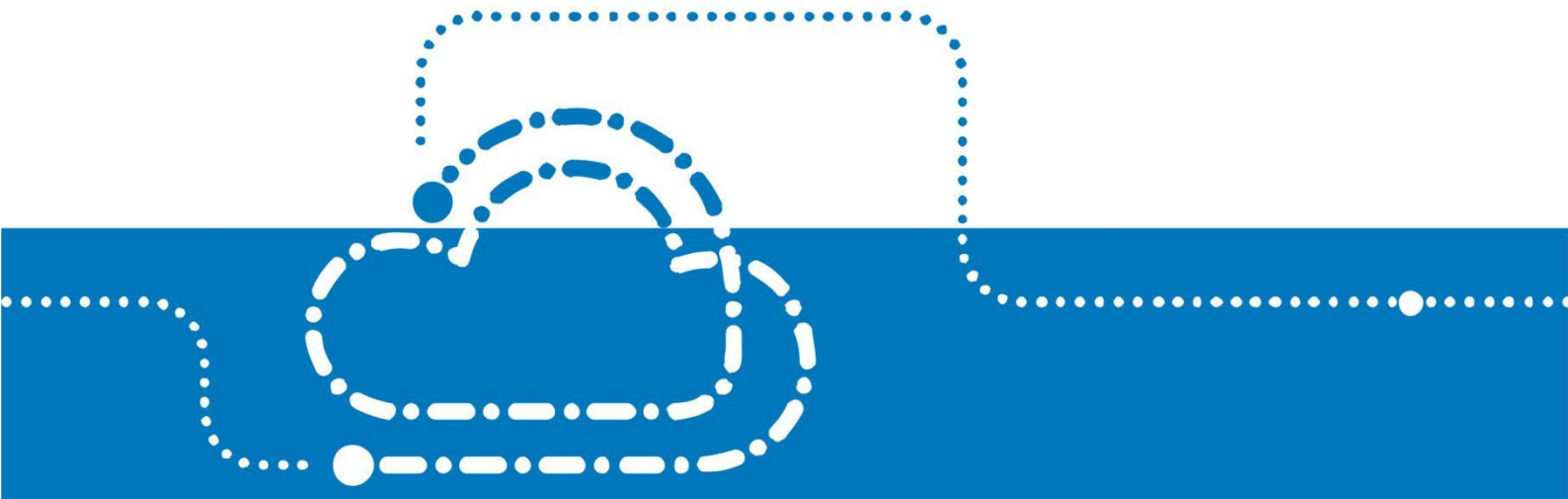
Operator Logo

ZXHN F8605P Product Description



ZXHN F8605P Product Description

Version	Date	Author	Reviewer	Notes
V1.0	2024/07/04	ZTE		Process Version draft, not open to the third party

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1 Overview

1.1 Product Positioning

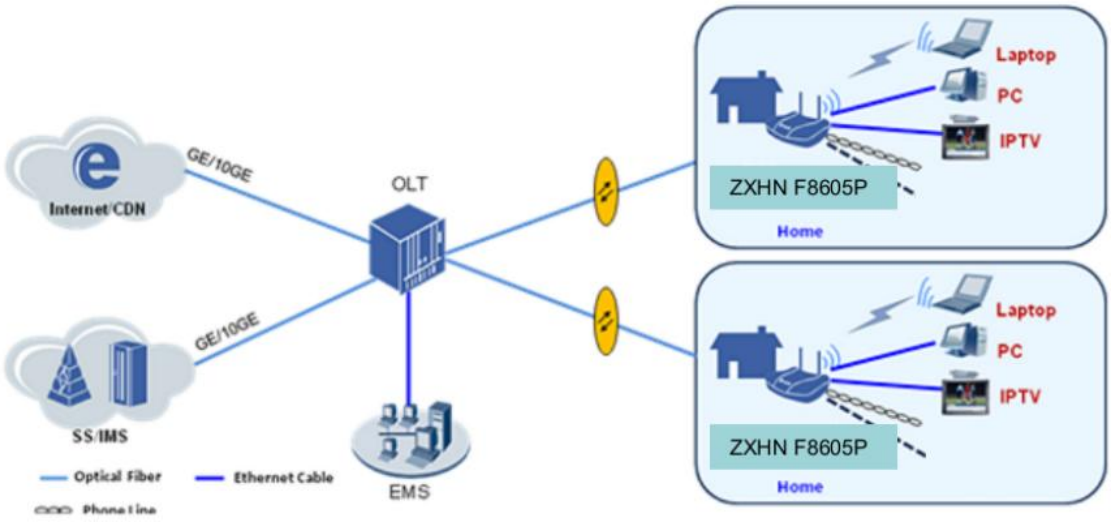
The ZXHN F8605P is an ITU-T G.9807 and ITU-T G.988 compliant optical network terminal (ONT) that is designed for high-end home users. It is well suited to fiber to the home (FTTH) scenarios and supports desktop mounting. At the network side, it supports 9.95328 Gbps downlink and 9.95328 Gbps uplink. At the user side, it provides one 2.5GE port,Three GE ports, and 2x2 802.11ax@2.4GHz & 2x2 802.11ax@5GHz concurrent. Figure 1-1 shows the housing design of the ZXHN F8605P

Figure 1-1 ZXHN F8605P Housing Design

1.2 Network Applications

The ZXHN F8605P is an ONT designed for FTTH application scenarios. By using the ZXHN F8605P, the home users can access data, video and enjoy high-speed Internet access. Figure 1-2 illustrates the application scenarios of the ZXHN F8605P:

Figure 1-2 Network Topology of the ZXHN F8605P



2 Product Highlights

2.1 Dual Band Concurrent Wi-Fi

ZXHN F8605P supports dual band concurrent Wi-Fi 6, delivering superior performance with MIMO 2x2 on both 2.4GHz and 5GHz bands achieving up to 600Mbps PHY rate on 2.4GHz and 2.4Gbps PHY rate on 5GHz. With the advanced features of Wi-Fi 6 like MU-MIMO, OFDMA, TWT, the F8605P also provides high network efficiency and more users in dense scenarios, while saves power consumption of user clients.

2.2 Enriched User-Side Interfaces

- Provides one 2.5GE ports for HSI or HD VoD services
- Provides three GE ports for HSI or HD VoD services.
- Supports 802.11b/g/n/ax@2.4GHz & 802.11a/n/ac/ax@5GHz dual-band concurrent Wi-Fi with up to 3.0Gbps PHY rate and excellent coverage.
- Users can connect PCs, IPTV STBs, tablets, smartphones, phones, faxes, and other terminals to the ZXHN F8605P to enjoy all kinds of Internet services.

2.3 High Reliability

- The full-service access capability featuring high bandwidth, high performance, high reliability, and easy operation, administration and maintenance (OMCI/TR-069) meets the ever changing customer requirements, protects legacy investments, and enhances the value of operators' networks.
- The highly reliable heat dissipation design guarantees stable operation.
- The dual image ensures uninterrupted services during software downloads or upgrades, thereby enhancing software reliability.
- The highly reliable lightning protection design provides lightning and surge protection of 4kV for the adapter and 2.5 kV for the Ethernet ports.

2.4 Convenient Installation and Management

- Remote batch upgrade, fault diagnosis, port loopback, and link detection via the OMCI/TR-069.
- Software upgrade and management via the EMS/ACS/OLT.(Upgrade timeout < 120s)
- Local Web management.
- Offline & batch configuration.

3 Hardware Features

3.1 Physical Interfaces and buttons

The ZXHN F8605P includes one XGS-PON optical port, one 100M/1G/2.5G port,three 10/100/1000M Ethernet ports, and Wi-Fi 802.11ax 2x2 @2.4GHz & 802.11ax 2x2 @5GHz concurrent.

The ZXHN F8605P provides one Wi-Fi button, one WPS button, one On/Off button and one Reset button.

Figure 3- 1 Rear Panel of the ZXHN F8605P

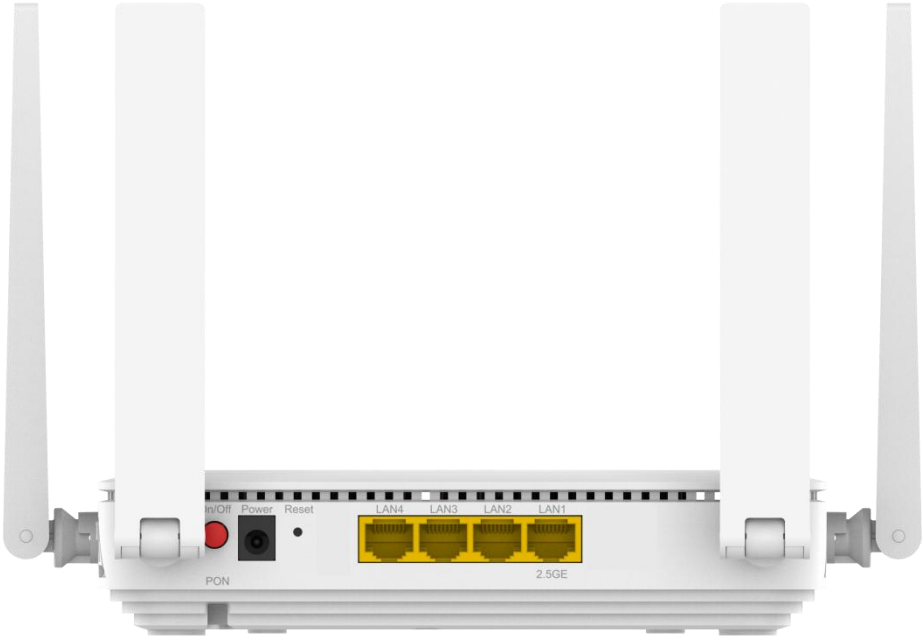


Table 3- 1 Specifications for the Interfaces and buttons on the rear panel

Interface	Description
LAN1 （2.5GE）	Supports one 100M/1G/2.5G Base-T Ethernet ports with RJ-45 connector. Supports half/full duplex and flow control, auto negotiation or manual configuration.

Interface	Description
	Supports MDI/MDIX auto-sensing.
LAN2-LAN4	Supports four 10/100/1000Base-T Ethernet ports with RJ-45 connector. Supports half/full duplex and flow control, auto negotiation or manual configuration. Supports MDI/MDIX auto-sensing.
Power	12 V Power Input Interface. +12 V DC (via external AC/DC adapter: 90 – 264 V, 50/60 Hz AC input, 12 V DC output). ZXHN F8605P does not lose its configuration when the power is turned off and when the mains power is unstable
On/Off	Power switch.
PON	SC/APC XGS-PON optical interface.

Figure 3- 2

Table 3- 2 Specifications for the Interfaces and buttons on the Front panel

Button	Introduction
Wi-Fi	After pushing the Wi-Fi button no longer than 0.4s, the WLAN function will be enabled or disabled.
WPS	After pushing the WPS button for longer than 0.4s, the WPS function will be enabled.
Reset	When the ZXHN F8605P is powered on, press and hold the Reset button for one second to restart the ZXHN F8605P. The user's settings information will not be lost. When the ZXHN F8605P is powered on, press and hold the Reset button for more than five seconds to restore the ZXHN F8605P to the factory settings.

3.2 LED Indicators

Figure 3-2 LED Indicators of the ZXHN F8605P

Table 3-2 Specification for the LED Indicators of the ZXHN F8605P

LED	Color	Status Description
Power	Off	The ONT is powered off

LED	Color	Status Description
	Solid Green	The ONT is powered on
PON	Off	1. The ONT is powered off 2. The ONT has not started the registration process. 3. The registration process failed.
	Solid Green	The ONT registration is successfully.
	Blinking	Blinking Fast:The ONT is upgrading. Blinking Slow:The ONT is registering.
LOS	Off	1. The ONT is powered off 2. The ONT received optical power is normal.
	Solid Red	07 status.
	Blinking Red	the optical fiber is not connected.
Internet	Off	1. The ONT is powered off. 2. There is no WAN connection with Internet properties configured. 3. The session is disconnected on user request or remote peer request (PPP disconnected, DHCP address released or no static IP address available on the Internet WAN connection).
	Solid Green	IP connected (the ONT has a Internet WAN IP address from IPCP, DHCP or statically configured).
LAN1-LAN 4	Off	1. The ONT is powered off. The Ethernet port is not connected to any terminal device.
	Solid Green	The Ethernet port is connected but no data is transmitted via the Ethernet port.
	Blinking Green	Data is being transmitted or received via the Ethernet port.
2.4G	Off	1. The 2.4G is powered off. 2. The 2.4G wireless interface is disabled.
	Solid Green	The 2.4G wireless interface is enabled.
5G	Off	1. The 5G is powered off. 2. The 5G wireless interface is disabled.
	Solid Green	The 5G wireless interface is enabled.
WPS	Off	1. The ONT is powered off. 2. The WPS function is disabled.

LED	Color	Status Description
	Blinking Green	WPS enable.

4 System Features

4.1 XGS-PON Features

- ITUT 988,ITUT 987.X compatible
- Flexible mapping between XGEM port and T-CONT
- Priority queuing and scheduling for upstream traffic
- AES-128 encryption
- FEC
- Five types of T-CONT
- Upstream traffic classification based on VLAN ID and 802.1p
- Multicast XGEM port
- SN, password, and SN+password authentication
- Auto-restart and recovery after power failure

4.1.1 Bandwidth Allocation

- Static bandwidth allocation
  - Adopts static bandwidth allocation mechanism in compliance with the ITU-T G.9807 standard
- Dynamic bandwidth allocation (DBA)
  - Adopts fair DBA policy for the same CoS services during traffic congestion

- Supports Status Reporting (SR) and Non Status Reporting (NSR) mode in compliance with the ITU-T G.9807 standard

4.1.2 GEM Adaptation

- Supports minimum 32 and up to 256 XGEM ports
- Supports mapping XGEM frame to XGTC payload.
- Supports mapping the traffic received at the UNI interface into XGEM port based on VID.
- Supports mapping the traffic received at the UNI interface into XGEM port based on VID + physical port.
- Supports mapping the traffic received at the UNI interface mapped XGEM port based on VID + physical port + CoS.
- Supports mapping one or several VIDs into the same XGEM port.

4.1.3 T-CONT

- Five types of T-CONT
- T-CONT as the basic unit of the upstream service
- T-CONT allocation based on the user and CoS; mapping to T-CONT queue based on the CoS value or GEM port
- WRR, SP, or WRR+SP T-CONT queue scheduling mode

4.1.4 Operation and Maintenance

- Supports physical layer operations and maintenance (PLOAM) defined in the ITU-T G.9807 standard.
- Supports OMCI defined in ITU-T G.988.

4.1.5 Optical Link Analysis and Diagnosis

- The optical module diagnostic interface analyses the parameters including operating temperature of the optical module, supply voltage, bias current, transmission power, and receiving power.
- Detection and auto shutdown of rogue ONTs.

4.2 Ethernet Features

4.2.1 MAC Address Features

- MAC address learning
- MAC address aging
- MAC address learning enable/disable
- MAC address learning limit
- MAC address binding to a user port. Only controls the input side of the port.
- Anti-MAC transferring (spoofing)
  - Forbids the MAC addresses learned from a user port to be transferred to other user port before aging.
  - Forbids the MAC addresses learned from an uplink port to be transferred to the user port.
- MAC filtering
  - Both the source and destination MAC addresses support the blacklist and the white list function.

4.2.2 VLAN Features

- IEEE 802.1q VLAN with the VLAN ID from 1 to 4094

- QinQ VLAN
- VLAN tagging/untagging on the user port
- VLAN overwrite function on the user port
- 1:1 mapping between the user port (physical port or logical port) and VLAN
- VLAN-based data forwarding
- VLAN-based packet filtering
- VLAN untagged mode, tagged mode and double tagged mode
- VLAN tag
  - Adds S-Tag to the untagged or priority tagged frames from the user port as per the needs.
  - Adds C-Tag and S-Tag to the untagged or priority tagged frames from the user port as needed.

4.3 Wi-Fi Features

The Wi-Fi function provides an easy, convenient, flexible, and cost-efficient method for users to access the Internet via a wireless LAN network.

- Supports 2.4GHz (2* 2 MIMO), IEEE802.11b/g/n/ax compliant
- Supports 5GHz (2* 2 MIMO), IEEE802.11a/n/ac/ax compliant
- Auto and manual channel selection
- Auto and manual rate control
- Supports 20MHz and 40MHz @2.4G
- Supports 20MHz, 40MHz，80MHz and 160MHz @5G

- Transmission power control
- Four SSIDs per frequency band
- Maximum 32 users per frequency band
- SSID broadcast enabling/disabling
- Access control based on MAC address
- WPA2-PSK, and WPA3-PSK s security authentication
- WPS
- WMM
- Beamforming
- Uplink(UL) and Downlink(DL) MU-MIMO
- Uplink(UL) and Downlink(DL) OFDMA
- STAs accessing WiFi are not affected by nearby STAs with RSSI ≤ −80 dBm.

4.4 QoS Features

- Traffic rate limiting based on the user port, traffic, and GEM port
- Upstream traffic classification based on VLAN ID, VLAN priority level (IEEE802.1D), and Ethernet type (such as IP, PPPoE and ARP/RARP)
- Ethernet priority level tagging of the upstream services based on the DSCP value
- Ingress rate limiting
- Egress shaping
- The LAN port can load the capacity of 40 PCs simultaneously through the switch

4.5 L3 Features

- Data forwarding and routing
  - Bridging, routing, or hybrid mode (bridging and routing)
  - Static routing
- Address management
  - DHCP server/client, Option 60
  - DHCP client, options 6, 15, 42, 50, 60, and 120
- PPPoE client
- DNS client/relay
- SNTP client
- NAT/PAT; The maximum number of NAT/PAT sessions is 8000
- ALG function: implements H.323, SIP, FTP, TFTP, PPTP, L2TP, IPSec, and RTSP private network traversal function; provides separate switches for each ALG function.

4.6 Multicast Features

- IGMP v1/v2/v3 and MLD Snooping
- IGMP PROXY
- 256 multicast groups per LAN port
- Fast leave time-the interval, from when a user sends an IGMP leaving message to when the ONU stops the multicast data packet, is less than 20ms.
- Supports MVLAN

4.7 IPv6 Features

- Transparent transmission of IPv6 protocol packets
- IPv4/IPv6 dual stack
- MLD v1 and MLD snooping
- Maximum Transmission Unit(MTU) of 1500 Bytes
- Maximum Jumbo frame size is 9000 Bytes
- IPv6 address management
  - SLAAC allocation mode on LAN side
  - DHCPv6 on LAN side
  - SLAAC on WAN side
  - DHCPv6 on WAN side
  - DHCPv6-PD on WAN side
  - PPPoE+DHCPv6 on WAN side
  - PPPoE+SLAAC on WAN side

4.8 Management Features

- OMCI management
- Web management
- TR-069 management complying with BBF TR-142 framework.
- Management via the OLT on the EMS
- Built-in capability for remote management with standards compliance, including the full range of FCAPS functions like supervision, analysis, and maintenance

- UNI loopback detection
- Remote software download, activation, and reboot via the OMCI
- Dual image, version download, update detection, and auto rollback

4.9 Security Features

- Traffic filtering based on UNI, VLAN ID, 802.1p, UNI + 802.1p, and VLAN + 802.1p
- Multicast , unicast and broadcast flow attack protection
- MAC address limiting based on each UNI or a single ONT
- Broadcast packet rate limiting
- Anti-DoS attack
- MAC filtering

4.9.1 Data Security of the XGS-PON Interface

Because the XGS-PON system works in broadcast mode in the downstream direction, malicious users can easily attack other users' messages. To enhance data security of the user, the XGS-PON downstream provides AES-128 encryption.

4.9.2 Traffic Suppression

- Broadcast storm suppression
  - When the broadcast traffic including the unknown unicast and multicast traffic exceeds the threshold that the user sets, the broadcast traffic will be discarded till the traffic is reduced to an allowable range, thereby avoiding network congestion and ensuring normal operation of the network services.

4.10 Alarm Features

- Dying gasp
- Receiving optical power too high
- Receiving optical power too low
- Transmission optical power too high
- Transmission optical power too low
- Port loopback alarm
- Loss of signal
- Loss of frame
- Signal degradation alarm
- Loss of GEM channel delineation

4.11 Performance Statistic Features

4.11.1 Ethernet Port Performance Parameters

- Frames transmitted
- Bytes transmitted
- Unicast frames
- Multicast frames
- Broadcast frames
- Frames received
- Bytes received

- Unicast frames received
- Multicast frames received
- Broadcast frames received

5 Technical Indices and Parameters

5.1 Physical Structure, Environmental and Electrical Indices

Table 5-1 Specifications and Environmental Indices of the ZXHN F8605P

Parameter	Nominal Value
Net dimensions	183 mm (W) x 117 mm (D) x 41.5 mm (H)
Typical power consumption	＜14.5
Noise	Null
Heat dissipation mode	Natural heat dissipation
Power supply	Rated 12 V DC (through the external AC/DC adapter)
Mounting	Desktop or wall-mount
Operating environment	0°C－40°C
Storage temperature	0°C－60°C
Relative humidity	5%－95%
Atmospheric pressure	70－106 kPa

5.2 XGS-PON Interface Indices and Parameters

Table 5-2 GPON Interface Indices of the ZXHN F8605P

Parameter	Nominal Value
Connector type	SC/APC
Number of PON	1
Fiber type	Single-mode fiber
Wavelength	Downstream: 1575~1580 nm Upstream: 1260~1280 nm
Compliant standard of the PON interface	ITU-T G9807

Parameter	Nominal Value
Receiving rate of the optical interface	9.95328 Gbps
Transmitting rate of the optical interface	9.95328 Gbps
Transmission wavelength range	1260~1280 nm
Root-mean-square spectral width of the transmitting end	< 1 nm (spectral width: 20 dB)
Output optical power	4-9 dBm
Optical power of the transmitter in output OFF status	< -45 dBm
Extinction ratio	>6 dB
Receive range	1575–1580 nm
Receive sensitivity	-28 dBm
Saturation optical power of the receiver	-9 dBm
Optical link length	20 km

5.3 Key Technical Indices

Table 5- 3 Key Technical Indices of the ZXHN F8605P

Parameter	Nominal Value
Configurable VLAN ID range	1 – 4094
Capacity of the MAC address table	1K
Capacity of the multicast table	1K
IGMP join delay	< 10 ms (single channel)
IGMP leave delay	< 10 ms (single channel)
Startup time	80s (default)
T-CONTs	32
GEM ports	256

6 Standards Compliance

Table 6- 1 Standards Compliance

Standard	Description
ITU-T G.988	ONT management and control interface (OMCI) specification
ITU-T G.9807.1	10 Gigabit-capable symmetric passive optical network (XGS-PON)
Broadband Forum TR-101	Migration to Ethernet-Based DSL Aggregation, April 2006
Broadband Forum TR-156	Using GPON Access in the context of TR-101, December 2008
IEEE Std 802.1D-2004	Media Access Control (MAC) Bridges
IEEE Std 802.1Q-2005	Virtual Bridged Local Area Networks
IEEE Std 802.1ad-2005	IEEE Standards for Local and Metropolitan Area Networks —Virtual Bridged Local Area Networks—Revision—Amendment 4: Provider Bridges
IEEE 802.3-2005	IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications (Includes: IEEE Std 802.3ae-2002, IEEE Std 802.3af-2003, IEEE Std 802.3ah-2004, IEEE Std 802.3aj-2003, IEEE Std 802.3ak-2004)(Revision of IEEE 802.3-2002)
IEEE 802.1X-2004	IEEE Standards for Local and Metropolitan Area Networks: Port-Based Network Access Control
ITU-T Y.1291	An architectural framework for support of Quality of Service in packet networks
ITU-T H.248.1 V2	Gateway control protocol: Version 2
ITU-T H.248.1 v3	Gateway control protocol: Version 3

Standard	Description
IETF RFC1112	Host extensions for IP multicasting
IETF RFC2236	Internet Group Management Protocol, Version 2
IETF RFC 3376	Internet Group Management Protocol, Version 3
ITU_T K.21	Resistibility of Telecommunication Equipment Installed in Customer Premises to Overvoltages and Overcurrents
EN60950	Information technology equipment. Safety, General requirements

Glossary

Table 7- 1 Glossary

Acronym	Full Term
OMCI	ONU Management and Control Interface
AES	Advanced Encryption Standard
HSI	High Speed Internet
ARP	Address Resolution Protocol
MIMO	Multiple-Input Multiple-Output
FAT	File Allocation Table
NTFS	New Technology File System
PPP	Point to Point Protocol
IPCP	IP Control Protocol
PPPoE	Point to Point Protocol over Ethernet
DHCP	Dynamic Host Configuration Protocol
CoS	Class of Service
GEM	G-PON Encapsulation Mode
DBA	Dynamic Bandwidth Allocation
EMS	Element Management System
ACS	Auto-Configuration Server
LED	Light Emitting Diode
FEC	Forward Error Correction
FTP	File Transfer Protocol
TFTP	Trivial File Transfer Protocol
WMM	Wi-Fi Multi-Media
IGMP	Internet Group Management Protocol
MLD	Multicast Listener Discover
DNS	Domain Name System
FTTH	Fiber to the Home
GE	Gigabits Ethernet

Acronym	Full Term
GFP	Generic Framing Procedure
XGS-PON	Gigabit-capable Passive Optical Networks
IP	Internet Protocol
IPTV	Internet Protocol Television
ITU	International Telecommunication Union
L3	Layer 3
WAN	Wide Area Network
LAN	Local Area Network
MAC	Media Access Control
SNTP	Simple Network Time Protocol
NAT	Network Address Translation
L2TP	Layer Two Tunneling Protocol
PPTP	Point to Point Tunneling Protocol
RTSP	Real Time Streaming Protocol
ALG	Application Layer Gateway
OLT	Optical Line Termination
ONT	Optical Network Terminal
ONU	Optical Network Unit
PON	Passive Optical Network
SN	Serial Number
QoS	Quality of Service
RARP	Reverse Address Resolution Protocol
SP	Service Priority
SP	Strict Priority
STB	Set Top Box
UNI	User Network Interface
VLAN	Virtual Local Area Network
VoD	Video on Demand
WPS	Wi-Fi Protected Setup
WRR	Weight Round Robin