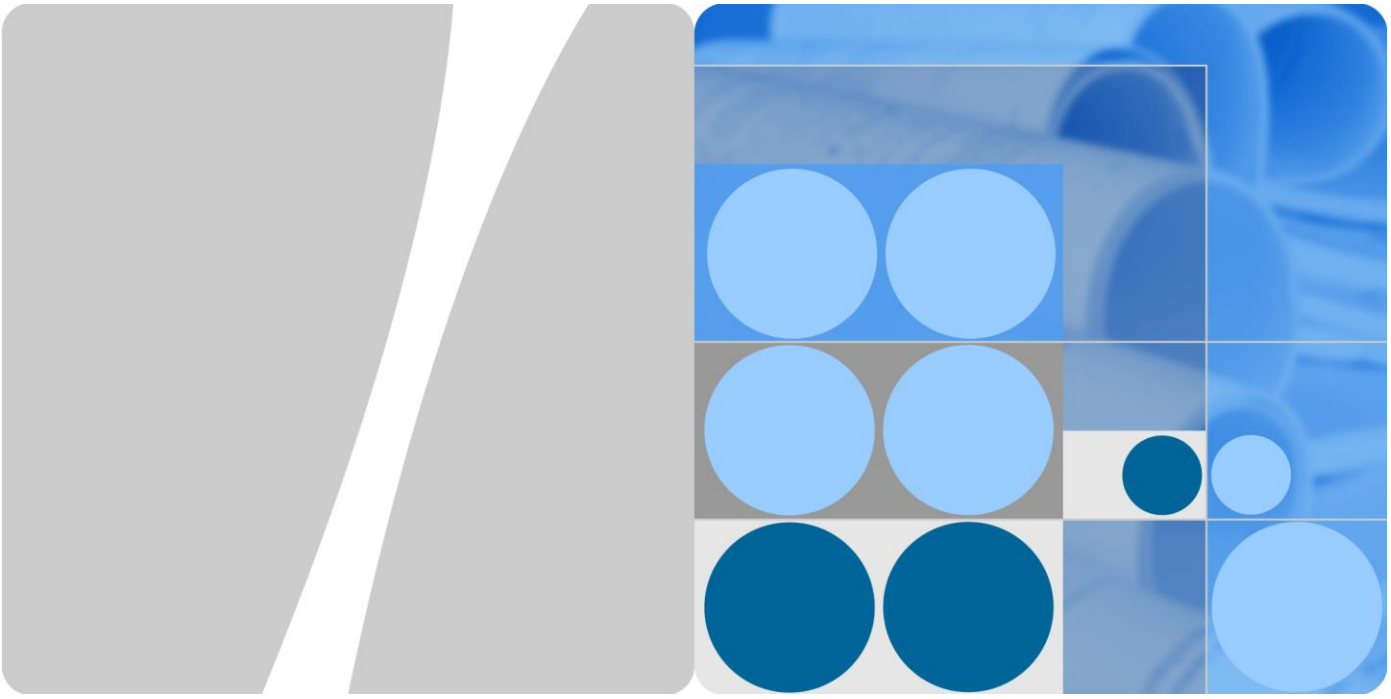
Product Description



HUAWEI B593s-22 LTE CPE
V200R001

Issue 03

Date 2013-06-09

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About This Document

Purpose

This document describes the main functions, supported services, and system architecture of the HUAWEI B593s-22 Long Term Evolution (LTE) Customer-Premises Equipment (CPE) V200R001 (B593s-22 for short).

This document is organized as follows.

Chapter	Description
1 Overview	Supported network modes, basic services and functions, and appearance of the B593s-22.
2 Product Features	Features and technical specifications of the B593s-22.
3 Services and Applications	Services provided by the B593s-22.
4 System Architecture	System architecture of the B593s-22.
5 Packing List	Items included with the B593s-22.

Change History

Version	Change Description	Date
01	First release	2013-02-08
02	• Change the maximum transmit power • Change the maximum transmission rate of the LTE. • Change the antenna gain. • Change the Ethernet cable from mandatory to optional in chapter 5. • Add the function of writing and sending SMS. • Add the description “Only FAT/FAT32 format USB storage device are supported.” in section 3.3.	2013-05-16
03	Change the Ethernet cable from optional to mandatory in chapter 5.	2013-06-09

Contents

1 Overview

As a high-performance LTE CPE device, the B593s-22 enables home office (SOHO) users to get access to wireless and wired networks. The B593s-22 supports the following frequency bands:

- LTE
  - Frequency division duplex (FDD): 2600/2100/1800/900/800 MHz
  - Time division duplex (TDD): 2600 MHz
- DC-HSPA+/HSPA+/HSPA/UMTS: 2100/900 MHz
- EDGE/GPRS/GSM: 1900/1800/900/850 MHz

The B593s-22 can work in any of the following network standards:

- LTE
- Dual Carrier High Speed Packet Access Plus (DC-HSPA+)
- High Speed Packet Access Plus (HSPA+)
- High Speed Uplink Packet Access (HSUPA)
- High Speed Downlink Packet Access (HSDPA)
- Universal Mobile Telecommunications System (UMTS)
- Enhanced Data Rates for Global Evolution (EDGE)
- General Packet Radio Service (GPRS)
- Global System for Mobile Communications (GSM)

The B593s-22 provides the following services and functions:

- Data services
- Voice services
- Short message service (SMS)
- USB Sharing services
- Security functions
- Maintenance and management

Figure 1-1 shows the appearance of the B593s-22.

Figure 1-1 B593s-22 appearance

2 Product Features

2.1 Main Features

The following lists the main features of the B593s-22:

- Access to LTE/DC-HSPA+/HSPA+/HSPA/UMTS wireless networks
- Access to wired Ethernet networks
- On the Ethernet, LTE FDD downlink packet data service at a maximum transmission rate of 100 Mbit/s
- On a Wi-Fi network, LTE FDD downlink packet data service at a maximum transmission rate of 150 Mbit/s
- LTE FDD uplink packet data service at a maximum transmission rate of 50 Mbit/s
- LTE TDD downlink packet data service at a maximum transmission rate of 110 Mbit/s
- LTE TDD uplink packet data service at a maximum transmission rate of 10 Mbit/s
- DC-HSPA+ downlink packet data service at a maximum transmission rate of 43.2 Mbit/s
- HSPA+ downlink packet data service at a maximum transmission rate of 21.6 Mbit/s
- HSPA downlink packet data service at a maximum transmission rate of 14.4 Mbit/s
- DC-HSPA+/HSPA+/HSPA uplink packet data service at a maximum transmission rate of 5.76 Mbit/s
- UMTS packet data service at a maximum transmission rate of 384 kbit/s
- UMTS circuit-switched data service at a maximum transmission rate of 64 kbit/s
- EDGE packet data service at a maximum transmission rate of 236.8 kbit/s
- GPRS packet data service at a maximum transmission rate of 85.6 kbit/s
- IEEE802.11b/g/n
- Functioning as a Dynamic Host Configuration Protocol (DHCP) server and supporting Network Address Translation (NAT)
- Security functions
- Internet Protocol version 6 (IPv6)/Internet Protocol version 4 (IPv4) dual stack
- Wi-Fi
- Wi-Fi protected setup (WPS)

- Windows XP, Windows Vista, Windows 7, Windows 8, and Mac OS X 10.6, 10.7, and 10.8
- LTE external antenna port
- USB 2.0 host port
- Personalized light emitting diode (LED) indicators

2.2 Technical Specifications

2.2.1 Hardware Specifications

Table 2-1 lists the hardware specifications of the B593s-22.

Table 2-1 Hardware specifications

Item	Description
Technical standards	WAN: LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS/GSM
	LAN: IEEE 802.3/802.3u
	WLAN: IEEE 802.11b/g/n
Working bands	LTE: • FDD: 2600/2100/1800/900/800 MHz • TDD: 2600 MHz
	DC-HSPA+/HSPA+/HSPA/UMTS: 2100/900 MHz
	EDGE/GPRS/GSM: 1900/1800/900/850 MHz
	WLAN: 2400–2483.5 MHz
Memory	512 MB NAND Flash 256 MB Double Data Rate (DDR) Synchronous Dynamic Random Access Memory (SDRAM)
External ports	One power port
	Two telephone ports (RJ11)
	Four LAN ports (RJ45)
	One USB 2.0 host port
	One Universal Subscriber Identity Module (USIM) card port
	Two external antenna ports
Buttons	One power button
	One WLAN button
	One WPS button

Item	Description	
	One reset button	
LED indicators	One power indicator	
	One WLAN indicator	
	One WPS indicator	
	One telephone indicator	
	One mode indicator	
	One signal strength indicator	
	Four LAN indicators	
Maximum transmit power	LTE: Conform to Power Class 3 Definition	
	UMTS: Conform to Power Class 3 Definition	
	WLAN	802.11b: 17 dBm
		802.11g: 16 dBm
		802.11n: 16 dBm
Receiving sensitivity	LTE: Confirm to 3GPP Requirements	
	UMTS: Confirm to 3GPP Requirements	
	WLAN	802.11n: –64 dBm at 65 Mbit/s
		802.11g: –65 dBm at 54 Mbit/s
		802.11b: –76 dBm at 11 Mbit/s
Power consumption	< 12 W	
Power supply	AC: 100–240 V	
	DC: 12 V/2 A	
Dimensions (H x W x D)	176 mm × 190 mm × 35 mm (6.93 in. x 7.48 in. x 1.38 in.)	
Weight	About 390 g (power adapter excluded)	
Temperature	Working temperature: 0°C to +40°C	
	Storage temperature: –20°C to +70°C	
Humidity	5%–95% RH	

2.2.2 Antenna Specifications

Built-in Antenna

Table 2-2 Specifications of the LTE main antenna

Item	Description
Frequency range	790–2690 MHz
Input impedance	50 Ω
Standing wave ratio (SWR)	< 3
Efficiency	> 50% (790–960 MHz); > 60% (1400–2690 MHz)
Gain	0–3 dBi
Polarization type	Linear polarization

Table 2-3 Specifications of the WLAN antenna

Item	Description
Frequency range	2400–2483.5 MHz
Input impedance	50 Ω
SWR	< 3
Efficiency	> 50%
Gain	< 1.5 dBi
Polarization type	Linear polarization

External Antenna

Table 2-4 Specifications of the LTE external antenna at 790 MHz to 2690 MHz

Item	Description
Frequency range	790–2690 MHz
Input impedance	50 Ω
SWR	< 3
Efficiency	> 50%
Gain (H-plane)	0–3 dBi
Polarization type	Linear polarization

Table 2-5 Specifications of the LTE external antenna at 2500 MHz to 2690 MHz

Item	Description
Frequency range	2500–2690 MHz
Input impedance	50 Ω
SWR	< 2
Efficiency	> 60%
Gain (H-plane)	5 dBi
Polarization type	Linear polarization

2.2.3 Software Specifications

Table 2-6 lists the software specifications of the B593s-22.

Table 2-6 Software specifications

Item	Description	
Gateway	Supports the default route, namely, the route with the IP address **0.0.0.0**.	
	Supports the Address Resolution Protocol (ARP).	
	Supports the Internet Control Message Protocol (ICMP).	
	Supports the domain name service (DNS).	
	NAT	Supports NAT and Network Address and Port Translation (NAPT), which complies with RFC2663, RFC3022, and RFC3027.
		Supports fragmented message identification during common NAT.
	DHCP server	Enables and disables the DHCP server.
		Configures DHCP server address pools.
		Sets the lease time.
		Displays the status of the DHCP server address pools, including host names, Media Access Control (MAC) addresses, IP addresses, and remaining lease time.
SMS	Writing/Sending/Receiving	
	Sets the SMS center number.	
Firewall	Enables and disables the firewall.	
	Filters LAN MAC addresses.	

Item	Description	
	Filters LAN IP addresses.	
	Filters URLs.	
	Supports port forwarding.	
	Supports demilitarized zone (DMZ).	
	Supports Universal Plug and Play (UPnP).	
	Supports Application Level Gateway (ALG) settings.	
LAN	Supports 10/100 Mbit/s autonegotiation.	
	Supports auto MDI/MDIX. MDI stands for Medium Dependent Interface, and MDIX stands for Medium Dependent Interface Crossover.	
	Complies with IEEE 802.3 and IEEE 802.3u.	
WLAN	Broadcasts and hides service set identifiers (SSIDs).	
	Complies with IEEE 802.11b/g/n.	
	Supports WPS.	
	Authentication	Supports OpenSystem authentication.
		Supports encryption using wired equivalent privacy (WEP), Wi-Fi protected access preshared key (WPA-PSK), and WPA2-PSK keys.
		Supports the Temporal Key Integrity Protocol (TKIP) encryption algorithm.
		Supports the Advanced Encryption Standard (AES) encryption algorithm.
		Supports the TKIP and AES hybrid encryption algorithm.
	MAC address authentication	Supports the MAC address authentication whitelist.
		Supports the MAC address authentication blacklist.
		Supports a maximum of 16 MAC address entries.
	Supports automatic transmission rate adjustment.	
	Station management	Supports station status queries.
		Supports a maximum of 32 connected stations.

Item	Description
System requirements	Operating system: supports Windows XP, Windows Vista, Windows 7, Windows 8, and Mac OS X 10.6, 10.7, and 10.8.
	Hardware configuration: meets the configuration requirements of the operating system.

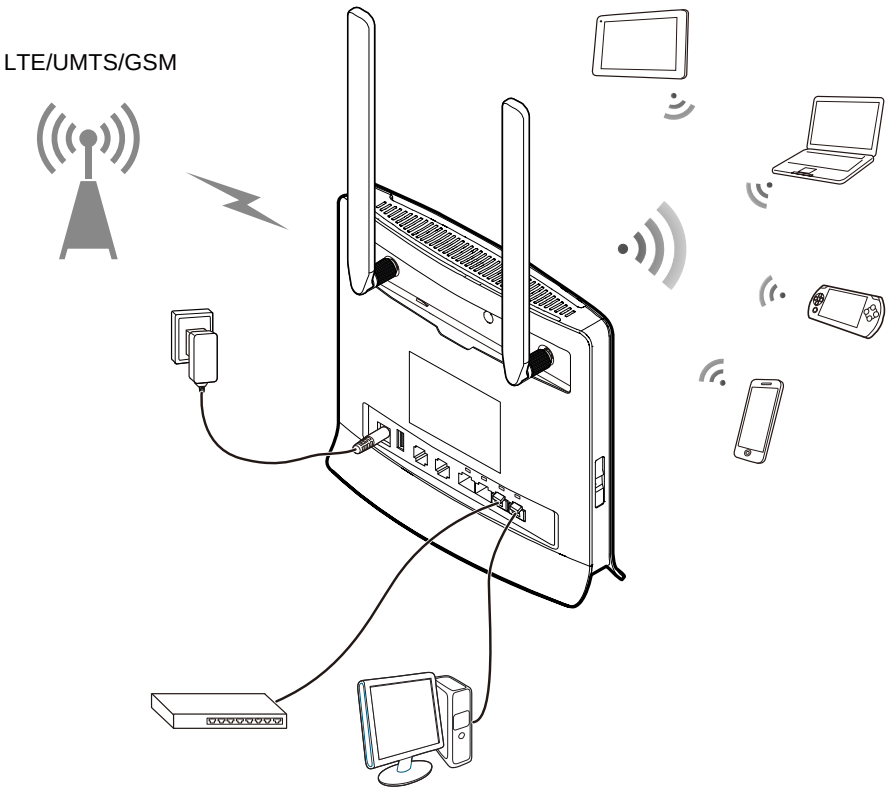
3 Services and Applications

3.1 Data Services

By connecting to the B593s-22 over a wireless or wired network, SOHO users can get access to high-speed Internet services.

The B593s-22 can simultaneously set up wireless connections with 32 Wi-Fi devices and establish a local area network (LAN) by connecting to concentrators and switches.

Figure 3-1 B593s-22 connected to multiple devices



3.2 Voice Services

The B593s-22 provides two telephone ports to which users can connect telephones to implement basic voice functions or connect fax machines (optional) to use fax services.

Figure 3-2 B593s-22 connected to telephones

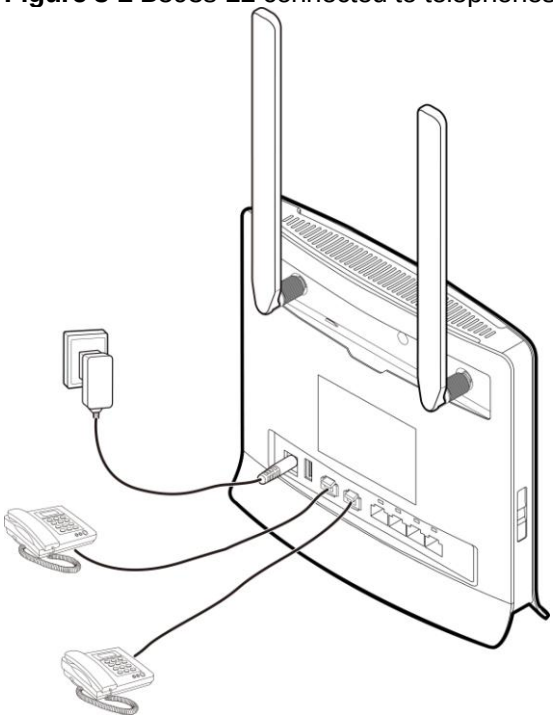
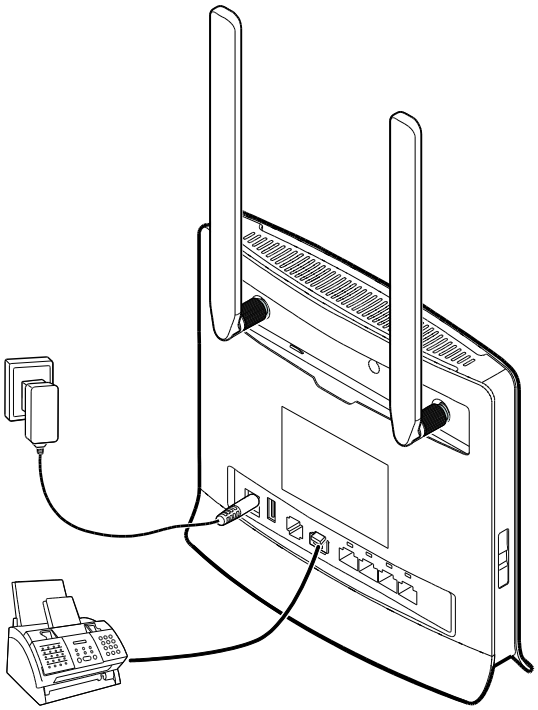


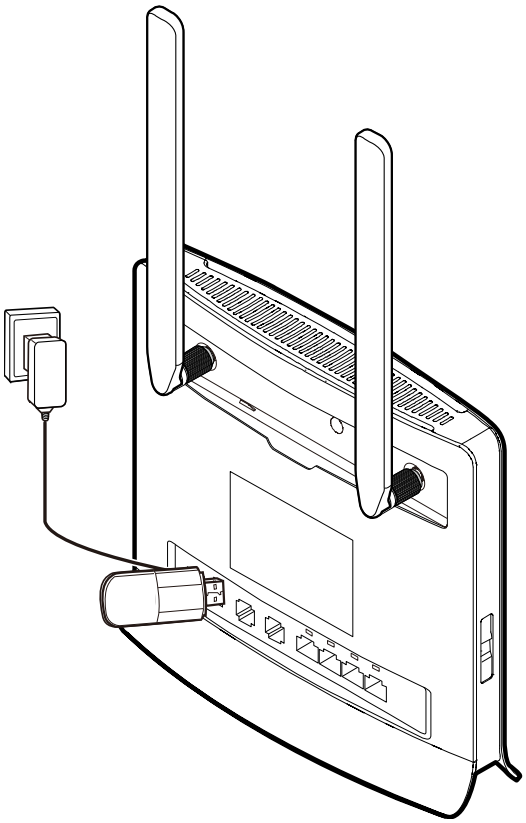
Figure 3-3 B593s-22 connected to a fax machine (optional)



3.3 USB Sharing Services

With one USB port, the B593s-22 can function as a file sharing center. Users can connect a USB storage device to the USB port on the B593s-22 to save and share files. Only FAT/FAT32 format USB storage device are supported.

Figure 3-4 B593s-22 connected to a USB storage device



3.4 Security Services

The B593s-22 offers security features, such as network firewalls, user authentication, and personal identification number (PIN) protection, to protect users from network security threats.

3.4.1 Firewall

The B593s-22 has the following firewall functions:

- Firewall switch: Enable and disable the firewall.
- LAN MAC address filtering: Prevent specified MAC addresses on a LAN from accessing the network.
- LAN IP address filtering: Prevent specified IP addresses on a LAN from accessing the network.
- URL filtering: Prevent computers on a LAN from visiting specified URLs.

3.4.2 User Authentication

The B593s-22 complies with the following user authentication protocols:

- WEP
- WPA-PSK
- WPA2-PSK

3.4.3 PIN Protection

If PIN protection is enabled, after the B593s-22 restarts, users must enter the correct PIN each time they log in to the web management page.

3.5 Maintenance and Management

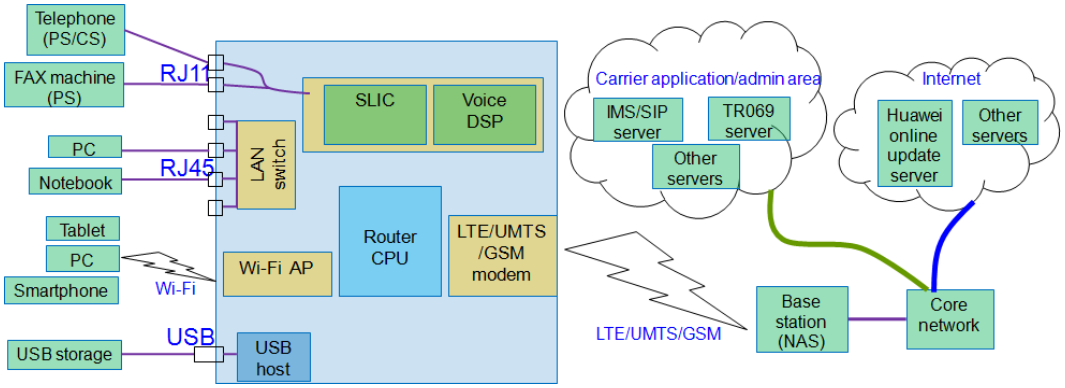
The B593s-22 allows users to locally and remotely manage connected devices, complete network settings, and check the device status to ensure consistent performance.

4 System Architecture

4.1 System Architecture Diagram

Figure 4-1 shows the B593s-22 system architecture.

Figure 4-1 B593s-22 system architecture



4.2 Functional Modules

- LTE/UMTS/GSM modem
  - Processes baseband and radio frequency (RF) signals for LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS/GSM standards, for example, modulates and demodulates LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS/GSM baseband signals and encodes and decodes LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS/GSM channels.
  - Sends and receives radio signals.
  - Modulates and demodulates radio and baseband signals.
- Router CPU

  Transmits data and voices from the wireless metropolitan area network (WMAN) to the LAN.
- Voice digital signal processor (DSP) and Subscriber Line Interface Circuit (SLIC)

  Provides voice and fax services.

- LAN switch

  Transmits data over Ethernet ports.
- Wi-Fi access point (AP)

  Enables wireless devices to connect to a LTE/UMTS/GSM network using Wi-Fi or related standards.
- USB 2.0 host port

  Connects a USB storage device to the B593s-22.

5 Packing List

Table 5-1 lists the items included with the B593s-22.

Table 5-1 Items in the B593s-22 package

Item	Quantity	Remarks
LTE CPE	1	Mandatory
Power adapter	1	Mandatory
Ethernet cable	1	Mandatory
Quick Start	1	Mandatory
Safety Information	1	Mandatory
Warranty Card	1	Optional
USB cable	1	Optional
External antenna	2	Optional

A Acronyms and Abbreviations

Numerics	
3G	The Third Generation
A	
AC	Alternating Current
AES	Advanced Encryption Standard
ALG	Application Level Gateway
ARP	Address Resolution Protocol
AP	Access Point
APN	Access Point Name
C	
CPE	Customer-Premises Equipment
D	
DC	Direct Current
DC-HSPA+	Dual Carrier High Speed Packet Access Plus
DDR	Double Data Rate
DHCP	Dynamic Host Configuration Protocol
DL	Down Link
DMZ	demilitarized zone
DNS	domain name service
E	
EDGE	Enhanced Data Rates for GSM Evolution
F	
FDD	frequency division duplex
G	

GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
H	
HSPA+	High Speed Packet Access Plus
HSPA	High Speed Packet Access
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
I	
ICMP	Internet Control Message Protocol
IP	Internet Protocol
L	
LAN	Local Area Network
LED	Light Emitting Diode
LTE	Long Term Evolution
M	
MAC	Media Access Control
MDI	Medium Dependent Interface
MDIX	Medium Dependent Interface Crossover
N	
NAPT	Network Address and Port Translation
NAT	Network Address Translation
P	
PIN	Personal Identification Number
S	
SDRAM	Synchronous Dynamic Random Access Memory
SMS	Short Message Service
SOHO	Small Office Home Office
SSID	service set identifier
T	
TDD	time division duplex
TKIP	Temporal Key Integrity Protocol
U	

UL	Up Link
UMTS	Universal Mobile Telecommunications System
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
W	
WAN	Wide Area Network
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network
WPA-PSK	Wi-Fi Protected Access Pre-shared Key
WPS	Wi-Fi Protected Setup