

User Manual

GPON OLT

TES7001&TES7002



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Preface

Thank you for choosing Tenda! If you want to know more product basic introduction, hardware and technical specifications, networking application and system management modes, please read this user manual carefully.

Application model

This manual applies to Tenda GPON OLT. The "OLT" and "device" mentioned in this manual refer to GPON OLT. All the figures herein, unless other specified, are taken from TES7002.

The appearances and parameters may differ with product models. The actual product prevails.

Audience

This manual is intended for network planning engineer, field maintenance engineer, system maintenance engineer and data configuration engineer.


Conventions

This manual is for reference only and does not imply that the product supports all functions in the manual. The functions may differ with product models. The actual product prevails.

The product figures and screenshots in this manual are for examples only. They may be different from the actual products you purchased, but do not affect the normal use.

If the function or parameter is displayed in gray on the product web UI, which is not supported or cannot be modified.

The symbol that may be found in this document is defined as follows.

Symbol	Meaning
	This format is used to supplement or explain relevant operations.

For more documents

If you want to get more documents about the device, visit www.tendacn.com and search for the corresponding product model.

Technical support

Contact us if you need more help. We will be glad to assist you as soon as possible.

Email address: support@tenda.cn

Website: www.tendacn.com

Revision history

Tenda is constantly searching for ways to improve its products and documentation. The following table indicates any changes that might have been made since the manual was released.

Version	Date	Description
V1.0	2024-06-30	Original publication.

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1 Product introduction

1.1 Overview

TES70 series optical access devices are FTTx carrier-grade GPON OLT devices independently developed by Shenzhen Tenda Technology Co., Ltd. The devices comply with the international standard ITU-T G.984.x, and GB/T 33845-2017 Technical requirements for access network—Gigabit-capable passive optical network (GPON), which can provide users with access to various services such as broadband, IPTV and voice.

1.2 Product positioning

■ Positioning of TES70 series devices in the network

- Can be used as Optical Line Terminal (OLT) devices in GPON system, and used in conjunction with Optical Network Termination/Optical Network Unit (ONT/ONU) terminal devices
- Meet various networking requirements such as Fiber to the Home (FTTH), Fiber to the Building (FTTB), base station transmission, and IP private line interconnection

■ Positioning of TES70 series devices in the market

- Uplink: 1 * 10-gigabit SFP port, 4 * gigabit RJ45 Ethernet ports.
- Guided service configuration, plug-and-play without configuration.
- ONTs under the PON port can communicate with each other.
- Rogue ONT detection.
- Strong environmental adaptability (-20°C-55°C).
- The network status and alarms are displayed on the homepage of the web UI, and the data is clear and easy to view.
- Remotely manage PoE devices.

1.3 Functions and features

1.3.1 Various port types

TES70 series devices provide various types of network ports, service ports and maintenance ports to adapt to different networking environments.

TES70 series devices provide up to one 10-gigabit uplink port and four GE uplink ports, providing 10-gigabit uplink transmission for GPON systems.

TES70 series devices port description

Type		Description
Uplink port	10 GE port	Provide 10-gigabit Ethernet uplink port
	GE port	Provide gigabit Ethernet uplink port
User port	GPON port	Provide GPON user port
Management port	Console port	Meet Command Line Interface (CLI) management requirements
	10 GE/GE port	Meet the Graphical User Interface (GUI) inband management requirements

1.3.2 High density and fully non-blocking design

TES70 series devices are 1U standard box-type devices with compact structure, which achieves high integration in the industry.

- TES7001 integrates 1 PON port, which can connect to 128 ONTs (1:128 branch ratio).
- TES7002 integrates 2 PON ports, which can connect to 256 ONTs (1:128 branch ratio).

1.3.3 Flexible networking method

▪ Triple-play solution

The FTTx system adopts wavelength division multiplexing technology. By adding a combiner to the external of the TES70 series devices, CATV signal and user's data service and voice service are transmitted in the same optical fiber, realizing the three-service integration in one network.

■ Point-to-multipoint optical access solution

The TES70 series devices are connected to the terminals in users' home through optical fiber, providing users with high-speed data internet access and multicast IPTV services.

1.3.4 Powerful GPON access capability

As a multi-service access platform, TES70 series devices can provide multiple access modes and support multiple networking modes to meet the networking requirements of users in different environments and services.

- Support GPON function specified by ITU-T G.988/ITU-T G.984 standard.
- Provide data and video services by using a single optical fiber to meet the individual needs of users.
- Provide large-capacity GPON transmission bandwidth. Uplink rate ≥ 1 Gbit/s; Downlink rate ≥ 2.2 Gbit/s
- GPON system adopts passive optical transmission technology, and the optical path separation adopts the way of Point to Multiple Point (P2MP).
- It has a split ratio of 1:128, thereby increasing capacity, saving fiber resources, and facilitating network expansion.
- Support Dynamic Bandwidth Allocation (DBA) algorithm: The minimum bandwidth allocation granularity of DBA is not greater than 512 Kbit/s. The configurable minimum bandwidth of DBA is not greater than 256 Kbit/s. The accuracy of DBA is greater than +5%.
- Support up to 20 km long-distance transmission.
- Support multiple types of ONTs.

1.3.5 Complete multicast function

TES70 series devices are equipped with the structural characteristics of PON network Point-to-Multi-Point (PTMP), which is the best access structure for multicast services. With the multicast function, it is convenient to provide users with some new value-added services, including live streaming, internet radio, IPTV, telemedicine, remote education, real-time video conferencing and other internet information services. TES70 series devices support the following multicast functions.

■ Multicast protocol

- Support Internet Group Management Protocol (IGMP) V2/V3.
- Support IGMP Snooping.

■ Multicast service

- Support up to 1,000 multicast groups.
- Support IGMP fast-leave function.

- Equipped with IGMP high-performance processing capability.
- Support program and user management based on multicast VLAN.

1.3.6 Powerful VLAN function

With powerful VLAN function, TES70 series devices enhance the manageability and security of the network, and realize service isolation and user isolation. TES70 series devices support the following VLAN functions.

- Support port-based VLAN.
- Support 512 VLANs based on IEEE 802.1Q.

1.3.7 Safety and reliability design

TES70 series devices consider system reliability index in system, hardware and software design, which fully guarantees the normal operation of the device and the safety and reliability of user services.

■ System design

- Support reporting the ONT's SN to the Network Management System (NMS), and authenticating ONT's legitimacy based on ONT's SN.
- Support broadcast storm suppression function.
- Prevent Denial of Service (DoS) attacks and improve the anti-attack performance of the system.
- To ensure the operation security of the NMS, both the web network management system and the command line can provide several user levels with different operation permissions.

■ Hardware design

Support dual power supply redundancy.

■ Software design

- Following the idea of modularization and platformization, the design of each software module is based on loose coupling mechanism.
- Adopt advanced design methods such as object-oriented, fault-tolerant, error-correcting, and automatic recovery.
- Implement Capability Maturity Model (CMM) management.
- Support software online upgrade.

■ Power reliability

- Redundant design for power supply, TES70 series support dual AC power supplies.
- The power board is equipped with a protection circuit to prevent service interruption when the single-board power supply is faulty.

- Support input/output current limiting protection.

- **Heat dissipation reliability**

- The heat dissipation system has a passive heat dissipation design, using heat dissipation fins and large-area thermal conductive strips to conduct heat to the shell.
- The device adopts wide temperature chip design.

1.3.8 Good maintenance and management function

TES70 series devices support good maintenance, management and monitoring functions, which is convenient for daily management and fault diagnosis.

- **Diversified maintenance methods**

- Support local maintenance and remote maintenance.
- Support command line and web maintenance modes.
- Support web management, which can realize the basic configuration management of OLT and ONT devices on the simple and easy-to-operate interface.

- **Terminal management**

- Support GPON terminal management function.
- Support the offline configuration of the ONT by the OLT, and automatically configure the ONT data during ONT registration, facilitating service delivery.
- Support the reporting of alarm information to help users determine the cause and solution of the alarm.
- Provide performance monitoring and testing of optical modules.

- **Security authentication management**

Provide diversified authentication management methods to meet different operation and maintenance requirements. It supports the assignment and management of multiple management domains and operation permissions.

- **Software upgrade**

Both TES70 series devices and ONT software support remote and online upgrade.

2 Hardware specifications

The appearances may differ with product models. The actual product prevails.

2.1 Appearance

2.1.1 Front panel



TES7001



TES7002

2.1.2 Back panel



Indicator status description

Device Model Port Type	TES7001	TES7002
PWR1 - PWR2	Power indicator <ul style="list-style-type: none"> - Solid green: Normal power input/output - Off: No power supply or abnormal power input/output 	
ACT	System status indicator <ul style="list-style-type: none"> - Solid green: System is working properly - Slowly blinking green: System is initializing, or software is starting but master-slave communication state is not established - Fast blinking green: System is receiving configuration commands, or is establishing master-slave communication state - Off: System is powered off or software is not started 	
PON	PON port indicator <ul style="list-style-type: none"> - Solid on: ONT is connected to the PON port - Off: ONT is not connected to the PON port or connected improperly 	
XGE	Uplink port indicator <ul style="list-style-type: none"> - Solid on: Port is connected properly - Off: Port is disconnected or connected improperly 	
GE	Ethernet port indicator <ul style="list-style-type: none"> - Yellow: Port rate is 100 Mbps. Blinking indicates that port is transmitting data. - Green: Port rate is 1000 Mbps. Blinking indicates that port is transmitting data. - Off: Port is disconnected or connected improperly 	

OLT front panel ports description


Device Model Port Type	TES7001	TES7002
Uplink SFP Port	1 * 10-gigabit port	
Uplink RJ45 Ethernet Port	4 * gigabit ports	

Device Model	TES7001	TES7002
Port Type		
GPON port	1	2
Console port	1 port that meets RS232 technical specifications Local management port of the OLT	
Inband management port	5 ports The uplink ports of the OLT are XGE1, GE2 - GE5 respectively.	

OLT front panel button description

Device Model	TES7001	TES7002
Port Type		
RST	<ul style="list-style-type: none"> - Hold down the button with a needle-like object for about 5 - 30 seconds, and the OLT will automatically reboot. - Hold down the button with a needle-like object for more than 30 seconds, and the OLT will restore the factory settings and automatically reboot. 	

OLT back panel description

Type	Description
GND	1 grounding terminal on the left side of the rear panel for the grounding of the device.
Power	<p>Power port of the device. You can use a single power port or both ports for power supply as required.</p> <p> TIP</p> <p>When both ports are used for power supply, it is recommended to connect the two power supplies to different power lines.</p>

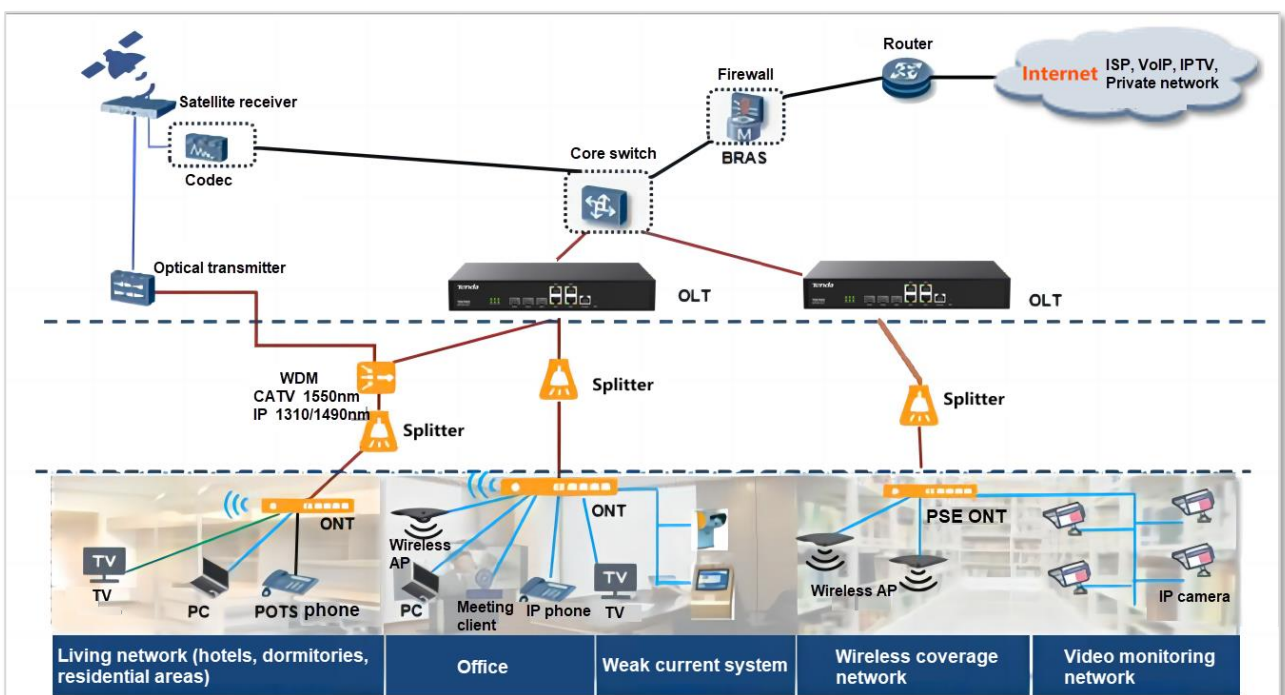
2.2 Basic parameters

Device Model	TES7001	TES7002
Parameter		
Rated power consumption	≤ 13W	≤ 18W
Dimensions (Length * width * height)	294 mm * 180 mm* 44 mm	
Working environment	Environment temperature: -20°C - 55°C (- 4°F - 131°F); environment humidity: (10% - 93%) RH, non-condensing	
Storage environment	Environment temperature: -40°C - 70°C (-40°F - 158°F); environment humidity: (5% - 90%) RH, non-condensing	
Power supply	AC: 100 V - 240 V	

3 Networking application

3.1 Network topology

TES70 series devices are suitable for the application of fiber access occasions, and are usually placed in the central office. The network topology of TES70 series devices is shown as below.



3.2 Networking features

The networking features of TES70 series devices are listed as below.

- Select device types in terms of the number of users.
- Support management of Tenda series PoE ONT terminal devices.

3.3 Networking suggestions

The networking suggestions for TES70 series devices are as below.

- In the case of FTTH networking of villa and residential areas featured with high user density, centralized light splitting is recommended.
- In the case of more optical fibers that need to be laid in the pipeline of the community featured with scattered users, distributed splitting is recommended to reduce the number of optical cables laid in residential pipelines.

4 System management modes

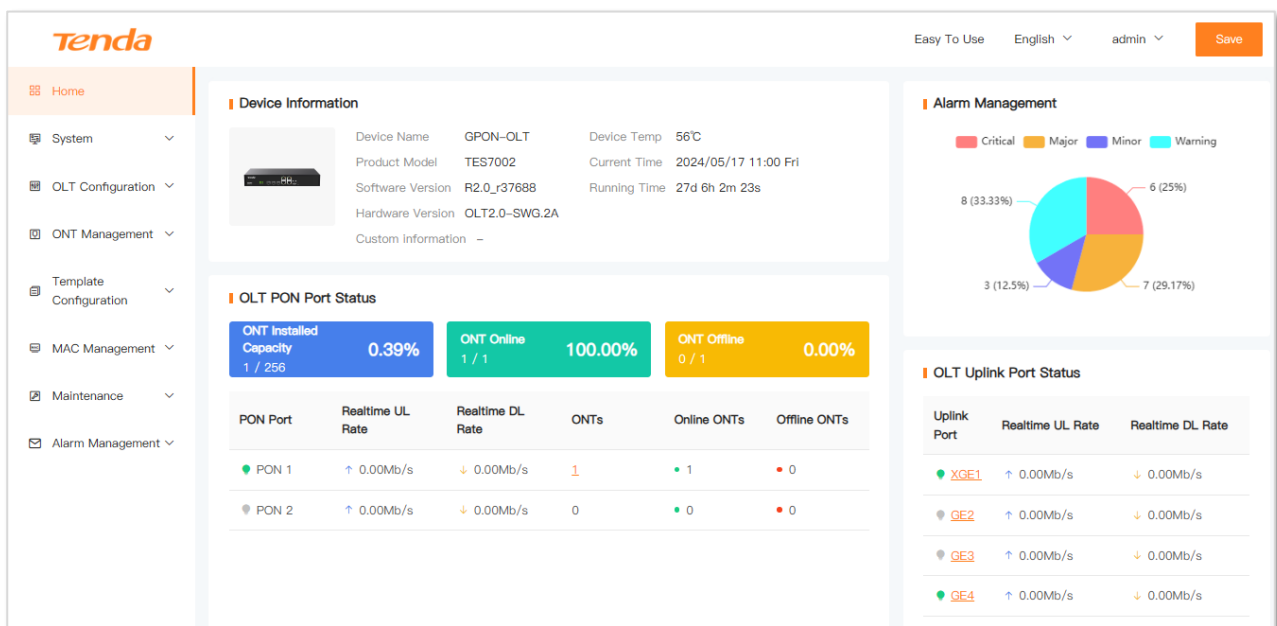
The management modes of TES70 series devices are flexible and convenient, which can be divided into the multiple categories. This part introduces the two management modes of web network management system and CLI. For detailed web network management introduction, refer to the user guide for web management (downloaded from www.tendacn.com).

- **Classified by network management location: Local management mode and Telnet remote login mode**
 - Local management mode: The management computer or server is directly connected to the devices through the network management ports of the device for management.
 - Telnet remote login mode: The management computer or server is connected to the device through the internet for management. For example, the GE and 10 GE uplink port of TES70 series devices are typical remote login management ports.
- **Classified by management channels: Local serial port management mode and inband management mode**
 - Local serial port management mode: Transmitted through separate physical channels, the management information and service information are completely independent and do not affect each other.
 - Inband management mode: The management information is transmitted over the service channel provided by the managed device. The disadvantage of inband management mode is that the management information occupies the service channel, and the device cannot be maintained when the service channel fails.
- **Classified by management interface: CLI mode and GUI mode**
 - Command Line Interface (CLI) mode executes various complex commands in the form of strings in the CLI of the Windows system, which is mostly used for debugging and fault diagnosis. The NMS in CLI mode does not require installation and is easy to operate. Users only need to connect the Console port of the device to the RS232 serial port on the management computer, and manage the TES70 series devices through HyperTerminal. The disadvantage is that various functions and configurations need to be entered in text line by line, which is highly professional and difficult for ordinary users to master.
 - Graphical User Interface (GUI) mode adopts a graphical interface, and users can click the button with the mouse to operate, which is simple and intuitive. Compared with

CLI mode, the human-computer interaction of GUI mode is stronger, which is easier for users to master.

4.1 Web network management

TES70 series can be connected to the network through the inband management mode. To log in to the web UI to complete the basic configuration and query of the OLT and ONT, users can start a web browser, and enter the inband management IP address (ensure that the IP addresses of the computer and the OLT's in-band management are on the same network segment and different). The following figure is for reference only.



4.2 CLI management

The TES70 series can realize CLI management through local serial port connection and telnet.

4.2.1 Serial port CLI management

Connect the local serial port of the computer to the Console port of the TES70 series OLT, and use the HyperTerminal of the local computer to manage the OLT.

- Baud Rate: 115200
- Data Bit: 8
- Parity Check: NO
- Stop Bit: 1
- Flow Control: NO
- Username: admin
- Password: admin

4.2.2 Telnet CLI management

The TES70 series can connect to the network through in-band management and use telnet to manage OLT.

- Username: admin
- Password: admin

5 Technical specifications and standards

5.1 Port specifications

This part introduces the various technical specifications of TES70 series devices.

5.1.1 GPON ports

GPON ports specifications

Parameter	Class B+	Class C+	Class C++	
Port type	SFP (SC/PC)	SFP (SC/PC)	SFP (SC/PC)	
Transmitter	Signal nominal rate	2.488 Gbit/s \pm 100 ppm	2.488 Gbit/s \pm 100 ppm	2.488 Gbit/s \pm 100 ppm
	Wavelength range	1480 nm - 1500 nm	1480 nm - 1500 nm	1480 nm - 1500 nm
	Average transmit power (Max.)	5 dBm	7 dBm	10 dBm
	Average transmit power (Min.)	1.5 dBm	3 dBm	5 dBm
	Extinction ratio (Min.)	10 dB	10 dB	10 dB
Receiver	Signal nominal rate	1.244 Gbit/s \pm 100 ppm	1.244 Gbit/s \pm 100 ppm	1.244 Gbit/s \pm 100 ppm
	Wavelength range	1290 nm - 1330 nm	1290 nm - 1330 nm	1290 nm - 1330 nm
	Receive sensitivity	-28 dBm	-30 dBm	-30 dBm
	Overload optical power	-8 dBm	-12 dBm	-12 dBm

5.1.2 SFP Ethernet ports



The specifications of the SFP Ethernet ports are determined by the optical module. The following table only lists the specifications of some modules for reference.

SFP Ethernet ports specifications

Parameter	1000Base-SX	1000Base-LX	1000Base-LX	10000Base-SR	10000Base-LR	10000Base-LR
Port type	LC/PC	LC/PC	LC/PC	LC/PC	LC/PC	LC/PC
Port rate	1000 Mbit/s	1000 Mbit/s	1000 Mbit/s	10000 Mbit/s	10000 Mbit/s	10000 Mbit/s
Standards compliant	IEEE 802.3z	IEEE 802.3z	IEEE 802.3z	IEEE 802.3ae	IEEE 802.3ae	IEEE 802.3ae
Center wavelength	850 nm	1310 nm	TX:1550/1310nm RX:1310/1550nm	850 nm	1310 nm	TX:1270/1310 nm RX:1310/1270 nm
Transmission distance (Max.)	500m	20 km	80 km	300m	10 km	10 km
Transmit optical power (Max.)	-4 dBm	-3 dBm	5 dBm	-1 dBm	0.5 dBm	1 dBm
Transmit optical power (Min.)	-9.5 dBm	-11.5 dBm	0 dBm	-7.3 dBm	-8.2 dBm	-5 dBm
Overload optical power (Min.)	0	-3 dBm	-3 dBm	-1 dBm	0.5 dBm	0.5 dBm
Receive sensitivity (Max.)	-17 dBm	-19 dBm	-24 dBm	-9.9 dBm	-14 dBm	-14 dBm
Extinction ratio (Min.)	9 dB	9 dB	9 dB	3 dB	3.5 dB	3.5 dB

5.1.3 RJ45 Ethernet ports

RJ45 Ethernet ports specifications

Parameter	10/100/1000Base-T
Port type	RJ45
Port rate	10/100/1000 Mbit/s auto-negotiation
Transmission medium	Category 5
Standards compliant	IEEE 802.3-2005
Transmission distance	100m

5.1.4 Debug ports

Console ports specifications

Parameter	Description
Port type	RJ45
Port standard	Asynchronous EIA/TIA-232
Rate	115200 bit/s

5.2 Functions specifications

TES7002 functions specifications

Functions	Specifications
Switching function	<ul style="list-style-type: none"> – The overall switching capacity is 60 Gbit/s – 4K MAC address table; support 1K multicast tables; support 512 VLANs (IEEE 802.1Q) – Aggregation of up to 1 uplink 10 GE and 4 uplink GE ports; support port-based mirroring
VLAN	<ul style="list-style-type: none"> – Support IEEE 802.1Q standard VLAN; support 512 concurrent VLANs – Powerful VLAN extension function, support VLAN Stacking/Trunk/Translation
Loopback detection	Support uplink port and ONT port loopback detection
IGMP	Support IGMPV2/V3 protocol; support IGMP snooping
Storm suppression	Support broadcast and Destination Lookup Failure (DLF) broadcast storm suppression, and suppression based on the set number of packets per second (pps)
Flow control	Support IEEE 802.3x flow control in full duplex mode; support backpressure flow control in half duplex mode
Encryption and security	<p>Support downlink data encryption of PON ports</p> <p>Support enabling or disabling the encryption function of the corresponding GEM Port when ONT is online</p>
Link test	Support link diagnosis of PON network through Ping and Link test
Configuration recovery	Support ONT offline configuration, and the configuration is automatically delivered during registration
Management mode	<ul style="list-style-type: none"> – Telnet, Console – Support inband and local serial port management; support ONT Management Control Interface (OMCI)

Functions	Specifications
Management function	<ul style="list-style-type: none"><li data-bbox="523 286 1406 387">– Support device configuration management, performance management, fault management, resource management, security management functions and so on<li data-bbox="523 409 1406 477">– Support ONT remote management function, remote batch configuration download, and remote software upgrade<li data-bbox="523 499 1406 566">– Support ONT offline configuration, and the configuration is automatically delivered during registration<li data-bbox="523 589 1246 622">– Support ONT link diagnosis and distance measure function
Redundant backup	Dual power supply redundancy, support AC and DC power supply protection at the same time

5.3 Protocols and standards

Environmental standards description

Standard	Description
ANSI/UL 94-2006	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances (Proposal dated March 17, 2006)
BS EN 60950-1-2006	Information technology equipment - Safety - General requirements
BS EN 60950-22-2006	Information technology equipment - Safety - Equipment installed outdoors
IEC 60917-1	Modular order for the development of mechanical structures for electronic equipment practices - Part 1: Generic standard
IEC 60917-1-amd1	Amendment 1 - Modular order for the development of mechanical structures for electronic equipment practices - Part 1: Generic standard
IEC 60917-2	Modular order for the development of mechanical structures for electronic equipment practices - Part 2: Sectional specification - Interface co-ordination dimensions for the 25 mm equipment practice
IEC 60917-2-1	Modular order for the development of mechanical structures for electronic equipment practices - Part 2: Sectional specification - Interface co-ordination dimensions for the 25 mm equipment practice - Section 1: Detail specification - Dimensions for cabinets and racks
IEC 60917-2-2	Modular order for the development of mechanical structures for electronic equipment practices - Part 2: Sectional specification - Interface co-ordination dimensions for the 25 mm equipment practice - Section 2: Detail specification - Dimensions for subracks, chassis, backplanes, front panels and plug-in units
IEC 60917-2-3	Modular order for the development of mechanical structures for electronic equipment practices - Part 2-3: Sectional specification - Interface co-ordination dimensions for the 25 mm equipment practice - Extended detail specification - Dimensions for subracks, chassis, backplanes, front panels and plug-in units
IEC 60950-22-2005	Information technology equipment - Safety - Part 22: Equipment to be installed outdoors
IEC 61587-1-2007	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 1: Climatic, mechanical tests and safety aspects for cabinets, racks, subracks and chassis

Standard	Description
IEC 61587-2-2000	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 2: Seismic tests for cabinets and racks
IEC 61587-3-2006	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 3: Electromagnetic shielding performance tests for cabinets, racks and subracks
GB4943-2001	Security of Information Technology Equipment: This standard is equivalent to the third edition of the international standard IEC 60950:1999 Security of Information Technology Equipment
GB/T4857	Packaging series standard
UL 94-1996	Test for flammability of plastic materials for parts in devices and appliances

Electromagnetic compatibility standards description

Standard	Description
CISPR 22	Information technology equipment - Radio Disturbance characteristics - Limits and methods of measurement
CISPR 24	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 300 386	Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electromagnetic Compatibility (EMC) requirements
EN 55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 55024	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4 - 2: Electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4 - 3: Testing and measurement techniques-Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4 - 4: Testing and measurement techniques-Electrical fast transient/burst immunity test

Standard	Description
EN 61000-4-5	Electromagnetic compatibility (EMC) - Part4 - 5: Testing and measurement techniques-Surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4 - 5: Testing and measurement techniques-Immunity to conducted disturbances, induced by radio-frequency fields
ETSI EN 300132-2	Power supply interface at the input telecommunications equipment; Part 2: Operated by direct current (DC)
ETSI EN 300386 V 1.4.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electromagnetic Compatibility (EMC) requirements
IEC 61000-4-2	Electromagnetic compatibility (EMC) - Part 4 - 2: Testing and measurement techniques-Electrostatic discharge immunity test
IEC 61000-4-3	Electromagnetic compatibility (EMC) - Part 4 - 3: Testing and measurement techniques-Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4 - 4: Testing and measurement techniques-Electrical fast transient/burst immunity test
IEC 61000-4-5	Electromagnetic compatibility (EMC) - Part4 - 5: Testing and measurement techniques-Surge immunity test
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4 - 6: Testing and measurement techniques-Immunity to conducted disturbances, induced by radio-frequency fields
ITU-T K.20	Resistibility of telecommunication equipment installed in a telecommunications center to overvoltages and overcurrents
ITU-T K.43	Immunity requirements for telecommunication equipment
ITU-T K.48	EMC requirements for telecommunication equipment - Product family Recommendation
YD/T 1244-2002	Electromagnetic compatibility requirements and measurement methods for digital subscriber line (xDSL) equipment

Safety standards description

Standard	Description
EN 60825-1	Safety of laser products – Part 1: Equipment classification and requirements
EN 60825-2	Safety of laser products – Part 2: Safety of optical fiber communication
EN 60950-1	Information technology equipment –Safety – Part 1: General Requirements
IEC 60825-1	Safety of laser products – Part 1: Equipment classification and requirements
IEC 60825-2	Safety of laser products – Part 2: Safety of optical fiber communication
IEC 60950-2001	Safety of Information technology equipment including Electrical Business Equipment
UL 60950-1:2003	Information Technology Equipment – Safety – Part 1: General Requirements

GPON standards description

Standard	Description
ITU-T G.984.1	Gigabit-capable passive optical networks (GPON): General characteristics
ITU-T G.984.2	Gigabit-capable Passive Optical Networks (GPON): Physical Media Dependent (PMD) layer specification
ITU-T G.984.3	Gigabit-capable passive optical networks (G-PON): Transmission convergence layer specification
ITU-T G.984.4	Gigabit-capable Passive Optical Networks (G-PON): ONT management and control interface specification
ITU-T G.984.5	Gigabit-capable passive optical networks (GPON): Enhancement band
ITU-T G.984.6	Gigabit-capable passive optical networks (GPON): Reach extension
ITU-T G.984.7	Gigabit-capable passive optical networks (GPON): Long reach

Ethernet protocol description

Standard	Description
IEEE 802-2001	IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture
IEEE 802.1ad	IEEE Standard for Local and Metropolitan Area Networks--Virtual Bridged Local Area Networks--Amendment 4: Provider Bridges
IEEE802.1ag-2007	IEEE Standard for Local and Metropolitan Area Networks Virtual Bridged Local Area Networks Amendment 5: Connectivity Fault Management
IEEE802.1s	IEEE Standard for Local and Metropolitan Area Networks--Virtual Bridged Local Area Networks--Amendment 4: Provider Bridges
IEEE 802.1x-2004	IEEE Standard for Local and Metropolitan Area Networks Port-Based Network Access Control
IEEE 802.1D-2004	IEEE Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges
IEEE 802.1Q-2005	IEEE Standard for Local and Metropolitan Area Networks--Virtual Bridged Local Area Networks--Amendment 4: Provider Bridges
ITU-T Y.1291	An architectural framework for support of Quality of Service in packet networks
ITU-T Y.1730	Requirements for OAM functions in Ethernet-based networks and Ethernet services
TR-101	Migration to Ethernet-Based DSL Aggregation
YD/T 1691-2007	Technical Specification for Content Ethernet Switch
YD/T 1694-2007	Technical Requirements for OAM Function in Ethernet Based on Network

Multicast protocol description

Standard	Description
IETF RFC 1112	Host Extensions for IP Multicasting
IETF RFC 2236	Internet Group Management Protocol, Version 2
IETF RFC 3376	Internet Group Management Protocol, Version 3
YD/T 1695-2007	Technical Requirements of Access Network for IPTV (Phase I)

Other protocol description

Standard	Description
IETF RFC 2284	PPP Extensible Authentication Protocol (EAP)
SFF-8472	Specification for Diagnostic Monitoring Interface for Optical Transceivers (Rev 10.3 Dec.1, 2007)

Appendixes

Acronyms and abbreviations

Acronym or Abbreviation	Full Spelling
AC	Alternating Current
ANSI	American National Standards Institute
CATV	Community Access Television
CLI	Command Line Interface
CMM	Capability Maturity Model
DBA	Dynamic Bandwidth Allocation
DC	Direct Current
DLF	Destination Lookup Failure
DoS	Denial of Service
EAP	Extensible Authentication Protocol
EMC	Electro Magnetic Compatibility
ETSI	European Telecommunications Standards Institute
FTTB	Fiber to the Building
FTTH	Fiber to the Home
GE	Gigabit Ethernet
GPON	Gigabit-capable Passive Optical Network
GUI	Graphical User Interface

Acronym or Abbreviation	Full Spelling
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPTV	Internet Protocol Television
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
MAC	Medium Access Control
NMS	Network Management System
OLT	Optical Line Terminal
OMCI	ONT Management Control Interface
ONT	Optical Network Termination
ONU	Optical Network Unit
P2MP	Point to Multiple Point
PMD	Physical Media Dependent
PoE	Power over Ethernet
PON	Passive Optical Network
PPP	Point to Point Protocol
PTMP	Point-to-Multi-Point
RFC	Request for Comments
SFP	Small Form-factor Pluggable
TV	Television

Acronym or Abbreviation	Full Spelling
UI	User Interface
VLAN	Virtual Local Area Network