800(OTN) products alarm indicators
- Describe the running environment of OptiX OSN 8800(OTN) products
- List the routine maintenance items of OptiX OSN 8800(OTN) products
- Perform the basic maintenance operations of OptiX OSN 8800(OTN) products, such as board replacement, fiber connection, optical power adjusting, etc
- Complete the maintenance records of OptiX OSN 8800(OTN) products
- Outline the common menus of OptiX iManager U2000/Web LCT
- Perform the NE configuration, board configuration, and protection configuration of OptiX OSN 8800(OTN) products via iManager U2000/Web LCT
- Perform the routine maintenance of OptiX OSN 8800(OTN) products via iManager U2000/Web LCT

Training Content

OTC24 OptiX NG WDM System Description

- OptiX NG WDM System Description
• OptiX NG WDM network application
• OptiX NG WDM product functions and features
• OptiX NG WDM product architecture and capacity

OTC29 OptiX NG WDM (OTN) Field Maintenance
• OptiX OSN 8800 Equipment Operation and Maintenance
  ■ Operation precautions
  ■ OptiX NG WDM basic maintenance operations
  ■ OptiX NG WDM board replacement
  ■ OptiX NG WDM equipment routine maintenance items
• OptiX OSN 8800 Web LCT Operation and Maintenance
  ■ Preparations for OptiX NG WDM Web LCT configuration
  ■ Basic OptiX NG WDM Web LCT configuration
  ■ OptiX NG WDM Web LCT maintenance and management operations

Duration

2 working days

Class Size

Min 6, Max 12
1.11.2 OptiX OSN 8800(OTN) 2nd Line Maintenance Training

Training Path

- **WDM Basics**
  - OTC01 Lecture 1d

- OptiX OSN 8800(OTN) Hardware Description and Application
  - OTC25 Lecture 2d

- U2000 System Introduction
  - ONU01 Lecture 0.5d

- **OTN Basics**
  - OTC05 Lecture 1d

- OptiX NG WDM Optical Layer Grooming
  - OTC153 Lecture, Lab, E-lab 1.5d

- OptiX NG WDM Electrical Layer Grooming
  - OTC154 Lecture, Lab, E-lab 2d

- OptiX NG WDM Commissioning
  - OTC28 Lecture, Lab, E-lab 2.5d

- NG WDM (OTN) System Troubleshooting
  - OTC30 Lecture, Lab 2.5d

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
Be familiar with Windows operating system

Objectives

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

- Describe the function module and network structure of WDM system
- Outline the characteristics of various fibers
- Explain the functions and characteristics of various optical components
- Explain the key technologies of WDM system, for example optical source, optical amplifiers, etc
- Describe the characteristics of optical interface in WDM system
- Describe the system structure and features of OptiX OSN 8800(OTN) systems
- Describe the main functions of the boards
- Outline the system protection modes of OptiX OSN 8800(OTN) systems
- List the common network topologies and network elements of OptiX OSN 8800(OTN) systems
- Describe the network applications of OptiX OSN 8800(OTN) systems
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Describe OTN frame structure, maintenance signals and function for different layers
- Outline alarm and performance events generation mechanism
- Analyze the alarm and performance events and locate the failures in OTN
- Describe the advantages of OTN
- Describe the OTN frame structure and list the different components’ function
- Describe the main features of the optical layer grooming and electrical layer grooming
- Describe OptiX OSN 8800(OTN) system signal flow and fiber connection, which include OTM, OLA, OADM, etc
- Outline the supervisory channel signal flow in different network elements
- Describe the functions, architecture and the menus of iManager U2000
- Implement iManager U2000 basic operations, OptiX OSN 8800(OTN) data configuration and system management
- Configure OptiX OSN 8800(OTN) products through iManager U2000
- Configure the typical protection for the equipment
- Check the data configuration correctness and validity
- Check the equipment running condition such as power connections, fiber connections, mounted boards, etc
- Outline and perform the commissioning procedure for OptiX OSN 8800(OTN) equipment
- Perform the single station commissioning of OptiX OSN 8800(OTN) equipment
- Perform the commissioning of supervisory channel
- Perform the main path commissioning of OptiX OSN 8800(OTN) equipment
- Perform indices testing during the commissioning process
- Eliminate the fault occurring during the commissioning process
- Explain the troubleshooting ideas and methods for OptiX OSN 8800(OTN) products
- Illustrate basic operation for OptiX OSN 8800(OTN) troubleshooting
● Describe the fault handling flow
● Analyze and eliminate the common faults of OptiX OSN 8800(OTN) products
● Improve the ability of eliminating faults through case analysis and practice

Training Content

OTC01 WDM Basics
● WDM Principle
  ■ WDM Overview
  ■ Transmission Media
  ■ Key Technologies
  ■ Technical Specifications

OTC25 OptiX OSN 8800(OTN) Hardware Description and Application
● OptiX OSN 8800 Hardware Description
  ■ OptiX OSN 8800 networking application and product features
  ■ OptiX OSN 8800 cabinet, subrack and frame
  ■ OptiX OSN 8800 boards description
● OptiX OSN 8800 Equipment Networking and Application
  ■ OptiX NG WDM product feature
  ■ OptiX NG WDM node type
  ■ OptiX NG WDM network applications
  ■ Key factors in WDM networking
● OptiX OSN 8800 Protection
  ■ OptiX NG WDM equipment level protection
  ■ OptiX NG WDM optical layer protection
  ■ OptiX NG WDM electrical layer protection

ONU01 U2000 System Introduction
● U2000 System Introduction
  ■ Telecommunications Management Network Concept
  ■ Network Management Layer of U2000
  ■ U2000 System Architecture
  ■ Interfaces of U2000
  ■ Managed Equipment of U2000
  ■ Hardware and Software Requirement
  ■ The User Interface of U2000
  ■ Processes of U2000
  ■ NMS Maintenance Suite: MSuite
  ■ License Introduction
  ■ Directory Structure of U2000

OTC05 OTN Basics
● OTN Introduction
  ■ Optical transport hierarchy
  ■ OTN interface structure
- Multiplexing/mapping principles and bit rates
- Overhead description
- Maintenance signals and function for different layers
- Alarm and performance events

OTC153 OptiX NG WDM Optical Layer Grooming
- OptiX NG WDM Common Data Configuration
  - Preparation for OptiX NG WDM data configuration
  - Creating a OptiX NG WDM network
- OptiX NG WDM Common Data Configuration Practice Guide
- OptiX NG WDM Optical Layer Grooming
  - FOADM and Its Features
  - ROADM Features and Relative Functional Units
  - ROADM Grooming Features
  - Main Scenarios of ROADM
- OptiX NG WDM Optical Layer Data Configuration
  - Basic concepts
  - Configuring the edge port
  - Creating OptiX NG WDM single-station optical cross-connection
  - Configuring OptiX NG WDM OCh trail
- OptiX OSN NG WDM Optical Layer Data Configuration Practice Guide

OTC154 OptiX NG WDM Electrical Layer Grooming
- OptiX NG WDM Electrical Layer Grooming
  - OptiX NG WDM electrical layer grooming
  - OptiX NG WDM service grooming model
  - OptiX NG WDM boards involved in electrical layer grooming
  - Application scenarios of electrical layer service grooming
- OptiX OSN NG WDM Electrical Layer Data Configuration
  - Basic concepts
  - Configuring OptiX NG WDM normal cross-connection Services
  - Configuring OptiX NG WDM service timeslots
  - Configuring OptiX NG WDM electrical trail
- OptiX OSN NG WDM Electrical Layer Data Configuration Practice Guide
- OptiX OSN 8800 Equipment Operation and Maintenance
  - Operation precautions
  - OptiX NG WDM basic maintenance operations
  - OptiX NG WDM board replacement
  - OptiX NG WDM equipment routine maintenance items
- OptiX NG WDM NMS Side Operation and Maintenance
  - OptiX NG WDM NMS side routine maintenance items
  - OptiX NG WDM daily maintenance items
  - OptiX NG WDM monthly maintenance items
  - OptiX NG WDM semiyearly maintenance items
- Other NMS side operation
- OptiX NG WDM NMS Side Operation and Maintenance Practice Guide

**OTC28 OptiX NG WDM Commissioning**
- OptiX NG WDM Optical Power Calculation
  - Review of the OptiX NG WDM signal flow
  - Basic concepts
  - Power calculation of OptiX NG WDM OSC
  - Power calculation of OptiX NG WDM main Path
- OptiX NG WDM Equipment Commissioning
  - Preparations for OptiX NG WDM commissioning
  - Configuring OptiX NG WDM NE and network
  - Commissioning OptiX NG WDM optical power
  - Commissioning OptiX NG WDM network
- OptiX OSN 8800 Equipment Commissioning Practice Guide

**OTC30 NG WDM (OTN) System Troubleshooting**
- OptiX NG WDM System Troubleshooting Methods
  - Basic rules and methods of OptiX NG WDM fault locating
  - Rectifying different types of OptiX NG WDM faults
- OptiX OSN 8800 Equipment Troubleshooting Case Study
  - OptiX NG WDM troubleshooting methods review
  - OptiX NG WDM troubleshooting cases Discussion
- OptiX OSN 8800 Equipment Troubleshooting Practice Guide

**Duration**

13 working days

**Class Size**

Min 6, Max 12
1.11.3 OptiX OSN 8800(OTN) 3rd Line Maintenance Training

Training Path

OptiX OSN 8800 Hardware Description and Signal Flow Review
OTC122 Lecture 0.5d

OptiX NG WDM ASON Operation and Maintenance
OTC65 Lecture, Lab, E-lab 3d

OptiX OSN 8800 (OTN) Advanced Troubleshooting
OTC64 Lecture, Lab 3d

OptiX NG WDM Ethernet Operation and Maintenance
OTC32 Lecture, Lab, E-lab 2.5d

OptiX OSN 8800 (Packet) Hardware, Networking and Application Introduction
OTC86 Lecture 1d

OptiX OSN 8800 Packet Service Configuration
OTC87 Lecture, Lab, E-lab 2d

Target Audience

OptiX NG WDM senior operation and maintenance engineer

Prerequisites

- Completion of OptiX OSN 8800 (OTN) 2nd Line Maintenance or NMC Operation Training

Objectives

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

- Describe the position and networking ability of OptiX OSN 8800
- List the main functions and features of OptiX OSN 8800
- Generalize the categories of boards
- List the main functions and features of the boards
- Outline typical node signal flow of OptiX OSN 8800
- Perform the commissioning for OptiX NG WDM systems
- Describe the characteristics of various protection types and their application scenarios
- Understand the operations related to the OSN 8800 product protection
- Fulfilled the service configuration and verify the characteristics of various protection types
- Locate and eliminate the trouble based on maintenance rules
- Illustrate troubleshooting common operation
- List the troubleshooting methods
- Briefly introduce the general workflow in OptiX OSN 8800 equipment troubleshooting
- Enhance the troubleshooting analyze and reaction ability through case discussion and practice
- Explain the IP over WDM principle
- Describe the Ethernet service and protection of NG WDM equipment
- Configure the Ethernet service and protection through iManager U2000
- Implement the routine maintenance and troubleshooting of NG WDM Ethernet service
- Describe the OSN 8800 hardware
- List the OSN 8800 packet boards
- Describe the networking application of OSN 8800 (Packet)
- Illustrate the service and protection type of OSN 8800 (Packet)
- Implement the data configuration through iManager U2000 for OSN 8800 packet service and protection
- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON
- Fulfill the WDM ASON trail configuration
- Complete the ASON routine maintenance items
- Describe The Basic Thoughts and Methods of NG WDN ASON Fault Locating
- Quickly restore interrupted ASON services under emergency conditions.

**Training Content**

**OTC122 OptiX OSN 8800 Hardware Description and Signal Flow Review**
- OptiX OSN 8800 Hardware Description and Signal Flow Review
  - System Knowledge Review
  - Boards Description Review
  - Signal Flow Review

**OTC65 OptiX NG WDM ASON Operation and Maintenance**
- OptiX NG WDM ASON Application
  - ASON Overview
  - System Structure of OptiX NG WDM ASON
  - Features of OptiX NG WDM ASON
- OptiX NG WDM Optical Layer ASON Configuration
  - Creating NE and Boards
  - Setting the Node ID
- Querying the DCC Configuration
- Enable ASON Feature
- Uploading NE Configuration Data
- Creating a Diamond WDM ASON OCh Trail
- Creating a Silver WDM ASON OCh Trail
- Creating a Copper WDM ASON OCh Trail
- Deleting an ASON Trail
- Migrating WDM ASON Trails
- Modifying the Attributes of ASON WDM Trails
- Modifying the Route of an ASON Service
- Managing the ASON Protocol
- Managing Link Resources
- Setting Association of WDM ASON Trails
- Setting Control Plane Parameters
- OptiX NG WDM Optical Layer ASON Configuration Practice Guide
  - Creating ASON Topology
  - Creating a Diamond WDM ASON OCh Trail
  - Creating a Silver WDM ASON OCh Trail
  - Optimize a WDM ASON trail
- OptiX NG WDM Electrical Layer ASON Configuration
  - Creating NE and Boards
  - Setting the Node ID
  - Querying the DCC Configuration
  - Enable ASON Feature
  - Uploading NE Configuration Data
  - Creating ASON Topology
  - Creating a Diamond WDM ASON ODUk/Client Trail
  - Creating a Gold WDM ASON ODUk Trail
  - Creating a Silver WDM ASON ODUk/Client Trail
  - Creating a Copper WDM ASON ODUk/Client Trail
  - Creating WDM ASON Inverse Multiplexing Trail
  - Deleting an ASON Trail
  - Migrating WDM ASON Trails
  - Modifying the Attributes of ASON WDM Trails
  - Modifying the Route of an ASON Service
  - Managing the ASON Protocol
  - Managing Link Resources
  - Setting Association of WDM ASON Trails
  - Setting Control Plane Parameters
- OptiX NG WDM Electrical Layer ASON Configuration Practice Guide
  - Creating ASON Topology
  - Creating a Diamond WDM ASON ODU1 Trail
Creating a Gold WDM ASON ODU1 Trail
Creating a Silver WDM ASON ODU1 Trail
Optimize a WDM ASON trail

OptiX NG WDM ASON Routine Maintenance
- ASON Routine Maintenance Items
- Checking ASON Abnormal Events
- Checking ASON Attribute
- Checking ASON Link
- Checking ASON Services
- Backing Up the Database of the ASON NE
- Precautions for Configuring Software Functions
- Precautions for the Hardware Operation
- Precautions on NMS Operations

OptiX NG WDM ASON Routine Maintenance Practice Guide

OptiX NG WDM ASON Troubleshooting
- NG WDM ASON Troubleshooting
- Quick Restoration of ASON Services
- NG WDM ASON Case Analysis

OptiX NG WDM ASON Troubleshooting Practice Guide

OTC64 OptiX OSN 8800 (OTN) Advanced Troubleshooting
- OptiX OSN 8800 (OTN) Advanced Troubleshooting case study
  - OptiX OSN 8800 (OTN) Troubleshooting Method
  - Power Abnormal Case Study
  - Bit Error Case Study
  - Service interrupt Case Study

OptiX OSN 8800 (OTN) Advanced Troubleshooting Practice Guide
- Troubleshooting Rules
- Abnormal Alarms and Performances Collection
- Troubleshooting Analysis
- Summary

OTC32 OptiX NG WDM Ethernet Operation and Maintenance
- OptiX NG WDM Ethernet Basics
  - Ethernet Overview
  - Associate Protocol and Frame Structure of Ethernet
  - Relative Technologies of Ethernet

OptiX NG WDM Ethernet Service Configuration
- OptiX NG WDM EPL service configuration
- OptiX NG WDM EVPL (QinQ) service configuration
- OptiX NG WDM EPLAN service configuration
OptiX NG WDM QoS configuration
• OptiX NG WDM Ethernet Service Configuration Practice Guide
• OptiX NG WDM Ethernet Routine Maintenance and Troubleshooting
  • OptiX NG WDM Ethernet background knowledge
  • OptiX NG WDM Ethernet maintenance operations
  • OptiX NG WDM Ethernet common troubleshooting thoughts and methods
  • OptiX NG WDM Ethernet common troubleshooting cases
• OptiX NG WDM Ethernet Routine Maintenance and Troubleshooting Practice Guide

OTC86 OptiX OSN 8800 (Packet) Hardware, Networking and Application Introduction
• OptiX OSN 8800 (Packet) Hardware, Networking and Application Introduction
  • OptiX OSN 8800 Hardware Overview
  • OptiX OSN 8800 Packet Boards Introduction
  • OptiX OSN 8800 Packet Networking
  • OptiX OSN 8800 Packet Service Introduction
  • OptiX OSN 8800 Packet Network Protection

OTC87 OptiX OSN 8800 Packet Service Configuration
• OptiX OSN 8800 Packet Service Configuration
  • OptiX OSN 8800 Packet Services Configuration
  • OptiX OSN 8800 Packet Protection Configuration
• OptiX OSN 8800 Packet Service Configuration Practice Guide
  • OptiX OSN 8800 Packet Services Configuration Practice
  • OptiX OSN 8800 Packet Protection Configuration Practice

Duration

12 working days

Class Size

Min 6, Max 12
1.11.4 OptiX OSN 8800(Packet) Operation and Maintenance Training

Training Path

OptiX NG WDM Packet Technology Introduction  
OTC85 Lecture 0.5d

→

OptiX OSN 8800 (Packet) Hardware, Networking & Application Introduction  
OTC86 Lecture 1d

→

OptiX OSN 8800 Packet Service Configuration  
OTC87 Lecture, Lab, E-Lab 2d

→

OptiX OSN 8800 Packet Features  
OTC88 Lecture, Lab, E-Lab 1.5d

→

OptiX OSN 8800 (Packet) Routine Maintenance  
OTC89 Lecture, Lab, E-Lab 1d

→

OptiX OSN 8800 (Packet) System Troubleshooting  
OTC90 Lecture, Lab 1d

Target Audience

OptiX OSN 8800 packet network operation and maintenance engineer

Prerequisites

- Having working experience in WDM transmission network
- Upon completion of OptiX OSN 6800/8800(OTN) 2nd Line Maintenance Training or having equivalent knowledge
- Be familiar with Windows operating system

Objectives

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

- Describe the basic concepts of Ethernet, VLAN and QinQ
- Describe the classification of IP addresses
• Describe the basic concepts of MPLS
• Describe the basic concepts of MPLS-TP
• Describe the basic concepts of PWE3
• Describe the OSN 8800 hardware
• List the OSN 8800 packet boards
• Describe the networking application of OSN 8800 (Packet)
• Illustrate the service and protection type of OSN 8800 (Packet)
• Implement the data configuration through iManager U2000 for OSN 8800 packet service and protection
• Describe the function and features of QoS in OSN 8800 (Packet)
• Implement the QoS configuration through iManager U2000
• Describe the function and features of OAM in OSN 8800 (Packet)
• Implement the OAM configuration through iManager U2000
• Implement the NMS side routine maintenance for OSN 8800 (Packet)
• List the common analysis methods of packet network fault locating
• Outline the fault handling flow
• Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc
• Illustrate the application of common troubleshooting methods for packet network
• Analyze common faulty of the OSN 8800 (Packet) network

Training Content

OTC85 OptiX NG WDM Packet Technology Introduction
• OptiX NG WDM Packet Technology Introduction
  ■ Ethernet Overview, VLAN, QinQ
  ■ TCP/IP Protocol Overview
  ■ IP Address Introduction and Configuration
  ■ MPLS Overview
  ■ MPLS LSP Introduction
  ■ MPLS Tunnel Network Application
  ■ MPLS-TP Overview
  ■ PWE3 Overview
  ■ Ethernet PWE3

OTC86 OptiX OSN 8800 (Packet) Hardware, Networking & Application Introduction
• OptiX OSN 8800 (Packet) Hardware, Networking & Application Introduction
  ■ OptiX OSN 8800 hardware overview
  ■ OptiX OSN 8800 Packet Boards Introduction
  ■ OptiX OSN 8800 Packet Networking
  ■ OptiX OSN 8800 Packet Service Introduction
  ■ OptiX OSN 8800 Packet Network Protection

OTC87 OptiX OSN 8800 Packet Service Configuration
• OptiX OSN 8800 Packet Service Configuration
  ■ OptiX OSN 8800 Packet Services Configuration
OptiX OSN 8800 Packet Protection Configuration

OptiX OSN 8800 Packet Service Configuration Practice Guide
- OptiX OSN 8800 Packet Services Configuration Practice
- OptiX OSN 8800 Packet Protection Configuration Practice

OTC88 OptiX OSN 8800 Packet Features
- OptiX OSN 8800(Packet) QoS Special Topic
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in OSN 8800 Equipment
- OptiX OSN 8800(Packet) QoS Special Topic Practice Guide
  - QoS Configuration Practice in OSN 8800
- OptiX OSN 8800(Packet) OAM Special Topic
  - Ethernet Port OAM
  - Ethernet Service OAM
  - MPLS-TP OAM
- OptiX OSN 8800(Packet) OAM Special Topic Practice Guide
  - Ethernet Port OAM Configuration Practice
  - Ethernet Service OAM Configuration Practice
  - MPLS-TP OAM Configuration Practice
  - OAM testing

OTC89 OptiX OSN 8800 (Packet) Routine Maintenance
- OptiX OSN 8800 (Packet) Routine Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTC90 OptiX OSN 8800 (Packet) System Troubleshooting
- OptiX NG WDM (Packet) System Troubleshooting
  - OptiX OSN 8800 Packet troubleshooting preparation
  - OptiX OSN 8800 Packet troubleshooting method
  - OptiX OSN 8800 Packet troubleshooting analyze ideas
  - OptiX OSN 8800 Packet troubleshooting case study

Duration

7 working days

Class Size

Min 6, Max 12
1.11.5 OptiX OSN 8800(OCS) Operation and Maintenance Training

Training Path

OptiX OSN 8800 (OCS) Hardware Description & Application
OTC48 Lecture 1d

OptiX OSN 8800 (OCS) Product Configuration
OTC49 Lecture, Lab, E-Lab 2.5d

OptiX OSN 8800 (OCS) Field Maintenance
OTC50 Lecture, Lab, E-Lab 1d

U2000 System Introduction
ONU01 Lecture 0.5d

OptiX SDH System Troubleshooting
OTA14 Lecture, Lab 2d

Target Audience

OptiX OSN 8800 (OCS) operation and maintenance engineer

Prerequisites

- Be familiar with Windows operating system

Objectives

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

- Describe the system structure and features of OptiX OSN 8800(OCS) system
- Describe the main functions of the boards
- Outline the system protection modes of OptiX OSN 8800(OCS) system
- Describe the network applications of OptiX OSN 8800(OCS) system
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of linear MSP
- Explain the protection mechanism of MS shared protection ring
- Explain the protection mechanism of SNCP in ring/mesh topology
- Analyze the service signal flow before/after the protection switch takes place
- Configure OptiX OSN 8800(OCS) product
● Configure the required SDH/Synchronization/Overhead units
● Configure the typical protection for the network and equipment
● Configure the common services for the typical SDH networks
● Analyze and maintain the configured equipment/units/services
● Describe the status of OptiX OSN 8800(OCS) product indicators
● Describe the operation environment of OptiX OSN 8800(OCS) equipment
● Perform the NE configuration, board configuration, service provisioning and protection configuration for equipment via NMS
● Perform the routine maintenance via NMS
● Perform the basic maintenance operations of OptiX OSN 8800(OCS) equipment such as board replacement, resetting etc
● Complete the routine maintenance records of OptiX OSN 8800(OCS) equipment
● Describe the architecture and main features of U2000
● Describe the directory structure of U2000
● Describe the main functions of U2000
● List the common analysis methods of fault locating
● Outline the fault handling flow
● Analyze the typical faults: traffic interruption, error bit, etc
● Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc
● Analyze common faulty of the network consist of OptiX NG SDH & OCS series
● Locate and eliminate faults, get experience from troubleshooting practice

Training Content

OTC48 OptiX OSN 8800 (OCS) Hardware Description & Application
● OptiX OSN 8800 (OCS) Hardware Description
  ■ Networking Application and Product Features
  ■ Cabinet, Sub rack and Frame
  ■ OCS Boards
● OptiX OSN 8800 (OCS) Network Application & Protection
  ■ Networking Application and Product Features
  ■ Cabinet, Sub rack and Frame
  ■ OCS Boards

OTC49 OptiX OSN 8800 (OCS) Product Configuration
● OptiX OSN 8800 (OCS) Data Configuration
  ■ Preparation for Data Configuration
  ■ Creating a Network
  ■ Configuring SDH Services
  ■ Backup NE Database
● OptiX OSN 8800 (OCS) Data Configuration Practice Guide
  ■ Creating Network
  ■ Configuring Non-Protection Ring
- Configuring 1+1 Linear MSP
- Configuring MSP Ring
- Configuring a Transoceanic MSP Ring
- Configuring SNCP Tangent Ring

OTC50 OptiX OSN 8800 (OCS) Field Maintenance
- OptiX OSN 8800 (OCS) Equipment Operation and Maintenance
  - Basic Maintenance Precautions
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Board Replacement
  - Equipment Maintenance Records
- OptiX OSN 8800 (OCS) Equipment Operation and Maintenance Practice Guide ISSUE1.00
  - Replacing the SDH Board
  - Replacing the EGSH Board
  - Replacing the Cross-Connect Board
  - Replacing the Clock Board
  - Replacing the AUX Board
  - Replacing the EFI Board
  - Replacing the SCC Board

ONU01 U2000 System Introduction
- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
  - Processes of U2000
  - NMS Maintenance Suite: MSuite
  - License Introduction
  - Directory Structure of U2000

OTA14 OptiX SDH System Troubleshooting
- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples
- OptiX NG SDH & OCS Series Classified Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples
- OptiX NG SDH & OCS Series Classified Troubleshooting Practice Task
  - Troubleshooting Requirement
- Collection the trouble phenomenon
- Analyze the possible reason
- Locate the classified trouble, include NMS trouble, ECC problem, service interrupt, bit error, etc)

Duration

7 working days

Class Size

Min 6, Max 12
1.11.6 OptiX OSN 8800 100G O&M Training

Training Path

OptiX OSN 8800 100G Operation and Maintenance
OTC128 Lecture, Lab, E-Lab 5d

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Completion of OptiX NG WDM relative technical training

Objectives

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

- Describe the position and networking ability of OptiX OSN 8800
- Outline the layout of OptiX OSN 8800 subrack
- Generalize the categories of boards
- List different usage of the common NG WDM network node types
- Describe NG WDM network application modes and main features
- Describe the key technologies for 40G/100G transmission
- Describe the PDM-BPSK and PDM-QPSK modulation method
- Describe the basic principle of coherent detection
- List the main functions and features of the 40G/100G coherent OTU board
- Configure the common data configuration by U2000
- Configure the OCh trail by U2000
- Configure 100G board electrical layer services by iManager U2000
- List the Items of Routine Maintenance;
- Grasp the basic operation of maintenance on U2000
- Implement routine operation and maintenance on NMS side
- Describe the optical power commissioning requirements
- List the optical power commissioning procedures
- Perform the optical power commissioning for 100Gbit/s and mixed transmission system
- List the items of testing the network
- Master the common methods for trouble shooting
- Analyze common faults
- Handle typical faults

Training Content

OTC128 OptiX OSN 8800 100G Operation and Maintenance
- OptiX NG WDM Common Data Configuration
  - Preparation for OptiX NG WDM data configuration
Creating a OptiX NG WDM network

- OptiX NG WDM Optical Layer Data Configuration
  - Basic concepts
  - Configuring the edge port
  - Creating OptiX NG WDM single-station optical cross-connection
  - Configuring OptiX NG WDM OCh trail

- OptiX WDM 40G/100G Coherent OTU Technology
  - 40G/100G Technology Overview
  - 40G/100G OTU Functions and Features
  - 40G/100G System Network Application

- OptiX OSN 8800 100G Hardware and Networking Description
  - OptiX OSN 8800 100G Hardware Description
  - OptiX OSN 8800 100G Networking Description

- OptiX OSN 8800 100G Electrical Layer Data Configuration
  - Basic Concepts of the Electrical Layer Grooming
  - Boards Involved in Electrical Layer Grooming
  - WDM Services Configuring Example

- OptiX OSN 8800 100G NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Semiyearly Maintenance Items
  - Other NMS Side Operation

- OptiX OSN 8800 100G Coherent System Commissioning
  - Basic Concept
  - Preparations for Commissioning
  - NE Optical Power Commissioning
  - 100G Coherent/Mixed System Optical Power Commissioning
  - Network Testing Items

- OptiX OSN 8800 100G Coherent System Troubleshooting Case Study
  - Troubleshooting Methods Review
  - Cases Discussion

- OptiX OSN 8800 100G O&M Training Practice Guide
  - Common Data Configuration
  - Optical Layer Data Configuration
  - Electrical Layer Data Configuration
  - Equipment Commissioning

Duration

5 working days

Class Size

Min 6, Max 12
1.11.7 OptiX NG WDM Equipment Installation Training

Training Path

OptiX NG WDM Installation

OTC133 Lecture 1d

Target Audience

OptiX NG WDM network installation engineer

Prerequisites

- Having basic knowledge of telecommunications

Objectives

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

- Outline the functions and features of the different units in OptiX NG WDM products
- Describe the hardware installation procedure
- Describe cable routing and related installation specifications for the equipment
- Outline the safety precautions to be taken during the installation
- Perform the hardware installation inspection according to the checklist

Training Content

OTC133 OptiX NG WDM Installation

- OptiX NG WDM Installation Criterion Introduction
  - OptiX NG WDM installation process
  - OptiX NG WDM room and grounding requirement
  - OptiX NG WDM installation criterion
  - OptiX NG WDM installation checklist

Duration

1 working day

Class Size

Min 6, Max 12
1.11.8 OptiX WDM Equipment Installation Training

Training Path

OptiX WDM Installation

OTC04 Lecture, WBT 2d

Target Audience

WDM network installation engineer

Prerequisites

- Having basic knowledge of telecommunications

Objectives

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

- Outline the functions and features of the different units in OptiX WDM products
- Describe the hardware installation procedure
- Describe cable routing and related installation specifications for the equipment
- Outline the safety precautions to be taken during the installation
- Perform the hardware installation inspection according to the checklist

Training Content

OTC04 OptiX WDM Installation

- OptiX BWS 1600G Installation Criterion Introduction
  - OptiX BWS 1600G installation process
  - OptiX BWS 1600G room and grounding requirement
  - OptiX BWS 1600G installation criterion
  - OptiX BWS 1600G installation checklist

- OptiX WDM Hardware Installation (Multimedia)

Duration

2 hours

Class Size

Min 6, Max 12
1.11.9 OptiX NG WDM ASON Operation & Maintenance Training

Training Path

Target Audience

OptiX NG WDM ASON operation and maintenance engineer

Prerequisites

- Completion of OptiX OSN 6800/8800 (OTN) 2nd Line Maintenance or NMC Operation Training.

Objectives

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

- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON
- Fulfill the WDM ASON trail configuration
- Complete the ASON routine maintenance items
- Describe The Basic Thoughts and Methods of NG WDN ASON Fault Locating
- Quickly restore interrupted ASON services under emergency conditions.

Training Content

OTC65 OptiX NG WDM ASON Operation & Maintenance

- OptiX NG WDM ASON Application
  - ASON Overview
  - System structure of OptiX NG WDM ASON
  - Features of OptiX NG WDM ASON
- OptiX NG WDM Optical Layer ASON Configuration
  - Creating NE and Boards
  - Setting the Node ID
  - Querying the DCC Configuration
  - Enable ASON Feature
  - Uploading NE Configuration Data
  - Creating a Diamond WDM ASON OCh Trail
  - Creating a Silver WDM ASON OCh Trail
  - Creating a Copper WDM ASON OCh Trail
  - Deleting an ASON Trail
  - Migrating WDM ASON Trails
  - Modifying the Attributes of ASON WDM Trails
- Modifying the Route of an ASON Service
- Managing the ASON Protocol
- Managing Link Resources
- Setting Association of WDM ASON Trails
- Setting Control Plane Parameters

- OptiX NG WDM Optical Layer ASON Configuration Practice Guide
  - Creating ASON Topology
  - Creating a Diamond WDM ASON och Trail
  - Creating a Silver WDM ASON och Trail
  - Optimize a WDM ASON trail

- OptiX NG WDM Electrical Layer ASON Configuration
  - Creating NE and Boards
  - Setting the Node ID
  - Querying the DCC Configuration
  - Enable ASON Feature
  - Uploading NE Configuration Data
  - Creating ASON Topology
  - Creating a Diamond WDM ASON ODUk/Client Trail
  - Creating a Gold WDM ASON ODUk Trail
  - Creating a Silver WDM ASON ODUk/Client Trail
  - Creating a Copper WDM ASON ODUk/Client Trail
  - Creating WDM ASON Inverse Multiplexing Trail
  - Deleting an ASON Trail
  - Migrating WDM ASON Trails
  - Modifying the Attributes of ASON WDM Trails
  - Modifying the Route of an ASON Service
  - Managing the ASON Protocol
  - Managing Link Resources
  - Setting Association of WDM ASON Trails
  - Setting Control Plane Parameters

- OptiX NG WDM Electrical Layer ASON Configuration Practice Guide
  - Creating ASON Topology
  - Creating a Diamond WDM ASON ODU1 Trail
  - Creating a Gold WDM ASON ODU1 Trail
  - Creating a Silver WDM ASON ODU1 Trail
  - Optimize a WDM ASON trail

- OptiX NG WDM ASON Routine Maintenance
  - ASON Routine Maintenance Items
  - Checking ASON Abnormal Events
  - Checking ASON Attribute
  - Checking ASON Link
  - Checking ASON Services
- Backing Up the Database of the ASON NE
- Precautions for Configuring Software Functions
- Precautions for the Hardware Operation
- Precautions on NMS Operations

- OptiX NG WDM ASON Routine Maintenance Practice Guide
- OptiX NG WDM ASON Troubleshooting
  - NG WDM ASON Troubleshooting
  - Quick Restoration of ASON Services
  - NG WDM ASON Case Analysis

Duration

3 working days

Class Size

Min 6, Max 12
1.11.10 OptiX OSN 1800 Operation and Maintenance Training

Training Path

OTC46 OptiX OSN 1800 Operation & Maintenance
Lecture, Lab, E-Lab 4d

Target Audience

OptiX OSN 1800 operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system
- Upon completion of OTC01 WDM Basics course or having equivalent knowledge

Objectives

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

- Describe the system structure and features of OptiX OSN 1800
- Describe the main functions of the boards
- Outline the system protection modes of OptiX OSN 1800
- List the common network topologies and network elements of OptiX OSN 1800
- Describe the network applications of OptiX OSN 1800
- Check the equipment running condition such as power connections, fiber connections, mounted boards, etc
- Describe OptiX OSN 1800 system signal flow and fiber connection
- Implement NMS basic operations, OptiX OSN 1800 data configuration and system management
- Configure OptiX OSN 1800 through NMS
- Configure the typical protection for the equipment
- Check the data configuration correctness and validity
- Perform the single station commissioning of OptiX OSN 1800
- Perform the main path commissioning of OptiX OSN 1800
- Eliminate the fault occurring during the commissioning process
- Apply different troubleshooting methods according to actual faults
- Perform the common troubleshooting operations of WDM network
- Explain the possible reasons of all kinds of OptiX WDM network faults
- Describe the fault handling flow
- Analyze and locate the complex fault of OptiX WDM network
- Improve the ability of eliminating faults through case analysis and practice

Training Content

OTC46 OptiX OSN 1800 Operation & Maintenance
OptiX OSN 1800 Hardware Description
- OptiX OSN 1800 system overview
- OptiX OSN 1800 chassis
- OptiX OSN 1800 boards

OptiX OSN 1800 Equipment Networking and Application
- OptiX OSN 1800 system signal flow
- OptiX OSN 1800 protection
- OptiX OSN 1800 design principle
- OptiX OSN 1800 application cases

OptiX OSN 1800 Configuration and Commissioning
- Preparation for OptiX OSN 1800 data configuration
- Creating an OptiX OSN 1800 network
- OptiX OSN 1800 service configuring
- OptiX OSN 1800 protection configuration
- OptiX OSN 1800 commissioning

OptiX OSN 1800 Configuration and Commissioning Practice Guide
- Preparation for OptiX OSN 1800 data configuration
- Creating an OptiX OSN 1800 network
- OptiX OSN 1800 service configuring
- OptiX OSN 1800 protection configuration
- OptiX OSN 1800 commissioning

OptiX OSN 1800 Maintenance and Troubleshooting
- Basic operation precautions
- OptiX OSN 1800 equipment basic maintenance operation
- OptiX OSN 1800 NMS basic maintenance operation
- OptiX OSN 1800 troubleshooting

OptiX OSN 1800 Maintenance and Troubleshooting Practice Guide
- Basic operation precautions
- OptiX OSN 1800 equipment basic maintenance operation
- OptiX OSN 1800 NMS basic maintenance operation
- OptiX OSN 1800 troubleshooting

Duration
4 working days

Class Size
Min 6, Max 12
1.11.11 OptiX OSN 1800(Packet) Operation and Maintenance Training

Training Path

Target Audience

OptiX OSN 1800 operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- Describe the basic concepts of Ethernet, VLAN and QinQ
- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
● Describe the basic concepts of PWE3
● Describe the network applications of OptiX OSN 1800 equipment.
● Explain the system structure and features of OptiX OSN 1800 equipment.
● State the main functions of the cards in the OptiX OSN 1800 equipment.
● System signal flow of OSN 1800
● The protection and design principle of OSN 1800
● Metro access backhaul application acenes of OSN 1800
● Key factors in networking of OSN 1800
● Describe OSN 1800 product feature (packet)
● Master packet services configuration
● Outline the configuration of protection for OSN 1800 (packet)
● Describe the function and features of QoS in OSN 1800 (Packet)
● Implement the QoS configuration through iManager U2000
● Describe the function and features of OAM in OSN 1800 (Packet)
● Implement the OAM configuration through iManager U2000
● List the items of routine maintenance
● Grasp the basic operation of maintenance on U2000
● Implement routine operation and maintenance
● List the common analysis methods of packet network fault locating
● Outline the fault handling flow
● Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc
● Illustrate the application of common troubleshooting methods for packet network
● Analyze common faulty of the OSN 1800 (Packet) network

Training Content

OTC85 OptiX NG WDM Packet Technology Introduction
● OptiX NG WDM Packet Technology Introduction
  ■ Ethernet Overview, VLAN, QinQ
  ■ TCP/IP Protocol Overview
  ■ IP Address Introduction and Configuration
  ■ MPLS Overview
  ■ MPLS LSP Introduction
  ■ MPLS Tunnel Network Application
  ■ MPLS-TP Overview
  ■ PWE3 Overview
  ■ Ethernet PWE3

OTC111 OptiX OSN 1800 System Introduction
● OptiX OSN 1800 Hardware Description
  ■ OptiX OSN 1800 system overview
  ■ OptiX OSN 1800 chassis
  ■ OptiX OSN 1800 boards
● OptiX OSN 1800 Equipment Networking and Application
- OptiX OSN 1800 system signal flow
- OptiX OSN 1800 protection
- OptiX OSN 1800 design principle
- OptiX OSN 1800 application cases

OTC112 OptiX OSN 1800 Packet Service Configuration
- OptiX OSN 1800 Packet Service Configuration
  - Creating a Network
  - Packet Service Configuration
  - Packet Service Protection Configuration
- OptiX OSN 1800 Packet Service Configuration Practice Guide
  - ETH PWE3 service configuration practice
  - Native Ethernet Service configuration practice
  - CES service configuration practice
  - ATM PWE3 service configuration practice
  - Protection Configuration practice

OTC113 OptiX OSN 1800 Packet Features
- OptiX OSN 1800(Packet) QoS Special Topic
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in OSN 1800 Equipment
- OptiX OSN 1800(Packet) QoS Special Topic Practice Guide
  - QoS Configuration Practice in OSN 1800
- OptiX OSN 1800(Packet) OAM Special Topic
  - Ethernet Port OAM
  - Ethernet Service OAM
  - MPLS-TP OAM
- OptiX OSN 1800(Packet) OAM Special Topic Practice Guide
  - Ethernet Port OAM Configuration Practice
  - Ethernet Service OAM Configuration Practice
  - MPLS-TP OAM Configuration Practice
  - OAM testing

OTC114 OptiX OSN 1800 (Packet) Routine Maintenance
- OptiX OSN 1800 (Packet) Routine Maintenance
  - Equipment Side Routine Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTC115 OptiX OSN 1800 (Packet) System Troubleshooting
- OptiX NG WDM (Packet) System Troubleshooting
OptiX OSN 8800 Packet troubleshooting preparation
OptiX OSN 8800 Packet troubleshooting method
OptiX OSN 8800 Packet troubleshooting analyze ideas
OptiX OSN 8800 Packet troubleshooting case study

Duration
5 working days

Class Size
Min 6, Max 12
1.11.12 OptiX OSN 1800V(Packet) Operation and Maintenance Training

Training Path

OptiX NG WDM Packet Technology Introduction
OTC85 Lecture 0.5d

OptiX OSN 1800V (Packet) System Introduction
OTC144 Lecture 1d

OptiX OSN 1800 Packet Service Configuration
OTC112 Lecture, Lab, E-lab 1.5d

OptiX OSN 1800 Packet Features
OTC113 Lecture, Lab, E-lab 1d

OptiX OSN 1800 (Packet) Routine Maintenance
OTC114 Lecture, Lab, E-lab 0.5d

OptiX OSN 1800 (Packet) System Troubleshooting
OTC115 Lecture, Lab, E-lab 0.5d

Target Audience

OptiX OSN 1800V (Packet) operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- Describe the basic concepts of Ethernet, VLAN and QinQ
- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
● Describe the basic concepts of PWE3
● Describe the network applications of OptiX OSN 1800V (Packet) equipment.
● Explain the system structure and features of OptiX OSN 1800V (Packet) equipment.
● State the main functions of the cards in the OptiX OSN 1800V (Packet) equipment.
● Metro access backhaul application scenes of OSN 1800V (Packet)
● Describe OSN 1800V (Packet) product feature
● Master packet services configuration
● Outline the configuration of protection for OSN 1800V(Packet)
● Describe the function and features of QoS in OSN 1800V(Packet)
● Implement the QoS configuration through iManager U2000
● Describe the function and features of OAM in OSN 1800V(Packet)
● Implement the OAM configuration through iManager U2000
● List the items of routine maintenance
● Grasp the basic operation of maintenance on U2000
● Implement routine operation and maintenance
● List the common analysis methods of packet network fault locating
● Outline the fault handling flow
● Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc
● Illustrate the application of common troubleshooting methods for packet network
● Analyze common faulty of the OSN 1800V (Packet) network

Training Content

OTC85 OptiX NG WDM Packet Technology Introduction
● OptiX NG WDM Packet Technology Introduction
  ■ Ethernet Overview, VLAN, QinQ
  ■ TCP/IP Protocol Overview
  ■ IP Address Introduction and Configuration
  ■ MPLS Overview
  ■ MPLS LSP Introduction
  ■ MPLS Tunnel Network Application
  ■ MPLS-TP Overview
  ■ PWE3 Overview
  ■ Ethernet PWE3

OTC144 OptiX OSN 1800V (Packet) System Introduction
● OptiX OSN 1800V (Packet) Hardware Description
  ■ OptiX OSN 1800V (Packet) System Overview
  ■ OptiX OSN 1800V (Packet) Chassis
  ■ OptiX OSN 1800V (Packet) Boards
● OptiX MS-OTN(Packet) Networking and Service Introduction
  ■ OptiX MS-OTN(Packet) Network Application
  ■ OptiX MS-OTN(Packet) Service Introduction
  ■ OptiX MS-OTN(Packet) Network Protection
OTC112 OptiX OSN 1800 Packet Service Configuration
- OptiX OSN 1800 Packet Service Configuration
  - Creating a Network
  - Packet Service Configuration
  - Packet Service Protection Configuration
- OptiX OSN 1800 Packet Service Configuration Practice Guide
  - ETH PWE3 Service Configuration Practice
  - Native Ethernet Service Configuration Practice
  - CES service configuration practice
  - ATM PWE3 service configuration practice
  - Protection Configuration practice

OTC113 OptiX OSN 1800 Packet Features
- OptiX OSN 1800 (Packet) QoS Special Topic
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in OSN 1800 Equipment
- OptiX OSN 1800 (Packet) QoS Special Topic Practice Guide
  - QoS Configuration Practice in OSN 1800
- OptiX OSN 1800 (Packet) OAM Special Topic
  - Ethernet Port OAM
  - Ethernet Service OAM
  - MPLS-TP OAM
- OptiX OSN 1800 (Packet) OAM Special Topic Practice Guide
  - Ethernet Port OAM Configuration Practice
  - Ethernet Service OAM Configuration Practice
  - MPLS-TP OAM Configuration Practice
  - OAM Testing

OTC114 OptiX OSN 1800 (Packet) Routine Maintenance
- OptiX OSN 1800 (Packet) Routine Maintenance
  - Equipment Side Routine Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTC115 OptiX OSN 1800 (Packet) System Troubleshooting
- OptiX OSN 1800 (Packet) System Troubleshooting
  - OptiX OSN 1800 Packet troubleshooting preparation
  - OptiX OSN 1800 Packet troubleshooting method
  - OptiX OSN 1800 Packet troubleshooting analyze ideas
  - OptiX OSN 1800 Packet troubleshooting case study
Duration

5 working days

Class Size

Min 6, Max 12
1.11.13 OptiX OSN 1800V(OTN) Operation and Maintenance Training

Training Path

Target Audience
- OptiX OSN 1800V (OTN) operation and maintenance engineer

Prerequisites
- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives
- On completion of this program, the participants will be able to:
  - Describe the function module and network structure of WDM system
  - Outline the characteristics of various fibers
  - Explain the functions and characteristics of various optical components
  - Explain the key technologies of WDM system, for example optical source, optical amplifiers, etc
  - Describe the characteristics of optical interface in WDM system
  - Describe the system structure and features of OptiX OSN 1800V(OTN)
  - Describe the main functions of the boards
  - Outline the system protection modes of OptiX OSN 1800V(OTN)
  - List the common network topologies and network elements of OptiX OSN 1800V(OTN)
  - Describe the network applications of OptiX OSN 1800V(OTN)
  - Check the equipment running condition such as power connections, fiber connections, mounted boards, etc
  - Describe OptiX OSN 1800V(OTN) system signal flow and fiber connection
  - Implement NMS basic operations, OptiX OSN 1800V(OTN) data configuration and system management
  - Configure OptiX OSN 1800V(OTN) through NMS
  - Configure the typical protection for the equipment
  - Check the data configuration correctness and validity
  - Perform the single station commissioning of OptiX OSN 1800V(OTN)
  - Perform the main path commissioning of OptiX OSN 1800V(OTN)
  - Eliminate the fault occurring during the commissioning process
  - Apply different troubleshooting methods according to actual faults
  - Perform the common troubleshooting operations of WDM network
  - Explain the possible reasons of all kinds of OptiX WDM network faults
  - Describe the fault handling flow
• Analyze and locate the complex fault of OptiX WDM network
• Improve the ability of eliminating faults through case analysis and practice

Training Content

OTC147 OptiX OSN 1800V (OTN) Operation and Maintenance

• OptiX OSN 1800V(OTN) Hardware Description
  ■ OptiX OSN 1800V(OTN) system overview
  ■ OptiX OSN 1800V(OTN) chassis
  ■ OptiX OSN 1800V(OTN) boards

• OptiX OSN 1800 Equipment Networking and Application
  ■ OptiX OSN 1800 system signal flow
  ■ OptiX OSN 1800 protection
  ■ OptiX OSN 1800 design principle
  ■ OptiX OSN 1800 application cases

• OptiX OSN 1800V(OTN) Configuration and Commissioning Practice Guide
  ■ Preparation for OptiX OSN 1800V(OTN) data configuration
  ■ Creating an OptiX OSN 1800V(OTN) network
  ■ OptiX OSN 1800V(OTN) service configuring
  ■ OptiX OSN 1800V(OTN) protection configuration
  ■ OptiX OSN 1800V(OTN) commissioning

• OptiX OSN 1800V(OTN) Commissioning and Configuration
  ■ Preparation for OptiX OSN 1800V(OTN) data configuration
  ■ Creating an OptiX OSN 1800V(OTN) network
  ■ OptiX OSN 1800V(OTN) service configuring
  ■ OptiX OSN 1800V(OTN) protection configuration
  ■ OptiX OSN 1800V(OTN) commissioning

• OptiX OSN 1800 Maintenance and Troubleshooting
  ■ Basic operation precautions
  ■ OptiX OSN 1800 equipment basic maintenance operation
  ■ OptiX OSN 1800 NMS basic maintenance operation
  ■ OptiX OSN 1800 troubleshooting

• OptiX OSN 1800 Maintenance and Troubleshooting Practice Guide
  ■ Basic operation precautions
  ■ OptiX OSN 1800 equipment basic maintenance operation
  ■ OptiX OSN 1800 NMS basic maintenance operation
  ■ OptiX OSN 1800 troubleshooting

Duration

5 working days

Class Size

Min 6, Max 12
1.11.14 OptiX OSN 1800V(TDM) Operation and Maintenance Training

Training Path

<table>
<thead>
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<th>Training Path</th>
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<th>Duration</th>
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<td>OptiX OSN 1800V (TDM) Service and Configuration</td>
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<td>Lecture</td>
<td>1d</td>
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</table>

Target Audience

OptiX OSN 1800V (TDM) operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- Appreciate the networking applications of the OptiX OSN 1800V(TDM)
- Describe the system structure and features of the OptiX OSN 1800V(TDM)
- Describe the main functions of the boards used on the OptiX OSN 1800V(TDM)
- Outline the system protection schemes of the OptiX OSN 1800V(TDM)
- Outline the operation environment of OptiX OSN 1800V(TDM) series equipment
- List the status description of OptiX OSN 1800V(TDM) equipment indicators
- List the maintenance items of OptiX OSN 1800V(TDM) equipment
- Perform the basic maintenance operations of OptiX OSN 1800V(TDM) equipment
- Complete the maintenance records of OptiX OSN 1800V(TDM) equipment
- Configure protection attributes in OptiX OSN 1800V(TDM) network, such as SNCP, L MSP, MS PRing etc
- Configure services of OSN 1800V(TDM)
Training Content

OTC140 OptiX OSN 1800V (TDM) Hardware and Networking
- OptiX OSN 1800V(TDM) Hardware Description
  - OptiX OSN 1800V(TDM) System Overview
  - OptiX OSN 1800V(TDM) Chassis
  - OptiX OSN 1800V(TDM) Boards
  - OptiX OSN 1800V(TDM) Features
- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection

OTC141 OptiX OSN 1800V (TDM) Service and Configuration
- Ethernet Service Introduction
  - Basic Concepts
  - EPL
  - EVPL
  - EPLAN
  - EVPLAN
- OptiX OSN 1800V(TDM) Service Configuration Practice Guide
  - OptiX OSN 1800V (TDM) Create Network
  - OptiX OSN 1800V (TDM) MSP Ring Service Configuration
  - OptiX OSN 1800V (TDM) SNCP Service Configuration

OTC143 OptiX OSN 1800V (TDM) Routine and Maintenance
- OptiX OSN 1800V (TDM) Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records
- OptiX OSN 1800V (TDM) Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide
- OptiX OSN 1800V (TDM) NMS Side Operation and Maintenance
  - Routine Maintenance for NMS
  - Routine Maintenance Operations for Network through NMS
OTC142 OptiX OSN 1800V (TDM) Troubleshooting

- OptiX OSN 1800V (TDM) System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

Duration

5 working days

Class Size

Min 6, Max 12
1.11.15  OptiX OSN 9800 1st Line Maintenance Training

Training Path

![Diagram](image)

Target Audience

OptiX OSN 9800 equipment field maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- Describe the position and networking ability of OptiX OSN 9800
- List the main functions and features of OptiX OSN 9800
- Outline the layout of OptiX OSN 9800 subrack
- Generalize the categories of boards
- List the main functions and features of the boards
- Outline the equipment operation precautions
- Perform the basic maintenance operations
- Replace the boards
- List the items of routine maintenance

Training Content

OTC116 OptiX OSN 9800 Hardware Description & Application
- OptiX OSN 9800 Hardware Description
  - OSN 9800 Network Application
  - Product Features
  - Cabinet, Subrack
  - Frame
  - OSN 9800 Boards Description

OTC151 OptiX OSN 9800 Field Maintenance
- OptiX OSN 9800 Equipment Operation and Maintenance
  - Operation Precautions
- Basic Maintenance Operations
- Replacing Boards and Components
- Equipment Routine Maintenance Items

Duration

2 working days

Class Size

Min 6, Max 12
1.11.16 OptiX OSN 9800 2nd line Maintenance Training

Training Path

WDM Basics
OTC01 Lecture 1d

OTN Basics
OTC05 Lecture 1d

OptiX WDM 40G100G Coherent OTU Technology
OTC81 Lecture 0.5d

OptiX OSN 9800 Hardware Description & Application
OTC116 Lecture 2d

U2000 System Introduction
ONU01 Lecture 0.5d

OptiX OSN 9800 Products Configuration
OTC117 Lecture, Lab, E-Lab 2.5d

OptiX OSN 9800 Commissioning
OTC118 Lecture, Lab, E-Lab 1.5d

OptiX OSN 9800 System Troubleshooting
OTC119 Lecture, Lab 1d

Target Audience
OptiX OSN 9800 operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
• Be familiar with Windows operating system

Objectives

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

• Describe the function module and network structure of WDM system
• Outline the characteristics of various fibers
• Explain the functions and characteristics of various optical components
• Explain the key technologies of WDM system, for example optical source, optical amplifiers, etc
• Describe the characteristics of optical interface in WDM system
• Describe the architecture and main features of U2000
• Describe the directory structure of U2000
• Describe the main functions of U2000
• Describe OTN frame structure, maintenance signals and function for different layers
• Outline alarm and performance events generation mechanism
• Analyze the alarm and performance events and locate the failures in OTN
• Describe the advantages of OTN
• Describe the OTN frame structure and list the different components’ function
• Describe the key technologies for 40G/100G transmission
• Describe the PDM-BPSK and PDM-QPSK modulation method
• Describe the basic principle of coherent detection
• List the main functions and features of the 40G/100G coherent OTU board
• List the main functions and features of OptiX OSN 9800
• Outline the layout of OptiX OSN 9800 subrack
• Generalize the categories of boards
• List the main functions and features of the boards
• List different usage of the common OptiX OSN 9800 network node Types.
• Describe OptiX OSN 9800 network application modes and main features.
• List key factors in OptiX OSN 9800 networking
• Explain the principles of various protection types applied in the OSN 9800 products
• Describe the characteristics of various protection types and their application scenarios
• Perform the operations related to the OSN 9800 product protection
• Configure client 1+1 protection and ODUk subnet connection protection (SNCP)
• Able to create an OptiX OSN 9800 network by iManager U2000
• Backup database by iManager U2000
• Describe the FOADM and ROADM features
• Describe the FOADM and ROADM application scope
• Understand the FOADM and ROADM functional units and the matching relations of these functional units
• Configure optical layer services by U2000
• Diagram the electrical layer service grooming model of OptiX OSN 9800
• List the boards which have electrical layer cross-connect function
• Configure electrical layer services independently by station
- Configure end-to-end electrical layer services independently by trail
- Outline the equipment operation precautions
- Perform the basic maintenance operations
- Replace the boards
- List the items of routine maintenance.
- Grasp the basic operation of maintenance on U2000
- Implement routine operation and maintenance on NMS side
- Review NG WDM network node signal flow
- List the common indices on optical power calculation
- Calculate the optical power
- Perform the Optical Power Commissioning
- List the Optical Power Commissioning Procedures
- Perform the Optical Power Commissioning for 100Gbit/s, 40Gbit/s and Hybrid Transmission System
- Understand the Operations Related to Tests Performing
- Describe the basic thoughts and methods of fault locating
- Comprehend the methods of rectifying different types of faults
- List the common methods for trouble shooting
- Analyze common faults independently.
- Handle typical faults

Training Content

OTC01 WDM Basics
  - WDM Principle
    - WDM Overview
    - Transmission Media
    - Key Technologies
    - Technical Specifications

OTC05 OTN Basics
  - OTN Introduction
    - Optical transport hierarchy
    - OTN interface structure
    - Multiplexing/mapping principles and bit rates
    - Overhead description
    - Maintenance signals and function for different layers
    - Alarm and performance events

OTC81 OptiX WDM 40G100G Coherent OTU Technology
  - OptiX WDM 40G100G Coherent OTU Technology
    - 40G/100G Technology Overview
    - 40G/100G OTU Functions and Features
    - 40G/100G System Network Application

OTC116 OptiX OSN 9800 Hardware Description & Application
OptiX OSN 9800 Hardware Description
- OSN 9800 Network Application
- Product Features
- Cabinet, Subrack
- Frame
- OSN 9800 Boards Description

OptiX OSN 9800 Equipment Networking and Application
- OSN 9800 Network Hierarchy and System Architecture
- OSN 9800 Node Type
- Network Applications
- Key Factors in WDM Networking

OptiX OSN 9800 Protection
- Equipment Level Protection
- Optical Layer Protection
- Electrical Layer Protection

OptiX OSN 9800 Protection Practice Guide
- Configuring Client 1+1 Protection (Manually by Station)
- Configuring ODUk SNCP (SNC/I) Protection (Manually by Station)
- Configuring ODUk SNCP (SNC/N) Protection (Manually by Trail)

ONU01 U2000 System Introduction
- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
  - Processes of U2000
  - NMS Maintenance Suite: MSuite
  - License Introduction
  - Directory Structure of U2000

OTC117 OptiX OSN 9800 Products Configuration
- OptiX OSN 9800 Common Data Configuration
  - Preparation for Data Configuration
  - Creating a Network
  - Backing up NE Database
- OptiX OSN 9800 Common Data Configuration Practice Guide
  - Start U2000
  - Create NEs
  - Configuring the NE Data
  - Create Optical NEs
- Create Fibers
- Synchronize the NE Time
- Setting Performance Monitoring Parameters of an NE

- **OptiX OSN 9800 Optical Layer Data Configuration**
  - Basic Concepts
  - Creating Single-Station Optical Cross-Connection
  - Configuring End-to-End OCh Trail

- **OptiX OSN 9800 Optical Layer Data Configuration Practice Guide**
  - Create Optical Cross-connection Station by Station
  - Create Optical Cross-Connection by Trail

- **OptiX OSN 9800 Electrical Layer Data Configuration**
  - OptiX OSN 9800 Electrical Layer Grooming
  - OptiX OSN 9800 Electrical Layer Data Configuration

- **OptiX OSN 9800 Electrical Layer Data Configuration Practice Guide**
  - Service Configuration in Single NE Mode
  - Service Configuration in E2E Mode

- **OptiX OSN 9800 Equipment Operation and Maintenance**
  - Operation Precautions
  - Basic Maintenance Operations
  - Replacing Boards and Components
  - Equipment Routine Maintenance Items

- **OptiX OSN 9800 NMS Side Operation and Maintenance**
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Semiyearly Maintenance Items
  - Other NMS Side Operation

- **OptiX OSN 9800 NMS Side Operation and Maintenance Practice Guide**
  - Optical Power Management
  - Alarm Management
  - Performance Management
  - DCN Management
  - Trail Management
  - Report Management

OTC118 OptiX OSN 9800 Commissioning
- **OptiX NG WDM Optical Power Calculation**
  - Review of the OptiX NG WDM signal flow
  - Basic concepts
  - Power calculation of OptiX NG WDM OSC
  - Power calculation of OptiX NG WDM main Path

- **OptiX OSN 9800 Equipment Commissioning**
  - Preparations for Commissioning
  - Commissioning Optical Power
- 40Gbit/s Non-Coherent System Optical Power Commissioning
- 100Gbit/s Coherent System Optical Power Commissioning
- Hybrid Transmission System Optical Power Commissioning
- Performing Tests

- OptiX OSN 9800 Equipment Commissioning Practice Guide
  - Commissioning Guidelines
  - Commissioning Optical Power of Supervisory Channel
  - Commissioning Optical Power Based on 100Gbit/s Single-Wavelength Coherent System (Manual Mode)
  - Commissioning Optical Power Based on 40Gbit/s and 10Gbit/s Non-Coherent System (Auto Mode)
  - Commissioning Optical Power Based on Mixed transmission of 100Gbit/s, 40Gbit/s and 10Gbit/s System (Manual Mode)

OTC119 OptiX OSN 9800 System Troubleshooting
- OptiX NG WDM System Troubleshooting Methods
  - Basic rules and methods of OptiX NG WDM fault locating
  - Rectifying different types of OptiX NG WDM faults
- OptiX OSN 9800 Equipment Troubleshooting Case Study
  - Troubleshooting Methods Review
  - Cases Discussion

Duration

10 working days

Class Size

Min 6, Max 12
1.11.17  OptiX OSN 9800 O&M Delta Training

Training Path

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<td>OptiX OSN 9800 Hardware Description &amp; Application Overview</td>
<td>1d</td>
</tr>
<tr>
<td>OptiX OSN 9800 Products Configuration Overview</td>
<td>2d</td>
</tr>
</tbody>
</table>

Target Audience

OptiX OSN 9800 operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- List the main functions and features of OptiX OSN 9800
- Outline the layout of OptiX OSN 9800 subrack
- Generalize the categories of boards
- List the main functions and features of the boards
- List different usage of the common OptiX OSN 9800 network node Types.
- Describe OptiX OSN 9800 network application modes and main features.
- List key factors in OptiX OSN 9800 networking
- Explain the principles of various protection types applied in the OSN 9800 products
- Describe the characteristics of various protection types and their application scenarios
- Perform the operations related to the OSN 9800 product protection
- Configure client 1+1 protection and ODUk subnet connection protection (SNCP)
- Able to create an OptiX OSN 9800 network by iManager U2000
- Backup database by iManager U2000
- Describe the FOADM and ROADM features
- Describe the FOADM and ROADM application scope
- Understand the FOADM and ROADM functional units and the matching relations of these functional units
- Configure optical layer services by U2000
- Diagram the electrical layer service grooming model of OptiX OSN 9800
- List the boards which have electrical layer cross-connect function
- Configure electrical layer services independently by station
• Configure end-to-end electrical layer services independently by trail
• Outline the equipment operation precautions
• Perform the basic maintenance operations
• Replace the boards
• List the items of routine maintenance.
• Grasp the basic operation of maintenance on U2000
• Implement routine operation and maintenance on NMS side

Training Content

OTC120 OptiX OSN 9800 Hardware Description & Application Overview
• OptiX OSN 9800 Hardware Description
  ■ OSN 9800 Network Application
  ■ Product Features
  ■ Cabinet, Subrack
  ■ Frame
  ■ OSN 9800 Boards Description

• OptiX OSN 9800 Equipment Networking and Application
  ■ OSN 9800 Network Hierarchy and System Architecture
  ■ OSN 9800 Node Type
  ■ Network Applications
  ■ Key Factors in WDM Networking

• OptiX OSN 9800 Protection
  ■ Equipment Level Protection
  ■ Optical Layer Protection
  ■ Electrical Layer Protection

OTC121 OptiX OSN 9800 Products Configuration Overview
• OptiX OSN 9800 Common Data Configuration
  ■ Preparation for Data Configuration
  ■ Creating a Network
  ■ Backing up NE Database

• OptiX OSN 9800 Optical Layer Data Configuration
  ■ Basic Concepts
  ■ Creating Single-Station Optical Cross-Connection
  ■ Configuring End-to-End OCh Trail

• OptiX OSN 9800 Electrical Layer Data Configuration
  ■ OptiX OSN 9800 Electrical Layer Grooming
  ■ OptiX OSN 9800 Electrical Layer Data Configuration

• OptiX OSN 9800 Equipment Operation and Maintenance
  ■ Operation Precautions
  ■ Basic Maintenance Operations
  ■ Replacing Boards and Components
  ■ Equipment Routine Maintenance Items
• OptiX OSN 9800 NMS Side Operation and Maintenance
  ■ NMS Side Routine Maintenance Items
  ■ Daily Maintenance Items
  ■ Monthly Maintenance Items
  ■ Semiyearly Maintenance Items
  ■ Other NMS Side Operation

Duration

3 working days

Class Size

Min 6, Max 12
1.11.18  OptiX BWS 1600S (repeatered) Sub-marine System Operation and Maintenance Training

Training Path

OptiX BWS 1600S Operation and Maintenance
OTC59  Lecture, Lab, E-Lab  2d

OptiX NPE (OSN 3500/7500/9500) Operation and Maintenance
OTC60  Lecture, Lab  3d

OptiX SLM 1630/RPT 1660 Operation and Maintenance
OTC61  Lecture, Lab  1d

Target Audience

OptiX BWS 1600S operation and maintenance engineer

Prerequisites

- Be familiar with Windows operating system

Objectives

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

- Explain the functions, characteristics of optical components and the key technologies of WDM sub-marine system
- Describe the characteristics of optical interfaces in WDM sub-marine system
- Describe the structure, functions and features of OptiX BWS 1600S equipment
- Describe the functions and specifications of different boards
- Describe the network topologies, system applications and network protection mechanisms
- Perform iManager U2000 operation and maintenance, such as alarms and performance browsing, parameters setting, database restoration/back-up, security/user management, etc
- Implement the equipment hardware configuration
- Draw the LTE/REG signal flow of OptiX BWS 1600S system
- Implement data configuration, optical power adjustment, protection configuration and network expansion through iManager U2000
- List the common indices of OptiX BWS 1600S equipment and perform the WDM products testing
- Illustrate the application of common troubleshooting methods, such as optical power testing, alarm and performance events analysis, replacement, etc
- Locate and eliminate faults, get experience from troubleshooting practice
- Describe the structure, functions and features of OptiX NPE equipment
- Explain the functions and specifications of different boards
- Outline the capacity and ability of OptiX NPE equipment
- Describe the network topologies, system applications and network protection mechanisms
- Implement the service configuration, alarm and performance monitoring through iManager U2000
- State the service application and protection mechanism
- Implement the clock, orderwire, protection configurations and network expansion through iManager U2000
- Execute the on-site operation, such as board replacement, board or equipment resetting and fiber connection
- Perform iManager U2000 operation and maintenance, such as alarms and performance browsing, parameters setting, etc
- Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc
- Locate and eliminate faults, get experience from troubleshooting practice
- Describe the structure, functions and features of OptiX SLM/RPT equipment
- Describe the functions and specifications of different boards
- Describe the network topologies, system applications and network protection mechanisms
- Perform iManager U2000 operation and maintenance, such as alarms and performance browsing, parameters setting, etc
- Implement the equipment hardware configuration
- Implement data configuration through iManager U2000
- Illustrate the application of common troubleshooting methods
- Locate and eliminate faults, get experience from troubleshooting practice

Training Content

OTC59 OptiX BWS 1600S Operation and Maintenance
- OptiX BWS 1600S V100R003 Hardware Description
  - OptiX BWS 1600S System Overview
  - Cabinet and Powerbox
  - Subrack
  - DCM Frame and HUB Frame
  - Cards
- OptiX BWS 1600S Equipment Networking and Application
  - Repeatered System Configuration
  - Unrepeatered System Configuration
  - Repeatered System Network Application
  - Unrepeatered System Network Application
  - Network Protection
  - Key Factors in Networking
- OptiX BWS 1600S Equipment Commissioning
  - Preparations for OptiX BWS 1600S Commissioning
Configuring NE and Network
Commissioning Optical Power
Commissioning Network

OptiX BWS 1600S System Troubleshooting Methods
- Overview
- Basic Rules and Methods of Fault Locating
- Rectifying different types of faults

OptiX BWS 1600S Equipment Routine Maintenance
- Guidelines to Safety (Alarm and Safety Symbols, ESD, Fibers, Network Management System Maintenance)
- Operations
- 1600S Routine Maintenance
- Board Replacement

OTC60 OptiX NPE (OSN 3500/7500/9500) Operation and Maintenance
OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
- 1+1 Linear MS Protection Configuration
- 1:1 Linear MS Protection Configuration
- Two-fiber Bidirectional MS Protection Ring Configuration
- SNCP Ring with Non-protection Chain Configuration

OptiX OSN 1500250035007500 Hardware Description
- OptiX OSN 1500250035007500 Product Introduction
- The Cabinet, Sub-rack of OptiX OSN 1500250035007500
- The Boards of OptiX OSN 1500250035007500
- Common Network Elements and Configuration
- Features

SDH Networking and Protection
- Optical networking introduction
- Classification of topologies
- Sub-networks
- Survivable networks introduction
- Types of protection

OptiX SDH Series Equipment Operation and Maintenance
- Safety labels
- Laser precautions
- Electrical precautions
- Precautions for Board Handling
- Precautions for Fiber Handling
- Equipment Operation Environment Monitoring
- Equipment Maintenance Operation
- Equipment Maintenance Records

OptiX SDH Series Equipment Operation and Maintenance Practice Guide
- Equipment Operation Environment Monitoring
Equipment Maintenance Operations
Equipment Operation and Maintenance Guide

- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

OTC61 OptiX SLM 1630/RPT 1660 Operation and Maintenance

- OptiX SLM 1630 System Description
  - SLM 1630 Overview
  - Hardware Architecture
  - Submarine Cable Line Management
  - In-service and Out-of-service
  - Parameters Setting
  - Monitoring Submarine Cable Lines
  - Application Example

- OptiX RPT 1660 System Description
  - RPT 1660 Overview
  - Optical Design
  - Mechanical Design
  - Fault Location

Duration

6 working days

Class Size

Min 6, Max 12
1.11.19  OptiX BWS 1600S (unrepeatered) Submarine System Operation and Maintenance Training

Training Path

[Diagram showing training path from OptiX BWS 1600S Operation and Maintenance (OTC59) to OptiX NPE (OSN 3500/7500/9500) Operation and Maintenance (OTC60)]

Target Audience

OptiX BWS 1600S operation and maintenance engineer

Prerequisites

- Be familiar with Windows operating system

Objectives

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

- Explain the functions, characteristics of optical components and the key technologies of WDM submarine system
- Describe the characteristics of optical interfaces in WDM submarine system
- Describe the structure, functions and features of OptiX BWS 1600S equipment
- Describe the functions and specifications of different boards
- Describe the network topologies, system applications and network protection mechanisms
- Perform iManager U2000 operation and maintenance, such as alarms and performance browsing, parameters setting, database restoration/back-up, security/user management, etc
- Implement the equipment hardware configuration
- Draw the LTE/REG signal flow of OptiX BWS 1600S system
- Implement data configuration, optical power adjustment, protection configuration and network expansion through iManager U2000
- List the common indices of OptiX BWS 1600S equipment and perform the WDM products testing
- Illustrate the application of common troubleshooting methods, such as optical power testing, alarm and performance events analysis, replacement, etc
- Locate and eliminate faults, get experience from troubleshooting practice
- Describe the structure, functions and features of OptiX NPE equipment
- Explain the functions and specifications of different boards
- Outline the capacity and ability of OptiX NPE equipment
- Describe the network topologies, system applications and network protection mechanisms
● Implement the service configuration, alarm and performance monitoring through iManager U2000
● State the service application and protection mechanism
● Implement the clock, orderwire, protection configurations and network expansion through iManager U2000
● Execute the on-site operation, such as board replacement, board or equipment resetting and fiber connection
● Perform iManager U2000 operation and maintenance, such as alarms and performance browsing, parameters setting, etc
● Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc
● Locate and eliminate faults, get experience from troubleshooting practice

Training Content

OTC59 OptiX BWS 1600S Operation and Maintenance
● OptiX BWS 1600S V100R003 Hardware Description
  ■ OptiX BWS 1600S System Overview
  ■ Cabinet and Powerbox
  ■ Subrack
  ■ DCM Frame and HUB Frame
  ■ Cards
● OptiX BWS 1600S Equipment Networking and Application
  ■ Repeated System Configuration
  ■ Unrepeated System Configuration
  ■ Repeated System Network Application
  ■ Unrepeated System Network Application
  ■ Network Protection
  ■ Key Factors in Networking
● OptiX BWS 1600S Equipment Commissioning
  ■ Preparations for OptiX BWS 1600S Commissioning
  ■ Configuring NE and Network
  ■ Commissioning Optical Power
  ■ Commissioning Network
● OptiX BWS 1600S System Troubleshooting Methods
  ■ Overview
  ■ Basic Rules and Methods of Fault Locating
  ■ Rectifying different types of faults
● OptiX BWS 1600S Equipment Routine Maintenance
  ■ Guidelines to Safety(Alarm and Safety Symbols, ESD, Fibers, Network Management System Maintenance)
  ■ Operations
  ■ 1600S Routine Maintenance
  ■ Board Replacement
OTC60 OptiX NPE (OSN 3500/7500/9500) Operation and Maintenance

- OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
  - 1+1 Linear MS Protection Configuration
  - 1:1 Linear MS Protection Configuration
  - Two-fiber Bidirectional MS Protection Ring Configuration
  - SNCP Ring with Non-protection Chain Configuration

- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features

- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection

- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records

- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide

- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

Duration
5 working days

Class Size
Min 6, Max 12
1.11.20 OptiX MDS 6630(Optical Power Commissioning) Training

Training Path

Target Audience

OptiX NG WDM commissioning engineer

Prerequisites

- Having working experience in the maintenance of WDM products
- Be familiar with Windows operating system

Objectives

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

- Describe the main functions of MDS 6630
- Outline the optical commissioning procedure by MDS 6630
- Perform the basic operations of MDS 6630
- Describe the Attention Matters for Commissioning
- Master the common methods for troubleshooting
- Analyze and handle the common commissioning faults

Training Content

OTC123 OptiX MDS 6630(Optical Power Commissioning)

- iManager MDS 6630 Introduction
  - MDS 6630 Overview
  - Main Functions of MDS 6630
  - Operations of MDS 6630
- iManager MDS 6630 Commissioning Practice Guide
  - Preparation for Commissioning
  - New Deployment Commissioning
  - Expansion Commissioning
  - Online Optimization
- iManager MDS 6630 Commissioning Troubleshooting
  - Attention Matters for MDS 6630
  - Common Troubleshooting Thoughts and Methods
  - Rectifying Different Types of Faults
  - Common Troubleshooting Cases
- iManager MDS 6630 Commissioning Troubleshooting Instructor Guide
  - Optical power commissioning preparations
  - Troubleshooting arrangement
Troubleshooting Objective
Troubleshooting Methods and Instruments
Fault Types

Duration
2 working days

Class Size
Min 6, Max 12
1.11.21 OptiX OSN 9800(Packet) Operation and Maintenance Training

Training Path

OptiX OSN 9800 (Packet) Hardware, Networking & Application Introduction
- OTC176 Lecture 1d

OptiX OSN 9800 Packet Service Configuration
- OTC177 Lecture, Lab, E-lab 2d

OptiX OSN 9800 Packet Features
- OTC178 Lecture, Lab, E-lab 2d

OptiX OSN 9800 (Packet) Routine Maintenance
- OTC179 Lecture, Lab, E-lab 1d

OptiX OSN 9800 (Packet) System Troubleshooting
- OTC180 Lecture, Lab 1d

Target Audience
OptiX OSN 9800 packet network operation and maintenance engineer

Prerequisites
- Having working experience in WDM transmission network
- Upon completion of OptiX OSN 9800(OTN) 2nd Line Maintenance Training or having equivalent knowledge
- Be familiar with Windows operating system

Objectives
On completion of this program, the participants will be able to:
- Describe the basic concepts of Ethernet, VLAN and QinQ
- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Describe the basic concepts of PWE3
- Describe the OptiX OSN 9800 hardware
• List the OptiX OSN 9800 packet boards
• Describe the networking application of OptiX OSN 9800 (Packet)
• Illustrate the service and protection type of OptiX OSN 9800 (Packet)
• Implement the data configuration through iManager U2000 for OptiX OSN 9800 packet service and protection
• Describe the function and features of QoS in OptiX OSN 9800 (Packet)
• Implement the QoS configuration through iManager U2000
• Describe the function and features of OAM in OptiX OSN 9800 (Packet)
• Implement the OAM configuration through iManager U2000
• Implement the NMS side routine maintenance for OptiX OSN 9800 (Packet)
• List the common analysis methods of packet network fault locating
• Outline the fault handling flow
• Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc
• Illustrate the application of common troubleshooting methods for packet network
• Analyze common faulty of the OptiX OSN 9800 (Packet) network

Training Content

OTC176 OptiX OSN 9800 (Packet) Hardware, Networking & Application Introduction
  • OptiX OSN 9800 (Packet) Hardware, Networking & Application Introduction
    ■ OptiX OSN 9800 hardware overview
    ■ OptiX OSN 9800 Packet Boards Introduction
    ■ OptiX OSN 9800 Packet Networking
    ■ OptiX OSN 9800 Packet Service Introduction
    ■ OptiX OSN 9800 Packet Network Protection

OTC177 OptiX OSN 9800 Packet Service Configuration
  • OptiX OSN 9800 Packet Service Configuration
    ■ OptiX OSN 9800 Packet Services Configuration
    ■ OptiX OSN 9800 Packet Protection Configuration
  • OptiX OSN 9800 Packet Service Configuration Practice Guide
    ■ OptiX OSN 9800 Packet Services Configuration Practice
    ■ OptiX OSN 9800 Packet Protection Configuration Practice

OTC178 OptiX OSN 9800 Packet Features
  • OptiX OSN 9800 (Packet) QoS Special Topic
    ■ QoS Overview
    ■ QoS Models
    ■ QoS Technology
    ■ Application of QoS in OSN 9800 Equipment
  • OptiX OSN 9800 (Packet) QoS Special Topic Practice Guide
    ■ QoS Configuration Practice in OSN 9800
  • OptiX OSN 9800 (Packet) OAM Special Topic
    ■ Ethernet Port OAM
    ■ Ethernet Service OAM
- MPLS-TP OAM
- OptiX OSN 9800 (Packet) OAM Special Topic Practice Guide
  - Ethernet Port OAM Configuration Practice
  - Ethernet Service OAM Configuration Practice
  - MPLS-TP OAM Configuration Practice
  - OAM testing

OTC179 OptiX OSN 9800 (Packet) Routine Maintenance
- OptiX OSN 9800 (Packet) Routine Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTC180 OptiX OSN 9800 (Packet) System Troubleshooting
- OptiX OSN 9800 (Packet) System Troubleshooting
  - OptiX OSN 9800 Packet troubleshooting preparation
  - OptiX OSN 9800 Packet troubleshooting method
  - OptiX OSN 9800 Packet troubleshooting analyze ideas
  - OptiX OSN 9800 Packet troubleshooting case study

Duration
- 7 working days

Class Size
- Min 6, Max 12
1.11.22 OptiX NG WDM T-SDN Operation and Maintenance Training

Training Path

OTC182 OptiX NG WDM T-SDN Operation and Maintenance

Target Audience

OptiX NG WDM T-SDN Operation and maintenance Engineer

Prerequisites

- Completion of OptiX OSN 3800/6800/8800(OTN) Hardware Description & Application and OptiX OSN 3800/6800/8800(OTN) Products Configuration courses or having equivalent knowledge

Objectives

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

- Understand the development and origin of T-SDN
- Describe the T-SDN structure
- Understand the application scenarios of T-SDN
- Master the T-SDN commissioning
- Master the T-SDN service configuration

Training Content

OTC182 OptiX NG WDM T-SDN Operation and Maintenance

- Transmission Based T-SDN Introduction
  - Move Towards SDN
  - Huawei T-SDN Solution
  - Huawei T-SDN Progress
- OptiX NG WDM T-SDN Configuration
  - Configure the NE T-SDN parameter
  - Configure GRE TUNNEL
  - Configure master and slave server
  - Enable the T-SDN
  - Configure the T-SDN
  - Creating a Diamond WDM ASON OCh Trail
  - Creating a Silver WDM ASON OCh Trail
  - Creating a Copper WDM ASON OCh Trail
  - Deleting an ASON Trail
- OptiX NG WDM T-SDN Configuration Practice Guide
  - Configure the NE T-SDN parameter
  - Configure GRE TUNNEL
- Configure master and slave server
- Enable the T-SDN
- Configure the T-SDN
- Creating a Diamond WDM ASON OCh Trail
- Creating a Silver WDM ASON OCh Trail
- Creating a Copper WDM ASON OCh Trail
- Deleting an ASON Trail
  - OptiX NG WDM T-SDN Routine Maintenance
    - NG WDM T-SDN Routine Maintenance
  - OptiX NG WDM T-SDN Routine Maintenance Practice Guide
    - NG WDM T-SDN Routine Maintenance

Duration

3 working days

Class Size

Min 6, Max 12
1.11.23 OptiX NG WDM Network Protection (EoO/EoW) Special Topic Training

Training Path

- OptiX NG WDM MSTP Special Topic
  - OTC160 Lecture, Lab, E-lab 1d
- OptiX NG WDM LAG Special Topic
  - OTC161 Lecture, Lab, E-lab 1d
- OptiX NG WDM MC-LAG Special Topic
  - OTC162 Lecture, Lab, E-lab 1d
- OptiX NG WDM ERPS Special Topic
  - OTC163 Lecture, Lab, E-lab 1d
- OptiX NG WDM LPT Special Topic
  - OTC164 Lecture, Lab, E-lab 1d
- OptiX NG WDM STP and RSTP Special Topic
  - OTC165 Lecture, Lab, E-lab 1d

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

On completion of this program, the participants will be able to:
- Describe the application of MC-LAG
- Outline the working principles of the MC-LAG
- Understand the Relevant Alarms and Events of the MC-LAG
- Describe the two aggregation types of the LAG
• Outline the working principles of the LAG
• Understand the Relevant Alarms and Events of the LAG
• Describe the ERPS working principle
• Understand the functions of R-APS Messages
• Describe the four timers of application
• Describe the LPT working principle
• Understand the application of LPT
• Master the configuration of LPT
• Describe the STP/RSTP working principle
• Understand the functions of STP/RSTP
• Describe the alarm of STP/RSTP

Training Content

OTC160 OptiX NG WDM MSTP Special Topic
  • MSTP Special Topic
    ■ Overview of MSTP
    ■ Basic Concepts and Principles of MSTP
    ■ Feature Dependencies and Limitations
    ■ Cases analysis of the MSTP
  • MSTP Special Topic Practice Guide
    ■ Creating an MSTP Port Group
    ■ Setting the Bridge Parameters of the MSTP
    ■ Setting the Parameters of the CIST
    ■ Enabling/Disabling the MSTP Protocol
    ■ Querying the CIST Running Information
    ■ Querying the MSTI Running Information
    ■ Changing the Spanning Tree Protocol Used by the Port Group

OTC161 OptiX NG WDM LAG Special Topic
  • LAG Special Topic
    ■ Overview of LAG
    ■ Basic Concepts and Principles of LAG
    ■ Feature Dependencies and Limitations
    ■ Cases analysis of the LAG
  • LAG Special Topic Practice Guide
    ■ Creating a LAG
    ■ Setting Port Priorities
    ■ Querying LAG Configuration and Running Information
    ■ Querying LAG Information and LACPDU Statistics
    ■ Changing LAG Configurations
    ■ Deleting a LAG

OTC162 OptiX NG WDM MC-LAG Special Topic
  • MC-LAG Special Topic
Overview of MC-LAG
- Basic Concepts and Principles of MC-LAG
- Feature Dependencies and Limitations
- Cases analysis of the MC-LAG

MC-LAG Special Topic Practice Guide
- Creating MCSP
- Configuring MC-LAGs
- Modifying and Deleting MCSP
- Modifying and Deleting MC-LAG

OTC163 OptiX NG WDM ERPS Special Topic
- ERPS Special Topic
  - Overview of ERPS
  - Basic Concepts and Principles of ERPS
  - Feature Dependencies and Limitations
  - Cases analysis of the ERPS

ERPS Special Topic Practice Guide
- Configuration Example: ERPS for EVPLAN Services
- Configuration Example: ERPS for EVPL Services

OTC164 OptiX NG WDM LPT Special Topic
- LPT Special Topic
  - Overview of LPT
  - Basic Concepts and Principles of LPT
  - Feature Dependencies and Limitations
  - Cases analysis of the LPT

LPT Special Topic Practice Guide
- Port-based LPT
- Service-based LPT

OTC165 OptiX NG WDM STP and RSTP Special Topic
- STP and RSTP Special Topic
  - Overview of STP/RSTP
  - Basic Concepts and Principles of STP/RSTP
  - Feature Dependencies and Limitations
  - Cases analysis of the STP/RSTP

STP and RSTP Special Topic Practice Guide
- Configuring the Spanning Tree

Duration

6 working days

Class Size

Min 6, Max 12
1.11.24 OptiX NG WDM Synchronization Special Topic Training

Training Path

OptiX NG WDM Physical Clocks (OTN) Special Topic
OTC168 Lecture, Lab, E-lab 1d

OptiX NG WDM IEEE 1588v2 (OTN) Special Topic
OTC169 Lecture, Lab, E-lab 1d

OptiX NG WDM Physical Clocks (OCS) Special Topic
OTC170 Lecture, Lab, E-lab 1d

OptiX NG WDM Physical Clocks (Packet) Special Topic
OTC171 Lecture, Lab, E-lab 1d

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Describe the Physical Clocks (OTN) working principle
- Understand the functions of Physical Clocks (OTN)
- Describe the alarm of Physical Clocks (OTN)
- Describe the IEEE 1588v2(OTN) working principle
- Understand the functions of IEEE 1588v2(OTN)
- Describe the alarm of IEEE 1588v2(OTN)
- Describe the Physical Clocks (OCS) working principle
- Understand the functions of Physical Clocks (OCS)
- Describe the alarm of Physical Clocks (OCS)
- Describe the Physical Clocks (Packet) working principle
- Understand the functions of Physical Clocks (Packet)
- Describe the alarm of Physical Clocks (Packet)
Training Content

OTC168 OptiX NG WDM Physical Clocks (OTN) Special Topic
- Physical Clocks (OTN) Special Topic
  - Overview of Physical Clocks (OTN)
  - Basic Concepts and Principles of Physical Clocks (OTN)
  - Feature Dependencies and Limitations
  - Cases analysis of the Physical Clocks (OTN)
- Physical Clocks (OTN) Special Topic Practice Guide
  - Configuring the Frequency Source Mode
  - Configuring Attributes of Transport Clock for Boards
  - Configuring External Clock Ports
  - Configuring Clock Attributes
  - Configuring the Clock Source Protection
  - Viewing Clock Synchronization Status
  - Viewing the Clock Tracing Status
  - Configuring Clock Source Switching
  - Configuring the ST2 Board to Transparent Transmission of Clock Information

OTC169 OptiX NG WDM IEEE 1588v2 (OTN) Special Topic
- IEEE 1588v2(OTN) Special Topic
  - Overview of IEEE 1588v2(OTN)
  - Basic Concepts and Principles of IEEE 1588v2(OTN)
  - Feature Dependencies and Limitations
  - Cases analysis of the IEEE 1588v2(OTN)
- IEEE 1588v2(OTN) Special Topic Practice Guide
  - Configuring PTP NEs
  - Configuring PTP Ports
  - Configuring Attributes of Transport Clock for Boards
  - Configuring External Time Ports
  - Querying the Clock Source Received at the Port
  - Viewing the Clock Tracing Status

OTC170 OptiX NG WDM Physical Clocks (OCS) Special Topic
- Physical Clocks (OCS) Special Topic
  - Overview of Physical Clocks (OCS)
  - Basic Concepts and Principles of Physical Clocks (OCS)
  - Feature Dependencies and Limitations
  - Cases analysis of the Physical Clocks (OCS)
- Physical Clocks (OCS) Special Topic Practice Guide
  - Configuring the Frequency Source Mode
  - Configuring External Clock Ports
  - Configuring Clock Attributes
  - Configuring the Clock Source Protection
Viewing Clock Synchronization Status
Viewing the Clock Tracing Status
Configuring Switching Conditions for Clock Sources

OTC171 OptiX NG WDM Physical Clocks (Packet) Special Topic

- Physical Clocks (Packet) Special Topic
  - Overview of Physical Clocks (Packet)
  - Basic Concepts and Principles of Physical Clocks (Packet)
  - Feature Dependencies and Limitations
  - Cases analysis of the Physical Clocks (Packet)

- Physical Clocks (Packet) Special Topic Practice Guide
  - Configuring the Frequency Source Mode
  - Configuring Attributes of Transport Clock for Boards
  - Configuring External Clock Ports
  - Configuring Clock Attributes
  - Configuring the Clock Source Protection
  - Viewing Clock Synchronization Status
  - Configuring Switching Conditions for Clock Sources
  - Viewing the Clock Tracing Status

Duration
4 working days

Class Size
Min 6, Max 12
1.11.25  OptiX NG WDM Network Protection (Packet) Special Topic Training

Training Path

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<td>OTC159 Lecture, Lab, E-lab 1d</td>
<td>OTC158 Lecture, Lab, E-lab 1d</td>
</tr>
</tbody>
</table>

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Describe the Tunnel APS working principle
- Outline the Tunnel APS switching conditions
- Understand the Relevant Alarms and Events of the Tunnel APS
- Describe the PW APS working principle
- Outline the PW APS switching conditions
- Understand the Relevant Alarms and Events of the PW APS

Training Content

OTC159 OptiX NG WDM Tunnel APS Special Topic

- Tunnel APS Special Topic
  - Overview of Tunnel APS
  - Basic Concepts and Principles of Tunnel APS
  - Feature Dependencies and Limitations
  - Cases analysis of the Tunnel APS
- Tunnel APS Special Topic Practice Guide
  - Configuring Tunnel APS on a Per-NE Basis
  - Configuring Tunnel APS in End-to-End Mode
  - Automatically Discovering Protection Groups
  - Modifying Protection Groups
  - Deleting Tunnel APS Protection Groups
  - Performing Protection Switching
  - Enabling and Disabling Tunnel APS Protection

OTC158 OptiX NG WDM PW APS Special Topic

- PW APS Special Topic
  - Overview of PW APS
  - Basic Concepts and Principles of PW APS
- Feature Dependencies and Limitations
- Cases analysis of the PW APS
- PW APS Special Topic Practice Guide
  - Configuration Procedure
  - Configuring PW APS Protection Groups
  - Configuring Slave Protection Pairs of PW APS
  - Starting the APS Protocol
  - Querying the Status of a PW APS Protection Group
  - Deleting PW APS Protection Groups
  - Performing External Switching of PW APS
  - Enabling/Disabling PW APS Protection

**Duration**

2 working days

**Class Size**

Min 6, Max 12
1.11.26 OptiX NG WDM DCN Special Topic Training

Training Path

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Describe the Outband DCN working principle
- Understand the functions of Outband DCN
- Describe the alarm of Outband DCN
- Describe the Inband DCN working principle
- Understand the functions of Inband DCN
- Describe the alarm of Inband DCN

Training Content

OTC174 OptiX NG WDM Outband DCN Special Topic

- Outband DCN Special Topic
  - Overview of Outband DCN
  - Basic Concepts and Principles of Outband DCN
  - Feature Dependencies and Limitations
  - Cases analysis of the Outband DCN
- Outband DCN Special Topic Practice Guide
  - HWECC Solution
  - IP over DCC Solution
  - OSI over DCC Solution
  - DCN Maintenance

OTC173 OptiX NG WDM Inband DCN Special Topic

- Inband DCN Special Topic
- Overview of Inband DCN
- Basic Concepts and Principles of Inband DCN
- Feature Dependencies and Limitations
- Cases analysis of the Inband DCN

**Inband DCN Special Topic Practice Guide**
- Setting the VLAN ID and Bandwidth Used by the Inband DCN
- Setting the NMS Access Parameters
- Configuring the DCN Function for a Port
- Configuring the Protocol Stack Used by the Inband DCN
- Setting Packet Priority

**Duration**

2 working day

**Class Size**

Min 6, Max 12
1.11.27 OptiX NG WDM Optical Doctor System Special Topic

Training Path

OptiX NG WDM Optical Doctor System Special Topic
OTC172 Lecture, Lab, E-lab 1d

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Describe the Optical Doctor System working principle
- Understand the functions of Optical Doctor System
- Describe the alarm of Optical Doctor System

Training Content

OTC172 OptiX NG WDM Optical Doctor System Special Topic

- Optical Doctor System Special Topic
  - Overview of Optical Doctor System
  - Basic Concepts and Principles of Optical Doctor System
  - Feature Dependencies and Limitations
  - Cases analysis of the Optical Doctor System

- Optical Doctor System Special Topic Practice Guide
  - Online Performance Monitoring
  - Online Optical-Layer Performance Optimization

Duration

1 working day

Class Size

Min 6, Max 12
1.11.28 OptiX NG WDM Master-Slave Subrack Management Special Topic

Training Path

Target Audience

OptiX NG WDM operation and maintenance engineer

Prerequisites

- Having knowledge of OTN, WDM and IP technology
- Having experience of IP, WDM network operation and maintenance

Objectives

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

- Describe the Master-Slave Subrack Management working principle
- Understand the functions of Master-Slave Subrack Management
- Describe the alarm of Master-Slave Subrack Management

Training Content

OTC175 OptiX NG WDM Master-Slave Subrack Management Special Topic

- Master-Slave Subrack Management Special Topic
  - Overview of Master-Slave Subrack Management
  - Basic Concepts and Principles of Master-Slave Subrack Management
  - Feature Dependencies and Limitations
  - Cases analysis of the Master-Slave Subrack Management
- Master-Slave Subrack Management Special Topic Practice Guide
  - Configuring Subrack Cascading Mode of an NE
  - Changing a Subrack Attribute
  - Querying the Status of a Slave Subrack
  - Deleting a Slave Subrack

Duration

1 working day

Class Size

Min 6, Max 12
1.12  RTN 900 Products Training

1.12.1 OptiX RTN 900 Installation and Commissioning Training

Training Path

OptiX RTN 900 Installation
OTF18  Lecture  1d

OptiX RTN 900 Data Configuration (Packet Domain)
OTF29  Lab, E-lab  2d

OptiX RTN 900 System Description
OTF47  Lecture  0.5d

OptiX RTN 900 Network Application
OTF32  Lecture  0.5d

OptiX RTN 900 Commissioning
OTF38  Lecture, Lab, E-lab  1d

OptiX RTN 900 Data Configuration (Hybrid Domain)
OTF46  Lab, E-lab  2d

Target Audience

OptiX RTN 900 series installation and commissioning engineer

Prerequisites

- Having basic experience of telecommunications equipment installation criterion
- Having working experience in the optical transport network and microwave products
- Be familiar with Windows operating system
- Having equivalent knowledge of digital microwave communication basics

Objectives

On completion of this program, the participants will be able to:
- Describe the relation among the different parts of OptiX RTN 900
Illustrate the installation procedures and steps of antenna, ODU/hybrid coupler and IDU

Implement the outdoor and indoor components installation of OptiX RTN 900

Describe the installation criterions for each part of OptiX RTN 900

Describe the basic concepts of IP & MPLS

Outline the steps of RTN 900 service configuration in packet plane

Implement Ethernet service / CES service / ATM / IMA services configuration in packet plane via NMS

Describe the parameters' meaning in service configuration of packet plane

Describe the main characteristics of OptiX RTN 900

Describe the system structure, functions and application of every unit

Explain the functions of AM, hybrid, packet microwave

Describe the networking application under PDH/SDH and hybrid microwave modes

List out the protection technologies in OptiX RTN 900 network

Describe the features and applications of the protection technologies

Finish proper preparations before the commissioning

Perform site commissioning of the OptiX RTN 900

Perform system commissioning of the OptiX RTN 900

Configure radio links of the OptiX RTN 900

Configure TDM services of the OptiX RTN 900

Configure Ethernet services of the OptiX RTN 900

Training Content

OTF18 OptiX RTN 900 Installation

- OptiX RTN 900 Installation
  - Relation among the different parts of OptiX RTN 900
  - Installation procedures and steps of antenna, ODU/hybrid coupler and IDU
  - Outdoor and indoor components installation of OptiX RTN 900
  - Installation criterions for each part of OptiX RTN 900

OTF29 OptiX RTN 900 Data Configuration (Packet Domain)

- IP and MPLS Tunnel Introduction
  - Classification of IP addresses
  - Basic principle of IP routing
  - Basic concept of MPLS
  - MPLS tunnel (LSP) creation procedure
  - MPLS OAM functions

- PWE3 Introduction for OptiX RTN series product
  - Basic concept of PWE3
  - Typical PWE3 encapsulation format for TDM
  - Ethernet and ATM services
  - PWE3 application scenarios of OptiX RTN series product

- OptiX RTN 900 Data Configuration(Packet Domain)
  - Practice on Ethernet service / CES service / ATM / IMA services / Ethernet service /
CES service / ATM / IMA services by Web LCT
- Configuration tasks

OTF47 OptiX RTN 900 System Description
- OptiX RTN 900 Hardware Description
  - OptiX RTN 900 Product Overview
  - OptiX RTN 900 Product Structure

OTF32 OptiX RTN 900 Network Application
- OptiX RTN 900 Networking Application and Protection
  - OptiX RTN 900 Networking Application
  - Protection Technologies in OptiX RTN 900

OTF38 OptiX RTN 900 Commissioning
- OptiX RTN 900 System Commissioning (Web LCT)
  - Practice on site and system commissioning by Web LCT
- OptiX RTN 900 System Commissioning (U2000)
  - Practice on site and system commissioning by U2000

OTF46 OptiX RTN 900 Data Configuration (Hybrid Domain)
- OptiX RTN 900 Data Configuration (Hybrid Domain)
  - Practice on radio links configuration of the OptiX RTN 900
  - Practice on TDM services configuration of the OptiX RTN 900
  - Practice on Ethernet services configuration of the OptiX RTN 900

Duration

7 working days

Class Size

Min 6, Max 12
1.12.2 OptiX RTN 900 1st Line Maintenance Training

Training Path

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<thead>
<tr>
<th>Course</th>
<th>Type</th>
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<tr>
<td>OptiX RTN 900 Field Operation &amp; Maintenance</td>
<td>Lecture, Lab, E-lab</td>
<td>1d</td>
</tr>
<tr>
<td>OptiX RTN 900 NE Database Topic</td>
<td>Lab, E-lab</td>
<td>0.5d</td>
</tr>
</tbody>
</table>
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Target Audience

OptiX RTN 900 series field maintenance engineer

Prerequisites

- Be familiar with Windows operating system
- Having the general knowledge of Microwave basics
- Having the general knowledge of IP, MPLS and QinQ

Objectives

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

- Describe the main characteristics of OptiX RTN 900
- Describe the system structure, functions and application of every unit
- Explain the functions of AM, hybrid, packet microwave
- Outline the general safety precautions of OptiX RTN 900
- List the routine maintenance items of OptiX RTN 900
- Implement the maintenance operations of OptiX RTN 900
- Judge the common faulty in OptiX RTN 900
- Describe the functions of CF card
- Routing maintenance of NE database
- Backup NE database

Training Content

- OTF47 OptiX RTN 900 System Description
  - OptiX RTN 900 Hardware Description
    - OptiX RTN 900 Product Overview
    - OptiX RTN 900 Product Structure
OTF33 OptiX RTN 900 Field Operation & Maintenance
- OptiX RTN 900 Routine Maintenance
  - Safety Precautions
  - Routine Maintenance
  - Common Maintenance Operations
- OptiX RTN 900 Routine Maintenance Practice Guide
  - Practice on routine maintenance items of OptiX RTN 900

OTF34 OptiX RTN 900 NE Database Topic
- OptiX RTN 900 NE Database Topic
  - NE Database Introduction
  - NE Database Common Operations

Duration

2 working days

Class Size

Min 6, Max 12
1.12.3 OptiX RTN 900 2nd Line Maintenance Training

Training Path

- Digital Microwave Communication Basics
  OTF01 Lecture 0.5d
  - OptiX RTN 900 System Description
    OTF47 Lecture 0.5d
    - OptiX RTN 900 Network Application
      OTF32 Lecture 0.5d
      - OptiX RTN 900 Data Configuration (Packet Domain)
        OTF29 Lab, E-lab 2d
        - OptiX RTN 900 Data Configuration (Hybrid Domain)
          OTF46 Lab, E-lab 2d
          - OptiX RTN 900 Troubleshooting
            OTF35 Lecture 1.5d

Target Audience

OptiX RTN series operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of Microwave products
- Be familiar with Windows operating system
- Having the general knowledge of IP, MPLS and QinQ
- Having the general knowledge of Ethernet

Objectives

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

- Describe the concept and characters of digital microwave communication
- Describe the theory and function of every part in the digital microwave system
• List the networking application for digital microwave system
• List the fadings in microwave propagation
• List the common technologies of antifading
• Describe the basic concepts of IP & MPLS
• Outline the steps of RTN 900 service configuration in packet plane
• Implement Ethernet service / CES service / ATM / IMA services configuration in packet plane via NMS
• Describe the parameters’ meaning in service configuration of packet plane
• Describe the main characteristics of OptiX RTN 900
• Describe the system structure, functions and application of every unit
• Explain the functions of AM, hybrid, packet microwave
• Describe the networking application under PDH/SDH and hybrid microwave modes
• List out the protection technologies in OptiX RTN 900 network
• Describe the features and applications of the protection technologies
• Configure radio links of the OptiX RTN 900
• Configure TDM services of the OptiX RTN 900
• Configure Ethernet services of the OptiX RTN 900
• Describe the general troubleshooting flow of OptiX RTN 900
• Outline the methods of faults analyzing and locating
• Perform the common troubleshooting for OptiX RTN 900

Training Content

OTF01 Digital Microwave Communication Basics
  • Digital Microwave Communication Principle
    ■ Concept and characters of digital microwave communication
    ■ Theory and function of every part in the digital microwave system
    ■ Networking application for digital microwave system
    ■ Fadings in microwave propagation
    ■ Common technologies of antifading

OTF47 OptiX RTN 900 System Description
  • OptiX RTN 900 Hardware Description
    ■ OptiX RTN 900 Product Overview
    ■ OptiX RTN 900 Product Structure

OTF32 OptiX RTN 900 Network Application
  • OptiX RTN 900 Networking Application and Protection
    ■ OptiX RTN 900 Networking Application
    ■ Protection Technologies in OptiX RTN 900

OTF29 OptiX RTN 900 Data Configuration (Packet Domain)
  • IP and MPLS Tunnel Introduction
    ■ Classification of IP addresses
    ■ Basic principle of IP routing
    ■ Basic concept of MPLS
- MPLS tunnel (LSP) creation procedure
- MPLS OAM functions
- **PWE3 Introduction for OptiX RTN series product**
  - Basic concept of PWE3
  - Typical PWE3 encapsulation format for TDM
  - Ethernet and ATM services
  - PWE3 application scenarios of OptiX RTN series product
- **OptiX RTN 900 Data Configuration(Packet Domain)**
  - Practice on Ethernet service / CES service / ATM / IMA services / Ethernet service / CES service / ATM / IMA services by Web LCT
  - Configuration tasks
- **OTF46 OptiX RTN 900 Data Configuration (Hybrid Domain)**
  - OptiX RTN 900 Data Configuration (Hybrid Domain)
    - Practice on radio links configuration of the OptiX RTN 900
    - Practice on TDM services configuration of the OptiX RTN 900
    - Practice on Ethernet services configuration of the OptiX RTN 900
- **OTF35 OptiX RTN 900 Troubleshooting**
  - OptiX RTN 900 Troubleshooting
    - Methods of analyzing and locating faults
    - Classified troubleshooting analysis
  - **Case Analysis for Troubleshooting OptiX RTN 900**
    - Analyze the problems of OptiX RTN 900 that frequently occur on live networks through the real cases

**Duration**

7 working days

**Class Size**

Min 6, Max 12
1.12.4 OptiX RTN 900 3rd Line Maintenance Training

Training Path

- Hybrid Services Testing
  - OTF23 Lecture, Lab, E-lab 1.5d

- OptiX RTN 900 QoS & OAM Technology
  - OTF36 Lecture, Lab, E-lab 1.5d

- OptiX RTN 900 Clock & DCN Topic
  - OTF31 Lecture, Lab, E-lab 1.5d

- OptiX RTN 900 System Control Unit and IF Feature Topic
  - OTF30 Lecture 1d

- OptiX RTN 900 Troubleshooting
  - OTF35 Lecture 1.5d

Target Audience

OptiX RTN series senior operation and maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance or NMC Operation Training.

Objectives

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

- Outline the types and applications of Ethernet
- Know the technical background of the Ethernet and its basic concepts
- Draw the Ethernet frame structure
- Describe the function of VLAN and L2 switching
- State the purpose of Ethernet performance testing
- List the common indices of Ethernet service performance testing
- Explain the concept of common testing indices
- Outline the testing methods of Ethernet service performance testing
- Outline the basic concept of QoS and ETH-OAM
- Describe the working principles of QoS
• Outline the QoS functions of the Ethernet service boards on the OptiX RTN 900
• List the planning principles of QoS
• Describe the configuration flow of QoS
• Describe the usage of ETH-OAM
• Configure clock tracing
• Configure clock protection
• Configure SSM byte in RTN 900
• Check clock status in RTN 900 network
• Manage and configure ECC link
• Configure extended ECC
• Enable/disable ECC link
• Configure IP over DCC, inband DCC
• Configure DCC transparent transmission
• Describe system architecture and functions of the SCC unit
• Outline the new features supported by OptiX RTN 900
• Describe the function and application of the new features
• Describe the general troubleshooting flow of OptiX RTN 900
• Outline the methods of faults analyzing and locating
• Perform the common troubleshooting for OptiX RTN 900

Training Content

OTF23 Hybrid Services Testing
• Ethernet Basics
  ■ Categories of Ethernet
  ■ Basic Principle of Ethernet
  ■ Ethernet Port Technology
  ■ VLAN Basis & L2 Switching
• Ethernet Performance Testing
  ■ State the purpose of Ethernet performance testing
  ■ List the common indices of Ethernet service performance testing
  ■ Explain the concepts of common testing indices
  ■ Outline the testing methods of Ethernet service performance testing
  ■ Categories of Ethernet
  ■ Basic principle of Ethernet
  ■ Ethernet port Technology
  ■ VLAN basis & L2 Switching
• Ethernet Performance Testing Practice Task
  ■ Ethernet performance testing and analyzing

OTF36 OptiX RTN 900 QoS & OAM Technology
• OptiX RTN 900 QOS & OAM
  ■ Practice on Qos such as shaping, queue etc
  ■ Practice on ETH-OAM such as service OAM and port OAM
- OptiX RTN 900 QOS & OAM Practice Guide
  - Causes study of fault that occurs in actual network
  - Competency improving of troubleshooting
  - Troubleshooting skills practice in the lab

OTF31 OptiX RTN 900 Clock & DCN Topic
- OptiX RTN 900 Clock Topic
  - Clock Synchronization overview
  - Microwave Clock Transmission Mode Introduction
  - Microwave Clock Transmission Application & Solutions

- OptiX RTN 900 Clock Topic Practice Guide
  - Configure clock sources of OptiX RTN 900 via NMS
  - Configure clock protection of OptiX RTN 900 via NMS

- OptiX RTN 900 DCN Topic
  - DCN overview
  - Extended ECC Introduction
  - Inband DCN Introduction
  - DCC Transparent Transmission Introduction
  - DCC Transparent Transmission through the External Clock Interface Introduction
  - IP over DCC Introduction

- OptiX RTN 900 DCN Topic Practice Guide
  - Perform basic DCN operation of OptiX RTN 900 via NMS
  - Configure extended ECC of OptiX RTN 900 via NMS
  - Configure inband DCC of OptiX RTN 900 via NMS
  - Configure DCC transparent transmission of OptiX RTN 900 via NMS
  - Configure DCC transparent transmission through the External Clock interface via NMS

OTF30 OptiX RTN 900 System Control Unit and IF Feature Topic
- OptiX 900 Features Introduction
  - Integrated IP Radio
  - IF Multimode
  - E1 Priority and Dynamic Adjustment
  - Fast Forwarding of High Priority Services
  - Highly Efficient Encapsulation Mechanism of Packet Services
  - Optimization of E1 Clock Transparent Transmission

- OptiX RTN 900 System Control Unit Topic
  - RTN 900 System control unit Introduction

OTF35 OptiX RTN 900 Troubleshooting
- OptiX RTN 900 Troubleshooting
  - Methods of analyzing and locating faults
  - Classified troubleshooting analysis

- Case Analysis for Troubleshooting OptiX RTN 900
  - Analyze the problems of OptiX RTN 900 that frequently occur on live networks through
the real cases
Duration
7 working days
Class Size
Min 6, Max 12
1.12.5 OptiX RTN 900V1R8 2nd Line Maintenance Training

Training Path

Digital Microwave Communication Basics
OTF01 Lecture 0.5d

OptiX RTN 900 System Description
OTF47 Lecture 0.5d

OptiX RTN 900 Network Application
OTF32 Lecture 0.5d

OptiX RTN 900 Data Configuration (Packet Domain)
OTF29 Lab, E-lab 2d

OptiX RTN 900 Data Configuration (Hybrid Domain)
OTF46 Lab, E-lab 2d

OptiX RTN 900 Troubleshooting
OTF35 Lecture 1.5d

Target Audience
OptiX RTN series operation and maintenance engineer

Prerequisites
- Having working experience in the maintenance of Microwave products
- Be familiar with Windows operating system
- Having the general knowledge of IP, MPLS and QinQ
- Having the general knowledge of Ethernet

Objectives
On completion of this program, the participants will be able to:
- Describe the concept and characters of digital microwave communication
- Describe the theory and function of every part in the digital microwave system
- List the networking application for digital microwave system
- List the fadings in microwave propagation
- List the common technologies of antifading
- Describe the basic concepts of IP & MPLS
- Outline the steps of RTN 900 service configuration in packet plane
- Describe the main characteristics of OptiX RTN 900
- Describe the system structure, functions and application of every unit
- Explain the functions of AM, hybrid, packet microwave
- Describe the networking application under PDH/SDH and hybrid microwave modes
- List out the protection technologies in OptiX RTN 900 network
- Describe the features and applications of the protection technologies
- Describe the SDN feature application
- Implement Ethernet service / CES service / ATM / IMA services configuration in packet plane via NMS
- Describe the parameters' meaning in service configuration of packet plane
- Configure radio links of the OptiX RTN 900
- Configure TDM services of the OptiX RTN 900
- Configure Ethernet services of the OptiX RTN 900
- Describe the general troubleshooting flow of OptiX RTN 900
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 900

Training Content

OTF01 Digital Microwave Communication Basics
- Digital Microwave Communication Principle
  - Concept and characters of digital microwave communication
  - Theory and function of every part in the digital microwave system
  - Networking application for digital microwave system
  - Fadings in microwave propagation
  - Common technologies of antifading

OTF47 OptiX RTN 900 System Description
- OptiX RTN 900 Hardware Description
  - OptiX RTN 900 Product Overview
  - OptiX RTN 900 Product Structure

OTF32 OptiX RTN 900 Network Application
- OptiX RTN 900 Networking Application and Protection
  - OptiX RTN 900 Networking Application
  - Protection Technologies in OptiX RTN 900

OTF29 OptiX RTN 900 Data Configuration (Packet Domain)
- IP and MPLS Tunnel Introduction
  - Classification of IP addresses
  - Basic principle of IP routing
Basic concept of MPLS
MPLS tunnel (LSP) creation procedure
MPLS OAM functions

- PWE3 Introduction for OptiX RTN series product
  - Basic concept of PWE3
  - Typical PWE3 encapsulation format for TDM
  - Ethernet and ATM services
  - PWE3 application scenarios of OptiX RTN series product

- OptiX RTN 900 Data Configuration (Packet Domain)
  - Practice on Ethernet service / CES service / ATM / IMA services / Ethernet service / CES service / ATM / IMA services by Web LCT
  - Configuration tasks

OTF46 OptiX RTN 900 Data Configuration (Hybrid Domain)

- OptiX RTN 900 Data Configuration (Hybrid Domain)
  - Practice on radio links configuration of the OptiX RTN 900
  - Practice on TDM services configuration of the OptiX RTN 900
  - Practice on Ethernet services configuration of the OptiX RTN 900

OTF35 OptiX RTN 900 Troubleshooting

- OptiX RTN 900 Troubleshooting
  - Methods of analyzing and locating faults
  - Classified troubleshooting analysis

- Case Analysis for Troubleshooting OptiX RTN 900
  - Analyze the problems of OptiX RTN 900 that frequently occur on live networks through the real cases

Duration

7 working days

Class Size

Min 6, Max 12
1.12.6 OptiX RTN 900 L3 VPN Features Training

Training Path

- **IP Routing Basic** (OTF95, Lecture, 0.5d)
- **ISIS Protocol Introduction** (OTF96, Lecture, 0.5d)
- **BGP Protocol Introduction** (OTF97, Lecture, 0.5d)
- **OptiX RTN 900 L3 VPN Features** (OTF98, Lecture, 0.5d)
- **OptiX RTN 900 L3 VPN Configuration** (OTF99, Lab, E-lab, 2d)
- **OptiX RTN 900 L3 VPN Troubleshooting** (OTF100, Lecture, Lab, E-lab, 1d)

Target Audience

OptiX RTN 900 L3 VPN network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe basic structure of IP network
- Describe basic knowledge of IP address
- Understand what is router and route
- Describe the classification of routing protocols
- Understand the origin of the IS-IS protocol
• Describe the principles of the IS-IS protocol
• Describe the principles of the BGP protocol
• Implement BGP Route Selection
• Understand the model of BGP MPLS VPN
• Understand the basic concepts referred to BGP MPLS VPN
• Understand the mechanisms of the route and label distribution in BGP MPLS VPN
• Understand the process of data forwarding in BGP MPLS VPN
• Understand the protection schemes of MPLS BGP VPN service
• Implement L3 VPN configuration on RTN 900
• Implement L3 VPN troubleshooting on RTN 900

Training Content

OTF95 IP Routing Basic
  • IP Routing Basic
    ▪ IP Address Introduction
    ▪ IP Routing Overview
    ▪ Routing Protocol Basic

OTF96 ISIS Protocol Introduction
  • ISIS Protocol Introduction
    ▪ Overview of IS-IS Routing Protocol
    ▪ Principle of IS-IS Routing Protocol
    ▪ Application Example of IS-IS Routing Protocol

OTF97 BGP Protocol Introduction
  • BGP Protocol Introduction
    ▪ BGP Overview
    ▪ Working Principle of BGP
    ▪ BGP Route Selection

OTF98 OptiX RTN 900 L3 VPN Features
  • OptiX RTN 900 L3 VPN Features
    ▪ Overview of L3 VPN
    ▪ Introduction of Control Plane
    ▪ Basic Concepts and Principles of BGP/MPLS L3 VPN
    ▪ Routing and Packet Forwarding in RTN L3 VPN
    ▪ Protection schemes of RTN L3

OTF99 OptiX RTN 900 L3 VPN Configuration
  • OptiX RTN 900 L3 VPN Configuration
    ▪ Network Basic Configuration
    ▪ ISIS Routing Protocol Configuration
    ▪ Tunnel Configuration
    ▪ Protection Configuration
    ▪ L3 VPN Service Configuration

OTF100 OptiX RTN 900 L3 VPN Troubleshooting
OptiX RTN 900 L3 VPN Troubleshooting
- General Troubleshooting Procedures
- Troubleshooting Methods
- Troubleshooting Cases

Duration

5 working days

Class Size

Min 6, Max 12
1.12.7 OptiX RTN 980L IP Long Haul Microwave Features Training

Training Path

- OptiX RTN 980L IP LH Features Description (OTF90, Lecture, 0.5d)
- OptiX RTN 980L IP LH Hardware Description (OTF91, Lecture, 0.5d)
- OptiX RTN 980L IP LH Configuration (OTF93, Lab, E-lab, 1.5d)
- OptiX RTN 980L IP LH Troubleshooting (OTF94, Lecture, 0.5d)

Target Audience

OptiX RTN 980L operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of RTN 900 products
- Be familiar with Windows operating system
- Having the general knowledge of IP and MPLS
- Having the general knowledge of Ethernet

Objectives

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

- Describe the product positioning of the RTN 980L
- List the components and boards of the RTN 980L
- Describe the function and feature of the RTN 980L
- Describe the microwave features in OptiX RTN 980L long haul network
- Describe the protection features in OptiX RTN 980L long haul network
- Illustrate the installation procedures and steps of antenna, RFU, branch, IDU
- Implement the outdoor and indoor components installation of OptiX RTN 980L
- Describe the installation criterions for each part of OptiX RTN 980L
- Implement radio configuration of OptiX RTN 980L
- Implement service configuration of OptiX RTN 980L
- Describe general troubleshooting flow of OptiX RTN 980L
Outline the methods of faults analyzing and locating
Perform the common troubleshooting for OptiX RTN 980L

Training Content

OTF90 OptiX RTN 980L IP LH Features Description
- OptiX RTN 980L IP LH Features Description
  - Microwave Features in OptiX RTN 980L
  - Protection Technologies in OptiX RTN 980L

OTF91 OptiX RTN 980L IP LH Hardware Description
- OptiX RTN 980L IP LH Hardware Description
  - OptiX RTN 980L IP LH Product Overview
  - OptiX RTN 980L IP LH Product Structure

OTF92 OptiX RTN 980L IP LH Installation
- OptiX RTN 980L IP LH Installation
  - Installation procedures and steps of antenna, RFU, Branch and IDU
  - Outdoor and indoor components installation of OptiX RTN 980L
  - Installation criterions for each part of OptiX RTN 980L

OTF93 OptiX RTN 980L IP LH Configuration
- OptiX RTN 980L IP LH Configuration
  - Practice on RTN 980L radio configuration via NMS
  - Practice on RTN 980L services configuration via NMS

OTF94 OptiX RTN 980L IP LH Troubleshooting
- OptiX RTN 980L IP LH Troubleshooting
  - Methods of Analyzing and Locating Faults
  - Classified Troubleshooting Analysis

Duration
3 working days

Class Size
Min 6, Max 12
1.12.8 OptiX RTN 980L Installation and Commissioning Training

**Training Path**

- OptiX RTN 980L IP LH Hardware Description
  - OTF91 Lecture 0.5d
- OptiX RTN 980L Commissioning
  - OTF149 Lecture, Lab, E-lab 1d
- OptiX RTN 980L Installation
  - OTF150 Lecture 1d
- OptiX RTN 980L Data Configuration (Packet Domain)
  - OTF151 Lab, E-lab 2d
- OptiX RTN 980L Data Configuration (Hybrid Domain)
  - OTF152 Lab, E-lab 2d

**Target Audience**

OptiX RTN 980L installation and commissioning engineer

**Prerequisites**

- Having basic experience of telecommunications equipment installation criterion
- Having working experience in the optical transport network and microwave products
- Be familiar with Windows operating system
- Having equivalent knowledge of digital microwave communication basics

**Objectives**

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

- Describe the relation among the different parts of OptiX RTN 980L
- Illustrate the installation procedures and steps of antenna, RFU/branch and IDU
- Implement the outdoor and indoor components installation of OptiX RTN 980L
- Describe the installation criterions for each part of OptiX RTN 980L
- Describe the basic concepts of IP & MPLS
- Outline the steps of RTN 980L service configuration in packet plane
● Implement Ethernet service / CES service / ATM / IMA services configuration in packet plane via NMS
● Describe the parameters' meaning in service configuration of packet plane
● Describe the main characteristics of OptiX RTN 980L
● Describe the system structure, functions and application of every unit
● Explain the functions of AM, hybrid, packet microwave
● Describe the networking application under PDH/SDH and hybrid microwave modes
● List out the protection technologies in OptiX RTN 980L network
● Describe the features and applications of the protection technologies
● Finish proper preparations before the commissioning
● Perform site commissioning of the OptiX RTN 980L
● Perform system commissioning of the OptiX RTN 980L
● Configure radio links of the OptiX RTN 980L
● Configure TDM services of the OptiX RTN 980L
● Configure Ethernet services of the OptiX RTN 980L

Training Content

OTF91 OptiX RTN 980L IP LH Hardware Description
● OptiX RTN 980L IP LH Hardware Description
  ■ OptiX RTN 980L IP LH Product Overview
  ■ OptiX RTN 980L IP LH Product Structure
● OptiX RTN 980L IP LH Installation
  ■ Installation procedures and steps of antenna, RFU, Branch and IDU
  ■ Outdoor and indoor components installation of OptiX RTN 980L
  ■ Installation criterions for each part of OptiX RTN 980L

OTF149 OptiX RTN 980L Commissioning
● OptiX RTN 980L System Commissioning (Web LCT)
  ■ Practice on site and system commissioning by Web LCT
● OptiX RTN 980L System Commissioning (U2000)
  ■ Practice on site and system commissioning by U2000

OTF150 OptiX RTN 980L Installation
● OptiX RTN 980L Installation
  ■ Relation among the different parts of OptiX RTN 980L
  ■ Installation procedures and steps of antenna, RFU/branch and IDU
  ■ Outdoor and indoor components installation of OptiX RTN 980L
  ■ Installation criterions for each part of OptiX RTN 980L

OTF151 OptiX RTN 980L Data Configuration (Packet Domain)
● IP and MPLS Tunnel Introduction
  ■ Classification of IP addresses
  ■ Basic principle of IP routing
  ■ Basic concept of MPLS
  ■ MPLS tunnel (LSP) creation procedure
MPLS OAM functions
PWE3 Introduction for OptiX RTN series product
  Basic concept of PWE3
  Typical PWE3 encapsulation format for TDM
  Ethernet and ATM services
  PWE3 application scenarios of OptiX RTN series product
OptiX RTN 980L Data Configuration (Packet Domain)
  Practice on Ethernet service / CES service / ATM / IMA services / Ethernet service / CES service / ATM / IMA services by Web LCT
  Configuration tasks
OTF152 OptiX RTN 980L Data Configuration (Hybrid Domain)
OptiX RTN 980L Data Configuration (Hybrid Domain)
  Practice on radio links configuration of the OptiX RTN 980L
  Practice on TDM services configuration of the OptiX RTN 980L
  Practice on Ethernet services configuration of the OptiX RTN 980L

Duration
  7 working days

Class Size
  Min 6, Max 12
1.13 RTN 900 Products Advanced Training

1.13.1 OptiX RTN 900 ERPS Special Topic Training

Training Path

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<td>OTF129 Lecture 0.5d</td>
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</table>

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Having knowledge of Ethernet technology and ELAN service

Objectives

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

- Describe the ERPS working principal
- Understand the functions of R-APS Messages
- Describe the four timers of application

Training Content

OTF129 OptiX RTN 900 ERPS Special Topic

- OptiX RTN 900 ERPS Special Topic
  - Overview of ERPS
  - Basic Concepts and Principles of ERPS
  - Feature Dependencies and Limitations
  - Cases analysis of the ERPS

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.2 OptiX RTN 900 PLA/EPLA Special Topic Training

Training Path

![OptiX RTN 900 PLA/EPLA Special Topic]

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the PLA/EPLA working principal
- Outline the differences between PLA, EPLA, and LAG
- Describe the Relevant Alarms and Events of the PLA/EPLA

Training Content

OTF130 OptiX RTN 900 PLA/EPLA Special Topic

- OptiX RTN 900 PLA/EPLA Special Topic
  - Overview of PLA/EPLA
  - Basic Concepts and Principles of PLA/EPLA
  - Feature Dependencies and Limitations
  - Cases analysis of the PLA/EPLA

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.3 OptiX RTN 900 PW APS Special Topic Training

Training Path

OptiX RTN 900 PW APS Special Topic
OTF131 Lecture 0.5d

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the PW APS working principal
- Outline the PW APS switching conditions
- Understand the Relevant Alarms and Events of the PW APS

Training Content

OTF131 OptiX RTN 900 PW APS Special Topic
- OptiX RTN 900 PW APS Special Topic
  - Overview of PW APS
  - Basic Concepts and Principles of PW APS
  - Feature Dependencies and Limitations
  - Cases analysis of the PW APS

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.4 OptiX RTN 900 Tunnel APS Special Topic Training

Training Path

OptiX RTN 900 Tunnel APS Special Topic

OTF132 Lecture 0.5d

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the Tunnel APS working principal
- Outline the Tunnel APS switching conditions
- Understand the Relevant Alarms and Events of the Tunnel APS

Training Content

OTF132 OptiX RTN 900 Tunnel APS Special Topic

OptiX RTN 900 Tunnel APS Special Topic

- Overview of Tunnel APS
- Basic Concepts and Principles of Tunnel APS
- Feature Dependencies and Limitations
- Cases analysis of the Tunnel APS

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.5 OptiX RTN 900 LAG Special Topic Training

Training Path

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<td>OTF133 Lecture 0.5d</td>
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</table>

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

● Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

● Describe the two aggregation types of the LAG
● Outline the working principles of the LAG
● Understand the Relevant Alarms and Events of the LAG

Training Content

OTF133 OptiX RTN 900 LAG Special Topic

● OptiX RTN 900 LAG Special Topic
  ■ Overview of LAG
  ■ Basic Concepts and Principles of LAG
  ■ Feature Dependencies and Limitations
  ■ Cases analysis of the LAG

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.6 OptiX RTN 900 AM Special Topic Training

Training Path

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

- Describe the AM working principal
- Outline the AM switching conditions
- Understand the Relevant Alarms and Events of the AM

Training Content

OTF134 OptiX RTN 900 AM Special Topic

- OptiX RTN 900 AM Special Topic
  - Overview of AM
  - Basic Concepts and Principles of AM
  - Feature Dependencies and Limitations
  - Cases analysis of the AM

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.7 OptiX RTN 900 Preconfiguration Tool and Operation Training

Training Path

OptiX RTN 900 Preconfiguration Tool and Operation
OTF135 Lecture 0.5d

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the procedure for Using the Preconfiguration Tool
- Outline GUI function
- Understand the Relevant operation of the Error Handling

Training Content

OTF135 OptiX RTN 900 Preconfiguration Tool and Operation
- OptiX RTN 900 Preconfiguration Tool and Operation
  - Procedure for Using the Preconfiguration Tool
  - templates
  - GUI Description
  - Remarks on Script Exporting
  - Error Handling

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.8 OptiX RTN 900 1588V2 Special Topic Training

Training Path

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the 1588V2 application
- Outline the Basic Concepts of the 1588V2
- Describe the 1588V2 working principal
- Understand the Relevant Alarms and Events of the 1588V2

Training Content

OTF137 OptiX RTN 900 1588V2 Special Topic

- OptiX RTN 900 1588V2 Special Topic
  - Overview of 1588V2 application
  - Basic Concepts and Principles of 1588V2
  - BMC Algorithm Description
  - Cases analysis of the 1588V2

Duration

0.5 working day

Class Size

Min 6, Max 12
1.13.9 iManager U2000 RTN Network Monitoring Training

Training Path

**Microwave product and common alarm overview**
- OTF142 Lecture 0.5d

**iManager U2000 monitoring of the OptiX RTN 900**
- OTF143 Lab, E-lab 0.5d

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Having working experience in the U2000 operating and maintenance
- Having the general knowledge of Microwave

Objectives

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

- Describe the typical products of Microwave equipments
- Describe the common alarm of the Microwave Link and service
- Describe the common performance of the Microwave Link and service

Training Content

OTF142 Microwave product and common alarm overview
- Microwave product and common alarm overview
  - RTN 900 serial products introduction

OTF143 iManager U2000 monitoring of the OptiX RTN 900
- iManager U2000 monitoring of the Microwave network
  - Practice on U2000 monitoring of the OptiX RTN 900
  - Common alarm description and analysis

Duration

1 working day

Class Size

Min 6, Max 12
KPI Analysis of Ethernet Service Training

Training Path

Target Audience

OptiX RTN 900 maintenance engineer

Prerequisites

- Having working experience in the U2000 operating and maintenance
- Having working experience in the optical transport network and microwave products

Objectives

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

- Explain the RMON functions of different boards
- Implement the Ethernet service performance monitoring through iManager U2000

Training Content

OTF149 KPI Analysis of Ethernet Service

- KPI Analysis of Ethernet Service
  - RMON basic concepts
  - RMON management groups introduction
  - RMON principles
  - RMON configuration
  - Relevant Alarms and Events

Duration

0.5 working day

Class Size

Min 6, Max 12
1.14 RTN 300 Products Training

1.14.1 OptiX RTN 310/360/380 Installation and Commissioning Training

Training Path

- OptiX RTN 310/360/380 System Description
  - OTF80 Lecture 0.5d
- OptiX RTN 310/360/380 Feature Description
  - OTF81 Lecture 0.5d
- OptiX RTN 310/360/380 Installation
  - OTF82 Lecture 0.5d
- OptiX RTN 310/360/380 Commissioning
  - OTF83 Lecture, Lab, E-lab 1d
- OptiX RTN 310/360/380 Data Configuration
  - OTF84 Lab, E-lab 1.5d

Target Audience

OptiX RTN 310/360/380 installation and commissioning engineer

Prerequisites

- Having basic experience of telecommunications equipment installation criterion
- Having equivalent knowledge of digital microwave communication basics
- Be familiar with windows operating system

Objectives

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

- Describe the main characteristics of OptiX RTN 310/360/380
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 310/360/380
- Describe the features and application of OptiX RTN 310/360/380
- Illustrate the installation procedures and steps of antenna, RTN 310/360/380 and PI
• Implement the installation of OptiX RTN 310/360/380
• Describe the installation criterions for each part of OptiX RTN 310/360/380
• Finish proper preparations before the commissioning
• Perform site commissioning of the OptiX RTN 310/360/380
• Perform system commissioning of the OptiX RTN 310/360/380
• Configure radio links of the OptiX RTN 310/360/380
• Configure services of the OptiX RTN 310/360/380

Training Content

OTF80 OptiX RTN 310/360/380 System Description
• OptiX RTN 310/360/380 System Description
  ■ OptiX RTN 310/360/380 product overview
  ■ OptiX RTN 310/360/380 product structure
  ■ OptiX RTN 310/360/380 technical specifications

OTF81 OptiX RTN 310/360/380 Feature Description
• OptiX RTN 310/360/380 Features Description
  ■ Microwave features
  ■ Ethernet features
  ■ Clock features
  ■ DCN features

OTF82 OptiX RTN 310/360/380 Installation
• OptiX RTN 310/360/380 Installation
  ■ OptiX RTN 310/360/380 System Hardware Structure
  ■ Installation Preparation
  ■ Antenna Installation
  ■ RTN 310/360/380/Hybrid Coupler and Related Cable Installation
  ■ PI and Related Cable Installation
  ■ Loading NE data and installation checking

OTF83 OptiX RTN 310/360/380 Commissioning
• OptiX RTN 310/360/380 System Commissioning
  ■ Preparations before the commissioning
  ■ Site commissioning of the OptiX RTN 310/360/380
  ■ System commissioning of the OptiX RTN 310/360/380
• OptiX RTN 310/360/380 System Commissioning Practice Guide
  ■ OptiX RTN 310/360/380 commissioning operation guide

OTF84 OptiX RTN 310/360/380 Data Configuration
• OptiX RTN 310/360/380 Data Configuration Practice Guide (Web LCT)
  ■ Radio links configuration of the OptiX RTN 310/360/380
  ■ Ethernet services configuration of the OptiX RTN 310/360/380
• OptiX RTN 310/360/380 Data Configuration Practice Guide (U2000)
  ■ Radio links configuration of the OptiX RTN 310/360/380
  ■ Ethernet services configuration of the OptiX RTN 310/360/380
Duration

4 working days

Class Size

Min 6, Max 12
1.14.2 OptiX RTN 310360380 1st Line Maintenance Training

Training Path

OptiX RTN 310/360/380 System Description
OTF80 Lecture 0.5d

OptiX RTN 310/360/380 Field Operations & Maintenance
OTF85 Lecture, Lab, E-lab 1.5d

Target Audience

OptiX RTN 310/360/380 field maintenance engineer

Prerequisites

- Having a general knowledge of microwave basics

Objectives

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

- Describe the main characteristics of OptiX RTN 310/360/380
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 310/360/380
- List the routine maintenance items of OptiX RTN 310/360/380
- Implement the maintenance operation of OptiX RTN 310/360/380
- Judge the common faulty in OptiX RTN 310/360/380

Training Content

OTF80 OptiX RTN 310/360/380 System Description
- OptiX RTN 310/360/380 System Description
  - OptiX RTN 310/360/380 product overview
  - OptiX RTN 310/360/380 product structure
  - OptiX RTN 300 technical specifications

OTF85 OptiX RTN 310/360/380 Field Operations & Maintenance
- OptiX RTN 310/360/380 Site Routine Maintenance
  - Safety Precautions
  - Routine Maintenance
  - Common Maintenance Operations
- OptiX RTN 310/360/380 Site Routine Maintenance Practice Guide
  - Common Maintenance Operations Guide

Duration

2 working days
Class Size

Min 6, Max 12
1.14.3 OptiX RTN 310360380 2nd Line Maintenance Training

Training Path

OptiX RTN 310/360/380 System Description
OTF80 Lecture 0.5d

OptiX RTN 310/360/380 Feature Description
OTF81 Lecture 0.5d

OptiX RTN 310/360/380 Data Configuration
OTF84 Lab, E-lab 1.5d

OptiX RTN 310/360/380 Maintenance and Troubleshooting
OTF86 Lecture 0.5d

Target Audience

OptiX RTN 310/360/380 operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of Microwave products
- Having the general knowledge of Ethernet
- Be familiar with Windows operating system

Objectives

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

- Describe the main characteristics of OptiX RTN 310/360/380
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 300
- Describe the features and application of OptiX RTN 310/360/380
- Illustrate the installation procedures and steps of antenna, RTN 310/360/380 and PI
- Configure radio links of the OptiX RTN 310/360/380
- Configure services of the OptiX RTN 310/360/380
- Implement the routine maintenance via NMS
- Describe the general troubleshooting flow of OptiX RTN 310/360/380
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 310/360/380
Training Content

OTF80 OptiX RTN 310/360/380 System Description
- OptiX RTN 310/360/380 System Description
  - OptiX RTN 310/360/380 product overview
  - OptiX RTN 310/360/380 product structure
  - OptiX RTN 310/360/380 technical specifications

OTF81 OptiX RTN 310/360/380 Feature Description
- OptiX RTN 310/360/380 Features Description
  - Microwave features
  - Ethernet features
  - Clock features
  - DCN features

OTF84 OptiX RTN 310/360/380 Data Configuration
- OptiX RTN 310/360/380 Data Configuration Practice Guide (Web LCT)
  - Radio links configuration of the OptiX RTN 310/360/380
  - Ethernet services configuration of the OptiX RTN 310/360/380
  - Radio links configuration of the OptiX RTN 310/360/380
  - Ethernet services configuration of the OptiX RTN 310/360/380

OTF86 OptiX RTN 310/360/380 Maintenance and Troubleshooting
- OptiX RTN 310/360/380 Maintenance and Troubleshooting
  - General troubleshooting flow of OptiX RTN 310/360/380
  - Methods of faults analyzing and locating
  - Common troubleshooting processing for OptiX RTN 310/360/380
  - Routine Maintenance via NMS

Duration

3 working days

Class Size

Min 6, Max 12
1.14.4 OptiX RTN 300 Preconfiguration Tool and Operation

Training Path

Target Audience

OptiX RTN 900 network maintenance engineer

Prerequisites

- Completion of OptiX RTN 900 2nd Line Maintenance Training

Objectives

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

- Describe the procedure for Using the Preconfiguration Tool
- Outline GUI function
- Understand the Relevant operation of the Error Handling

Training Content

OTF136 OptiX RTN 300 Preconfiguration Tool Operation

- OptiX RTN 300 Preconfiguration Tool Operation
  - Procedure for Using the Preconfiguration Tool
  - templates
  - GUI Description
  - Remarks on Script Exporting
  - Error Handling

Duration

0.5 working day

Class Size

Min 6, Max 12
1.14.5 OptiX RTN 320 Operation and Maintenance Training

Training Path

- OptiX RTN 320 System Description
  - OTF138 Lecture 0.5d

- OptiX RTN 320 Feature Description
  - OTF139 Lecture 0.5d

- OptiX RTN 320 Data Configuration
  - OTF140 Lab, E-lab 1.5d

- OptiX RTN 320 Maintenance and Troubleshooting
  - OTF141 Lecture, Lab, E-lab 1.5d

Target Audience

OptiX RTN 320 operation and maintenance engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of Ethernet

Objectives

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

- Describe the main characteristics of OptiX RTN 320
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 320
- Describe the features and application of OptiX RTN 320
- Configure radio links of the OptiX RTN 320
- Configure services of the OptiX RTN 320
- Implement the routine maintenance via NMS
- Describe the general troubleshooting flow of OptiX RTN 320
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 320

Training Content

OTF138 OptiX RTN 320 System Description
- OptiX RTN 320 System Description
  - OptiX RTN 320 product overview
  - OptiX RTN 320 product structure
  - OptiX RTN 320 technical specifications

OTF139 OptiX RTN 320 Feature Description
- OptiX RTN 320 Feature Description
  - Microwave features
  - Ethernet features
  - Clock features
  - DCN features

OTF140 OptiX RTN 320 Data Configuration
- OptiX RTN 320 Data Configuration
  - Radio links configuration of the OptiX RTN 320
  - Ethernet services configuration of the OptiX RTN 320

OTF141 OptiX RTN 320 Maintenance and Troubleshooting
- OptiX RTN 320 Maintenance and Troubleshooting
  - General troubleshooting flow of OptiX RTN 320
  - Methods of faults analyzing and locating
  - Common troubleshooting processing for OptiX RTN 320
  - Routine Maintenance via NMS

Duration

4 working days

Class Size

Min 6, Max 12
### 1.14.6 OptiX RTN 310 Operation and Maintenance Training

#### Training Path

- **OptiX RTN 310 System Description**
  - OTF117 Lecture 0.5d

- **OptiX RTN 310 Feature Description**
  - OTF118 Lecture 0.5d

- **OptiX RTN 310 Data Configuration**
  - OTF119 Lab, E-lab 1.5d

- **OptiX RTN 310 Maintenance and Troubleshooting**
  - OTF120 Lecture, Lab, E-lab 1.5d

#### Target Audience

OptiX RTN 310 operation and maintenance engineer

#### Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of Ethernet

#### Objectives

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

- Describe the main characteristics of OptiX RTN 310
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 310
- Describe the features and application of OptiX RTN 310
- Configure radio links of the OptiX RTN 310
- Configure services of the OptiX RTN 310
- Implement the routine maintenance via NMS
- Describe the general troubleshooting flow of OptiX RTN 310
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 310
Training Content

OTF117 OptiX RTN 310 System Description
- OptiX RTN 310 System Description
  - OptiX RTN 310 product overview
  - OptiX RTN 310 product structure
  - OptiX RTN 310 technical specifications

OTF118 OptiX RTN 310 Feature Description
- OptiX RTN 310 Feature Description
  - Microwave features
  - Ethernet features
  - Clock features
  - DCN features

OTF119 OptiX RTN 310 Data Configuration
- OptiX RTN 310 Data Configuration(Web LCT)
  - Radio links configuration of the OptiX RTN 310 via Web LCT
  - Ethernet services configuration of the OptiX RTN 310 Web LCT
- OptiX RTN 310 Data Configuration(U2000)
  - Radio links configuration of the OptiX RTN 310 via U2000
  - Ethernet services configuration of the OptiX RTN 310 via U2000

OTF120 OptiX RTN 310 Maintenance and Troubleshooting
- OptiX RTN 310 Routine Maintenance
  - Routine Maintenance via NMS
- OptiX RTN 310 Maintenance and Troubleshooting
  - General troubleshooting flow of OptiX RTN 310
  - Methods of faults analyzing and locating
- OptiX RTN 310 Routine Maintenance Practice Guide
  - Common troubleshooting processing for OptiX RTN 310
  - Routine Maintenance via NMS

Duration

4 working days

Class Size

Min 6, Max 12
1.14.7 OptiX RTN 380 Operation and Maintenance Training

Training Path

- OptiX RTN 380 System Description
  OTF121 Lecture 0.5d
- OptiX RTN 380 Feature Description
  OTF122 Lecture 0.5d
- OptiX RTN 380 Data Configuration
  OTF123 Lab, E-lab 1.5d
- OptiX RTN 380 Maintenance and Troubleshooting
  OTF124 Lecture, Lab, E-lab 1.5d

Target Audience

OptiX RTN 380 operation and maintenance engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of Ethernet

Objectives

On completion of this program, the participants will be able to:
- Describe the main characteristics of OptiX RTN 380
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 380
- Describe the features and application of OptiX RTN 380
- Configure radio links of the OptiX RTN 380
- Configure services of the OptiX RTN 380
- Implement the routine maintenance via NMS
- Describe the general troubleshooting flow of OptiX RTN 380
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 380

Training Content

OTF121 OptiX RTN 380 System Description
- OptiX RTN 380 System Description
  - OptiX RTN 380 product overview
  - OptiX RTN 380 product structure
  - OptiX RTN 380 technical specifications

OTF122 OptiX RTN 380 Feature Description
- OptiX RTN 380 Feature Description
  - Microwave features
  - Ethernet features
  - Clock features
  - DCN features

OTF123 OptiX RTN 380 Data Configuration
- OptiX RTN 380 Data Configuration(Web LCT)
  - Radio links configuration of the OptiX RTN 380 via Web lct
  - Ethernet services configuration of the OptiX RTN 380 Web lct
- OptiX RTN 380 Data Configuration(U2000)
  - Radio links configuration of the OptiX RTN 380 via U2000
  - Ethernet services configuration of the OptiX RTN 380 via U2000

OTF124 OptiX RTN 380 Maintenance and Troubleshooting
- OptiX RTN 380 Routine Maintenance
  - Routine Maintenance via NMS
- OptiX RTN 380 Maintenance and Troubleshooting
  - General troubleshooting flow of OptiX RTN 380
  - Methods of faults analyzing and locating
  - Common troubleshooting processing for OptiX RTN 380
  - Routine Maintenance via NMS
- OptiX RTN 380 Routine Maintenance Practice Guide
  - Common troubleshooting processing for OptiX RTN 310
  - Routine Maintenance via NMS

Duration

4 working days

Class Size

Min 6, Max 12
1.14.8 OptiX RTN 360 Operation and Maintenance Training

Training Path

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<td>OTF126 OptiX RTN 360 Feature Description</td>
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<td>OTF127 OptiX RTN 360 Data Configuration</td>
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<td>OTF128 OptiX RTN 360 Maintenance and</td>
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<td>Troubleshooting</td>
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Target Audience

OptiX RTN 360 operation and maintenance engineer

Prerequisites

- Having a general knowledge of Digital Microwave Communication
- Having the general knowledge of Ethernet

Objectives

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

- Describe the main characteristics of OptiX RTN 360
- Describe the system structure, functions and application of every unit
- Describe the relation among the different parts of OptiX RTN 360
- Describe the features and application of OptiX RTN 360
- Configure radio links of the OptiX RTN 360
- Configure services of the OptiX RTN 360
- Implement the routine maintenance via NMS
- Describe the general troubleshooting flow of OptiX RTN 360
- Outline the methods of faults analyzing and locating
- Perform the common troubleshooting for OptiX RTN 360

Training Content

OTF125 OptiX RTN 360 System Description
OptiX RTN 360 System Description
- OptiX RTN 360 product overview
- OptiX RTN 360 product structure
- OptiX RTN 360 technical specifications

OptiX RTN 360 Feature Description
- Microwave features
- Ethernet features
- Clock features
- DCN features

OptiX RTN 360 Data Configuration
- Radio links configuration of the OptiX RTN 360 via Web LCT
- Ethernet services configuration of the OptiX RTN 360 Web LCT
- Radio links configuration of the OptiX RTN 360 via U2000
- Ethernet services configuration of the OptiX RTN 310 via U2000

OptiX RTN 360 Maintenance and Troubleshooting
- Routine Maintenance via NMS
- General troubleshooting flow of OptiX RTN 360
- Methods of faults analyzing and locating
- Common troubleshooting processing for OptiX RTN 360
- Common troubleshooting processing for OptiX RTN 360 via NMS

Duration
4 working days

Class Size
Min 6, Max 12
1.15 MSTD Products Training

1.15.1 OptiX OSN NG SDH & OCS Product Overview Training

Training Path

<table>
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<tr>
<th>Training Course</th>
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<td>OptiX NG SDH &amp; OCS Product Overview</td>
<td>Lecture</td>
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</tbody>
</table>

Target Audience

Non-technical manager
OptiX NG SDH & OCS products novice

Prerequisites

- NA

Objectives

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

- List the function of transmission network
- Describe the network application of the OptiX NG SDH & OCS system
- Describe the structure of the OptiX NG SDH & OCS equipment
- List the main cards of the OptiX NG SDH & OCS equipment
- Understand the features of the OptiX NG SDH & OCS equipment

Training Content

OTA27 OptiX NG SDH & OCS Product Overview

- OptiX NG SDH & OCS Management Overview
  - Brief introduction of OptiX NG SDH & OCS equipment
  - System structure of OptiX NG SDH & OCS equipment
  - Hardware structure of OptiX NG SDH & OCS equipment
  - Main features of OptiX NG SDH & OCS equipment

Duration

0.5 working day

Class Size

Min 6, Max 12
1.15.2 OptiX OSN NG SDH & OCS Installation Training

Training Path

OptiX NG SDH  &  OCS Installation
OTA26 Lecture, WBT 2d

Target Audience
OptiX NG SDH  &  OCS installation engineer

Prerequisites
- NA

Objectives
On completion of this program, the participants will be able to:
- Describe the features of the OptiX NG SDH  &  OCS equipment
- Outline the main boards of the OptiX NG SDH  &  OCS equipment
- List the equipment installation procedure
- Describe the preparation for installation
- State the required equipment room environment and grounding condition checks
- Verify the cabinet, cables and component installations

Training Content
OTA26 OptiX NG SDH  &  OCS Installation
- OptiX NG SDH  &  OCS Hardware Overview
  - OptiX NG SDH  &  OCS Cabinet
  - Sub-rack
  - Boards
- OptiX NG SDH  &  OCS Series Installation Criterion Introduction
  - Installation Process
  - Room and Grounding Requirement
  - Installation Criteria
  - Installation Checklist
- OptiX OSN 1500/2500/3500/3500II/7500/9500 Hardware Installation (Multimedia)

Duration
2 working days

Class Size
No limit
1.15.3 OptiX NG SDH & OCS Equipment (TDM) Commissioning Training

Training Path

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<td>OTA29</td>
<td>OptiX NG SDH &amp; OCS Hardware Description (TDM)</td>
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<td>OTA02</td>
<td>SDH Networking and Protection</td>
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<td>ONU01</td>
<td>U2000 System Introduction</td>
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<td>OTA32</td>
<td>OptiX NG SDH &amp; OCS Commissioning</td>
<td>2d</td>
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</table>

Target Audience

OptiX NG SDH & OCS commissioning engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system
- Upon completion of OTA01 SDH Basics course or having equivalent knowledge

Objectives

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

- Describe the network applications of the OptiX NG SDH & OCS equipment
- Explain the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection modes of the OptiX NG SDH & OCS equipment
- State the main functions of the cards in the OptiX NG SDH & OCS equipment
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of linear MSP
- Explain the protection mechanism of MS shared protection ring
- Explain the protection mechanism of SNCP in ring/mesh topology
- Analyze the service signal flow before/after the protection switch takes place
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Describe the preparation for the commissioning
- List the items for single station commissioning for OptiX NG SDH & OCS system
- Outline the procedures of network commissioning for OptiX NG SDH & OCS system
- Summarize the equipment/network condition after commissioning
- Accomplish the OptiX NG SDH & OCS system commissioning

Training Content

ONU01 U2000 System Introduction
- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
  - Processes of U2000
  - NMS Maintenance Suite: MSuite
  - License Introduction
  - Directory Structure of U2000

OTA02 SDH Networking and Protection
- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection
- SDH Networking and Protection (Manual)

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features
- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II
- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
The Cabinet, Sub-rack, Boards of OptiX OSN 9500
Equipment Features of OptiX OSN 9500

OTA32 OptiX NG SDH & OCS Commissioning

- NG SDH & OCS Equipment Commissioning Guide
  - Checking hardware
  - Testing Power-on of the Cabinet
  - Testing subrack functions
  - Configuring the commissioning data, and testing the all buses
  - Testing the ALMC/RESET Button on the SCC
  - Testing on/off of all electrical interfaces
  - Testing the indices of optical/electrical interface
  - Testing TPS
  - Testing active/standby board switching
  - Testing PDH channels in Series
  - Checking the Network-wide Fiber Connection
  - Checking Connection Between the U2000 Computer and the Equipment
  - Configuring Network
  - Testing ECC
  - Testing Service Channel Availability
  - Testing Self-Healing Protection
  - Testing Clock Protection and Orderwire
  - Testing Network-wide BER

- NG SDH & OCS Equipment Commissioning
  - Preparations before Commissioning
  - Single Station Commissioning
  - Network Commissioning

Duration

5 working days

Class Size

Min 6, Max 12
1.15.4 OptiX NG SDH & OCS Equipment (TDM) 1st Line Maintenance Training

Training Path

OptiX NG SDH & OCS System Description
OTA28 Lecture 1d

OptiX SDH Equipment Operation and Maintenance
OTA30 Lecture, Lab, E-lab 0.5d

OptiX SDH Equipment Field Maintenance
OTA35 Lecture, Lab, E-lab 0.5d

Target Audience

OptiX NG SDH & OCS equipment field maintenance engineer

Prerequisites

- Be familiar with Windows operating system
- Having a general knowledge of SDH basics

Objectives

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

- Illustrate the networking applications of the OptiX NG SDH & OCS equipment
- Describe the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection schemes of the OptiX NG SDH & OCS equipment
- Outline the operation environment of OptiX SDH series equipment
- List the status description of OptiX SDH series equipment indicators
- List the maintenance items of OptiX SDH series equipment
- Perform the basic maintenance operations of OptiX SDH series equipment
- Complete the maintenance records of OptiX SDH series equipment
- Outline the function of basic menus of OptiX iManager U2000 LCT
- Create topology including create NE/Link/NM
- Perform the NE configuration, board configuration, service dispatching and protection configuration for equipment via OptiX iManager U2000 LCT
- Perform the routine maintenance via U2000 LCT

Training Content

OTA28 OptiX NG SDH & OCS System Description
- OptiX NG SDH & OCS System Description
OptiX NG SDH & OCS Product Introduction
- Cabinet, Sub-rack, Boards
- Equipment Features

OTA30 OptiX SDH Equipment Operation and Maintenance
- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records

OTA35 OptiX SDH Equipment Field Maintenance
- OptiX iManager U2000-LCTV2 Operation and Maintenance for SDH
  - Starting and Shutting Down the U2000-LCT
  - Opening/Closing the Online Help
  - Selecting Operation Objects
  - Setting Parameters in the List
  - Operation Precautions
  - Configure Services
  - Maintenance

Duration
- 2 working days

Class Size
- Min 6, Max 12
1.15.5 OptiX NG SDH & OCS Equipment (TDM) NMC Operation Training

Training Path

[Diagram showing the training path with course codes and descriptions]

Target Audience

OptiX NG SDH & OCS network operation center engineer

Prerequisites

- Be familiar with Windows operating system
Upon completion of OTA01 SDH Basics course or having equivalent knowledge

Objectives

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

- Describe the network applications of the OptiX NG SDH & OCS equipment
- Explain the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection modes of the OptiX NG SDH & OCS equipment
- State the main functions of the cards in the OptiX NG SDH & OCS equipment
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of linear MSP
- Explain the protection mechanism of MS shared protection ring
- Explain the protection mechanism of SNCP in ring/mesh topology
- Analyze the service signal flow before/after the protection switch takes place
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Accomplish the network protection and SDH service configuration through NMS
- Outline the classification of Ethernet service
- Explain the function and applications of different types Ethernet service
- List the main Ethernet boards of OptiX NG SDH & OCS equipment
- Describe the functions and application of the Ethernet boards of OptiX NG SDH & OCS equipment
- Describe the features of the Ethernet boards
- Accomplish the Ethernet service EPL/EVPL/EPLAN configuration through NMS
- State the purpose of Ethernet performance testing
- List the common indices of Ethernet service performance testing
- Explain the concepts of common testing indices
- Outline the testing methods of Ethernet service performance testing
- Implement the Ethernet performance testing and analyze the result
- Know the operation environment of NMS
- List the maintenance tasks
- Perform the basic maintenance operations
- Complete the maintenance records
- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON
- Implement the creation of ASON network
- Create SLA services and test the protection and restoration of them
- Conduct the maintenance operation of ASON network
- Explain the operation precaution of ASON
- Explain the fault reported by the ASON network
● Outline the methods of ASON troubleshooting
● Solve the typical ASON trouble

Training Content

ONU10 OptiX iManager U2000 Basic Operation

● iManager U2000-T System Introduction
  ■ Telecommunications Management Network Concept
  ■ Network Management Layer of U2000
  ■ U2000 System Architecture
  ■ Interfaces of U2000
  ■ Managed Equipment of U2000
  ■ Hardware and Software Requirement
  ■ The User Interface of U2000
  ■ Processes of U2000
  ■ NMS Maintenance Suite: MSuite
  ■ License Introduction
  ■ Directory Structure of U2000

● iManager U2000 Basic Operation Practice Guide

OTA02 SDH Networking and Protection

● SDH Networking and Protection
  ■ Optical networking introduction
  ■ Classification of topologies
  ■ Sub-networks
  ■ Survivable networks introduction
  ■ Types of protection

● SDH Networking and Protection (Manual)

OTA07 ASON Basics

● ASON Introduction
  ■ Background of ASON
  ■ System Structure of ASON
  ■ Networking Characters of ASON
  ■ Service Characters of ASON
  ■ ASON Network Functions

OTA10 OptiX SDH Ethernet Operation and Maintenance

● Ethernet Service Introduction
  ■ Basic Concepts
  ■ EPL
  ■ EVPL
  ■ EPLAN
  ■ EVPLAN

● OptiX NG SDH & OCS Ethernet Boards Description & Application
  ■ Ethernet Transparent Transmission Boards
- Ethernet L2 Switching Boards
- Ethernet RPR Boards
- Ethernet Service Switching Boards
- Ethernet Interface Boards
- MPLS (Multi-Protocol Label Switching)
- QinQ (VLAN stacking and nesting technology)
- LCAS (Link Capacity Adjustment Scheme)
- LPT (Link State Pass Through)
- STP/RSTP (Spanning Tree Protocol/Rapid STP)
- IGMP Snooping (Internet Group Management Protocol Snooping)
- CAR (Committed Access Rate)
- Traffic Shaping
- ETH-OAM (Ethernet Operations, Administration and Maintenance)
- Ethernet Board Protection

- OptiX OSN 1500250035007500 U2000 Ethernet Configuration Practice Tasks
  - Configuring EPL Services
  - Configuring PORT-Shared EVPL (VLAN) Services
  - Configuring VCTRUNK-Shared EVPL (VLAN) Services
  - Configuring Ingress/Egress EVPL (MPLS) Services
  - Configuring EPLAN Services (IEEE 802.1d Bridge)
  - Configuring EVPLAN Services (IEEE 802.1q Bridge)

- Ethernet Performance Testing
  - State the purpose of Ethernet performance testing
  - List the common indices of Ethernet service performance testing
  - Explain the concepts of common testing indices
  - Outline the testing methods of Ethernet service performance testing
  - Categories of Ethernet
  - Basic principle of Ethernet
  - Ethernet port Technology
  - VLAN basis & L2 Switching

- Ethernet Performance Testing Practice Task
  - Ethernet performance testing and analyzing

- OTA12 ASON Operation and Maintenance
  - ASON Configuration Practice Guide
    - ASON Enabling
    - Service Configuration
    - ASON Maintenance and Management

- ASON Maintenance
  - Intelligent Abnormal Events
  - Intelligent Link Management
  - Intelligent Services Management
  - Single Station ASON Items Check
ASON NE Database Backup
- Precautions on Software Configuration
- Precautions on Hardware Operations
- Precautions on NMS Operations

ASON Troubleshooting
- ASON Troubleshooting Idea and Method
- Control Plane Troubleshooting
- Service Plane Troubleshooting

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features
- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II
- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - The Cabinet, Sub-rack, Boards of OptiX OSN 9500
  - Equipment Features of OptiX OSN 9500

OTA31 OptiX NG SDH & OCS Products Configuration
- OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
  - 1+1 Linear MS Protection Configuration
  - 1:1 Linear MS Protection Configuration
  - Two-fiber Bidirectional MS Protection Ring Configuration
  - SNCP Ring with Non-protection Chain Configuration
- OptiX OSN 1500250035007500 U2000 Configuration Guide (SDH)

OTA40 OptiX SDH Equipment NMS Side Maintenance
- OptiX SDH Series NMS Side Operation and Maintenance
  - Routine Maintenance for NMS
  - Routine Maintenance Operations for Network through NMS
- OptiX SDH Series NMS Side Operation & Maintenance Practice Guide
  - Browsing and Analyzing NE Alarms
  - Browsing Performance
  - Checking Networkwide Maintenance & Switching Status

Duration

12 working days
Class Size

Min 6, Max 12
1.15.6 OptiX NG SDH & OCS Equipment (TDM) 2nd Line Maintenance Training

Training Path

- **SDH Networking and Protection**
  - OTA02 Lecture 1d

- **OptiX NG SDH & OCS Hardware Description (TDM)**
  - OTA29 Lecture 1.5d

- **OptiX iManager U2000 Basic Operation**
  - ONU10 Lecture, Lab, E-lab 1d

- **OptiX NG SDH & OCS Products Configuration**
  - OTA31 Lab, E-lab 2d

- **OptiX SDH Equipment Operation and Maintenance**
  - OTA30 Lecture, Lab, E-lab 0.5d

- **OptiX SDH Ethernet Operation and Maintenance**
  - OTA10 Lecture, Lab, E-lab 3d

- **OptiX SDH Equipment Field Maintenance**
  - OTA35 Lecture, Lab, E-lab 0.5d

- **ASON Basics**
  - OTA07 Lecture 1d

- **ASON Operation and Maintenance**
  - OTA12 Lecture, Lab, E-lab 2d
Target Audience

OptiX NG SDH & OCS operation and maintenance engineer

Prerequisites

- Having working experience in the maintenance of SDH products
- Be familiar with Windows operating system
- Upon completion of OTA01 SDH Basics course or having equivalent knowledge

Objectives

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

- Describe the network applications of the OptiX NG SDH & OCS equipment
- Explain the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection modes of the OptiX NG SDH & OCS equipment
- State the main functions of the cards in the OptiX NG SDH & OCS equipment
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of linear MSP
- Explain the protection mechanism of MS shared protection ring
- Explain the protection mechanism of SNCP in ring/mesh topology
- Analyze the service signal flow before/after the protection switch takes place
- Accomplish the network protection and SDH service configuration through NMS
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Outline the function of basic menus of OptiX iManager U2000 LCT
- Create topology including create NE/Link/NM
- Perform the NE configuration, board configuration, service dispatching and protection configuration for equipment via OptiX iManager U2000 LCT
- Perform the routine maintenance via U2000 LCT
- Outline the classification of Ethernet service
- Explain the function and applications of different types Ethernet service
- List the main Ethernet boards of OptiX NG SDH & OCS equipment
- Describe the functions and application of the Ethernet boards of OptiX NG SDH & OCS equipment
- Describe the features of the Ethernet boards
Accomplish the Ethernet service EPL/EVPL/EPLAN configuration through NMS
State the purpose of Ethernet performance testing
List the common indices of Ethernet service performance testing
Explain the concepts of common testing indices
Outline the testing methods of Ethernet service performance testing
Implement the Ethernet performance testing and analyze the result
Implement the creation of ASON network
Create SLA services and test the protection and restoration of them
Conduct the maintenance operation of ASON network
Explain the operation precaution of ASON
Outline the methods of ASON troubleshooting
Solve the typical ASON trouble
Outline the operation environment of OptiX SDH series equipment
List the status description of OptiX SDH series equipment indicators
List the maintenance items of OptiX SDH series equipment
Perform the basic maintenance operations of OptiX SDH series equipment
Complete the maintenance records of OptiX SDH series equipment
Know the operation environment of NMS
List the maintenance tasks
Perform the basic maintenance operations
Complete the maintenance records
List the common analysis methods of fault locating
Outline the fault handling flow
Analyze the typical faults: traffic interruption, error bit, etc
Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc
Analyze common faulty of the network consist of OptiX NG SDH & OCS series
Locate and eliminate faults, get experience from troubleshooting practice
Outline the standards of ASON
Illustrate the structure of ASON
Describe the networking characters of ASON
Explain the service characters of ASON

Training Content
ONU10 OptiX iManager U2000 Basic Operation
- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
Hardware and Software Requirement
The User Interface of U2000
Processes of U2000
NMS Maintenance Suite: MSuite
License Introduction
Directory Structure of U2000

OTA02 SDH Networking and Protection

OTA07 ASON Basics

OTA10 OptiX SDH Ethernet Operation and Maintenance

- Optical networking introduction
- Classification of topologies
- Sub-networks
- Survivable networks introduction
- Types of protection

- SDH Networking and Protection (Manual)

- ASON Introduction
  - Background of ASON
  - System Structure of ASON
  - Networking Characters of ASON
  - Service Characters of ASON
  - ASON Network Functions

- Ethernet Service Introduction
  - Basic Concepts
  - EPL
  - EVPL
  - EPLAN
  - EVPLAN

- OptiX NG SDH & OCS Ethernet Boards Description & Application
  - Ethernet Transparent Transmission Boards
  - Ethernet L2 Switching Boards
  - Ethernet RPR Boards
  - Ethernet Service Switching Boards
  - Ethernet Interface Boards
  - MPLS (Multi-Protocol Label Switching)
  - QinQ (VLAN stacking and nesting technology)
  - LCAS (Link Capacity Adjustment Scheme)
  - LPT (Link State Pass Through)
  - STP/RSTP (Spanning Tree Protocol/Rapid STP)
  - IGMP Snooping (Internet Group Management Protocol Snooping)
  - CAR (Committed Access Rate)
- Traffic Shaping
- ETH-OAM (Ethernet Operations, Administration and Maintenance)
- Ethernet Board Protection

- OptiX OSN 1500250035007500 U2000 Ethernet Configuration Practice Tasks
  - Configuring EPL Services
  - Configuring PORT-Shared EVPL (VLAN) Services
  - Configuring VCTRUNK-Shared EVPL (VLAN) Services
  - Configuring Ingress/Egress EVPL (MPLS) Services
  - Configuring EPLAN Services (IEEE 802.1d Bridge)
  - Configuring EVPLAN Services (IEEE 802.1q Bridge)

- Ethernet Performance Testing
  - State the purpose of Ethernet performance testing
  - List the common indices of Ethernet service performance testing
  - Explain the concepts of common testing indices
  - Outline the testing methods of Ethernet service performance testing
  - Categories of Ethernet
  - Basic principle of Ethernet
  - Ethernet port Technology
  - VLAN basis & L2 Switching

- Ethernet Performance Testing Practice Task
  - Ethernet performance testing and analyzing

OTA12 ASON Operation and Maintenance
- ASON Configuration Practice Guide
  - ASON Enabling
  - Service Configuration
  - ASON Maintenance and Management

- ASON Maintenance
  - Intelligent Abnormal Events
  - Intelligent Link Management
  - Intelligent Services Management
  - Single Station ASON Items Check
  - ASON NE Database Backup
  - Precautions on Software Configuration
  - Precautions on Hardware Operations
  - Precautions on NMS Operations

- ASON Troubleshooting
  - ASON Troubleshooting Idea and Method
  - Control Plane Troubleshooting
  - Service Plane Troubleshooting

OTA14 OptiX SDH System Troubleshooting
- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
- Troubleshooting Idea and Methods
- Classified Troubleshooting Examples

- OptiX NG SDH & OCS Series Classified Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

- OptiX NG SDH & OCS Series Classified Troubleshooting Practice Task
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the classified trouble, include NMS trouble, ECC problem, service interrupt, bit error, etc)

Summary

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features

- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II

- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - The Cabinet, Sub-rack, Boards of OptiX OSN 9500
  - Equipment Features of OptiX OSN 9500

OTA30 OptiX SDH Equipment Operation and Maintenance
- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records

- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
OTA31 OptiX NG SDH & OCS Products Configuration
- OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
  - 1+1 Linear MS Protection Configuration
  - 1:1 Linear MS Protection Configuration
  - Two-fiber Bidirectional MS Protection Ring Configuration
  - SNCP Ring with Non-protection Chain Configuration
- OptiX OSN 1500250035007500 U2000 Configuration Guide (SDH)

OTA35 OptiX SDH Equipment Field Maintenance
- OptiX iManager U2000-LCTV2 Operation and Maintenance for SDH
  - Starting and Shutting Down the U2000-LCT
  - Opening/Closing the Online Help
  - Selecting Operation Objects
  - Setting Parameters in the List
  - Operation Precautions
  - Configure Services
  - Maintenance

OTA40 OptiX SDH Equipment NMS Side Maintenance
- OptiX SDH Series NMS Side Operation and Maintenance
  - Routine Maintenance for NMS
  - Routine Maintenance Operations for Network through NMS
- OptiX SDH Series NMS Side Operation & Maintenance Practice Guide
  - Browsing and Analyzing NE Alarms
  - Browsing Performance
  - Checking Networkwide Maintenance & Switching Status

Duration
15 working days

Class Size
Min 6, Max 12
1.15.7 OptiX NG SDH & OCS Equipment (TDM) 3rd Line Maintenance Training

Training Path

- OptiX NG SDH & OCS Hardware Description (TDM)
  - OTA29 Lecture 1.5d

- OptiX NG SDH & OCS Features and Application
  - OTA34 Lecture, Lab, E-lab 3d

- OptiX SDH Special Topics
  - OTA36 Lecture, Lab, E-lab 2d

- OptiX SDH System Advanced Troubleshooting
  - OTA37 Lecture, Lab, Discussion 2.5d

- OptiX SDH Ethernet Advanced Operation & Maintenance
  - OTA42 Lecture, Lab, E-lab 4d

Target Audience

OptiX NG SDH & OCS senior operation and maintenance engineer

Prerequisites

- Completion of OptiX NG SDH & OCS Equipment (TDM) 2nd Line Maintenance Training or OptiX NG SDH & OCS Equipment (TDM) NMC Operation Training

Objectives

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

- Describe the network applications of the OptiX NG SDH & OCS equipment
- Explain the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection modes of the OptiX NG SDH & OCS equipment
- State the main functions of the cards in the OptiX NG SDH & OCS equipment
- Describe the principle and process of TPS on OptiX NG SDH equipment
- List the main characteristics of TPS on OptiX NG SDH equipment
- Implement the configuration of TPS on OptiX NG SDH equipment
- Describe the feature of power source system in OptiX NG SDH & OCS system
- Grasp the protection principle and function of all types of power sources in OptiX NG SDH &
OCS equipments

- Grasp the principle of cross-connection & clock active/standby switching in OptiX NG SDH & OCS system
- Grasp the mechanism of cross-connection & clock active/standby switching in OptiX NG SDH & OCS system
- Describe the principle of SCC active/standby switching in OptiX NG SDH & OCS system
- List the methods of SCC switching in OptiX NG SDH & OCS system
- Describe the traffic flow and service configuration about the complicated networks
- Analyze the protection capability about the complicated networks
- Accomplish the service configuration of the complicated network and verify the protection
- Describe the working mechanism of the L2 switching
- Interpret the basic of QoS
- Outline the key technology in QoS
- Describe the typical QoS application
- Describe the frame structure of MPLS
- Interpret the basic of QinQ
- List the application of MPLS and QinQ
- Describe the working mechanism of virtual concatenation
- Describe the function of LCAS
- Illustrate the GFP-F frame structure for the Ethernet signal
- Describe the troubleshooting idea and methods
- Analyze the common faults locating
- Outline the procedures of Ethernet troubleshooting
- Analyze the failure of the Ethernet service
- Locate the faulty of the Ethernet service
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Accomplish the OAM testing
- Locate the fault position when error reports
- Explain the meaning of clock protection related synchronization parameters
- Explain the basic principles of implementing clock protection networking
- Accomplish the clock protection configuration and verify it while the network fails
- Grasp the working principle of ECC
- Describe the network application of ECC and how to separate huge ECC network into smaller networks
- Illustrate the extended applications of ECC
- Accomplish the configuration of ECC, verify extended ECC and DCC transparent transmission
- Outline common ECC command lines
- Get further understand of the feature of OptiX NG SDH & OCS system
- Analyze common cases in the real network and figure out the problem
- Locate the faulty of the failed network and summarize the key point of troubleshooting
Training Content

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
- Features
- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II
- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - The Cabinet, Sub-rack, Boards of OptiX OSN 9500
  - Equipment Features of OptiX OSN 9500

OTA34 OptiX NG SDH & OCS Features and Application
- OptiX NG SDH & OCS TPS Protection
  - TPS Overview
  - Mechanism and Process of TPS
  - Configuration of TPS
- OptiX NG SDH & OCS Power System
  - Power Supply and 1+1 Protection
  - 1:N Protection System for Board 3.3V Power
  - Integrated Installation and Application of OptiX OSN 1500 Power System
- OptiX NG SDH & OCS Cross Connection & Clock 1+1 Protection
  - Principle of Active/Standby Cross-Connection
  - Principle of Active/Standby Clock
  - Switching of Active/Standby Cross-Connection & Clock
  - Active/Standby
- OptiX NG SDH & OCS SCC 1+1 Protection
  - Overhead Principle of Active/Standby SCC
  - Board Intercommunication
  - Principle of Active/Standby SCC
  - Data Backup between Active/Standby SCC
  - Switching of Active/Standby SCC
  - Precautions during Switching
- OptiX NG SDH & OCS Complicated Networking
  - Tangency Rings
  - Intersection Rings
Fiber-Shared Virtual Trail Protection

- OptiX NG SDH & OCS Complicated Networking Practice Guide
  - SNCP & SNCP Tangential Rings
  - SNCP & MSP Tangential Rings
  - SNCP & SNCP Intersectional Rings
  - MSP & MSP Intersectional Rings
  - SNCP & MSP Intersectional Rings
  - MSP & SNCP Fiber-Shared Virtual Trail Protection
  - SNCP & SNCP Fiber-Shared Virtual Trail Protection

- OptiX NG SDH & OCS TPS Protection (Manual)
  - OptiX OSN 1500/2500/3500 Equipments TPS Protection Overview
  - OptiX OSN 1500/2500/3500 TPS Protection Mechanism
  - OptiX OSN 1500/2500/3500 TPS Configuration

- OptiX NG SDH & OCS Power System (Manual)
  - Power Supply and 1+1 Protection of OptiX OSN 1500/2500/3500
  - 1:N Protection System for Board 3.3V Power
  - Compositive Installation and Application of OptiX OSN 1500 Power System

- OptiX NG SDH & OCS Cross-Connection & Clock 1+1 Protection (Manual)
  - Principle of Active/Standby Cross-Connection
  - Principle of Active/Standby Clock
  - Active/Standby Switching of Cross Connection & Clock
  - Switching Cautions

- OptiX NG SDH & OCS SCC 1+1 Protection (Manual)
  - Active/Standby SCC Overhead Realization Principle
  - Active/Standby SCC Communication Principle
  - The Backup Mode of Active/Standby SCC
  - OptiX OSN 1500/2500/3500 Active/Standby SCC Switching
  - Switching Cautions

OTA36 OptiX SDH Special Topics

- Clock Protection Analysis
  - Basics Concepts of Clock Protection
  - Principle of Clock Protection Configuration
  - Standard SSM Protocol Clock Protection Analysis
  - Extended SSM Protocol Clock Protection Analysis

- OptiX Equipment Clock Protection Principles (Manual)
  - Principles of OptiX Equipment Clock Protection

- Clock protection Configuration Guide
  - Clock protection configuration in ring topology
  - Clock protection configuration in ring with chain
  - Clock protection configuration in tangency ring

- ECC Maintenance
  - Basic Concepts
- ECC Network Application and Division of Huge ECC Network
- ECC Applications and Configurations

- ECC Maintenance Practice Guide
  - Extended ECC Configuration
  - DCC Transparent Transmission
  - ECC Huge Network Division
  - ECC Allocation

- Pointer Justification
  - Pointer Generation
  - AU Pointer Termination and It’s Transformation into TU Pointer
  - Detection Report of AU and TU Pointer Justification Events
  - Methods of Pointer Justification Processing
  - Pointer Justification Processing Cases

- Pointer Adjustment (Manual)
  - Pointer Generation
  - AU Pointer Termination and It’s Transformation into TU Pointer
  - Detection Report of AU and TU Pointer Justification Events
  - Methods of Pointer Justification Processing
  - Pointer Justification Processing Cases

- Errored Bits Special Topic
  - Bit Error Detection Principle
  - Troubleshooting of the Bit Error Problems
  - Typical Cases

- Errored Bits Special Topic (Manual)
  - Bit Error Detection Principle
  - Troubleshooting of the Bit Error Problems
  - Typical Cases

OTA37 OptiX SDH System Advanced Troubleshooting
- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

- OptiX NG SDH Comprehensive Troubleshooting Cases
  - Get further understand of the feature of OptiX NG SDH & OCS system
  - Analyze common cases in the real network and figure out the problem

OTA42 OptiX SDH Ethernet Advanced Operation & Maintenance
- OptiX NG SDH Ethernet OAM Introduction
  - Ethernet Port OAM
- Ethernet Service OAM
- **OptiX NG SDH Ethernet OAM Introduction (Manual)**
  - Ethernet Port OAM
  - Ethernet Service OAM
- **OptiX NG SDH Ethernet OAM Practice Guide**
  - ETH OAM Configuration and testing
- Advanced Ethernet Troubleshooting Introduction
  - Ethernet troubleshooting cases analyze
- **OptiX Ethernet QoS Introduction**
  - L2 Switch Principle
  - QinQ Introduction
  - QoS Definition and Function
  - CAR Definition, Mechanism and Application
  - CoS Definition, Mechanism and Application
  - Difference between CAR and CoS
  - Shapping Definition, Mechanism and Application
  - Queue Classification and Mechanism
- **OptiX Ethernet Layer 2 Switching Introduction**
  - MPLS Overview
  - MPLS Work Mode
  - MPLS Network and Application
  - QinQ Overview
  - QinQ Process Mode
  - QinQ Network and Application
  - Comparison between MPLS and QinQ
- **EoS Concatenation & Encapsulation Introduction**
  - Contiguous Concatenation
  - Virtual Concatenation
  - LCAS
  - Encapsulation Technology
- **OptiX Ethernet Maintenance & Troubleshooting**
  - Background Knowledge
  - Ethernet Maintenance Operations
  - Ethernet Troubleshooting Idea and Method
  - Common Reasons of Ethernet Service Problem
  - Common Troubleshooting Cases
- **OptiX Ethernet Maintenance & Troubleshooting Practice Task**
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the trouble
  - Test the service
Summary

Duration
13 working days

Class Size
Min 6, Max 12
1.15.8 OptiX NG SDH Equipment (Packet) Commissioning Training

Training Path

[Diagram of training path]

Target Audience

Hybrid MSTP commissioning engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system

Objectives

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

- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Describe OptiX Hybrid MSTP product networking
- Outline the protection types of OptiX Hybrid MSTP product
- Classify the service types of Ethernet
- Outline the types and applications of Ethernet
- Check the equipment condition such as power connections, fiber connections, mounted boards, etc
- Outline and perform the commissioning process for OptiX Hybrid MSTP equipment
- Perform the commissioning process of the network
- Describe methods of operation including circuit provisioning, routing maintenance tasks and
fault finding

- Perform commissioning tests on the equipment
- Perform commissioning tests on the network
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000

Training Content

ONU10 OptiX iManager U2000 Basic Operation

- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
  - Processes of U2000
  - NMS Maintenance Suite: MSuite
  - License Introduction
  - Directory Structure of U2000

- iManager U2000 Basic Operation Practice Guide

OTA46 Hybrid MSTP Network Application

- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction (E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

OTA48 OptiX Hybrid MSTP Hardware Description

- OptiX 155622H (Metro 1000) V300 Hardware Description
  - Network application and system structure
  - Sub-rack
  - Equipment Cards
  - Common Network Elements and Configuration
  - Equipment Level and Network Level Protection

- OptiX OSN 1500350075007500II Hardware Description (Packet)
  - OptiX OSN 1500350075007500II Product Introduction
  - Cabinet, Sub-rack
  - Hybrid MSTP Boards
  - Hybrid MSTP Typical Hardware
  - Hybrid MSTP Configuration
  - Hybrid MSTP Protection

OTA52 OptiX Hybrid MSTP Commissioning
• OptiX OSN 150035007500 Equipment(Packet Mode) Commissioning
  ■ Single station commissioning(subrack function testing, configuring NE parameters, CES service interface testing, board protection testing)
  ■ System commissioning(configure inter-band DCN, packet ethernet service testing, intra-plane service testing, packet network protection testing)
• OptiX OSN 150035007500 Equipment(Packet Mode) Commissioning Guide
  ■ Preparations for Commissioning
  ■ Per-NE Commissioning
  ■ System Commissioning

Duration

5 working days

Class Size

Min 6, Max 12
1.15.9 OptiX NG SDH Equipment (Packet) 1st Line Maintenance Training

Training Path

OptiX Hybrid MSTP Hardware Description
OTA48 Lecture 1d

OptiX SDH Equipment Operation and Maintenance
OTA30 Lecture, Lab, E-lab 0.5d

OptiX Hybrid MSTP Field Maintenance
OTA53 Lecture, Lab, E-lab 0.5d

Target Audience
Hybrid MSTP equipment field maintenance engineer

Prerequisites
- Be familiar with Windows operating system
- Having a general knowledge of SDH basics

Objectives
On completion of this program, the participants will be able to:
- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Outline the operation environment of OptiX SDH series equipment
- List the status description of OptiX SDH series equipment indicators
- List the maintenance items of OptiX SDH series equipment
- Perform the basic maintenance operations of OptiX SDH series equipment
- Complete the maintenance records of OptiX SDH series equipment
- Outline the function of basic menus of iManager U2000 LCT
- Create topology including create NE/Link
- Perform the NE configuration, board configuration, and service dispatching and protection configuration for equipment via iManager U2000 LCT
- Perform the routine maintenance via U2000 LCT

Training Content
OTA30 OptiX SDH Equipment Operation and Maintenance
- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records
- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide

OTA48 OptiX Hybrid MSTP Hardware Description
- OptiX 155622H(Metro 1000) V300 Hardware Description
  - Network application and system structure
  - Sub-rack
  - Equipment Cards
  - Common Network Elements and Configuration
  - Equipment Level and Network Level Protection
- OptiX OSN 1500350075007500II Hardware Description (Packet)
  - OptiX OSN 1500350075007500II Product Introduction
  - Cabinet, Sub-rack
  - Hybrid MSTP Boards
  - Hybrid MSTP Typical Hardware
  - Hybrid MSTP Configuration
  - Hybrid MSTP Protection

OTA53 OptiX Hybrid MSTP Field Maintenance
- iManager U2000 LCT Operation and Maintenance for Hybrid MSTP
  - OptiX iManager U2000 LCT menu
  - Create NE and Topology
  - Configure the NE service Create protection subnet
  - Routine maintenance operation

Duration
2 working days

Class Size
Min 6, Max 12
1.15.10 OptiX NG SDH Equipment (Packet) NMC Operation Training

Training Path

Hybrid MSTP Technology Introduction
OTA45 Lecture 1d

Hybrid MSTP Network Application
OTA46 Lecture 1d

OptiX Hybrid MSTP Hardware Description
OTA48 Lecture 1d

OptiX iManager U2000 Basic Operation
ONU10 Lecture, Lab, E-lab 1d

OptiX Hybrid MSTP Products Configuration
OTA49 Lab, E-lab 3d

OptiX Hybrid MSTP Features Application
OTA50 Lecture, Lab, E-lab 2d

OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
OTA51 Lecture, Lab, E-lab 1d

Target Audience
Hybrid MSTP network operation center engineer

Prerequisites
- Having working experience in transport network
- Be familiar with Windows operating system
- Upon completion of OTA01 SDH Basics and OTA45 Hybrid MSTP Technology Introduction courses or having equivalent knowledge
Objectives

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

- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Outline the QinQ application scenarios of OptiX Hybrid MSTP
- Describe the basic concepts of PWE3
- Outline the typical PWE3 encapsulation format for Ethernet
- Outline the typical PWE3 encapsulation format for TDM E1
- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Configure OptiX Hybrid MSTP products
- Configure the protection of TDM plane & packet transport plane for the network and equipment
- Configure the common services for the TDM plane
- Configure the E-Line/E-LAN/E-AGGR service in the packet transport plane
- Outline the QoS model
- Describe QoS basic concepts
- Outline the key technology in QoS
- Describe the typical QoS application in Hybrid MSTP network
- Configure QoS in Hybrid MSTP system according to the service demand
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Describe the working mechanism and application scene of MPLS OAM
- Describe the working mechanism and application scene of MPLS-TP OAM
- Describe the working mechanism and application scene of PW OAM
- Accomplish the OAM testing
- Locate the fault position when error reports
- Describe the operation environment of NMS
- List the maintenance tasks for Hybrid MSTP equipment
- Perform the basic maintenance operations for Hybrid MSTP equipment
- Complete the maintenance records
- Describe OptiX Hybrid MSTP product networking
- Outline the protection types of OptiX Hybrid MSTP product
- Classify the service types of Ethernet
- Outline the types and applications of Ethernet
Training Content

ONU10 OptiX iManager U2000 Basic Operation
  ● iManager U2000-T System Introduction
    ■ Telecommunications Management Network Concept
    ■ Network Management Layer of U2000
    ■ U2000 System Architecture
    ■ Interfaces of U2000
    ■ Managed Equipment of U2000
    ■ Hardware and Software Requirement
    ■ The User Interface of U2000
    ■ Processes of U2000
    ■ NMS Maintenance Suite: MSuite
    ■ License Introduction
    ■ Directory Structure of U2000
  ● iManager U2000 Basic Operation Practice Guide

OTA45 Hybrid MSTP Technology Introduction
  ● OptiX Hybrid MSTP Technologies Introduction
    ■ TCP/IP Protocol Overview
    ■ IP Address Introduction and Configuration
    ■ MPLS Overview
    ■ MPLS LSP Introduction
    ■ MPLS-TP Introduction
    ■ MPLS Tunnel Network Application
    ■ QinQ Overview
    ■ PWE3 Overview
    ■ Ethernet PWE3
    ■ TDM E1 PWE3

OTA46 Hybrid MSTP Network Application
  ● OptiX Hybrid MSTP Networking & Service Introduction
    ■ Hybrid MSTP Networking
    ■ Hybrid MSTP Service Introduction(E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
    ■ MRPS (MPLS-TP Ring Protection Switch)

OTA48 OptiX Hybrid MSTP Hardware Description
  ● OptiX 155622H(Metro 1000) V300 Hardware Description
    ■ Network application and system structure
    ■ Sub-rack
    ■ Equipment Cards
    ■ Common Network Elements and Configuration
    ■ Equipment Level and Network Level Protection
  ● OptiX OSN 1500350075007500II Hardware Description (Packet)
    ■ OptiX OSN 1500350075007500II Product Introduction
Cabinet, Sub-rack
Hybrid MSTP Boards
Hybrid MSTP Typical Hardware
Hybrid MSTP Configuration
Hybrid MSTP Protection

OTA49 OptiX Hybrid MSTP Products Configuration
- OptiX OSN 15003500(Hybrid MSTP) U2000 Configuration Guide (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection
- OptiX OSN 15003500(Hybrid MSTP) U2000 Configuration Tasks (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection

OTA50 OptiX Hybrid MSTP Features Application
- OptiX Hybrid MSTP QoS Practice Guide
  - Configure QoS in Hybrid MSTP system according to the service demand
- OptiX Hybrid MSTP OAM Introduction
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Introduction (Manual)
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Practice Guide
  - MPLS OAM Configuration and testing
  - MPLS-TP OAM Configuration and testing
- OptiX Hybrid MSTP QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment
- OptiX Hybrid MSTP QoS Introduction (Manual)
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment

OTA51 OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
- OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
- Monthly Maintenance Items
- Quarterly Maintenance Items
- Other NMS Side Operation

Duration

10 working days

Class Size

Min 6, Max 12
1.15.11 OptiX NG SDH Equipment (Packet) 2nd Line Maintenance Training

Training Path

- **Hybrid MSTP Technology Introduction**
  - OTA45 Lecture 1d

- **Hybrid MSTP Network Application**
  - OTA46 Lecture 1d

- **OptiX Hybrid MSTP Hardware Description**
  - OTA48 Lecture 1d

- **OptiX iManager U2000 Basic Operation**
  - ONU10 Lecture, Lab, E-lab 1d

- **OptiX Hybrid MSTP Products Configuration**
  - OTA49 Lab, E-lab 3d

- **OptiX Hybrid MSTP Features Application**
  - OTA50 Lecture, Lab, E-lab 2d

- **OptiX Hybrid MSTP System Troubleshooting**
  - OTA54 Lecture, Lab, E-lab 1.5d

- **OptiX Hybrid MSTP Field Maintenance**
  - OTA53 Lecture, Lab, E-lab 0.5d

- **OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance**
  - OTA51 Lecture, Lab, E-lab 1d
Target Audience

Hybrid MSTP operation and maintenance engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system

Objectives

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

- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Outline the QinQ application scenarios of OptiX Hybrid MSTP
- Describe the basic concepts of PWE3
- Outline the typical PWE3 encapsulation format for Ethernet
- Outline the typical PWE3 encapsulation format for TDM E1
- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Describe the architecture and main features of U2000
- Describe the main functions of U2000
- Configure OptiX Hybrid MSTP products
- Configure the protection of TDM plane & packet transport plane for the network and equipment
- Configure the common services for the TDM plane
- Configure the E-Line/E-LAN/E-AGGR service in the packet transport plane
- Outline the QoS model
- Describe QoS basic concepts
- Outline the key technology in QoS
- Describe the typical QoS application in Hybrid MSTP network
- Configure QoS in Hybrid MSTP system according to the service demand
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Describe the working mechanism and application scene of MPLS OAM
- Describe the working mechanism and application scene of MPLS-TP OAM
- Describe the working mechanism and application scene of PW OAM
- Accomplish the OAM testing
- Locate the fault position when error reports
- Describe the operation environment of NMS
- List the maintenance tasks for Hybrid MSTP equipment
• Perform the basic maintenance operations for Hybrid MSTP equipment
• Complete the maintenance records
• Outline the function of basic menus of iManager U2000 LCT
• Create topology including create NE/Link
• Perform the NE configuration, board configuration, and service dispatching and protection configuration for equipment via iManager U2000 LCT
• Perform the routine maintenance via U2000 LCT
• List the common analysis methods of packet network fault locating
• Outline the fault handling flow
• Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc
• Illustrate the application of common troubleshooting methods for packet network
• Analyze common faulty of the Hybrid MSTP network
• Describe OptiX Hybrid MSTP product networking
• Outline the protection types of OptiX Hybrid MSTP product
• Classify the service types of Ethernet
• Outline the types and applications of Ethernet

Training Content

ONU10 OptiX iManager U2000 Basic Operation
• iManager U2000-T System Introduction
  ■ Telecommunications Management Network Concept
  ■ Network Management Layer of U2000
  ■ U2000 System Architecture
  ■ Interfaces of U2000
  ■ Managed Equipment of U2000
  ■ Hardware and Software Requirement
  ■ The User Interface of U2000
  ■ Processes of U2000
  ■ NMS Maintenance Suite: MSuite
  ■ License Introduction
  ■ Directory Structure of U2000
• iManager U2000 Basic Operation Practice Guide

OTA45 Hybrid MSTP Technology Introduction
• OptiX Hybrid MSTP Technologies Introduction
  ■ TCP/IP Protocol Overview
  ■ IP Address Introduction and Configuration
  ■ MPLS Overview
  ■ MPLS LSP Introduction
  ■ MPLS-TP Introduction
  ■ MPLS Tunnel Network Application
  ■ QinQ Overview
  ■ PWE3 Overview
Ethernet PWE3
TDM E1 PWE3

OTA46 Hybrid MSTP Network Application
- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction (E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

OTA48 OptiX Hybrid MSTP Hardware Description
- OptiX 155622H (Metro 1000) V300 Hardware Description
  - Network application and system structure
  - Sub-rack
  - Equipment Cards
  - Common Network Elements and Configuration
  - Equipment Level and Network Level Protection
- OptiX OSN 150035007507500II Hardware Description (Packet)
  - OptiX OSN 150035007507500II Product Introduction
  - Cabinet, Sub-rack
  - Hybrid MSTP Boards
  - Hybrid MSTP Typical Hardware
  - Hybrid MSTP Configuration
  - Hybrid MSTP Protection

OTA49 OptiX Hybrid MSTP Products Configuration
- OptiX OSN 15003500 (Hybrid MSTP) U2000 Configuration Guide (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection
- OptiX OSN 15003500 (Hybrid MSTP) U2000 Configuration Tasks (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection

OTA50 OptiX Hybrid MSTP Features Application
- OptiX Hybrid MSTP QoS Practice Guide
  - Configure QoS in Hybrid MSTP system according to the service demand
- OptiX Hybrid MSTP OAM Introduction
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Introduction (Manual)
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Practice Guide
- MPLS OAM Configuration and testing
- MPLS-TP OAM Configuration and testing
- OptiX Hybrid MSTP QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment
- OptiX Hybrid MSTP QoS Introduction (Manual)
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment

OTA51 OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
- OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTA53 OptiX Hybrid MSTP Field Maintenance
- iManager U2000 LCT Operation and Maintenance for Hybrid MSTP
  - OptiX iManager U2000 LCT menu
  - Create NE and Topology
  - Configure the NE service  Create protection subnet
  - Routine maintenance operation

OTA54 OptiX Hybrid MSTP System Troubleshooting
- OptiX Hybrid MSTP System Troubleshooting Methods
  - OptiX Hybrid MSTP troubleshooting preparation
  - OptiX Hybrid MSTP troubleshooting method
  - OptiX Hybrid MSTP troubleshooting analyze ideas
  - OptiX Hybrid MSTP troubleshooting case study
- OptiX Hybrid MSTP System Troubleshooting Instructor Guide
- OptiX Hybrid MSTP System Troubleshooting Practice Task
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the classified trouble, include Ethernet service interrupt, packet loss, etc)
  - Summary

Duration

12 working days
Class Size

Min 6, Max 12
1.15.12  OptiX NG SDH Equipment (Packet+TDM) Commissioning Training

Training Path

- Hybrid MSTP Network Application
  - OTA46 Lecture 1d

- OptiX NG SDH & OCS Hardware Description (TDM)
  - OTA29 Lecture 1.5d

- OptiX NG SDH & OCS Commissioning
  - OTA32 Lecture, Lab, E-lab 2d

- OptiX Hybrid MSTP Hardware Description
  - OTA48 Lecture 1d

- OptiX Hybrid MSTP Commissioning
  - OTA52 Lecture, Lab, E-lab 2d

Target Audience

Hybrid MSTP commissioning engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system

Objectives

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

- Describe OptiX Hybrid MSTP product networking
- Outline the protection types of OptiX Hybrid MSTP product
- Classify the service types of Ethernet
- Outline the types and applications of Ethernet
- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Check the equipment condition such as power connections, fiber connections, mounted boards,
etc
- Outline and perform the commissioning process for OptiX Hybrid MSTP equipment
- Perform the commissioning process of the network
- Describe methods of operation including circuit provisioning, routing maintenance tasks and fault finding
- Perform commissioning tests on the equipment
- Perform commissioning tests on the network
- Describe the network applications of the OptiX NG SDH & OCS equipment
- Explain the system structure and features of the OptiX NG SDH & OCS equipment
- Outline the system protection modes of the OptiX NG SDH & OCS equipment
- State the main functions of the cards in the OptiX NG SDH & OCS equipment
- Describe the preparation for the commissioning
- List the items for single station commissioning for OptiX NG SDH & OCS system
- Outline the procedures of network commissioning for OptiX NG SDH & OCS system
- Summarize the equipment/network condition after commissioning
- Accomplish the OptiX NG SDH & OCS system commissioning
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000

Training Content

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features
- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II
- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - The Cabinet, Sub-rack, Boards of OptiX OSN 9500
  - Equipment Features of OptiX OSN 9500

OTA32 OptiX NG SDH & OCS Commissioning
- NG SDH & OCS Equipment Commissioning Guide
  - Checking hardware
  - Testing Power-on of the Cabinet
  - Testing subrack functions
- Configuring the commissioning data, and testing the all buses
- Testing the ALMC/RESET Button on the SCC
- Testing on/off of all electrical interfaces
- Testing the indices of optical/electrical interface
- Testing TPS
- Testing active/standby board switching
- Testing PDH channels in Series
- Checking the Network-wide Fiber Connection
- Checking Connection Between the U2000 Computer and the Equipment
- Configuring Network
- Testing ECC
- Testing Service Channel Availability
- Testing Self-Healing Protection
- Testing Clock Protection and Orderwire
- Testing Network-wide BER

- NG SDH & OCS Equipment Commissioning
  - Preparations before Commissioning
  - Single Station Commissioning
  - Network Commissioning

OTA46 Hybrid MSTP Network Application
- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction(E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

OTA48 OptiX Hybrid MSTP Hardware Description
- OptiX 155622H(Metro 1000) V300 Hardware Description
  - Network application and system structure
  - Sub-rack
  - Equipment Cards
  - Common Network Elements and Configuration
  - Equipment Level and Network Level Protection

- OptiX OSN 1500350075007500II Hardware Description (Packet)
  - OptiX OSN 1500350075007500II Product Introduction
  - Cabinet, Sub-rack
  - Hybrid MSTP Boards
  - Hybrid MSTP Typical Hardware
  - Hybrid MSTP Configuration
  - Hybrid MSTP Protection

OTA52 OptiX Hybrid MSTP Commissioning
- OptiX OSN 150035007500 Equipment(Packet Mode) Commissioning
  - Single station commissioning(subrack function testing, configuring NE parameters, CES service interface testing, board protection testing)
- System commissioning (configure inter-band DCN, packet ethernet service testing, intra-plane service testing, packet network protection testing)
- OptiX OSN 150035007500 Equipment (Packet Mode) Commissioning Guide
  - Preparations for Commissioning
  - Per-NE Commissioning
  - System Commissioning

Duration

8 working days

Class Size

Min 6, Max 12
1.15.13 OptiX NG SDH Equipment (Packet+TDM) 1st Line Maintenance Training

Training Path

- **OptiX NG SDH & OCS System Description**
  - OTA28 Lecture 1d

- **OptiX SDH Equipment Operation and Maintenance**
  - OTA30 Lecture, Lab, E-lab 0.5d

- **OptiX Hybrid MSTP Hardware Description**
  - OTA48 Lecture 1d

- **OptiX Hybrid MSTP Field Maintenance**
  - OTA53 Lecture, Lab, E-lab 0.5d

Target Audience

Hybrid MSTP equipment field maintenance engineer

Prerequisites

- Be familiar with Windows operating system
- Having a general knowledge of SDH basics

Objectives

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

- Describe the networking applications of the OptiX OSN 1500/3500/7500/7500II
- Describe the system structure of the OptiX OSN 1500/3500/7500/7500II
- Outline the main boards of the OptiX OSN 1500/3500/7500/7500II
- Outline the system protection schemes of the OptiX OSN 1500/3500/7500/7500II
- Outline the operation environment of OptiX SDH series equipment
- List the status description of OptiX SDH series equipment indicators
- List the maintenance items of OptiX SDH series equipment
- Perform the basic maintenance operations of OptiX SDH series equipment
- Complete the maintenance records of OptiX SDH series equipment
- Outline the function of basic menus of iManager U2000 LCT
- Create topology including create NE/Link
- Perform the NE configuration, board configuration, and service dispatching and protection configuration for equipment via iManager U2000 LCT
Perform the routine maintenance via U2000 LCT
Illustrate the networking applications of the OptiX NG SDH & OCS equipment
Describe the system structure and features of the OptiX NG SDH & OCS equipment
Outline the system protection schemes of the OptiX NG SDH & OCS equipment

Training Content

OTA28 OptiX NG SDH & OCS System Description
- OptiX NG SDH & OCS System Description
  - OptiX NG SDH & OCS Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features

OTA30 OptiX SDH Equipment Operation and Maintenance
- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records
- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide

OTA48 OptiX Hybrid MSTP Hardware Description
- OptiX 155622H(Metro 1000) V300 Hardware Description
  - Network application and system structure
  - Sub-rack
  - Equipment Cards
  - Common Network Elements and Configuration
  - Equipment Level and Network Level Protection
- OptiX OSN 1500350075007500II Hardware Description (Packet)
  - OptiX OSN 1500350075007500II Product Introduction
  - Cabinet, Sub-rack
  - Hybrid MSTP Boards
  - Hybrid MSTP Typical Hardware
  - Hybrid MSTP Configuration
  - Hybrid MSTP Protection

OTA53 OptiX Hybrid MSTP Field Maintenance
- iManager U2000 LCT Operation and Maintenance for Hybrid MSTP
  - OptiX iManager U2000 LCT menu
- Create NE and Topology
- Configure the NE service  Create protection subnet
- Routine maintenance operation

Duration

3 working days

Class Size

Min 6, Max 12
1.15.14 OptiX NG SDH Equipment (Packet+TDM) NMC Operation Training

Training Path

- **Hybrid MSTP Technology Introduction**
  - OTA45 Lecture 1d

- **U2000 System Introduction**
  - ONU01 Lecture 0.5d

- **OptiX Hybrid MSTP Products Configuration**
  - OTA49 Hands-on exercise 3d

- **OptiX Hybrid MSTP Features Application**
  - OTA50 Lecture, Hands-on exercise 2d

- **Hybrid MSTP Network Application**
  - OTA46 Lecture 1d

- **OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance**
  - OTA51 Lecture, Hands-on exercise 1d

- **OptiX NG SDH & OCS Hardware Description (TDM)**
  - OTA29 Lecture 1.5d

- **OptiX NG SDH & OCS Products Configuration**
  - OTA31 Hands-on exercise 2d
Target Audience

Hybrid MSTP network operation center engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system

Objectives

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

- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Outline the QinQ application scenarios of OptiX Hybrid MSTP
- Describe the basic concepts of PWE3
- Outline the typical PWE3 encapsulation format for Ethernet
- Outline the typical PWE3 encapsulation format for TDM E1
- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Configure OptiX Hybrid MSTP products
- Configure the protection of TDM plane & packet transport plane for the network and equipment
- Configure the common services for the TDM plane
- Configure the E-Line/E-LAN/E-AGGR service in the packet transport plane
- Outline the QoS model
- Describe QoS basic concepts
- Outline the key technology in QoS
- Describe the typical QoS application in Hybrid MSTP network
- Configure QoS in Hybrid MSTP system according to the service demand
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Describe the working mechanism and application scene of MPLS OAM
- Describe the working mechanism and application scene of MPLS-TP OAM
- Describe the working mechanism and application scene of PW OAM
- Accomplish the OAM testing
- Locate the fault position when error reports
- Describe the operation environment of NMS
- List the maintenance tasks for Hybrid MSTP equipment
- Perform the basic maintenance operations for Hybrid MSTP equipment
● Complete the maintenance records
● Describe the network applications of the OptiX NG SDH & OCS equipment
● Explain the system structure and features of the OptiX NG SDH & OCS equipment
● Outline the system protection modes of the OptiX NG SDH & OCS equipment
● State the main functions of the cards in the OptiX NG SDH & OCS equipment
● Describe OptiX Hybrid MSTP product networking
● Outline the protection types of OptiX Hybrid MSTP product
● Classify the service types of Ethernet
● Outline the types and applications of Ethernet
● Accomplish the network protection and SDH service configuration through NMS
● Outline the classification of Ethernet service
● Explain the function and applications of different types Ethernet service
● List the main Ethernet boards of OptiX NG SDH & OCS equipment
● Describe the functions and application of the Ethernet boards of OptiX NG SDH & OCS equipment
● Describe the features of the Ethernet boards
● Accomplish the Ethernet service EPL/EVPL/EPLAN configuration through NMS
● State the purpose of Ethernet performance testing
● List the common indices of Ethernet service performance testing
● Explain the concepts of common testing indices
● Outline the testing methods of Ethernet service performance testing
● Implement the Ethernet performance testing and analyze the result

Training Content

ONU01 U2000 System Introduction
● iManager U2000-T System Introduction
  ■ Telecommunications Management Network Concept
  ■ Network Management Layer of U2000
  ■ U2000 System Architecture
  ■ Interfaces of U2000
  ■ Managed Equipment of U2000
  ■ Hardware and Software Requirement
  ■ The User Interface of U2000
  ■ Processes of U2000
  ■ NMS Maintenance Suite: MSuite
  ■ License Introduction
  ■ Directory Structure of U2000

OTA10 OptiX SDH Ethernet Operation and Maintenance
● Ethernet Service Introduction
  ■ Basic Concepts
  ■ EPL
  ■ EVPL
EPLAN
EVPLAN

OptiX NG SDH & OCS Ethernet Boards Description & Application
- Ethernet Transparent Transmission Boards
- Ethernet L2 Switching Boards
- Ethernet RPR Boards
- Ethernet Service Switching Boards
- Ethernet Interface Boards
- MPLS (Multi-Protocol Label Switching)
- QinQ (VLAN stacking and nesting technology)
- LCAS (Link Capacity Adjustment Scheme)
- LPT (Link State Pass Through)
- STP/RSTP (Spanning Tree Protocol/Rapid STP)
- IGMP Snooping (Internet Group Management Protocol Snooping)
- CAR (Committed Access Rate)
- Traffic Shaping
- ETH-OAM (Ethernet Operations, Administration and Maintenance)
- Ethernet Board Protection

OptiX OSN 1500250035007500 U2000 Ethernet Configuration Practice Tasks
- Configuring EPL Services
- Configuring PORT-Shared EVPL (VLAN) Services
- Configuring VCTRUNK-Shared EVPL (VLAN) Services
- Configuring Ingress/Egress EVPL (MPLS) Services
- Configuring EPLAN Services (IEEE 802.1d Bridge)
- Configuring EVPLAN Services (IEEE 802.1q Bridge)

Ethernet Performance Testing
- State the purpose of Ethernet performance testing
- List the common indices of Ethernet service performance testing
- Explain the concepts of common testing indices
- Outline the testing methods of Ethernet service performance testing
- Categories of Ethernet
- Basic principle of Ethernet
- Ethernet port Technology
- VLAN basis & L2 Switching

Ethernet Performance Testing Practice Task
- Ethernet performance testing and analyzing

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)

OptiX OSN 1500250035007500 Hardware Description
- OptiX OSN 1500250035007500 Product Introduction
- Cabinet, Sub-rack
- Boards
- Common Network Elements and Configuration
Features

- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features

OTA31 OptiX NG SDH & OCS Products Configuration

- OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
  - 1+1 Linear MS Protection Configuration
  - 1:1 Linear MS Protection Configuration
  - Two-fiber Bidirectional MS Protection Ring Configuration
  - SNCP Ring with Non-protection Chain Configuration

- OptiX OSN 1500250035007500 U2000 Configuration Guide (SDH)

OTA45 Hybrid MSTP Technology Introduction

- OptiX Hybrid MSTP Technologies Introduction
  - TCP/IP Protocol Overview
  - IP Address Introduction and Configuration
  - MPLS Overview
  - MPLS LSP Introduction
  - MPLS-TP Introduction
  - MPLS Tunnel Network Application
  - QinQ Overview
  - PWE3 Overview
  - Ethernet PWE3
  - TDM E1 PWE3

OTA46 Hybrid MSTP Network Application

- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction(E-Line, E-LAN, E-AGGR, TDM E1, MS-PW)
  - MPLS-TP Protection

OTA49 OptiX Hybrid MSTP Products Configuration

- OptiX OSN 15003500(Hybrid MSTP) U2000 Configuration Guide (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection

- OptiX OSN 15003500(Hybrid MSTP) U2000 Configuration Tasks (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection

OTA50 OptiX Hybrid MSTP Features Application

- OptiX Hybrid MSTP QoS Practice Guide
Configure QoS in Hybrid MSTP system according to the service demand

- OptiX Hybrid MSTP OAM Introduction
  - MPLS OAM
  - MPLS-TP OAM

- OptiX Hybrid MSTP OAM Introduction (Manual)
  - MPLS OAM
  - MPLS-TP OAM

- OptiX Hybrid MSTP OAM Practice Guide
  - MPLS OAM Configuration and testing

- OptiX Hybrid MSTP QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment

- OptiX Hybrid MSTP QoS Introduction (Manual)
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment

OTA51 OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance

- OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

Duration

15 working days

Class Size

Min 6, Max 12
1.15.15 OptiX NG SDH Equipment (Packet+TDM) 2nd Line Maintenance Training

Training Path

1. OptiX NG SDH & OCS Hardware Description (TDM)
   - OTA29 Lecture 1.5d

2. OptiX SDH Ethernet Operation and Maintenance
   - OTA10 Lecture, Lab, E-lab 3d

3. OptiX NG SDH & OCS Products Configuration
   - OTA31 Lab, E-lab 2d

4. OptiX SDH System Troubleshooting
   - OTA14 Lecture, Lab, E-lab 2d

5. Hybrid MSTP Technology Introduction
   - OTA45 Lecture 1d

6. Hybrid MSTP Network Application
   - OTA46 Lecture 1d

7. OptiX Hybrid MSTP Products Configuration
   - OTA49 Lab, E-lab 3d

8. OptiX Hybrid MSTP Features Application
   - OTA50 Lecture, Lab, E-lab 2d

9. OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
   - OTA51 Lecture, Lab, E-lab 1d
Target Audience

Hybrid MSTP operation and maintenance engineer

Prerequisites

- Having working experience in transport network
- Be familiar with Windows operating system

Objectives

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

- Describe the classification of IP addresses
- Describe the basic concepts of MPLS
- Describe the basic concepts of MPLS-TP
- Outline the QinQ application scenarios of OptiX Hybrid MSTP
- Describe the basic concepts of PWE3
- Outline the typical PWE3 encapsulation format for Ethernet
- Outline the typical PWE3 encapsulation format for TDM E1
- Configure OptiX Hybrid MSTP products
- Configure the protection of TDM plane & packet transport plane for the network and equipment
- Configure the common services for the TDM plane
- Configure the E-Line/E-LAN/E-AGGR service in the packet transport plane
- Outline the QoS model
- Describe QoS basic concepts
- Outline the key technology in QoS
- Describe the typical QoS application in Hybrid MSTP network
- Configure QoS in Hybrid MSTP system according to the service demand
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Describe the working mechanism and application scene of MPLS OAM
- Describe the working mechanism and application scene of MPLS-TP OAM
- Describe the working mechanism and application scene of PW OAM
- Accomplish the OAM testing
- Locate the fault position when error reports
- Describe the operation environment of NMS
- List the maintenance tasks for Hybrid MSTP equipment
- Perform the basic maintenance operations for Hybrid MSTP equipment
- Complete the maintenance records
- Describe OptiX Hybrid MSTP product networking
• Outline the protection types of OptiX Hybrid MSTP product
• Classify the service types of Ethernet
• Outline the types and applications of Ethernet
• List the common analysis methods of packet network fault locating
• Outline the fault handling flow
• Analyze the typical faults: service interruption, APS switching failed, OAM errors, etc.
• Illustrate the application of common troubleshooting methods for packet network
• Analyze common fault of the Hybrid MSTP network
• Describe the network applications of the OptiX NG SDH & OCS equipment
• Explain the system structure and features of the OptiX NG SDH & OCS equipment
• Outline the system protection modes of the OptiX NG SDH & OCS equipment
• State the main functions of the cards in the OptiX NG SDH & OCS equipment
• Accomplish the network protection and SDH service configuration through NMS
• Outline the classification of Ethernet service
• Explain the function and applications of different types Ethernet service
• List the main Ethernet boards of OptiX NG SDH & OCS equipment
• Describe the functions and application of the Ethernet boards of OptiX NG SDH & OCS equipment
• Describe the features of the Ethernet boards
• Accomplish the Ethernet service EPL/EVPL/EPLAN configuration through NMS
• State the purpose of Ethernet performance testing
• List the common indices of Ethernet service performance testing
• Explain the concepts of common testing indices
• Outline the testing methods of Ethernet service performance testing
• Implement the Ethernet performance testing and analyze the result
• List the common analysis methods of fault locating
• Outline the fault handling flow
• Analyze the typical faults: traffic interruption, error bit, etc.
• Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc.
• Analyze common faulty of the network consist of OptiX NG SDH & OCS series
• Locate and eliminate faults, get experience from troubleshooting practice

Training Content

OTA10 OptiX SDH Ethernet Operation and Maintenance

• Ethernet Service Introduction
  ▪ Basic Concepts
  ▪ EPL
  ▪ EVPL
  ▪ EPLAN
  ▪ EVPLAN

• OptiX NG SDH & OCS Ethernet Boards Description & Application
- Ethernet Transparent Transmission Boards
- Ethernet L2 Switching Boards
- Ethernet RPR Boards
- Ethernet Service Switching Boards
- Ethernet Interface Boards
- MPLS (Multi-Protocol Label Switching)
- QinQ (VLAN stacking and nesting technology)
- LCAS (Link Capacity Adjustment Scheme)
- LPT (Link State Pass Through)
- STP/RSTP (Spanning Tree Protocol/Rapid STP)
- IGMP Snooping (Internet Group Management Protocol Snooping)
- CAR (Committed Access Rate)
- Traffic Shaping
- ETH-OAM (Ethernet Operations, Administration and Maintenance)
- Ethernet Board Protection

- OptiX OSN 1500250035007500 U2000 Ethernet Configuration Practice Tasks
  - Configuring EPL Services
  - Configuring PORT-Shared EVPL (VLAN) Services
  - Configuring VCTRUNK-Shared EVPL (VLAN) Services
  - Configuring Ingress/Egress EVPL (MPLS) Services
  - Configuring EPLAN Services (IEEE 802.1d Bridge)
  - Configuring EVPLAN Services (IEEE 802.1q Bridge)

- Ethernet Performance Testing
  - State the purpose of Ethernet performance testing
  - List the common indices of Ethernet service performance testing
  - Explain the concepts of common testing indices
  - Outline the testing methods of Ethernet service performance testing
  - Categories of Ethernet
  - Basic principle of Ethernet
  - Ethernet port Technology
  - VLAN basis & L2 Switching

- Ethernet Performance Testing Practice Task
  - Ethernet performance testing and analyzing

OTA14 OptiX SDH System Troubleshooting
- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

- OptiX NG SDH & OCS Series Classified Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples
- OptiX NG SDH & OCS Series Classified Troubleshooting Practice Task
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the classified trouble, include NMS trouble, ECC problem, service interrupt, bit error, etc
  - Summary

OTA29 OptiX NG SDH & OCS Hardware Description (TDM)
- OptiX OSN 1500250035007500 Hardware Description
  - OptiX OSN 1500250035007500 Product Introduction
  - The Cabinet, Sub-rack of OptiX OSN 1500250035007500
  - The Boards of OptiX OSN 1500250035007500
  - Common Network Elements and Configuration
  - Features
- OptiX OSN 7500 II Hardware Description
  - OptiX OSN 7500II Product Introduction
  - Cabinet, Sub-rack, Boards
  - Equipment Features of OptiX OSN 7500II
- OptiX OSN 9500 Hardware Description
  - OptiX OSN 9500 Product Introduction
  - Cabinet, Sub-rack, Boards
  - The Cabinet, Sub-rack, Boards of OptiX OSN 9500
  - Equipment Features of OptiX OSN 9500

OTA31 OptiX NG SDH & OCS Products Configuration
- OptiX OSN 1500250035007500 U2000 General Configuration Practice Tasks
  - 1+1 Linear MS Protection Configuration
  - 1:1 Linear MS Protection Configuration
  - Two-fiber Bidirectional MS Protection Ring Configuration
  - SNCP Ring with Non-protection Chain Configuration
- OptiX OSN 1500250035007500 U2000 Configuration Guide (SDH)

OTA45 Hybrid MSTP Technology Introduction
- OptiX Hybrid MSTP Technologies Introduction
  - TCP/IP Protocol Overview
  - IP Address Introduction and Configuration
  - MPLS Overview
  - MPLS LSP Introduction
  - MPLS-TP Introduction
  - MPLS Tunnel Network Application
  - QinQ Overview
  - PWE3 Overview
  - Ethernet PWE3
  - TDM E1 PWE3
OTA46 Hybrid MSTP Network Application
- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction (E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

OTA49 OptiX Hybrid MSTP Products Configuration
- OptiX OSN 15003500 (Hybrid MSTP) U2000 Configuration Guide (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection
- OptiX OSN 15003500 (Hybrid MSTP) U2000 Configuration Tasks (Packet Transport Plane)
  - Configuring E-Line Services
  - Configuring E-LAN Services
  - Configuring E-AGGR Services
  - Configuration Task Collection

OTA50 OptiX Hybrid MSTP Features Application
- OptiX Hybrid MSTP QoS Practice Guide
  - Configure QoS in Hybrid MSTP system according to the service demand
- OptiX Hybrid MSTP OAM Introduction
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Introduction (Manual)
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Practice Guide
  - MPLS OAM Configuration and testing
  - MPLS-TP OAM Configuration and testing
- OptiX Hybrid MSTP QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment
- OptiX Hybrid MSTP QoS Introduction (Manual)
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS in MSTP+ Equipment

OTA51 OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
- OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
OTA54 OptiX Hybrid MSTP System Troubleshooting

- OptiX Hybrid MSTP System Troubleshooting Methods
  - OptiX Hybrid MSTP troubleshooting preparation
  - OptiX Hybrid MSTP troubleshooting method
  - OptiX Hybrid MSTP troubleshooting analyze ideas
  - OptiX Hybrid MSTP troubleshooting case study

- OptiX Hybrid MSTP System Troubleshooting Instructor Guide
- OptiX Hybrid MSTP System Troubleshooting Practice Task
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the classified trouble, include Ethernet service interrupt, packet loss, etc
  - Summary

Duration

18 working days

Class Size

Min 6, Max 12
1.15.16 OptiX OSN 500/550/580 (TDM) Operation and Maintenance Training

Training Path

Target Audience

OptiX OSN 500/550/580 operation and maintenance engineer

Prerequisites

- Having experience in the operation and maintenance of optical network equipment
- Be familiar with Windows operating system

Objectives

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

- Appreciate the networking applications of the OptiX OSN 500/550/580 (TDM)
- Describe the system structure and features of the OptiX OSN 500/550/580 (TDM)
- Describe the main functions of the boards used on the OptiX OSN 500/550/580 (TDM)
- Outline the system protection schemes of the OptiX OSN 500/550/580 (TDM)
- Outline the operation environment of OptiX OSN 500/550/580 series equipment
- List the status description of OptiX OSN 500/550/580 equipment indicators
- List the maintenance items of OptiX OSN 500/550/580 equipment
- Perform the basic maintenance operations of OptiX OSN 500/550/580 equipment
- Complete the maintenance records of OptiX OSN 500/550/580 equipment
- Configure protection attributes in OSN 500/550/580 network, such as SNCP, LMP, RMP etc
- Configure services of OSN 500/550/580
Training Content

OTA60 OptiX OSN 500/550/580 (TDM) Hardware & Networking

- OptiX OSN 500/550/580 (TDM) Hardware Description
  - OptiX OSN 500/550/580 Product Introduction
  - OptiX OSN 500/550/580 Chassis
  - OptiX OSN 500/550/580 Boards
  - OptiX OSN 500/550/580 Features

- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection

OTA61 OptiX OSN 500/550/580 (TDM) Routine & Maintenance

- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records

- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide

- OptiX SDH Series NMS Side Operation and Maintenance
  - Routine Maintenance for NMS
  - Routine Maintenance Operations for Network through NMS

OTA62 OptiX OSN 500/550/580 (TDM) Service & Configuration

- OptiX OSN 500/550/580 TDM (E1) Service Configuration
  - Protection attributes configuration
  - TDM service configuration

- OptiX OSN 500/550/580 TDM (Ethernet) Service Configuration
  - Ethernet service configuration
  - EVPL service configuration
  - EPLAN service configuration
  - EVPLAN service configuration

- Ethernet Service Introduction
  - Basic Concepts
OTA63 OptiX OSN 500/550/580 (TDM) Troubleshooting

- OptiX SDH System Troubleshooting
  - Troubleshooting Preparation
  - Troubleshooting Idea and Methods
  - Classified Troubleshooting Examples

Duration

4 working days

Class Size

Min 6, Max 12
1.15.17  OptiX OSN 500/550/580 (Packet) Operation and Maintenance Training

Training Path

Target Audience
- OptiX OSN 500/550/580 operation and maintenance engineer

Prerequisites
- Having experience in the operation and maintenance of optical network equipment
- Be familiar with Windows operating system

Objectives
On completion of this program, the participants will be able to:
- Appreciate the networking applications of the OptiX OSN 500/550/580(Packet)
- Describe the system structure and features of the OptiX OSN 500/550/580 (Packet)
- Describe the main functions of the boards used on the OptiX OSN 500/550/580(Packet)
- Outline the system protection schemes of the OptiX OSN 500/550/580(Packet)
- Outline the operation environment of OptiX OSN 500/550/580 series Equipment
- List the status description of OptiX OSN 500/550/580 Equipment indicators
- List the maintenance items of OptiX OSN 500/550/580 Equipment
- Perform the basic maintenance operations of OptiX OSN 500/550/580 Equipment
- Complete the maintenance records of OptiX OSN 500/550/580 Equipment
- Configure MPLS APS/MRPS protection attributes in OSN 500/550/580 network
- Configure packet services on OSN 500/550/580

Training Content

OTA64 OptiX OSN 500/550/580 (Packet) Hardware & Networking
- OptiX OSN 500/550/580 (Packet) Hardware Description
  - OptiX OSN 500/550/580 Product Introduction
  - OptiX OSN 500/550/580 Chassis
  - OptiX OSN 500/550/580 Boards
  - OptiX OSN 500/550/580 Features
- OptiX Hybrid MSTP Networking & Service Introduction
  - Hybrid MSTP Networking
  - Hybrid MSTP Service Introduction (E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  - MRPS (MPLS-TP Ring Protection Switch)

OTA65 OptiX OSN 500/550/580 (Packet) Routine & Maintenance
- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records
- OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operations
  - Equipment Operation and Maintenance Guide
- OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  - NMS Side Routine Maintenance Items
  - Daily Maintenance Items
  - Monthly Maintenance Items
  - Quarterly Maintenance Items
  - Other NMS Side Operation

OTA66 OptiX OSN 500/550/580 (Packet) Service & Configuration
- OptiX OSN 500/550/580 Packet Service Configuration
  - Protection attributes configuration
  - CES service configuration
  - E-Line service configuration
  - VPLS service configuration

OTA67 OptiX OSN 500/550/580 (Packet) Special Topic
- OptiX Hybrid MSTP OAM Introduction
- MPLS OAM
- MPLS-TP OAM
- OptiX Hybrid MSTP OAM Practice Guide
  - MPLS OAM Configuration and testing
  - MPLS-TP OAM Configuration and testing
- OptiX OSN 500/550/580 QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS on OSN 500/550/580 Equipment
- OptiX OSN 500/550/580 QoS Practice Guide
  - QoS configuration

OTA68 OptiX OSN 500/550/580 (Packet) Troubleshooting
- OptiX Hybrid MSTP System Troubleshooting Methods and Case Analysis
  - OptiX Hybrid MSTP troubleshooting preparation
  - OptiX Hybrid MSTP troubleshooting method
  - OptiX Hybrid MSTP troubleshooting analyze ideas
  - OptiX Hybrid MSTP troubleshooting case study

Duration

5 working days

Class Size

Min 6, Max 12
1.15.18  OptiX OSN 500/550/580 (Packet+TDM) Operation and Maintenance Training

Training Path

- OptiX OSN 500/550/580 (TDM) Hardware & Networking
  - OTA60  Lecture  1.5d

- OptiX OSN 500/550/580 (Packet) Hardware & Networking
  - OTA64  Lecture  1.5d

- OptiX OSN 500/550/580 (Packet) Special Topic
  - OTA67  Lecture, Lab, E-lab  1d

- OptiX OSN 500/550/580 (TDM+Packet) Service & Configuration
  - OTA69  Lecture, Lab, E-lab  1.5d

- OptiX OSN 500/550/580 (TDM) Troubleshooting
  - OTA63  Lecture, Lab, E-lab  0.5d

- OptiX OSN 500/550/580 (TDM) Routine & Maintenance
  - OTA61  Lecture, Lab, E-lab  0.5d

- OptiX OSN 500/550/580 (Packet) Troubleshooting
  - OTA68  Lecture, Lab, E-lab  0.5d

- OptiX OSN 500/550/580 (Packet) Routine & Maintenance
  - OTA65  Lecture, Lab, E-lab  1d

Target Audience

OptiX OSN 500/550/580 operation and maintenance engineer
Prerequisites

- Having experience in the operation and maintenance of optical network equipment
- Be familiar with Windows operating system

Objectives

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

- Appreciate the networking applications of the OptiX OSN 500/550/580(TDM+Packet)
- Describe the system structure and features of the OptiX OSN 500/550/580 (TDM+Packet)
- Describe the main functions of the boards used on the OptiX OSN 500/550/580(TDM+Packet)
- Outline the system protection schemes of the OptiX OSN 500/550/580(TDM+Packet)
- Outline the operation environment of OptiX OSN 500/550/580 series equipment
- List the status description of OptiX OSN 500/550/580 equipment indicators
- List the maintenance items of OptiX OSN 500/550/580 equipment
- Perform the basic maintenance operations of OptiX OSN 500/550/580 equipment
- Complete the maintenance records of OptiX OSN 500/550/580 equipment
- Configure MPLS APS/MRPS protection, SNCP, LMP, RMP etc attributes in OSN 500/550/580 network
- Configure services of OSN 500/550/580(TDM+Packet)

Training Content

OTA60 OptiX OSN 500/550/580 (TDM) Hardware & Networking

- OptiX OSN 500/550/580 (TDM) Hardware Description
  - OptiX OSN 500/550/580 Product Introduction
  - OptiX OSN 500/550/580 Chassis
  - OptiX OSN 500/550/580 Boards
  - OptiX OSN 500/550/580 Features

- SDH Networking and Protection
  - Optical networking introduction
  - Classification of topologies
  - Sub-networks
  - Survivable networks introduction
  - Types of protection

OTA61 OptiX OSN 500/550/580 (TDM) Routine & Maintenance

- OptiX SDH Series Equipment Operation and Maintenance
  - Safety labels
  - Laser precautions
  - Electrical precautions
  - Precautions for Board Handling
  - Precautions for Fiber Handling
  - Equipment Operation Environment Monitoring
  - Equipment Maintenance Operation
  - Equipment Maintenance Records
• OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  ■ Equipment Operation Environment Monitoring
  ■ Equipment Maintenance Operations
  ■ Equipment Operation and Maintenance Guide
• OptiX SDH Series NMS Side Operation and Maintenance
  ■ Routine Maintenance for NMS
  ■ Routine Maintenance Operations for Network through NMS

OTA63 OptiX OSN 500/550/580 (TDM) Troubleshooting
• OptiX SDH System Troubleshooting
  ■ Troubleshooting Preparation
  ■ Troubleshooting Idea and Methods
  ■ Classified Troubleshooting Examples

OTA64 OptiX OSN 500/550/580 (Packet) Hardware & Networking
• OptiX OSN 500/550/580 (Packet) Hardware Description
  ■ OptiX OSN 500/550/580 Product Introduction
  ■ OptiX OSN 500/550/580 Chassis
  ■ OptiX OSN 500/550/580 Boards
  ■ OptiX OSN 500/550/580 Features
• OptiX Hybrid MSTP Networking & Service Introduction
  ■ Hybrid MSTP Networking
  ■ Hybrid MSTP Service Introduction(E-Line, E-LAN, E-AGGR, CES E1, MS-PW)
  ■ MRPS (MPLS-TP Ring Protection Switch)

OTA65 OptiX OSN 500/550/580 (Packet) Routine & Maintenance
• OptiX SDH Series Equipment Operation and Maintenance
  ■ Safety labels
  ■ Laser precautions
  ■ Electrical precautions
  ■ Precautions for Board Handling
  ■ Precautions for Fiber Handling
  ■ Equipment Operation Environment Monitoring
  ■ Equipment Maintenance Operation
  ■ Equipment Maintenance Records
• OptiX SDH Series Equipment Operation and Maintenance Practice Guide
  ■ Equipment Operation Environment Monitoring
  ■ Equipment Maintenance Operations
  ■ Equipment Operation and Maintenance Guide
• OptiX Hybrid MSTP Equipment NMS Side Operation and Maintenance
  ■ NMS Side Routine Maintenance Items
  ■ Daily Maintenance Items
  ■ Monthly Maintenance Items
  ■ Quarterly Maintenance Items
  ■ Other NMS Side Operation
OTA67 OptiX OSN 500/550/580 (Packet) Special Topic
- OptiX Hybrid MSTP OAM Introduction
  - MPLS OAM
  - MPLS-TP OAM
- OptiX Hybrid MSTP OAM Practice Guide
  - MPLS OAM Configuration and testing
  - MPLS-TP OAM Configuration and testing
- OptiX OSN 500/550/580 QoS Introduction
  - QoS Overview
  - QoS Models
  - QoS Technology
  - Application of QoS on OSN 500/550/580 Equipment
- OptiX OSN 500/550/580 QoS Practice Guide
  - QoS configuration

OTA68 OptiX OSN 500/550/580 (Packet) Troubleshooting
- OptiX Hybrid MSTP System Troubleshooting Methods and Case Analysis
  - OptiX Hybrid MSTP troubleshooting preparation
  - OptiX Hybrid MSTP troubleshooting method
  - OptiX Hybrid MSTP troubleshooting analyze ideas
  - OptiX Hybrid MSTP troubleshooting case study

OTA69 OptiX OSN 500/550/580 (TDM+Packet) Service & Configuration
- OptiX OSN 500/550/580 TDM (E1) Service Configuration
  - Protection attributes configuration
  - TDM service configuration
- OptiX OSN 500/550/580 Packet Service Configuration
  - Protection attributes configuration
  - CES service configuration
  - E-Line service configuration
  - VPLS service configuration

Duration

8 working days

Class Size

Min 6, Max 12
1.15.19 OptiX SDH Ethernet Advanced Operation and Maintenance Training

Training Path

OptiX SDH Ethernet Advanced Operation & Maintenance
OTA42 Lecture, Lab, E-lab 4d

Target Audience

Ethernet over SDH equipment senior operation and maintenance engineer

Prerequisites

- Be familiar with NMS
- Be familiar with OptiX SDH service configuration and maintenance
- Be familiar with the Ethernet service configuration and maintenance
- Upon completion of OTA03 Ethernet Basics course or having equivalent knowledge

Objectives

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

- Describe the working mechanism of the L2 switching
- Interpret the basic of QoS
- Outline the key technology in QoS
- Describe the typical QoS application
- Describe the frame structure of MPLS
- Interpret the basic of QinQ
- List the application of MPLS and QinQ
- Describe the working mechanism of virtual concatenation
- Describe the function of LCAS
- Illustrate the GFP-F frame structure for the Ethernet signal
- Describe the troubleshooting idea and methods
- Analyze the common faults locating
- Outline the procedures of Ethernet troubleshooting
- Analyze the failure of the Ethernet service
- Locate the faulty of the Ethernet service
- Compare the function of Ethernet port and service OAM
- Outline the typical application scenario of Ethernet service OAM
- Accomplish the OAM testing
- Locate the fault position when error reports

Training Content

OTA42 OptiX SDH Ethernet Advanced Operation & Maintenance
- OptiX NG SDH Ethernet OAM Introduction
  - Ethernet Port OAM
- Ethernet Service OAM
- OptiX NG SDH Ethernet OAM Introduction (Manual)
  - Ethernet Port OAM
  - Ethernet Service OAM
- OptiX NG SDH Ethernet OAM Practice Guide
  - ETH OAM Configuration and testing
- Advanced Ethernet Troubleshooting Introduction
  - Ethernet troubleshooting cases analyze
- OptiX Ethernet QoS Introduction
  - L2 Switch Principle
  - QinQ Introduction
  - QoS Definition and Function
  - CAR Definition, Mechanism and Application
  - CoS Definition, Mechanism and Application
  - Difference between CAR and CoS
  - Shapping Definition, Mechanism and Application
  - Queue Classification and Mechanism
- OptiX Ethernet Layer 2 Switching Introduction
  - MPLS Overview
  - MPLS Work Mode
  - MPLS Network and Application
  - QinQ Overview
  - QinQ Process Mode
  - QinQ Network and Application
  - Comparison between MPLS and QinQ
- EoS Concatenation & Encapsulation Introduction
  - Contiguous Concatenation
  - Virtual Concatenation
  - LCAS
  - Encapsulation Technology
- OptiX Ethernet Maintenance & Troubleshooting
  - Background Knowledge
  - Ethernet Maintenance Operations
  - Ethernet Troubleshooting Idea and Method
  - Common Reasons of Ethernet Service Problem
  - Common Troubleshooting Cases
- OptiX Ethernet Maintenance & Troubleshooting Practice Task
  - Troubleshooting Requirement
  - Collection the trouble phenomenon
  - Analyze the possible reason
  - Locate the trouble
  - Test the service
Summary

Duration

4 working days

Class Size

Min 6, Max 12
1.15.20 OptiX ASON(SDH) Operation and Maintenance Training

Training Path

ASON Basics
OTA07 Lecture 1d

ASON Operation and Maintenance
OTA12 Lecture, Lab, E-lab 2d

Target Audience
ASON operation and maintenance engineer

Prerequisites
- Having a general knowledge of SDH basics
- Be familiar with NMS
- Be familiar with SDH service configuration and maintenance

Objectives
On completion of this program, the participants will be able to:
- Implement the creation of ASON network
- Create SLA services and test the protection and restoration of them
- Conduct the maintenance operation of ASON network
- Explain the operation precaution of ASON
- Explain the fault reported by the ASON network
- Outline the methods of ASON troubleshooting
- Solve the typical ASON trouble
- Outline the standards of ASON
- Illustrate the structure of ASON
- Describe the networking characters of ASON
- Explain the service characters of ASON

Training Content
OTA07 ASON Basics
- ASON Introduction
  - Background of ASON
  - System Structure of ASON
  - Networking Characters of ASON
  - Service Characters of ASON
  - ASON Network Functions
OTA12 ASON Operation and Maintenance

- ASON Configuration Practice Guide
  - ASON Enabling
  - Service Configuration
  - ASON Maintenance and Management

- ASON Maintenance
  - Intelligent Abnormal Events
  - Intelligent Link Management
  - Intelligent Services Management
  - Single Station ASON Items Check
  - ASON NE Database Backup
  - Precautions on Software Configuration
  - Precautions on Hardware Operations
  - Precautions on NMS Operations

- ASON Troubleshooting
  - ASON Troubleshooting Idea and Method
  - Control Plane Troubleshooting
  - Service Plane Troubleshooting

Duration

3 working days

Class Size

Min 6, Max 12
1.15.21  TP-Assist Operation and Maintenance Training (Hybrid MSTP)

Training Path

TP-Assist Operation and Maintenance
OTA70  Lecture, Lab, E-lab  1d

Target Audience

Hybrid MSTP Maintenance Engineer

Prerequisites

- Having basic knowledge for Hybrid MSTP equipment or completed OptiX NG SDH Equipment (Packet) 2nd Line Maintenance Training

Objectives

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

- Describe the application scenarios of TP-Assist features
- Outline the application functions of TP-Assist features
- Complete TP-Assist configuration and test

Training Content

OTA70 TP-Assist Operation and Maintenance

- TP-Assist Introduction
  - IP Ping
  - Loopback Test
  - Ethernet Port Half-Duplex Alarm
  - Intelligent Fault Detection
  - TP-Assist Performance Alarm
  - Throughput Test

- TP-Assist Practice Guide
  - TP-Assist practice

Duration

1 working day

Class Size

Min 6, Max 12
## 1.16 Transmission Network OSS Training

### 1.16.1 iManager U2000 Monitoring Training (Transmission Network only)

**Training Path**

<table>
<thead>
<tr>
<th>U2000 System Introduction</th>
<th>ONU01 Lecture 0.5d</th>
</tr>
</thead>
<tbody>
<tr>
<td>U2000 Alarm and Performance Management</td>
<td>ONU02 Lecture 0.5d</td>
</tr>
</tbody>
</table>

**Target Audience**

U2000 operator and maintainer

**Prerequisites**

- Having the basic knowledge of network management
- Having the basic principle and equipment knowledge of Transmission network

**Objectives**

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

- Describe the architecture and main features of U2000
- Describe the directory structure of U2000
- Describe the main functions of U2000
- Describe the basic concepts in alarm and performance management of U2000
- Perform the browse and setting operation for alarm
- Perform the basic response operation for common alarm events
- Perform the browse and setting operation for performance events

**Training Content**

ONU01 U2000 System Introduction

- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
  - Processes of U2000
NMS Maintenance Suite: MSuite
License Introduction
Directory Structure of U2000

ONU02 U2000 Alarm and Performance Management

- iManager U2000-T Alarm and Performance
  - Alarm Severity and Category
  - Alarm Status
  - Alarm Viewing and Operations
  - Alarm Template
  - Alarm Setting Operations
  - Alarm Dumping
  - Performance Events Type
  - Performance Monitoring Setting
  - Performance Viewing Operations
  - Performance Data Dumping

Duration

1 working day

Class Size

Min 6, Max 16
1.16.2 iManager U2000 LCT Operation Training

Training Path

<table>
<thead>
<tr>
<th>iManager U2000 LCT Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONU12 Lecture, Lab 1d</td>
</tr>
</tbody>
</table>

Target Audience

U2000 LCT user

Prerequisites

- Having the basic knowledge of Windows OS

Objectives

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

- List the main menus of iManager U2000 LCT
- Perform the NE configuration, service configuration for NG SDH equipment via U2000 LCT
- Perform the routine maintenance via U2000 LCT
- 

Training Content

ONU12 iManager U2000 LCT Operation

- U2000 LCT Operations for NG SDH Equipment
  - Network Position of U2000 LCT
  - Login U2000 LCT
  - Service Configuration of NG SDH Equipment
  - Routine Maintenance for NG SDH Equipment

Duration

1 working day

Class Size

Min 6, Max 16
1.16.3 iManager N2510 OLS Operation and Maintenance Training (Transmission)

Training Path

ONU16 iManager N2510 OLS System Overview (Transmission) Lecture 0.5d

ONU17 iManager N2510 OLS System Operation and Maintenance (Transmission) Lab, E-lab 0.5d

Target Audience

N2510 Maintenance Engineer

Prerequisites

- Having the basic knowledge of NMS

Objectives

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

- Describe iManager N2510 OLS networking and application
- Outline iManager N2510 OLS solution of fiber optic transmission monitoring
- Describe iManager N2510 OLS hardware and feature
- Describe iManager N2510 OLS function
- Perform iManager N2510 OLS operation and maintenance for transmission networks
- Perform iManager N2510 OLS test and analysis for transmission networks

Training Content

ONU16 iManager N2510 OLS System Overview (Transmission)

- iManager N2510 OLS Solution Overview
  - Challenges of Fiber Operation and Maintenance in Fixed Networks
  - N2510 System Introduction
  - N2510 OLS Application for Transmission Networks
  - N2510 OLS Fiber Fault Diagnosis and Location
  - N2510 OLS Fiber Monitoring

- iManager N2510 OLS Hardware and Network
  - N2510 OLS Overview
  - N2510 OLS Hardware
  - N2510 OLS Device Networking

ONU17 iManager N2510 OLS System Operation and Maintenance (Transmission)

- iManager N2510 Operation and Maintenance Practice Guide
  - Basic operations
  - Dark fiber test
- Active fiber test
- Other operations

Duration

1 working day

Class Size

Min 6, Max 12
1.16.4 iManager U2000 Operation and Maintenance Training for NOC FO (Transmission)

Training Path

Target Audience

NOC FO and U2000 Maintenance Engineer

Prerequisites

- Having the basic knowledge of NMS

Objectives

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

- Describe the directory structure of U2000
- Describe the main functions of U2000
- Describe the basic concepts in alarm and performance management of U2000
- Perform the browse and setting operation for alarm
- Perform the basic response operation for common alarm events
- Perform the browse and setting operation for performance events
- Outline the function of Huawei network equipment
- List the board type
- Describe the characteristic of the common boards
- List the common alarms of the equipment
- List the common operation for FO

Training Content

ONU18 iManager U2000 Operation and Maintenance for NOC FO

- OptiX OSN Product Introduction
  - OptiX NG SDH overview
  - OptiX NG WDM overview
- iManager U2000-T System Introduction
  - Telecommunications Management Network Concept
  - Network Management Layer of U2000
  - U2000 System Architecture
  - Interfaces of U2000
  - Managed Equipment of U2000
  - Hardware and Software Requirement
  - The User Interface of U2000
- Processes of U2000
- NMS Maintenance Suite
- License Introduction
- Directory Structure of U2000

- **iManager U2000 Basic Configuration for NG SDH**
  - Preparation for OptiX NG SDH data configuration
  - Creating a OptiX NG SDH network

- **iManager U2000 Basic Configuration for NG WDM**
  - Preparation for OptiX NG WDM data configuration
  - Creating a OptiX NG WDM network

- **iManager U2000 Basic Operation for FO**
  - Alarm Severity and Category
  - Alarm Status
  - Alarm Viewing and Operations
  - Performance Events Type
  - Performance Monitoring Setting
  - Performance Viewing Operations

**Duration**

2 working days

**Class Size**

Min 6, Max 12
1.16.5 iManager U2000 Operation and Maintenance Training for NOC BO (Transmission)

Training Path

ONU19 Lecture, Lab, E-lab 3d

Target Audience

NOC BO and U2000 Administrator

Prerequisites

- Complete iManager U2000 Operation and Maintenance Training for NOC FO (Transmission) or
  Having equivalent knowledge of NMS

Objectives

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

- Explain the concept of security management
- Complete the operation of U2000 security management
- Explain the concept of data management
- Complete the operation of U2000 data management
- List U2000 routine maintenance items
- Perform operations of routine maintenance
- Complete routine maintenance for U2000
- List the common analysis methods of fault localization
- Locate U2000 faults
- Complete NG SDH/NG WDM common services configuration and management
- Complete inventory and report management
- Perform Msuite tool common operations

Training Content

ONU19 iManager U2000 Operation and Maintenance for NOC BO

- iManager U2000 Security and Data Management
  - U2000 security management
  - U2000 database management
- iManager U2000 Service Configuration and Management for NG SDH
  - Protection configuration and management
  - TDM configuration and management
  - Ethernet configuration and management
- iManager U2000 Service Configuration and Management for NG WDM
  - Optical layer services configuration and management
- Electrical layer service configuration and management
- Protection configuration and management

- **iManager U2000 Msuite Operation and Maintenance**
  - Start Msuite
  - Msuite common operation and management
  - Msuite operation for HA system

- **iManager U2000 Advance Operation for BO**
  - Routine maintenance for U2000
  - Data backup and restore
  - Inventory and resource management
  - Report management
  - NBI configuration

**Duration**

3 working days

**Class Size**

Min 6, Max 12
1.16.6 iManager U2100 Operation and Maintenance Training

Training Path

| U2100 System Operation and Maintenance | OTD08 Lecture, Lab | 5d |

Target Audience

U2100 administrator and operator

Prerequisites

- Be familiar with Windows operating system and SQL Server
- Having the knowledge of Solaris and Sybase basics

Objectives

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

- List the features and basics of Solaris and Sybase
- Describe the basic command of Solaris and Sybase
- Describe the system structure, management capacity and menus of iManager U2100
- Browse the SDH/WDM/PTN/Hybrid MSTP trail and their alarm through iManager U2100
- Create and delete SDH/WDM/PTN/Hybrid MSTP trail through iManager U2100
- Check the running status of U2100 and perform the routine maintenance
- Perform the U2100 troubleshooting, deal the NMS and network problems with U2000

Training Content

OTD08 U2100 System Operation and Maintenance

- Solaris Operating System Basics
  - Solaris Introduction
  - SUN Workstation Introduction
  - Solaris Commands and Configuration

- Sybase Database Basics
  - Sybase Introduction
  - Basic Operations of Sybase

- iManager U2100 System Introduction
  - The architecture and main features of U2100
  - The directory structure of U2100
  - The main functions of U2100

- iManager U2100 Security and Data Management
  - The concepts of security management
  - The operation of U2100 security management
  - The concept of data management
The operation of U2100 data management

- iManager U2100 Basic Operation Practice Guide
  - U2100 Basic Operation Practice
  - U2100 Security Management Practice
  - U2100 Database Management Practice

- iManager U2100 Routine Maintenance
  - U2100 routine maintenance items
  - The operations of routine maintenance

- iManager U2100 Troubleshooting
  - The common analysis methods of fault localization
  - The typical faults in Windows platform
  - The typical faults in Solaris platform

- iManager U2100 WDM Service Configuration
  - U2100 WDM Protection Subnet Management
  - U2100 WDM Trail Management

- iManager U2100 SDH Service Configuration
  - Data layer of U2100
  - SDH Protection Subnet Management
  - SDH Trail Management
  - Hybrid MSTP Service Configuration

- iManager U2100 PTN Service Configuration
  - PTN Tunnel Configuration
  - PTN PWE3 Configuration
  - PTN E-Line Service Configuration

Duration

5 working days

Class Size

Min 6, Max 12
1.16.7 iManager uTraffic Network Performance Monitoring Training (Transmission Network Only)

Training Path

Target Audience

U2000 Maintenance Engineer and Administrator

Prerequisites

- Having the basic knowledge of NMS

Objectives

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

- Describe the basic concepts in performance management of iManager uTraffic
- Perform the browse and setting operation for performance events
- Describe the IP/Transmission/Access scenario in iManager uTraffic
- Understand the basic parameters in performance management of iManager uTraffic
- Describe the iManager uTraffic troubleshooting

Training Content

ONU20 iManager uTraffic System Introduction

- iManager uTraffic System Introduction
  - uTraffic Overview
  - uTraffic Main Services
  - uTraffic System Architecture
  - uTraffic Management Capability
  - uTraffic Solutions

ONU21 iManager uTraffic Configuration and Performance Management

- iManager uTraffic Configuration and Performance Management (PTN/OTN/RTN)
  - Interconnecting the uTraffic with the U2000
- Report User Management
- Configuring uTraffic Performance Collection
- uTraffic Network Performance Report
- **iManager uTraffic Configuration and Performance Management (PTN/OTN/RTN) Practice Guide**
  - uTraffic Performance Configuration Introduction
  - PTN Performance Configuration
  - OTN Performance Configuration
  - RTN Performance Configuration
- **ONU22 iManager uTraffic Troubleshooting**
  - **iManager uTraffic Troubleshooting**
    - uTraffic Troubleshooting Principles
    - Uploading Performance Data
    - U2000 Interconnection Faults
    - uTraffic Report System Faults
    - Import and Export Faults

**Duration**

2 working days

**Class Size**

Min 6, Max 12
1.17 Transmission Engineer Certification

1.17.1 Huawei Certified Network Associate-Transmission Technologies and Device Training

Training Path

| OTH01 | Transmission Technologies and Device | Lecture, Lab | 15d |

Target Audience

- Personnel who are going to take HCNA HTTD (Huawei Certified Network Associate-Transmission Technologies and Device) exam
- Personnel who expect to learn about basic optical transmission principles and Huawei SDH equipment operation

Prerequisites

- Having a general knowledge of telecommunications

Objectives

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

- Describe SDH working principle
- Describe WDM working principle
- Describe OTN working principle
- Describe Ethernet working principle
- Describe the basic concept of MPLS
- Describe the basic concept of PWE3
- Describe the common SDH network topologies and their features
- Explain the protection mechanism of MSP/SNCP
- Explain the system structure and features of the OptiX OSN 3500 equipment
- State the main functions of the boards in the OptiX OSN 3500 equipment
- Accomplish the SDH network configuration and monitoring through NMS
- Accomplish the PDH service configuration through NMS
- Accomplish the Ethernet service (EPL/EVPL/EPLAN) configuration through NMS
- List the common analysis methods of fault locating

Training Content

OTH01 Transmission Technologies and Device

- Basic Optical Communications Technology (HC)
  - Basic Knowledge of Fiber
  - Passive Optical Components for Fiber Communication
- Basic Optical Communications Technology (Manual) (HC)
- SDH Principles (HC)
  - SDH Overview
  - SDH Frame Structure and Multiplexing
  - SDH Overhead and Pointers
  - Logical Function Modules
  - Networking and Protection
- SDH Principles (Manual) (HC)
- WDM Principles (HC)
  - Overview of WDM
  - Key WDM Technologies
  - ITU-T Compliance
- WDM Principles (Manual) (HC)
- OTN Principles (HC)
  - Overview of OTN
  - OTN Interface Structure
  - Mapping and Multiplexing of OTN
  - OTN Overhead
  - OTN Trail Layers and Maintenance Signals
  - Common OTN Alarms
- OTN Principles (Manual) (HC)
- Ethernet Technologies (HC)
  - Overview of LAN
  - Ethernet Principles
  - About Ethernet QoS
  - Overview of EoS
  - Overview of VLAN
- Ethernet Technologies (Manual) (HC)
- Packet Switch Principles (HC)
  - Telecommunications Network Overview
  - IP Addressing
  - QinQ Technologies
  - MPLS Technologies
  - PWE3 Technologies
- Packet Switch Principles (Manual) (HC)
- OptiX SDH Equipment Hardware (HC)
  - System Overview
  - Cabinets and Subracks
  - Boards
  - Hardware Configurations
  - Functions and Features
- SDH Networking and Self-Healing Protection (HC)
- Linear MSP
- Two-Fiber MSP Rings
- Four-Fiber MSP Rings
- SNCP

- iManager NMS system (HC)
  - System Structure and Major Features of U2000
  - Directory Structure of U2000
  - Major Functions of U2000

- SDH Networking and Self-Healing Protection and PDH Service Configurations Practice Guide (HC)
  - Linear MSP Configurations
  - Two-Fiber MSP Rings Configurations
  - Four-Fiber MSP Rings
  - SNCP Configurations
  - Per-NE Service Configurations
  - Path-Specific Service Configurations

- Ethernet Services and Networking Applications (HC)
  - Ethernet Terms
  - Ethernet Service Types: EPL, EVPL, EPLAN, EVPLAN
  - Ethernet Service Configurations

- Ethernet Configuration Practice Guide (HC)
  - Ethernet Service Types: EPL, EVPL, EPLAN, EVPLAN Practice Guide

Duration

15 working days

Class Size

Min 6, Max 16
1.17.2 Huawei Certified Network Professional-Building Carrier MSTP Transmission Network Training

Training Path

Target Audience

Personnel who are going to take HCNP HTMN(MSTP)(Huawei Certified Network Professional-Building Carrier MSTP Transmission Network) exam

Personnel who expect to learn SDH network commissioning, maintenance and troubleshooting

Prerequisites

- Pass HCNA HTTD(Huawei Certified Network Associate-Transmission Technologies and Device) exam or having equivalent knowledge

Objectives

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

- Describe the procedure of the SDH equipment commissioning
- Describe the complex Networking of SDH
- Replacing the SDH Board
- Analyze the discrete services on the NMS
- Tests for common ethernet services indicators
- Describe the principle of the clock protection
- Describes the notes to do the SDH equipment interconnection
- Complete the ECC maintenance
- Describes the methods for handling typical faults and alarms to troubleshoot networks in practice
- Describes the mechanism of pointer justification
- Describes the functions of ASON

Training Content

OTH02 Building Carrier MSTP Transmission Network

- OptiX SDH Equipment Commissioning(HC)
  - Preparations for Equipment Commissioning
  - Per-NE Commissioning
  - System Commissioning
- OptiX SDH Equipment Commissioning Practice Guide(HC)
  - The Per-NE Commissioning and System Commissioning of OptiX OSN Equipment
- Complex Networking of OptiX SDH Equipment(HC)
  - Tangent Rings
- Intersecting Rings
- Shared-Fiber Virtual Path Protection
- Dual-Plane Optical Transmission Network
- Board Replacement of OptiX NG SDH Equipment (HC)
  - Board Replacement/Overview
  - Replacing Faulty Boards
  - Board Version Replacement
  - Board Capacity Expansion
- Board Replacement of OptiX NG SDH Equipment Practice Guide (HC)
- Discrete Service Analysis and Handling (HC)
  - Concepts of Discrete Services and Paths
  - Causes of Discrete Services and Handling Methods
- Tests for Common Ethernet Service Indicators (HC)
  - Ethernet Test Description
  - Tests for Common Ethernet Services Indicators
  - Common Methods for Testing Ethernet Service Indicators
- Tests for Common Ethernet Service Indicators Practice Guide (HC)
- Clock Protection of OptiX OSN Equipment (HC)
  - Concepts of Clock Protection
  - Configuration Principles for Clock Subnetworks
  - Protection by Using the Standard SSM Protocol
  - Protection by Using the Extended SSM Protocol
- Clock Protection of OptiX OSN Equipment Practice Guide (HC)
- SDH Equipment Interconnection (HC)
  - SDH Port Interconnection
  - PDH Port Interconnection
- SDH Equipment Interconnection Practice Guide (HC)
- ECC Maintenance (HC)
  - ECC Communication Overview
  - ECC Networking and Network Division
  - ECC Extension Applications and Configurations
- ECC Maintenance Practice Guide (HC)
- Pointer Justification (HC)
  - Working Principles for Pointer Justification
  - Handling Pointer Justification Events
- Pointer Justification Practice Guide (HC)
- Routine Maintenance of OptiX SDH Equipment (HC)
  - Routine Maintenance on Equipment
  - Routine Maintenance on the NMS
- Troubleshooting OptiX SDH Equipment (HC)
  - Preparations for Locating Faults on OptiX SDH Equipment
  - Methods for Locating Faults on OptiX SDH Equipment
  - Analyzing Fault Cases of OptiX SDH Equipment
- ASON Overview (HC)
  - ASON Background
  - ASON Architecture
  - ASON Features
  - ASON Service Provisioning
  - ASON Functions

Duration

10 working days

Class Size

Min 6, Max 16
1.17.3 Huawei Certified Network Professional-Building Carrier OTN Transmission Network Training

Training Path

Target Audience

Personnel who are going to take HCNP HTON(OTN)(Huawei Certified Network Professional-Building Carrier OTN Transmission Network) exam
Personnel who expect to learn WDM network configuration, commissioning, maintenance and troubleshooting

Prerequisites

- Pass HCNA HTTD(Huawei Certified Network Associate-Transmission Technologies and Device) exam or having equivalent knowledge

Objectives

On completion of this program, the participants will be able to:
- Describe the function and features of WDM cabinet, sub-rack and boards
- Describe the network topologies and signal flow
- Implement the data configuration through iManager U2000
- Implement the single station and system commissioning step by step through iManager U2000
- List the common indices of WDM product and perform the testing
- Describe the WDM protection principle
- Describe the notice of traffic interconnection
- Describe the principle of ALC/IPA/APE
- Illustrate the application of common troubleshooting methods, such as loop-back, testing, alarm and performance events analysis, replacement, etc
- Locate and eliminate faults, get experience from troubleshooting practice

Training Content

OTH03 Building Carrier OTN Transmission Network
- OptiX WDM Hardware Description(HC)
  - Huawei NG WDM product overview
  - OptiX OSN 6800/8800 networking application and product features
  - OptiX OSN 6800/8800 cabinet, subrack and frame
  - OptiX OSN 6800/8800 boards description
- OptiX WDM Equipment Networking and Application(HC)
  - OptiX NG WDM product feature
- OptiX NG WDM node type
- OptiX NG WDM network applications
- Key factors in WDM networking
- OptiX WDM Common Data Configuration (HC)
  - Preparation for OptiX NG WDM data configuration
  - Creating a OptiX NG WDM network
- OptiX WDM Common Data Configuration Practice Guide (HC)
  - Start NMS
  - Create NE
  - Create ONE
  - Configure NE data
  - Connect the logic fiber
- OptiX WDM Optical Layer Data Configuration (HC)
  - Basic concepts
  - Configuring the edge port
  - Creating OptiX NG WDM single-station optical cross-connection
  - Configuring OptiX NG WDM OCh trail
- OptiX WDM Optical Layer Data Configuration Practice Guide (HC)
  - Configure the OCh in the NMS
- OptiX WDM Electrical Layer Data Configuration (HC)
  - Basic concepts
  - Configuring OptiX NG WDM normal cross-connection Services
  - Configuring OptiX NG WDM service timeslots
  - Configuring OptiX NG WDM electrical trail
- OptiX WDM Electrical Layer Data Configuration Practice Guide (HC)
  - Configure STM-16, Any and GE level service in the NMS
- OptiX WDM Equipment Commissioning (HC)
  - Preparations for OptiX NG WDM commissioning
  - Configuring OptiX NG WDM NE and network
  - Commissioning OptiX NG WDM optical power
  - Commissioning OptiX NG WDM network
- OptiX WDM Equipment Commissioning Practice Guide (HC)
  - Configure the NE and network
  - Optical power commissioning
  - System commissioning
- OptiX WDM Testing (HC)
  - Overview of testing
  - Testing of main channel
  - Testing of OSC channel
  - Testing of system
- OptiX WDM Equipment Protection (HC)
  - OptiX NG WDM equipment level protection
- OptiX NG WDM optical layer protection
- OptiX NG WDM electrical layer protection
- OptiX WDM Equipment Protection Practice Guide (HC)
  - WDM optical layer OLP protection
  - WDM electrical layer ODUk SNCP protection
- OptiX WDM ALC Special Topic (HC)
  - Introduction of ALC function
  - Principle of ALC
  - Configuration of ALC
- OptiX WDM ALC Special Topic Configuration Practice Guide (HC)
  - Creating ALC Link Nodes
  - Checking ALC Links
  - Starting Automatic Link Adjustment
- OptiX WDM IPA Special Topic (HC)
  - Introduction of IPA function
  - Principle of IPA
  - Configuration of IPA
- OptiX WDM IPA Special Topic Configuration Practice Guide (HC)
  - Create and enable IPA
  - Setting IPA Start Delay
  - Configuring Auxiliary Detect Boards for an IPA Protection Group
  - Test and Restart IPA
- OptiX WDM APE Special Topic (HC)
  - Introduction of APE function
  - Principle of APE
  - Configuration of APE
- OptiX WDM APE Special Topic Configuration Practice Guide (HC)
  - Creating APE pair
  - Setting Wavelength Monitoring Parameters
  - Setting the Standard Power Curve
  - Starting/Stopping APE Adjustment
- OptiX WDM Routine Maintenance (HC)
  - Operation precautions
  - OptiX NG WDM basic maintenance operations
  - OptiX NG WDM board replacement
  - OptiX NG WDM equipment routine maintenance items
  - OptiX NG WDM NMS side routine maintenance items
  - OptiX NG WDM daily maintenance items
  - OptiX NG WDM monthly maintenance items
  - OptiX NG WDM semiyearly maintenance items
  - Other NMS side operation
- OptiX WDM Routine Maintenance Practice Guide (HC)
- Optical Power Management
- Alarm Management
- Performance Management

**OptiX WDM Alarm and Signal Flow (HC)**
- Overview
- Electrical Layer Alarm Signal Flow Analysis
- Optical Layer Alarm Signal Flow Analysis

**OptiX WDM Alarm and Signal Flow Practice Guide (HC)**
- Overview
- Electrical Layer Alarm Signal Flow Analysis
- Optical Layer Alarm Signal Flow Analysis

**OptiX WDM Equipment Troubleshooting (HC)**
- Overview
- Basic Rules and Methods of Fault Locating
- Rectifying different types of faults

**Duration**

10 working days

**Class Size**

Min 6, Max 16