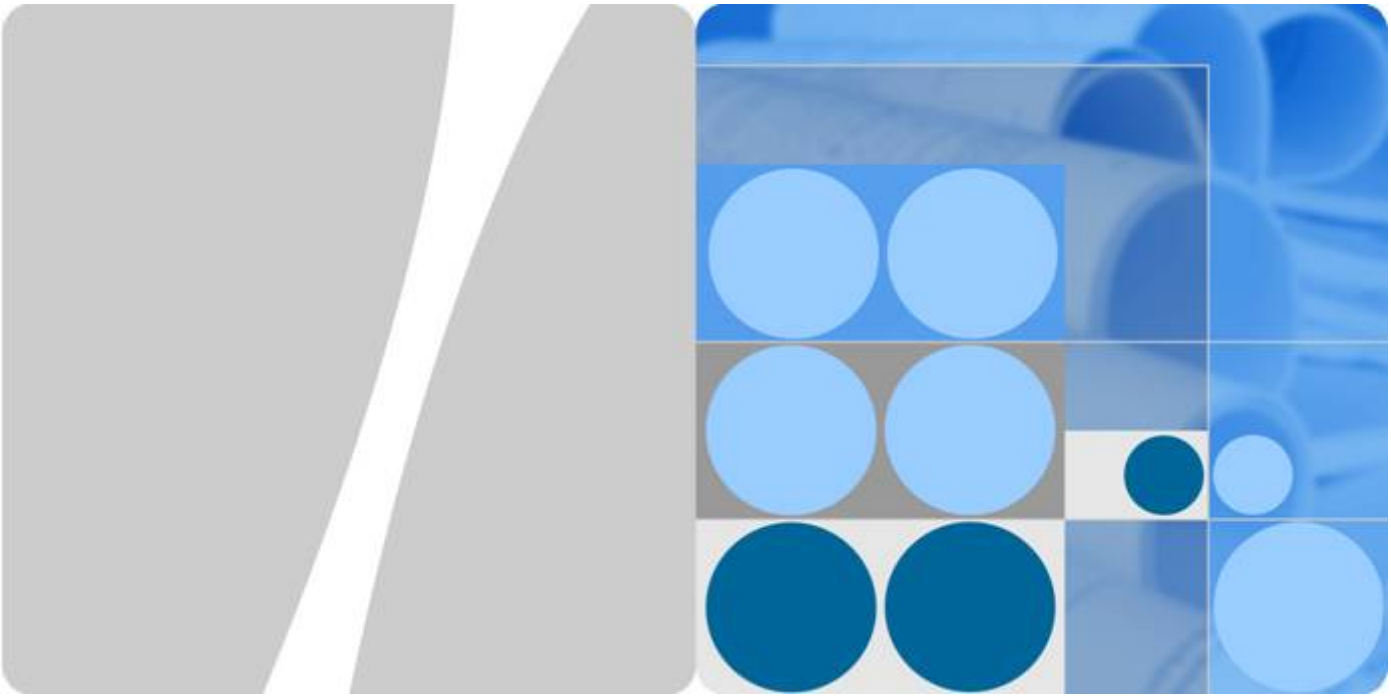

EchoLife HG8247 GPON Terminal

V100R003C00&C01

Product Description

Issue 03

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Contents

1 Introduction

1.1 Product Positioning

The HG8247 GPON terminal (hereafter referred to as the HG8247) is an indoor optical network terminal (ONT) designed for home users and small office and home office (SOHO) users. Its upper shell adopts the natural heat dissipation material, and its optical port adopts the dust-proof design with a rubber plug. The HG8247 is eye-pleasing and energy-efficient. It can be deployed on a workbench or mounted on a wall, meeting users' deployment requirements in different scenarios.

By using the Gigabit-capable Passive Optical Network (GPON) technology, the HG8247 provides a high-speed data channel through a single optical fiber with an upstream rate of 1.244 Gbit/s and a downstream rate of 2.488 Gbit/s. In this way, you can enjoy the high-speed data service, quality voice service, superior video service. Apart from that, you can also enjoy the secure and reliable wireless access service and the convenient home network attached storage and file sharing services.

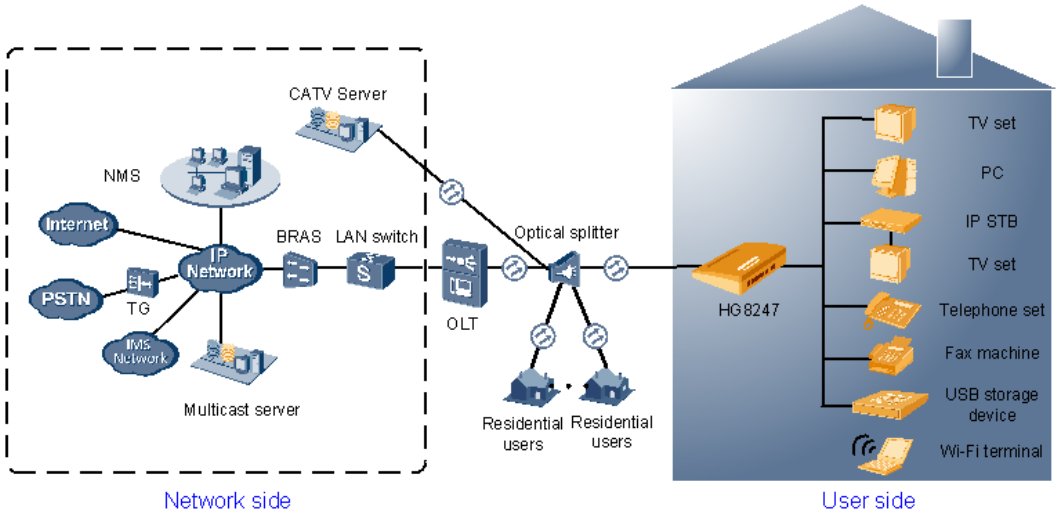
As an ONT, the HG8247 provides the more convenient and efficient remote management function. It supports the ONT Management and Control Interface (OMCI) protocols and manages all home terminals in a unified manner, implementing remote fault diagnosis, service provisioning, and performance statistics.

1.2 Network Applications

As a network terminal, the HG8247 is deployed at the GPON access layer and connects the home users and SOHO users to the Internet through the optical upstream port.

Figure 1-1 shows the position of the HG8247 in a network.

Figure 1-1 Network topology of the HG8247



- In the upstream direction, the HG8247 is connected to the optical splitter and the network-side OLT through the passive optical network (PON) port, namely the OPTICAL port, to provide the integrated access service.
- In the downstream direction, the HG8247 is connected to various terminals through the abundant LAN-side ports, implementing the triple play service.
  - Four 10/100/1000M Base-T Ethernet ports, which can be connected to terminals such as the PC, STB, and video phone to provide the high-speed data and video services.
  - Two TEL ports, which can be connected to the telephone set or fax machine to provide the superior and cost-effective voice over IP (VoIP), fax over IP (FoIP), and modem over IP (MoIP) services.
  - Two Wi-Fi antenna, which can be connected to a Wi-Fi terminal through wireless connection to provide a secure and reliable high-speed wireless network.
  - One USB port, which can be connected to a USB storage device to provide convenient home network attached storage and file sharing services.
  - One CATV port, which can be connected to a TV set to provide the quality CATV service transmission.

1.3 Product Highlights

1.3.1 Comprehensive Triple Play Service

On the LAN side, the HG8247 provides abundant hardware ports to implement multiple access services, including the home network attached storage, Internet access, voice, and video services, providing users with the comprehensive triple play service.

1.3.2 Quality CATV Service Transmission

The HG8247 provides the quality CATV service transmission through the CATV port.

The CATV service transmission of the HG8247 has the following features:

- Controls and queries the status of the CATV port remotely.
- Connects to multiple through one CATV port.
- Supports the optical port of the APC type with a return loss larger than 60 dB, ensuring the quality of the CATV service.

1.3.3 Secure and Reliable Wi-Fi Access

The HG8247 helps users build a secure and reliable wireless network based on the 802.11 b/g/n Wi-Fi access.

The Wi-Fi access of the HG8247 has the following features:

- Supports four SSIDs. The user can select different wireless networks by setting different SSIDs.
- Compatible with IEEE 802.11b/802.11g, passing the authentication of Wireless Fidelity (Wi-Fi) Alliance and featuring good compatibility with other WLAN devices.
- Supports multiple authentication and encryption modes, providing users with the secure and reliable wireless access.

1.3.4 Convenient Home Network Attached Storage and File Sharing Services

The HG8247 provides one USB port, which can be used to connect to a USB storage device to provide convenient home network attached storage and file sharing services.

The USB storage function of the HG8247 has the following features:

- The USB port supports plug and play (PnP) and hot plugging.
- The USB function can be configured on the local Web page, which facilitates home network attached file sharing.
- The USB port implements the FTP client for home storage, that is, downloading files from the FTP server in a public network to the USB storage device.

1.3.5 Secure and Powerful Gateway Functions

The HG8247 can function as a home gateway, which features the secure and powerful gateway functions.

The gateway features of the HG8247 are as follows:

- Forwarding rate up to 900 Mbit/s, meeting service requirements for a high quality
- Functioning as a DHCP server or a DHCP client, meeting various requirements in different scenarios
- Configuration of anti-DoS attack, MAC address filtering, IP address filtering, URL address filtering, firewall, and ONT ACL, making the HG8247 more secure and reliable when it functions as a gateway

1.3.6 Convenient Automatic Provisioning, Maintenance, and Management of the Remote Service

The HG8247 applies the TR-069 and OMCI management, manages terminal services without additional IP networks, which facilitates automatic provisioning, maintenance, and management of the remote service.

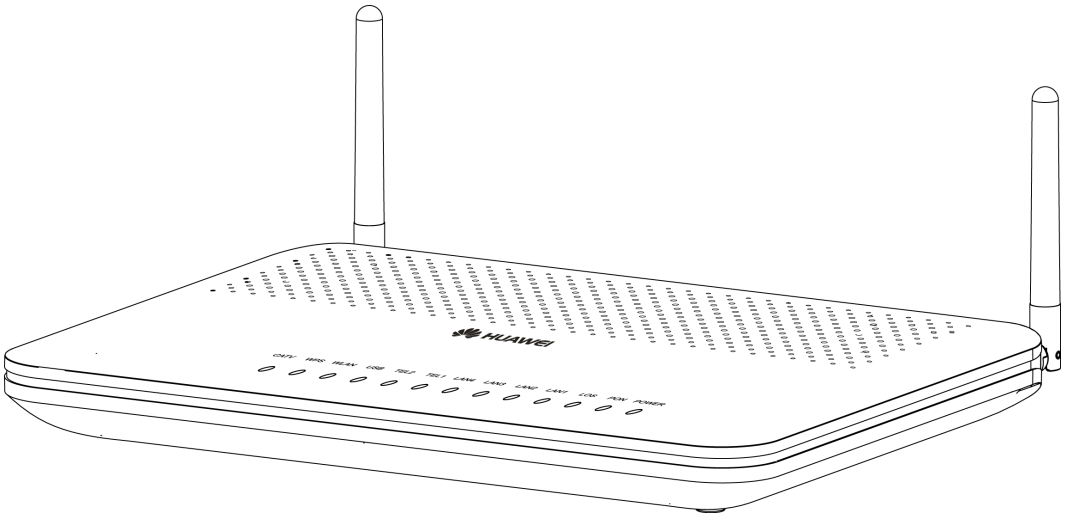
The remote service management of the HG8247 has the following features:

- Supports configuring the global profile and issuing the XML configuration file on the NMS. To provision ONT services in batches and adjust the network, only a few changes are required.
- Supports user-defined upgrade policies configured through the NMS. The device is automatically upgraded after being powered on and no manual operation is required.
- Supports remote performance management of the HG8247 through the NMS. By collecting the performance data, the network performance exception can be monitored in real time.
- Supports remote fault locating of the HG8247 through the NMS. Through alarm reporting and remote loopback diagnosis, the fault can be located remotely, which decreases the maintenance cost.

1.4 Hardware Features

1.4.1 Appearance

Figure 1-2 Appearance of the HG8247



1.4.2 Port/Button

Ports and Buttons on the Rear Panel

Figure 1-3 Ports and buttons on the rear panel of the HG8247

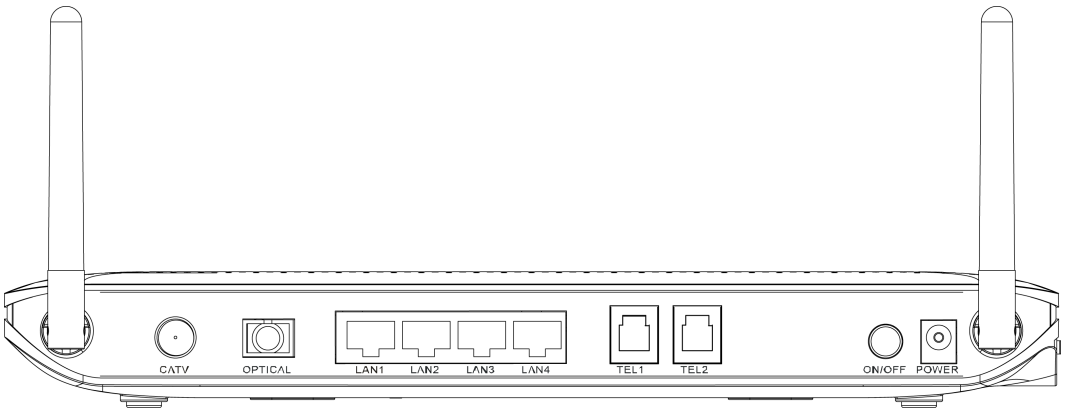


Table 1-1 Description of ports and buttons on the rear panel of the HG8247

Port/Button	Function
CATV	Indicates an RF port, used to connect to a TV set.
OPTICAL	Indicates an optical port. The optical port is equipped with a rubber plug and is connected to an optical fiber for upstream transmission. The type of the optical connector connected to the OPTICAL port is SC/APC.
LAN1–LAN4	
TEL1–TEL2	Indicate VoIP telephone ports (RJ-11), used to connect to the ports of telephone sets.
ON/OFF	Indicates the power button. It is used to power on or power off the device.
POWER	Indicates the power port, used to connect to the power adapter or backup battery unit.

Ports and Buttons on the Side Cover

Figure 1-4 Ports and buttons on the side cover of the HG8247

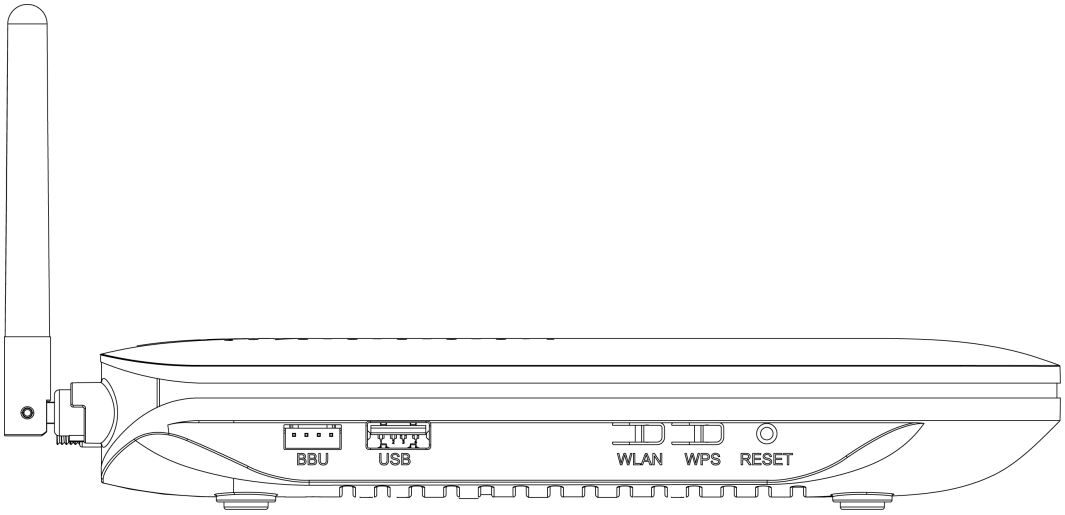


Table 1-2 Description of ports and buttons on the side cover of the HG8247

Port/Button	Function
BBU	Indicates an external backup battery monitoring port, used to connect to the backup battery unit for battery monitoring.
USB	Indicate USB host ports, used to connect to USB storage devices.
WLAN	Indicates the WLAN button, used to enable or disable the WLAN function.
WPS	Indicates the WLAN data encryption switch.
RESET	Indicates the reset button. Press the button for a short time to reset the device; press the button for a long time (longer than 10s) to restore the device to the default settings and reset the device.

1.4.3 LEDs

Figure 1-5 LEDs on the HG8247

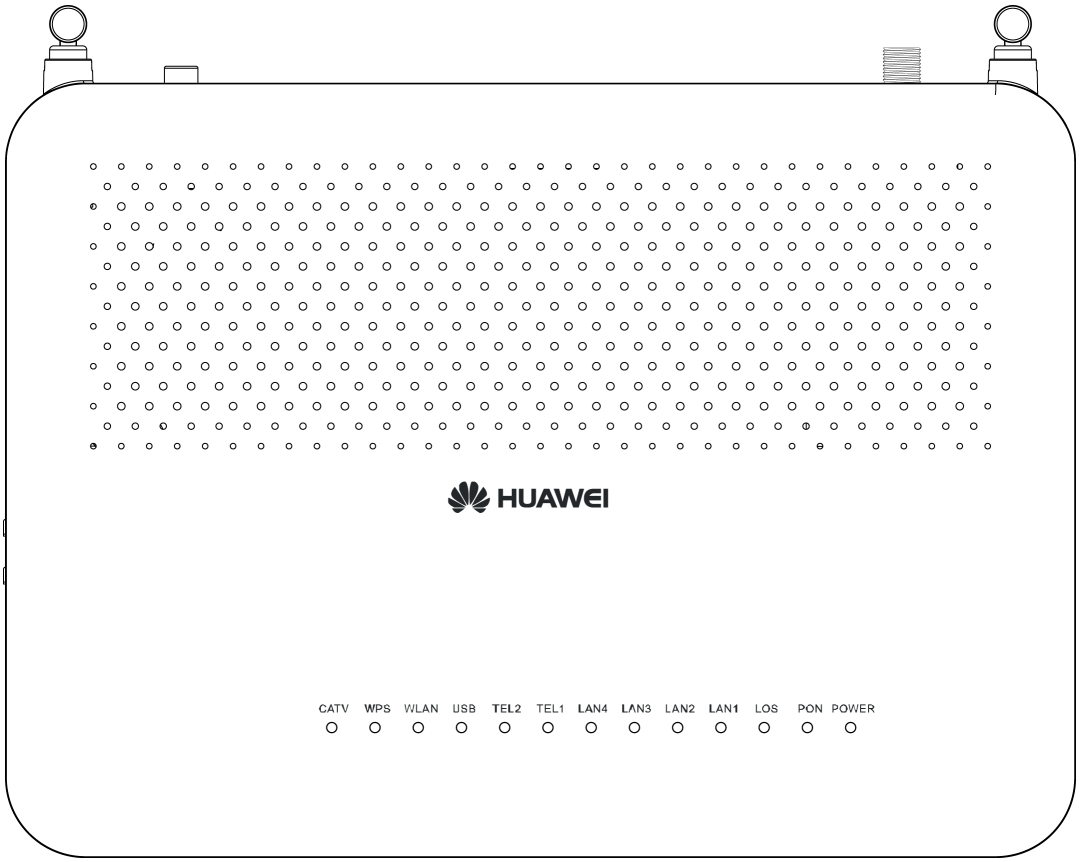


Table 1-3 Indications of the LEDs on the HG8247

LED	Description	Status	Description
POWER	Power supply LED	Green: always on	The device is powered on.
		Orange: always on	The backup battery is supplying power.
		Off	The power supply is cut off.
PON	Authentication LED	See **Table 1-4**.	
LOS	Connection LED	See **Table 1-4**.	
LAN1–LAN4	Ethernet port LED	Always on	The Ethernet connection is in the normal state.
		Blinks	Data is being transmitted on the Ethernet port.
		Off	The Ethernet connection is not set up.

LED	Description	Status	Description
TEL1–TEL2	Voice telephone port LED	Always on	The connection to the voice server is set up.
		Blinks quickly (twice per second)	The connection to the voice server is set up and the telephone is in the off-hook or ringing state.
		Blinks slowly (once two seconds)	The ONT is registering with the voice server.
		Off	The connection to the voice server is not set up.
USB	USB port LED	Always on	The USB port is connected and is working in the host mode, but no data is transmitted.
		Blinks quickly (twice per second)	Data is being transmitted on the USB port.
		Off	The system is not powered on or the USB port is not connected.
WLAN	WLAN LED	Always on	The WLAN function is enabled.
		Blinks	Data is being transmitted on the WLAN port.
		Off	The WLAN function is disabled.
WPS	WPS LED	Always on	The WPS function is enabled.
		Blinks	A Wi-Fi terminal is accessing the system.
		Off	The WPS function is disabled.
CATV	CATV port LED	Always on	The CATV function is enabled and CATV signals are received.
		Off	The CATV function is disabled or CATV signals are not received.

Table 1-4 Indications of the PON and LOS LEDs

No.	LED Status		Description
	PON	LOS	
1	Off	Off	The ONT is disabled by the OLT.

No.	LED Status		Description
	PON	LOS	
2	Blinks quickly (twice per second)	Off	The ONT is attempting to set up a connection to the OLT.
3	Always on	Off	The connection between the ONT and the OLT is set up.
4	Off	Blinks slowly (once two seconds)	The Rx optical power of the ONT is lower than the optical receiver sensitivity.
5	Blinks quickly (twice per second)	Blinks quickly (twice per second)	The OLT detects that the device is a rogue ONT.

2 Product Functions and Features

2.1 GPON Features

- Compliance with ITU-T G.984 GPON Recommendations
- Class B+ optical power budget
- A maximum upstream rate of 1.244 Gbit/s and downstream rate of 2.488 Gbit/s at the GPON physical layer
- GEM encapsulation mode
- 8 T-CONTs with up to 32 GEM ports
- GEM port to T-CONT mapping
- Multiple traffic mapping modes:
  - Mapping from VLAN to GEM port
  - Mapping from PRI to GEM port
  - Mapping from Ethernet port to GEM port
  - Mapping from VLAN+PRI to GEM port
  - Mapping from Ethernet port+VLAN to GEM port
  - Mapping from Ethernet port+PRI to GEM port
  - Mapping from Ethernet port+VLAN+PRI to GEM port
  - Mapping from IPToS to GEM port
- Dynamic Bandwidth Assignment (DBA)
- Forward error correction (FEC) function in the upstream and downstream directions
- Embedded OAM, physical layer OAM (PLOAM), and OMCI
- 128-bit advanced encryption standard (AES) in the downstream direction
- Authentication modes of SN, password, and SN+password
- Deactivation/Activation and re-register of the ONT
- Loopback test based on the GEM port

2.2 CATV Features

- Enabling/Disabling the CATV port remotely
- Querying the CATV port status
- Reprting alarms of a CATV port
- Port type: F-type
- Working wavelength: 1550-1560 nm
- Working frequency: 54-870 MHz
- Average receive optical power: -8 dBm to +2 dBm
- Radio-frequency output power: ≥ 17 dBmV/Ch
- Radio-frequency output impedance: 75 ohms
- Carrier-to-noise ratio (CNR): ≥ 46 dB
- Carrier to composite second order ratio (CSO): ≤ -55 dB
- Carrier to composite third order ratio (CTO): ≤ -55 dB

2.3 Ethernet Features

- Auto-negotiation of rate and duplex mode
- IPv6 Layer 2 transparent transmission
- Setting to half duplex or full duplex mode manually
- MDI/MDI-X adaptation
- Upstream and downstream rate limit based on the Ethernet port with a granularity of 64 kbit/s
- PAUSE traffic control (IEEE 802.3 Annex 31B)
- Ethernet frame of up to 2000 bytes

2.4 Multicast Features

- IGMP V2&V3 Snooping
- Up to 255 multicast groups
- VLAN transforming of the upstream multicast protocol packet
- Separate GEM ports for the downstream multicast service streams and the IGMP signaling packets
- Transformation, transparent transmission, and removal of the downstream multicast VLAN
- Filtering downstream multicast packets
- Multicast filtering and forwarding based on MAC address
- Authentication based on the GEM port
- Fast leave

2.5 Voice Features

- 19 preset ringing tones and 16 user-defined ringing tones

- Presetting the signal tone parameter according to country
- Configuring and issuing user-defined signal tones
- Session Initiation Protocol (SIP)
- H.248
- G.711A/u, G.729a/b, and G.722 encoding/decoding
- Static and dynamic jitter buffer
- Dual-tone multi-frequency (DTMF) detection
- Local echo cancellation (EC)
- Receiving and sending DTMF and FAX based on RFC 2833
- RTP/RTCP (RFC 3550)
- Highest ringing current voltage provided by POTS ports: 60 V AC

2.6 WLAN Features

- Compliance with IEEE 802.11n, compatible with IEEE 802.11b/802.11g
- 4 service set identifiers (SSIDs) for differentiating networks
- 13 working channels
- Automatic and manual channel selection
- 64-bit and 128-bit WEP encryption
- TKIP, AES, and AES+TKIP encryption modes
- Negotiating the encryption algorithm and key according to the WPS standard
- Open system, shared key, WPA, WPA2, WPA-PSK, WPA2-PSK, and WPS authentication modes
- Power-conservation working mode of the interconnected STA
- Adjustable transmit power, with a maximum transmit power (including the antenna gain) of the overall system up to 85-100 mW

2.7 USB Features

- Compliance with USB 1.1/USB 2.0
- PnP and hot plugging of the USB storage device
- USB storage device of the USB hub or mass storage type
- Read and write operations in the FAT32/FAT/NTFS file system
- Automatic mounting/dismounting of the USB storage device
- Supports USB fast backup and USB recovery of the configuration file

2.8 OMCI Features

- OMCI configuration management (including the GEM port, T-CONT, CAR, and VLAN configurations)

- OMCI query management (including the device information and Ethernet port status)
- OMCI alarming and alarm synchronization
- OMCI performance statistics

2.9 Gateway Features

- DHCP client and options 6, 15, 42, 50, 60, and 120 supported by the DHCP client
- ARP, DDNS, NAT/NAPT, UPnP, ALG, Portal, and QoS
- Port trigger and DMZ

2.10 Security Features

- MAC address filtering
- Access control rule (ACL) configuration of the ONT

2.11 Device Maintenance

- Local service configuration, query, and software upgrade on the Web page
- Automatic remote service provisioning, device management, and software upgrade through OMCI
- Query of the information about the ONT optical transceiver
- Type B protection
- Reporting the Dying_Gasp alarm when the ONT is powered off
- System energy conservation
- Dual system protection of the software (normal system and mini system)

3 Technical Specifications

3.1 Optical Port Specifications

GPON Port Specifications

Table 3-1 GPON port specifications

Parameter	Specifications
Transmission rate	Rx: 2.488 Gbit/s Tx: 1.244 Gbit/s
Port mode	Single mode
Connector	SC/APC
Maximum reach	20 km
Standard compliance	ITU-T G.984.2 CLASS B+
Center wavelength	Tx: 1310 nm Rx: 1490 nm
Tx optical power	0.5 dBm to 5.0 dBm
Extinction ratio	> 10 dB
Minimum receiver sensitivity	-27 dBm
Maximum overload optical power	-8 dBm

3.2 Power Specifications

- Power adapter input: 100–240 V AC, 50–60 Hz
- System power supply: 11–14 VDC, 2A

- Maximum power consumption: 16 W

3.3 Working Environment

- Operating temperature: 0ºC – 40ºC
- Environment humidity: 5% – 95% (non-condensing)

3.4 Dimensions and Weight

- Dimensions (Length x Width x Height): 268 mm x 213 mm x 34 mm
- Weight (including power adapter): about 800 g

A Acronyms and Abbreviations

AES	Advanced Encryption Standard
ALG	Application Level Gateway
BRAS	Broadband Remote Access Server
CATV	Community Antenna Television
DBA	Dynamic Bandwidth Assignment
DHCP	Dynamic Host Configuration Protocol
DMZ	Demilitarized Zone
DNS	Domain Name Server
DTMF	Dual Tone Multi-Frequency
DoS	Denial of Service
FEC	Forward Error Correction
FoIP	FAX over IP
FTTH	Fiber To The Home
GPON	Gigabit-capable Passive Optical Network
IGMP	Internet Group Management Protocol
MoIP	Modem over IP
NAPT	Network Address and Port Translation
NAT	Network Address Translation
NMS	Network Management System
OAM	Operations, Administration, and Maintenance
OLT	Optical Line Terminal
OMCI	Optical Network Termination Management and Control Interface
ONT	Optical Network Terminal

PLOAM	Physical Layer OAM
PON	Passive Optical Network
PSTN	Public Switched Telephone Network
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
SIP	Session Initiation Protocol
SOHO	Small Office and Home Office
SSID	Service Set Identifier
STB	Set Top Box
TKIP	Temporal Key Integrity Protocol
UPnP	Universal Plug and Play
VLAN	Virtual Local Area Network
VoIP	Voice over IP
WLAN	Wireless Local Area Network
WEP	Wired Equivalent Privacy
WPA	Wi-Fi Protected Access
WPS	Wi-Fi Protected Setup