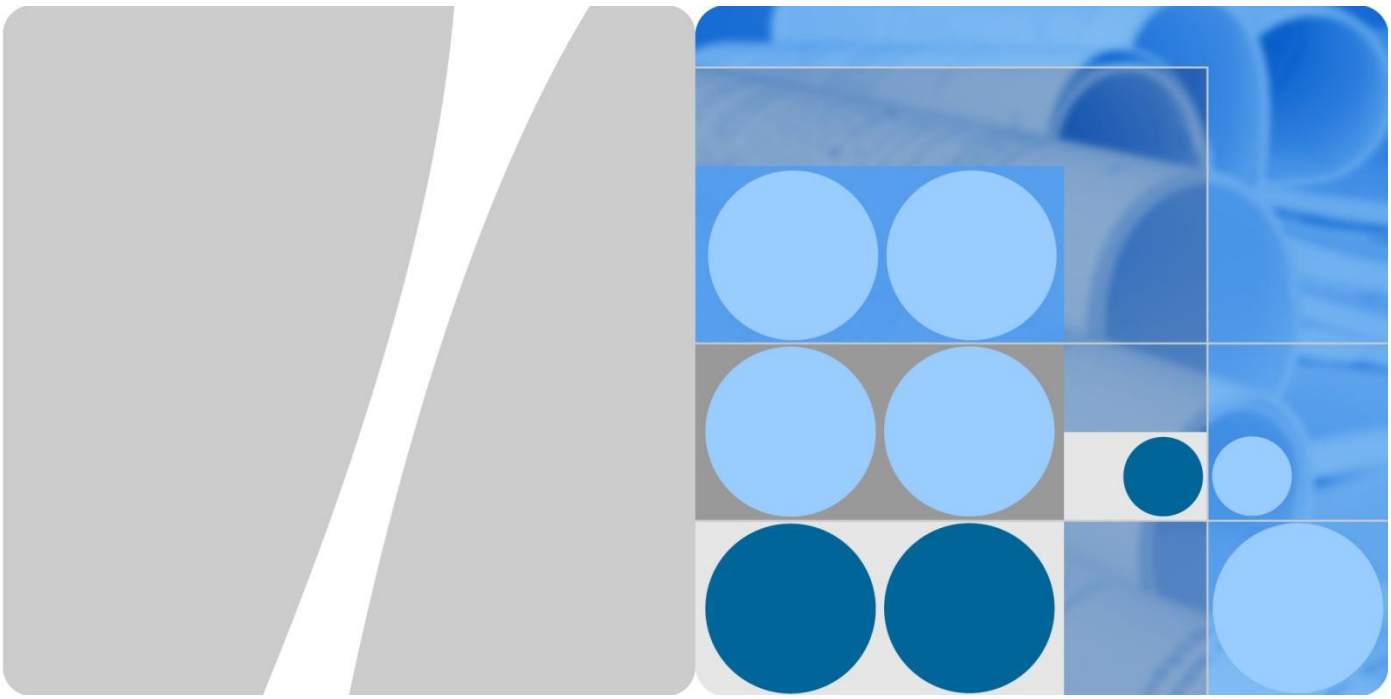


LTE TDD B2268H V100R001C00

User Guide

Issue 01

Date 2014-01-15

HUAWEI TECHNOLOGIES CO., LTD.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Contents

1 Introduction

1.1 Overview

The Device is an LTE (Long Term Evolution) device including an outdoor unit (ODU) and an indoor unit (IDU). The LTE Device also provides a complete security solution with a robust firewall based on Stateful Packet Inspection (SPI) technology and Denial of Service (DoS).

See the chapter on product specifications for a full list of features.

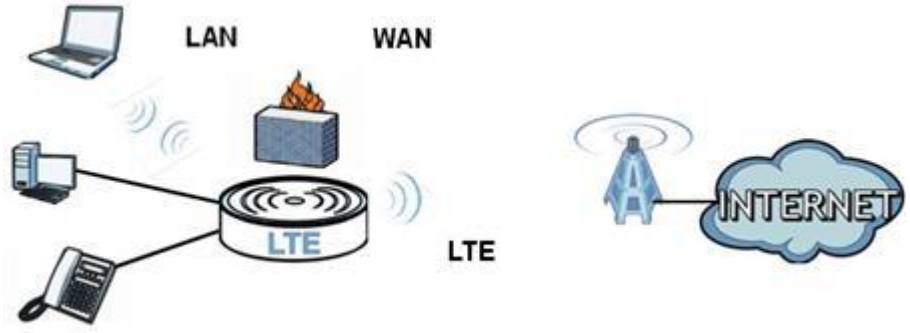
1.2 Applications for the LTE Device

Here are some examples for which the LTE Device is well suited.

1.2.1 Internet Access

Your LTE Device provides Internet access by connecting to an LTE network wirelessly. Your LTE Device supports LTE frequency bands 38, 40, 42, and 43 although the bands it actually uses depends on your LTE service provider. Computers can connect to the LTE Device's **ETHERNET** ports (or wirelessly).

Figure 1-1 LTE Device's Internet Access Application



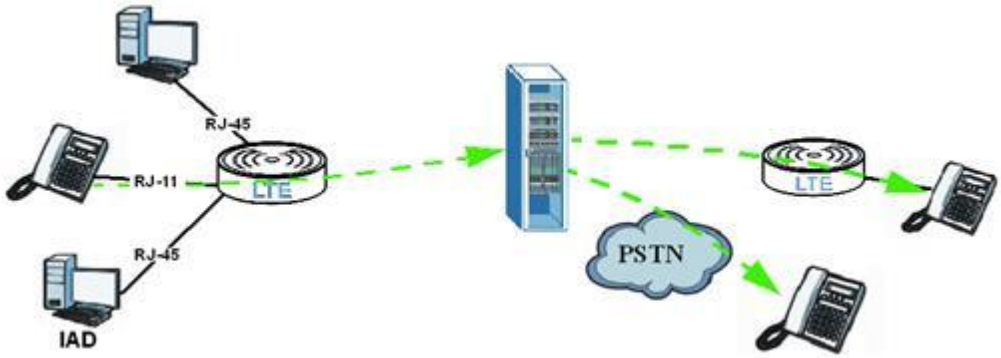
1.2.2 VoIP Features

CAUTION

VoIP is not supported

You can register one SIP (Session Initiation Protocol) profile with one account for that profile and use the LTE Device to make and receive VoIP telephone calls:

Figure 1-2 LTE Device's VoIP Application

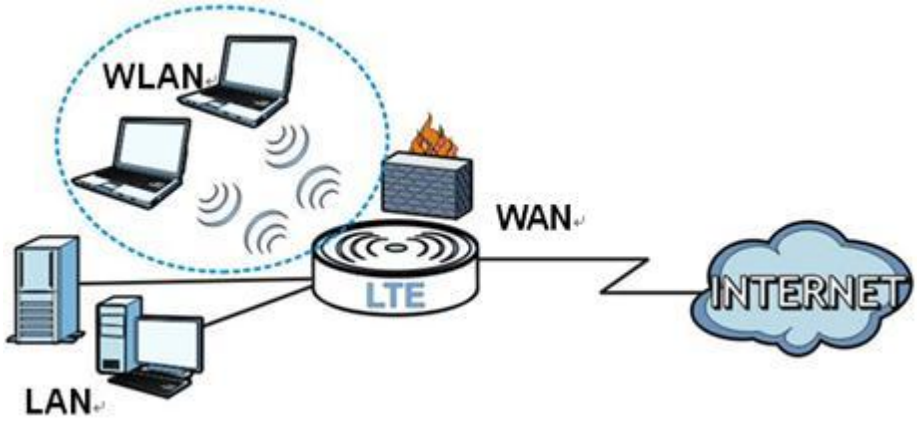


The LTE Device sends your call to a VoIP service provider's SIP server which forwards your calls to either VoIP or PSTN phones. Enable the LTE Device's SIP ALG feature to support SIP phones and IAD devices on the LAN.

1.2.3 Wireless Connection

By default, the wireless LAN (WLAN) is enabled on the LTE Device. Once Wireless is enabled, IEEE 802.11b/g/n compliant clients can wirelessly connect to the LTE Device to access network resources. You can set up a wireless network with WPS (WiFi Protected Setup) or manually add a client to your wireless network.

Figure 1-3 Wireless Connection Application



1.2.4 IPv6

CAUTION

IPv6 is not support

1.3 The WLAN Button

You can use the **WIRELESS On/Off** button on top of the device to turn the wireless LAN on or off. You can also use it to activate WPS in order to quickly set up a wireless network with strong security.

Turn the Wireless LAN On or Off

Step 1 Make sure the **PWR/SYS** LED is on (not blinking).

Step 2 Press the **WIRELESS On/Off** button for one second and release it. The **WLAN/WPS** LED should change from on to off or vice versa.

----End

Activate WPS

Step 1 Make sure the **PWR/SYS** LED is on (not blinking).

Step 2 Press the **WIRELESS On/Off** button for more than five seconds and release it. Press the WPS button on another WPS-enabled device within range of the LTE Device. The **WLAN/ WPS** LED should flash while the LTE Device sets up a WPS connection with the wireless device.

NOTE

You must activate WPS in the LTE Device and in another wireless device within two minutes of each other. See Section 5.7.6 for more information.

----End

1.4 Ways to Manage the LTE Device

Web Configurator is for management of the LTE Device using a (supported) web browser.

1.5 Good Habits for Managing the LTE Device

Do the following things regularly to make the LTE Device more secure and to manage the LTE Device more effectively.

- Change the password. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the password and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password to access the Web Configurator, you will have to reset the LTE Device to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the LTE Device. You could simply restore your last configuration. Keep in mind that backing up a configuration file will not back up passwords used to set up your VoIP account. Write down any information your ISP provides you.

1.6 LEDs (Lights)

The following graphic displays the labels of the LEDs.

Figure 1-4 LEDs on the top of the Device

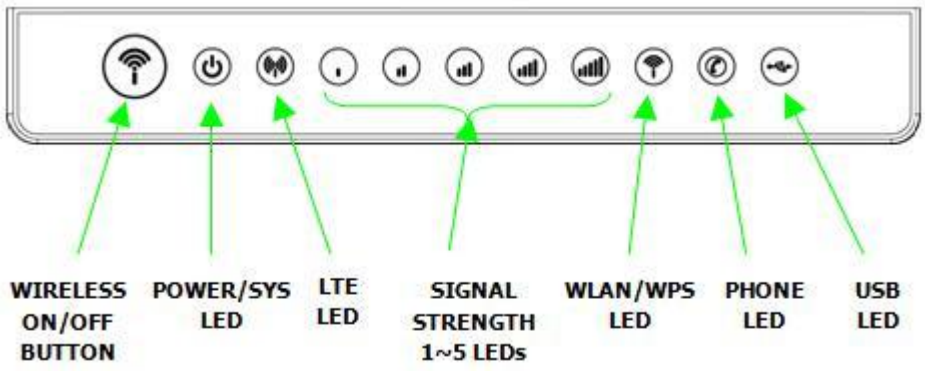


Figure 1-5 LEDs on the Ethernet Ports

None of the LEDs are on if the LTE Device is not receiving power.

Table 1-1 LED Descriptions (From Left To Right)

LED	COLOR	STATUS	DESCRIPTION
PWR/SYS	Green	On	The LTE Device is receiving power and ready for use.
		Blinking	The LTE Device is booting up.
	Red	On	The LTE Device detected an error while self-testing, or there is a device malfunction.
		Blinking	The LTE Device is upgrading the firmware.
	Off		The LTE Device is not receiving power.
LINK	Green	On	The LTE Device has an LTE connection on the WAN.
		Blinking	The LTE Device is searching for a frequency channel or is performing network entry.
	Off		The LTE Device does not have an LTE connection on the WAN.
LTE RSSI	Green (RSSI_1, RSSI_2, RSSI_3, RSSI_4, RSSI_5)	No Signal LEDS	There are 5 signal LEDs to show the Received Signal Strength Indication (RSSI) of the LTE radio connection.
			There is no LTE connection.
		Refer Table 1-2 LTE Signal Strength LED Definition Please note the ODU presents the same LED behavior as IDU.	
WLAN/ WPS	Green	On	The wireless network is activated and is operating in IEEE 802.11 "b", "g" or "n" mode.
		Blinking	The LTE Device is communicating with other wireless clients.
	Orange	Blinking	The LTE Device is setting up a WPS connection.
	Off		The wireless network is not activated.
PHONE	Green	On	A SIP account is registered for the phone port.
		Blinking	A telephone connected to the phone port has its receiver off of the hook or there is an incoming call.
	Orange	On	A SIP account is registered for the phone port and there is a voice message in the corresponding SIP account.
		Blinking	A telephone connected to the phone port has its receiver off of the hook and there is a voice message in the corresponding SIP account.
	Off		The phone port does not have a SIP account

LED	COLOR	STATUS	DESCRIPTION
			registered.
ETHERNET 1-2	Yellow (Giga Ethernet)	On	The LTE Device has a successful 1000 Mbps Ethernet connection with a device on the Local Area Network (LAN).
		Blinking	The LTE Device is sending or receiving data to/from the LAN at 1000 Mbps.
	Green (Fast Ethernet)	On	The LTE Device has a successful 10/100 Mbps Ethernet connection with a device on the Local Area Network (LAN).
		Blinking	The LTE Device is sending or receiving data to/from the LAN at 10/100 Mbps.
	Off		The LTE Device does not have an Ethernet connection with the LAN.
USB	Green	On	USB Storage device is plugged in.

Table 1-2 Signal Strength LED Definition

RSRP: dBm SINR: dB	RSRP < -114	-114 <= RSRP < -109	-109 <= RSRP < -104	-104 <= RSRP < -94	-94 <= RSRP < -84	RSRP >= -84
SINR < -2.8	0	1	1	1	1	1
-2.8 <= SINR < 1.2	0	1	2	2	2	2
1.2 <= SINR < 4.8	0	1	2	3	3	3
4.8 <= SINR < 13.2	0	1	2	3	4	4
SINR >= 13.2	0	1	2	3	4	5

Refer to the Quick Start Guide for information on hardware connections.

1.7 The RESET Button

If you forget your password or cannot access the web configurator, you will need to use the **RESET** button at the back of the device to reload the factory-default configuration file. This means that you will lose all configurations that you had previously and the web access password will be reset to the default.

Step 1 Make sure the **POWER** LED is on (not blinking).

Step 2 To set the device back to the factory default settings, press the **RESET** button for 5 seconds or until the **POWER** LED begins to blink and then release it. When the **POWER** LED begins to blink, the defaults have been restored and the device will restart to load the default settings.

----End

2 Introducing the Web Configurator

2.1 Overview

The web configurator is an HTML-based management interface that allows easy device setup and management via Internet browser. Use Internet Explorer 6.0 and later versions, Mozilla Firefox 3 and later versions, or Safari 2.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the web configurator you need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

2.1.1 Accessing the Web Configurator

Step 1 Make sure your LTE Device hardware is properly connected (refer to the Quick Start Guide).

Step 2 Launch your web browser.

Step 3 Type "192.168.1.1" as the URL.

Step 4 A password screen displays. Type "admin" as the default **Username** and "LTEcpe" as the default password to access the device's Web Configurator. Click **Login**. If you have changed the password, enter your password and click **Login**.

Figure 2-1 Password Screen

NOTE

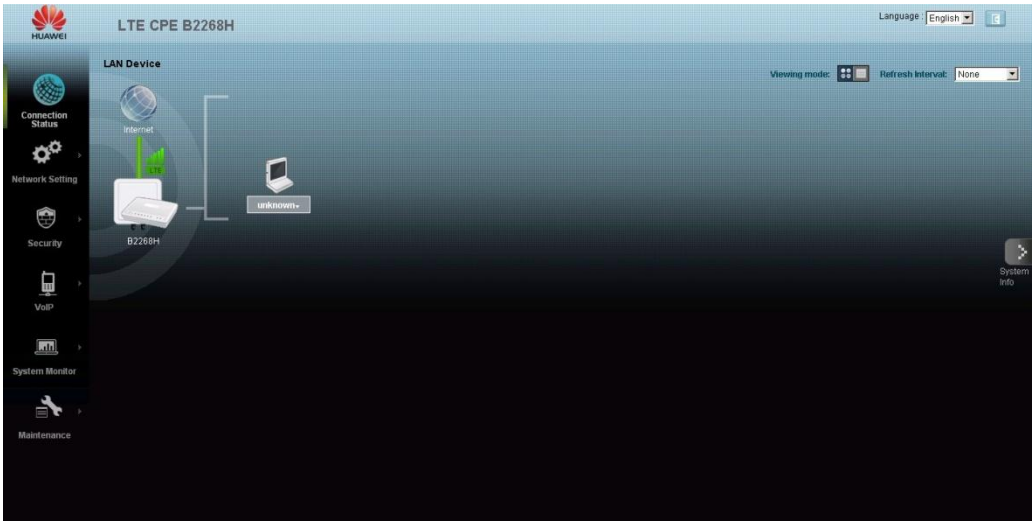
For security reasons, the LTE Device automatically logs you out if you do not use the web configurator for five minutes (default). If this happens, log in again.

Step 5 The following screen displays if you have not yet changed your password. It is strongly recommended you change the default password. Enter a new password, retype it to confirm and click **Apply**; alternatively click **Skip** to proceed to the main menu if you do not want to change the password now.

Figure 2-2 Change Password Screen

Step 6 The **Connection Status** screen appears.

Figure 2-3 Connection Status (The screenshot uses B2268H as an example.)



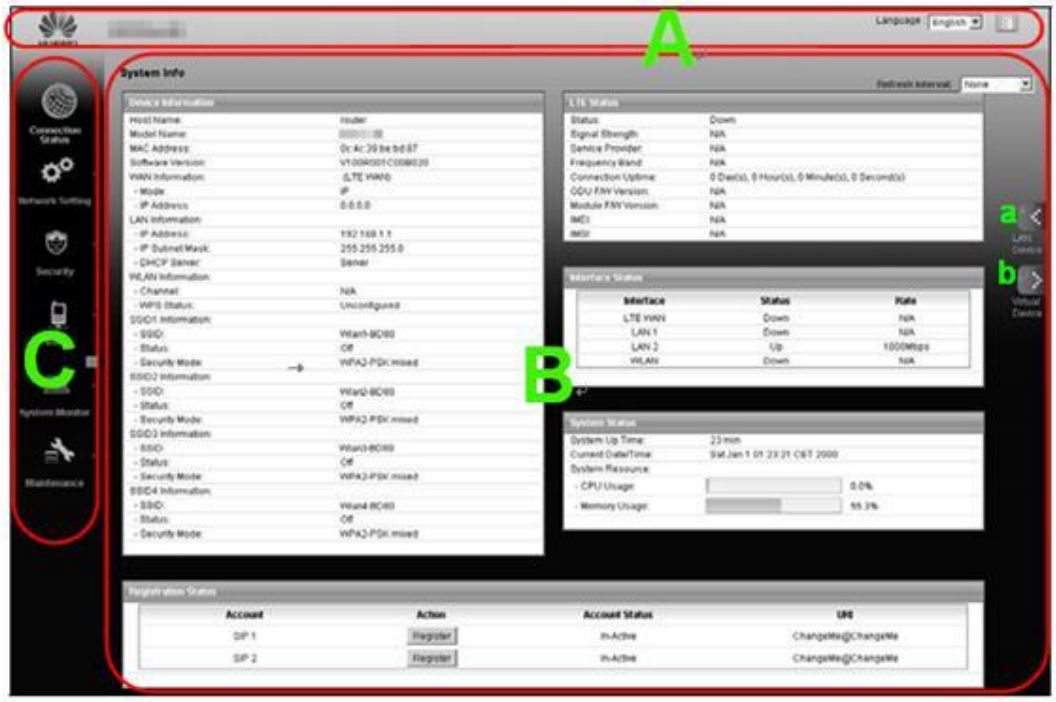
Step 7 Click **System Info** to display the **System Info** screen, where you can view the LTE Device's interface and system information.

----End

2.2 The Web Configurator Layout

Click **Connection Status** > **System Info** to show the following screen. (See 3.3 The System Info Screen for more information.)

Figure 2-4 Web Configurator Layout



As illustrated above, the main screen is divided into these parts:

- **A** - title bar
- **B** - main window
- **C** - navigation panel

2.2.1 Title Bar

The title bar shows the following icon in the upper right corner.

Click this icon to log out of the Web Configurator.

2.2.2 Main Window

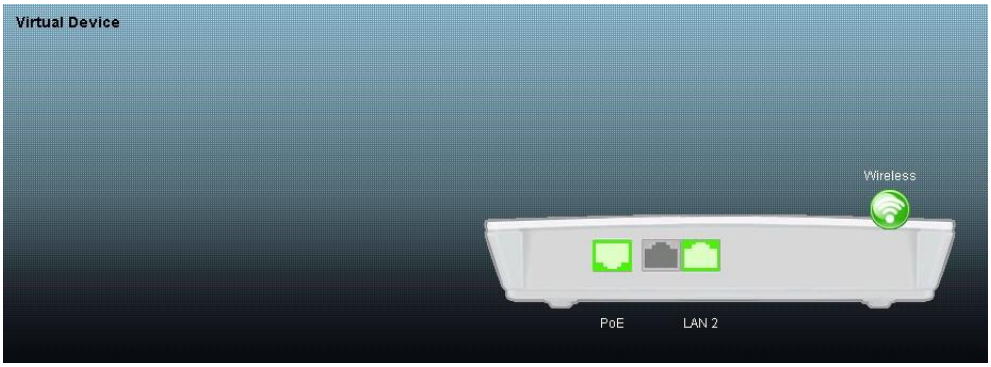
The main window displays information and configuration fields. It is discussed in the rest of this document.

After you click **System Info** on the **Connection Status** screen, the **System Info** screen is displayed. See 3.3 The System Info Screen for more information about the **System Info** screen.

If you click **LAN Device** on the **System Info** screen (**A** in Figure 2-4), the **Connection Status** screen appears. See 3.2 The Connection Status Screen for more information about the **Connection Status** screen.

If you click **Virtual Device** on the **System Info** screen (**B** in Figure 2-4), a visual graphic appears, showing the connection status of the LTE Device's ports. The connected ports are in color and disconnected ports are gray.

Figure 2-5 Virtual Device



2.2.3 Traffic Status

Use the **Maintenance > Traffic Status** screens to look at network traffic status and statistics of the WAN, LAN interfaces and NAT. See 19 Traffic Status for more information.

2.2.4 User Account

Use the **Maintenance > User Accounts** screen to configure system password for different user accounts. See 20 User Account for more information.

2.2.5 Navigation Panel

Use the menu items on the navigation panel to open screens to configure LTE Device features. The following table describes each menu item.

Table 2-1 Navigation Panel Summary

LINK	TAB	FUNCTION
Connection Status	NA	This screen shows the network status of the LTE Device and computers/devices connected to it.
Network Setting		
Broadband	Broadband	Use this screen to view or edit an LTE WAN interface
	SIM	Use this screen to enable or disable SIM PIN/PUK code.
Wireless	General	Use this screen to turn the wireless connection on or off, specify the SSID(s) and configure the wireless LAN settings and WLAN authentication/security settings.
	More AP	Use this screen to configure multiple BSSs on the LTE Device.
	WPS	Use this screen to use WPS (Wi-Fi Protected Setup) to establish a wireless connection.

LINK	TAB	FUNCTION
	WMM	Use this screen to enable or disable Wi-Fi MultiMedia (WMM).
	Scheduling	Use this screen to configure when the LTE Device enables or disables the wireless LAN.
Home Networking	LAN Setup	Use this screen to configure LAN IPv4 TCP/IP settings, and other advanced properties.
	Static DHCP	Use this screen to assign specific IP addresses to individual MAC addresses.
	UPnP	Use this screen to enable the UPnP function.
	File Sharing	Use this screen to enable file sharing via the LTE Device.
	Media Server	Use this screen to use the LTE Device as a media server.
Static Route	Static Route	Use this screen to view and set up static routes for IPv4 networks on the LTE Device.
NAT	Port Forwarding	Use this screen to make your local servers visible to the outside world.
	DMZ	Use this screen to configure the IP address of the LTE Device's DMZ interface.
	Sessions	Use this screen to limit the number of NAT sessions a single client can establish.
	ALG	Use this screen to enable or disable the SIP ALG function which allows SIP calls to pass through NAT.
Dynamic DNS	Dynamic DNS	Use this screen to allow a static hostname alias for a dynamic IP address.
Security		
Firewall	General	Use this screen to activate/deactivate the firewall for the IPv4 network.
	Services	Use this screen to view and configure services for the IPv4 network.
	Access Control	Use this screen to view and configure filter rules for incoming and outgoing traffic.
	DoS	Use this screen to activate/deactivate Denial of Service (DoS) protection.
MAC Filter	MAC Filter	Use this screen to allow specific devices to access the LTE Device.
Parental Control	Parental Control	Use this screen to define time periods and days during which the LTE Device performs parental

LINK	TAB	FUNCTION
		control and/ or block web sites with the specific URL.
VoIP		
SIP	SIP Service Provider	Use this screen to configure your LTE Device's Voice over IP settings.
	SIP Account	Use this screen to set up information about your SIP account and configure audio settings such as volume levels for the phones connected to the LTE Device.
Phone	Phone Device	Use this screen you will see which phone(s) will ring when a specific SIP account number receive an incoming call; and which SIP account number will be used when a specific phone is used to make an outgoing call.
	Region	Use this screen to select your location.
Call Rule	Speed Dial	Use this screen to configure speed dial for SIP phone numbers that you call often.
System Monitor		
LTE Status	LTE Status	Use this screen to view detail LTE status information.
Log	System Log	Use this screen to view the system logs for the categories that you select.
	Phone Log	Use this screen to view the LTE Device's phone logs.
	VoIP Call History	Use this screen to view the LTE Device's VoIP call history.
Traffic Status	WAN	Use this screen to view the status of all network traffic going through the WAN port of the LTE Device.
	LAN	Use this screen to view the status of all network traffic going through the LAN ports of the LTE Device.
	NAT	Use this screen to view the status of NAT sessions on the LTE Device.
VoIP Status	VoIP Status	Use this screen to view the SIP, phone, and call status of the LTE Device.
Maintenance		
Users Account	Users Account	Use this screen to configure the passwords your user accounts.
Remote MGMT	Remote MGMT	Use this screen to enable specific traffic directions for network services.

LINK	TAB	FUNCTION
System	System	Use this screen to configure the LTE Device's name, domain name, management inactivity time-out.
Time Setting	Time Setting	Use this screen to change your LTE Device's time and date.
Log Setting	Log Setting	Use this screen to select which logs and/or immediate alerts your device is to record. You can also set it to e- mail the logs to you.
Software Upgrade	Software Upgrade	Use this screen to upload firmware to your device.
Backup/Restore	Backup/Restore	Use this screen to backup and restore your device's configuration (settings) or reset the factory default settings.
Reboot	Reboot	Use this screen to reboot the LTE Device without turning the power off.
Diagnostic	Ping/ TraceRoute	Use this screen to test the connections to other devices.

3 Connection Status and System Info

3.1 Overview

After you log into the web configurator, the **Connection Status** screen appears. This shows the network connection status of the LTE Device and clients connected to it.

Use the **System Info** screen to look at the current status of the device, system resources, interfaces (LAN, WAN and WLAN), and SIP accounts. You can also register and unregister SIP accounts.

If you click **Virtual Device** on the **System Info** screen, a visual graphic appears, showing the connection status of the LTE Device's ports. See 2.2.2 Main Window for more information.

3.2 The Connection Status Screen

Use this screen to view the network connection status of the device and its clients. A warning message appears if there is a connection problem.

If you prefer to view the status in a list, click **List View** in the **Viewing mode** selection box. You can configure how often you want the LTE Device to update this screen in **Refresh Interval**.

Figure 3-1 Connection Status: Icon View (This screenshot uses B2268H for an example.)

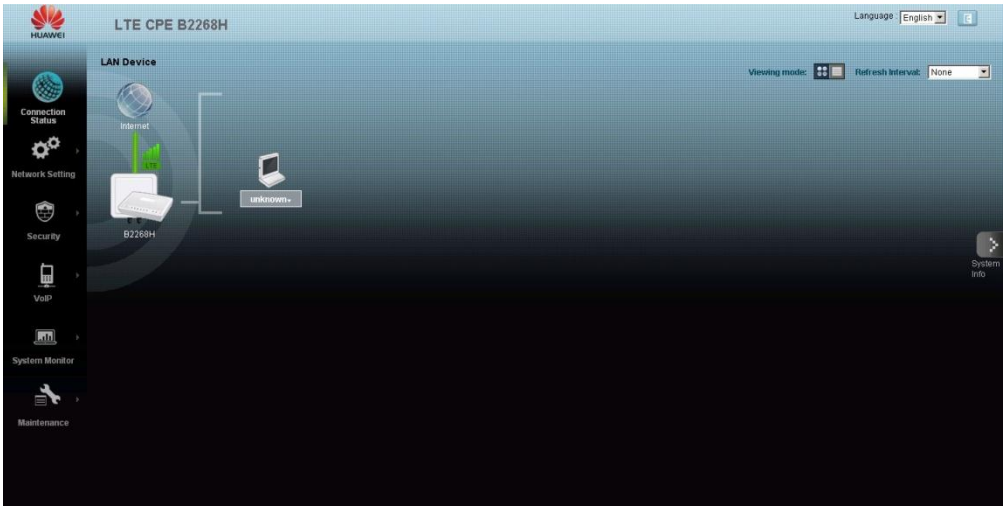


Figure 3-2 Connection Status: List View

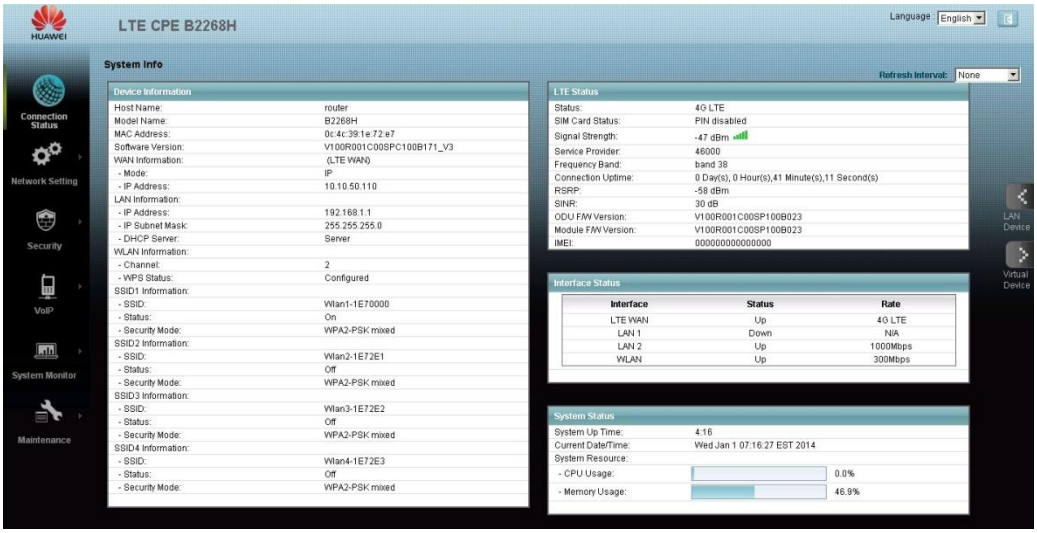
In **Icon View**, if you want to view information about a client, click the client's name and **Info**. Click the IP address if you want to change it. If you want to change the name or icon of the client, click **Change name/icon**.

In **List View**, you can also view the client's information.

3.3 The System Info Screen

Click **Connection Status > System Info** to open this screen.

Figure 3-3 System Info Screen (This screenshot uses B2268S for an example.)



Each field is described in the following table.

Table 3-1 System Info Screen

LABEL	DESCRIPTION
Language	Select the web configurator language from the drop-down list box.
Refresh Interval	Select how often you want the LTE Device to update this screen from the drop-down list box.
Device Information	
Host Name	This field displays the LTE Device system name. It is used for identification. You can change this in the **Maintenance > System** screen's **Host Name** field.
Model Name	This is the model name of your device.
MAC Address	This is the MAC (Media Access Control) or Ethernet address unique to your LTE Device.
Software Version	This field displays the current version of the firmware inside the device. It also shows the date the firmware version was created. Go to the **Maintenance > Firmware Upgrade** screen to change it.
WAN Information	
Mode	This is the method of encapsulation used by your ISP.
IP Address	This field displays the current IP address of the LTE Device in the WAN.
LAN Information	
IP Address	This field displays the current IP address of the LTE Device in the LAN.
IP Subnet Mask	This field displays the current subnet mask in the LAN.
DHCP Server	This field displays what DHCP services the LTE Device is providing to the LAN. Choices are: **Server** - The LTE Device is a DHCP server in the LAN. It assigns IP addresses to other computers in the LAN. **None** - The LTE Device is not providing DHCP services to the LAN.
ULA IPv6 Address	This field displays the static IPv6 address and the prefix length the LTE Device uses for the LAN IPv6 address.
Link-Local IPv6 Address	This field displays a unique address the LTE Device generates itself for the LAN.
DHCPv6 Server	This field displays the IPv6 IP address of the DHCPv6 server.
IP Alias 1 Information	
IP Address	This field displays the IP address for another logical LAN interface on the LTE Device.
IP Subnet Mask	This field displays the subnet mask of the logical LAN network.

LABEL	DESCRIPTION
WLAN Information	
Channel	This is the channel number used by the LTE Device now.
WPS Status	**Configured** displays when a wireless client has connected to the LTE Device or WPS is enabled and wireless or wireless security settings have been configured. **Unconfigured** displays if WPS is disabled or wireless security settings have not been configured.
SSID (1~4) Information	
SSID	This is the descriptive name used to identify the LTE Device in the wireless LAN.
Status	This shows whether or not the SSID is enabled (on).
Security Mode	This displays the type of security the LTE Device is using in the wireless LAN.
LTE Status	
Status	This displays **4G LTE** if there is an LTE connection, otherwise, it displays **N/A**.
SIM Card Status	This displays **PIN disable** if SIM card needs PIN or PUK to unlock, it displays **PIN required** or **PUK required**.
Signal Strength	This displays the strength of the LTE connection that the LTE Device has with the base station which is also known as eNodeB or eNB.
Service Provider	This displays the service provider's name of the connected LTE Network.
Frequency Band	This displays **LTE** if there is an LTE connection.
Connection Uptime	This displays how long the LTE connection has been available since it was last established successfully.
RSRP	This displays the RSRP strength of the LTE connection that the LTE Device has with the base station which is also known as eNodeB or eNB.
SINR	This displays the SINR strength of the LTE connection that the LTE Device has with the base station which is also known as eNodeB or eNB.
ODU F/W Version	This displays the firmware version of the outdoor unit.
Module F/W Version	This displays the firmware version of LTE module.
IMEI	This displays the LTE Device’s International Mobile Equipment Identity number (IMEI). An IMEI is a unique ID used to identify a mobile device.
IMSI	This displays the International Mobile Subscriber Identity (IMSI) of the SIM card inserted in the outdoor unit. An IMSI is a unique ID used

LABEL	DESCRIPTION
	to identify a mobile subscriber in a mobile network.
Interface Status	
Interface	This column displays each interface the LTE Device has.
Status	This field indicates whether or not the LTE Device is using the interface. For the LTE WAN interface, this field displays **Up** when the LTE Device is connected to an LTE network and **Down** when the LTE Device does not have an LTE connection. For the LAN interface, this field displays **Up** when the LTE Device is using the interface and **Down** when the LTE Device is not using the interface. For the WLAN interface, it displays **Up** when WLAN is enabled or **Down** when WLAN is disabled.
Rate	For the LTE WAN interface, this displays **4G LTE** if there is an LTE connection. For the LAN interface, this displays the port speed and duplex setting. For the WLAN interface, it displays the maximum transmission rate when WLAN is enabled or **N/A** when WLAN is disabled.
System Status	
System Up Time	This field displays how long the LTE Device has been running since it last started up. The LTE Device starts up when you plug it in, when you restart it (**Maintenance > Reboot**), or when you reset it (see Section 1.7).
Current Date/Time	This field displays the current date and time in the LTE Device. You can change this in **Maintenance > Time Setting**.
System Resource	
CPU Usage	This field displays what percentage of the LTE Device's processing ability is currently used. When this percentage is close to 100%, the LTE Device is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, other applications should be turned off.
Memory Usage	This field displays what percentage of the LTE Device's memory is currently used. Usually, this percentage should not increase much. If memory usage does get close to 100%, the LTE Device is probably becoming unstable, and you should restart the device. See Chapter 23, or turn off the device (unplug the power) for a few seconds.
Registration Status	
Account	This column displays each SIP account in the LTE Device.
Action	This field displays the current registration status of the SIP account. You have to register SIP accounts with a SIP server to use VoIP. If the SIP account is already registered with the SIP server, • Click **Unregister** to delete the SIP account's registration in the SIP

LABEL	DESCRIPTION
	server. This does not cancel your SIP account, but it deletes the mapping between your SIP identity and your IP address or domain name. • The second field displays **Registered**. If the SIP account is not registered with the SIP server, • Click **Register** to have the LTE Device attempt to register the SIP account with the SIP server. • The second field displays the reason the account is not registered. **Inactive** - The SIP account is not active. You can activate it in **VoIP > SIP > SIP Settings**. **Register Fail** - The last time the LTE Device tried to register the SIP account with the SIP server, the attempt failed. The LTE Device automatically tries to register the SIP account when you turn on the LTE Device or when you activate it.
Account Status	This field shows **Active** when the SIP account has been registered and ready for use or **In-Active** when the SIP account is not yet registered.
URI	This field displays the account number and service domain of the SIP account. You can change these in **VoIP > SIP > SIP Settings**.

4 Broadband

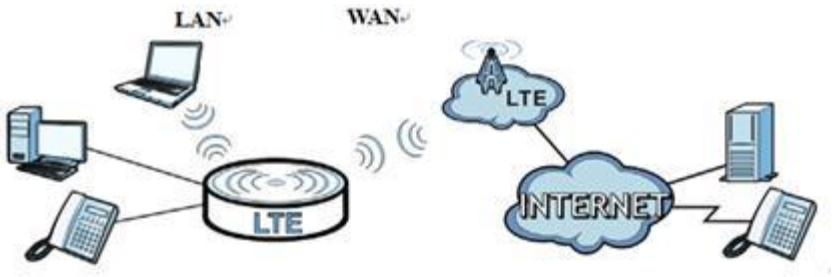
4.1 Overview

This chapter discusses the LTE Device's **Broadband** screens. Use these screens to configure your LTE Device for Internet access.

A WAN (Wide Area Network) connection is an outside connection to another network or the Internet. It connects your private networks, such as a LAN (Local Area Network) and other networks, so that a computer in one location can communicate with computers in other locations.

This LTE Device supports LTE connection for the WAN only.

Figure 4-1 LAN and WAN



4.1.1 What You Need to Know

The following terms and concepts may help as you read this chapter.

Encapsulation Method

Encapsulation is used to include data from an upper layer protocol into a lower layer protocol. To set up a WAN connection to the Internet, you need to use the same encapsulation method used by your ISP (Internet Service Provider).

WAN IP Address

The WAN IP address is an IP address for the LTE Device, which makes it accessible from an outside network. It is used by the LTE Device to communicate with other devices in other

networks. It can be static (fixed) or dynamically assigned by the ISP each time the LTE Device tries to access the Internet.

If your ISP assigns you a static WAN IP address, they should also assign you the subnet mask and DNS server IP address(es).

APN

Access Point Name (APN) is a unique string which indicates an LTE network.

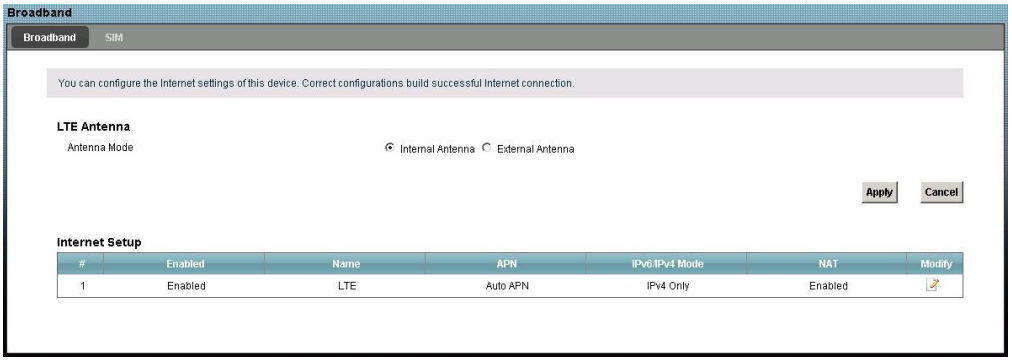
4.1.2 Before You Begin

You may need to know your Internet access settings such as LTE APN, WAN IP address and SIM card's PIN code if the **INTERNET** light on your LTE Device is off. Get this information from your service provider.

4.2 Broadband Screen

The LTE Device must have a WAN interface to allow users to use the LTE connection to access the Internet. Use this screen to view or modify the WAN interface. Click **Network Setting > Broadband** to display the following screen.

Figure 4-2 Network Setting >Broadband



If the LTE network supports dual APNs, you can set up the second APN via this page. The detail setting will be provided from your service provider. The second APN is dedicated for transmitting VoIP traffic only. When the second APN is enabled (see Figure 4-2) and its NAT is disabled (see Figure 4-3), the LTE Device forwards all VoIP related traffic received from the built-in FXS port and SIP phones or IAD devices connected to the LAN to the connection. The following table describes the fields in this screen.

Table 4-1 Network Setting > Broadband

LABEL	DESCRIPTION
LTE Antenna	If your LTE Device has an external antenna, you may choose to use it instead of the internal one.
Antenna Mode	If you connect an external antenna to the LTE Device, select **External Antenna** here to have the LTE Device use it instead of the internal antenna.
Apply	Click this to save the change in this section.

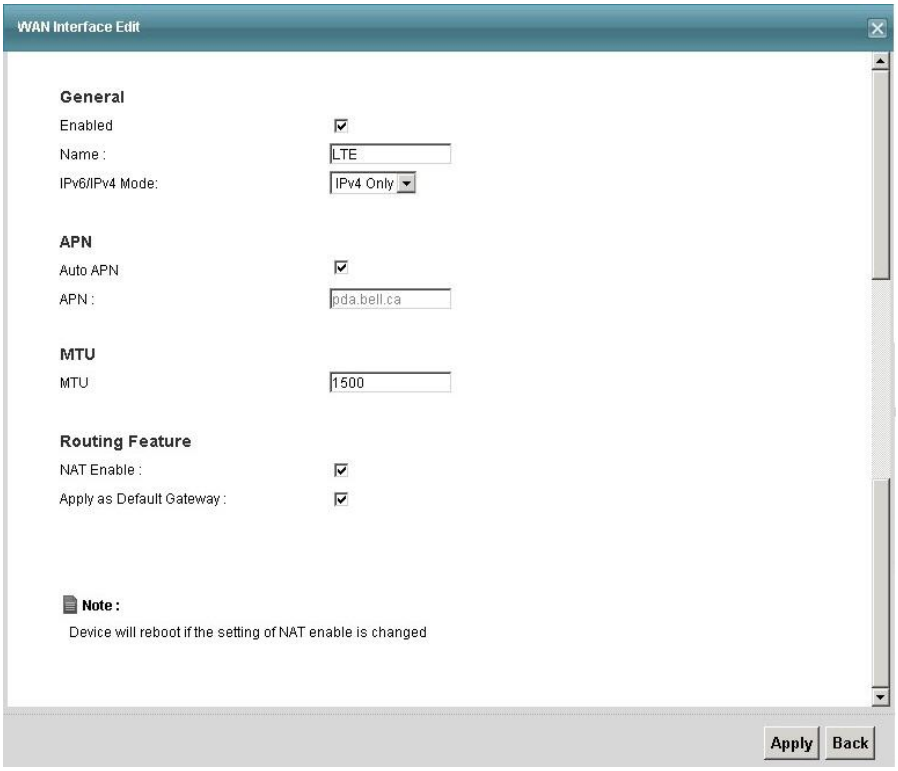
LABEL	DESCRIPTION
Cancel	Click this to restore your previously saved settings in this section.
Internet Setup	
Enabled	This shows the APN service is activated or inactivated.
Name	This is the service name of the connection.
IPv4/IPv6 Mode	This shows whether the connection uses IPv6 or IPv4.
APN	This is the name of the LTE network to which the LTE Device will connect.
NAT	This shows whether NAT is activated or not for this connection. NAT is not available when the connection uses the bridging service.
Modify	Click the **Edit** icon to configure the connection. Click the **Delete** icon to delete this connection from the Device. A window displays asking you to confirm that you want to delete the connection.

4.2.1 WAN Interface Edit

Use this screen to configure a WAN connection.

In the **Network Setting > Broadband** screen, click the **Interface Setup** section's **Edit** icon next to the connection you want to configure, the screen displays as shown next.

Figure 4-3 WAN Interface Edit



The following table describes the fields in this screen.

Table 4-2 WAN Interface Edit

LABEL	DESCRIPTION
General	
Enabled	Select the checkbox to enable the WAN interface.
Name	Specify the name for this WAN interface.
IPv4/IPv6 Mode	Select **IPv4 Only** if you just connect this WAN interface to an IPv4 network. Select **IPv6/IPv4 Dual Stack** if you connect this WAN interface to both an IPv6 and an IPv4 networks.
APN	
Auto APN	Select this to have the LTE Device configure the APN (**Access Point Name)** of an LTE network automatically. Otherwise, enter the APN manually in the field below.
APN	Enter the APN of an LTE network, which your service provider gave you.
MTU	
MTU	The Maximum Transmission Unit (MTU) defines the size of the

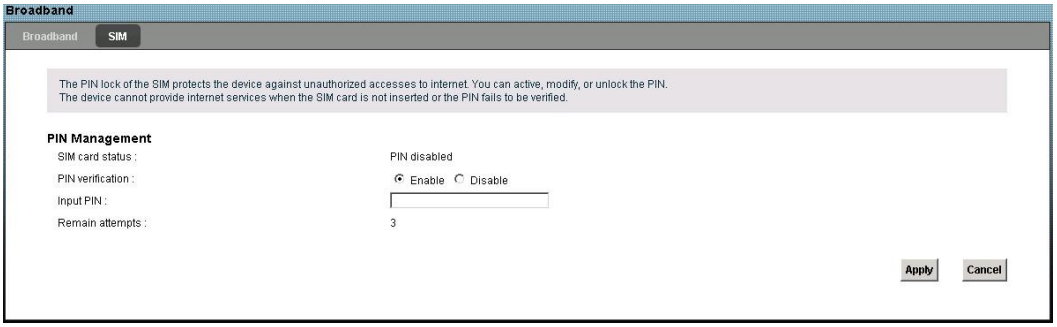
LABEL	DESCRIPTION
	largest packet allowed on an interface or connection. Enter the MTU for this WAN interface in this field.
Routing Feature	
NAT Enable	Select this option to activate NAT on this connection.
Apply as Default Gateway	Select this option to have the LTE Device use the WAN interface of this connection as the system default gateway.
IPv6 Address	
Obtain IPv6 Address/ Prefix Automatically	Select this option to have the LTE Device use the IPv6 prefix from the connected router's Router Advertisement (RA) to generate an IPv6 address.
Enable Non-temporary Addresses	Select this option to have the LTE Device use the prefix to automatically generate a unique IP address that does not need to be maintained by a DHCP server.
Enable Prefix Delegation	Select this option to use DHCP PD (Prefix Delegation) to allow the LTE Device to pass the IPv6 prefix information to its LAN hosts. The hosts can then use the prefix to generate their IPv6 addresses.
Static IPv6 Address	Select this option to configure a fixed IPv6 address for the Device's LAN IPv6 address.
IPv6 Address	If you select static IPv6 address, enter the IPv6 address prefix that the Device uses for the LAN IPv6 address.
Prefix length	If you select static IPv6 address, enter the IPv6 prefix length that the Device uses to generate the LAN IPv6 address. An IPv6 prefix length specifies how many most significant bits (starting from the left) in the address compose the network address. This field displays the bit number of the IPv6 subnet mask.
IPv6 Default Gateway	If you select static IPv6 address, enter the IPv6 default gateway's IP or domain name address that helps forward traffic to other networks.
IPv6 DNS Server	
Obtain IPv6 DNS info Automatically	Select this option to have the LTE Device get DNS information from a DHCPv6 server.
Use the following Static DNS IPv6 Address	Select this option if you have the IPv6 address of a DNS server and then configure the DNS server's IPv6 address.
Primary IPv6 DNS Server	Enter the primary DNS server's IPv6 address the LTE Device uses and passes to the DHCPv6 clients.
Secondary IPv6 DNS Server	Enter the secondary DNS server's IPv6 address the LTE Device uses and passes to the DHCPv6 clients.
4 to 6 Tunnel	
Enable DS-Lite 4to6	Select this option to enable DS-Lite (Dual Stack Lite) to let local

LABEL	DESCRIPTION
Endpoint IPv6 Address	computers use IPv4 through an ISP's IPv6 network.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to return to the previous screen.

4.3 SIM Screen

If your LTE Device has the **SIM** screen, you may use it to specify the PIN for your SIM card. Click **Network Setting > Broadband > SIM** to open the following screen.

Figure 4-4 Network Setting > Broadband > SIM



The following table describes the fields in this screen.

Table 4-3 Network Setting > Broadband > SIM

LABEL	DESCRIPTION
PIN	Enter the PIN from your LTE Internet service provider.
Apply	Click this to save the change in this section.
Cancel	Click this to restore your previously saved settings in this section.

5 Wireless

5.1 Overview

This chapter describes the LTE Device's **Network Setting** > **Wireless** screens. Use these screens to set up your LTE Device's wireless connection.

5.1.1 Wireless Network Overview

Wireless networks consist of wireless clients, access points and bridges.

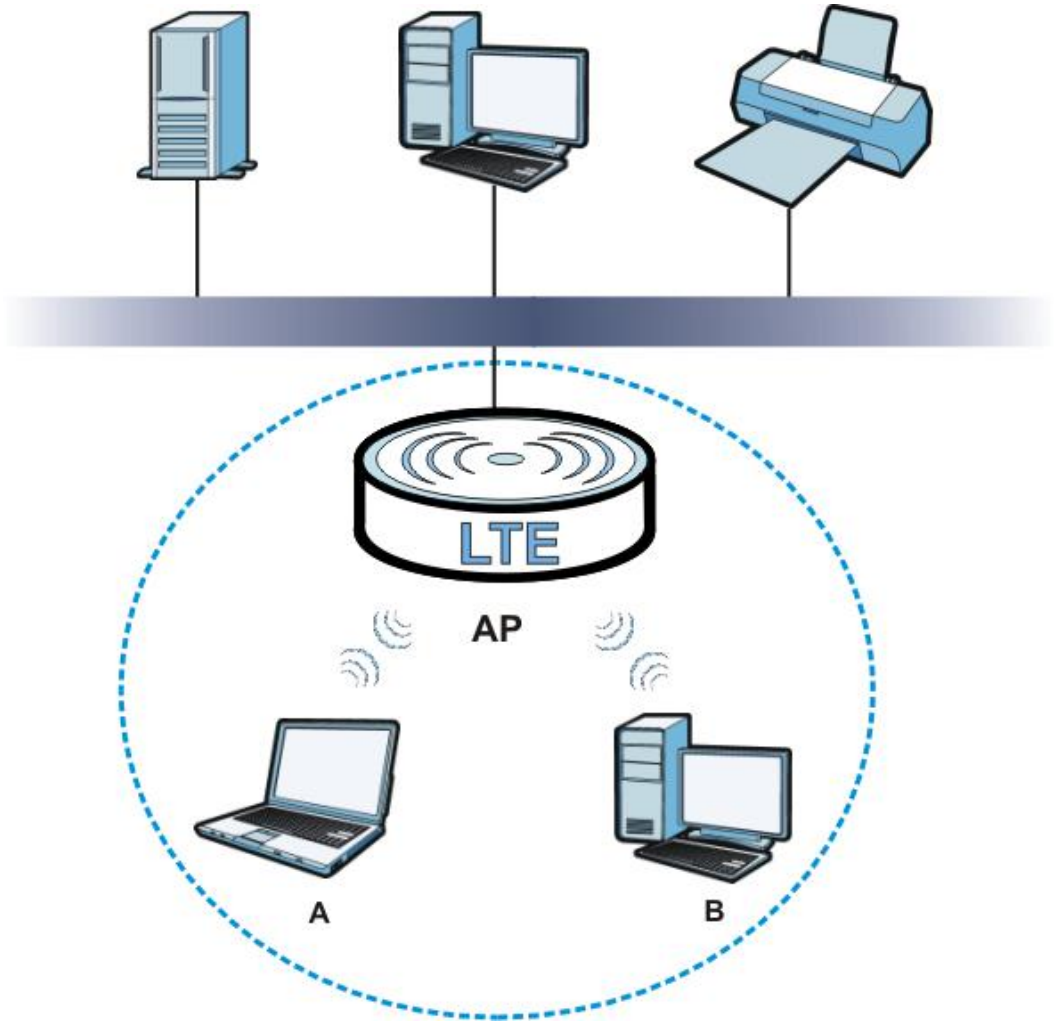
- A wireless client is a radio connected to a user's computer.
- An access point is a radio with a wired connection to a network, which can connect with numerous wireless clients and let them access the network.
- A bridge is a radio that relays communications between access points and wireless clients, extending a network's range.

Traditionally, a wireless network operates in one of two ways.

- An "infrastructure" type of network has one or more access points and one or more wireless clients. The wireless clients connect to the access points.
- An "ad-hoc" type of network is one in which there is no access point. Wireless clients connect to one another in order to exchange information.

The following figure provides an example of a wireless network.

Figure 5-1 Example of a Wireless Network



The wireless network is the part in the blue circle. In this wireless network, devices **A** and **B** use the access point (**AP**) to interact with the other devices (such as the printer) or with the Internet. Your LTE Device is the AP.

Every wireless network must follow these basic guidelines.

- Every device in the same wireless network must use the same SSID.

The SSID is the name of the wireless network. It stands for Service Set Identifier.

- If two wireless networks overlap, they should use a different channel.

Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.

- Every device in the same wireless network must use security compatible with the AP.
- Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

Radio Channels

In the radio spectrum, there are certain frequency bands allocated for unlicensed, civilian use. For the purposes of wireless networking, these bands are divided into numerous channels. This allows a variety of networks to exist in the same place without interfering with one another. When you create a network, you must select a channel to use.

Since the available unlicensed spectrum varies from one country to another, the number of available channels also varies.

A channel is the radio frequencyused by wireless devices to transmit and receive data. Channels available depend on your geographical area. You may have a choice of channels (for your region) so you should use a channel different from an adjacent AP (access point) to reduce interference. Interference occurs when radio signals from different access points overlap causing interference and degrading performance.

Adjacent channels partially overlap however. To avoid interference due to overlap, your AP should be on a channel at least five channels away from a channel that an adjacent AP is using. For example, if your region has 11 channels and an adjacent AP is using channel 1, then you need to select a channel between 6 or 11.

5.1.2 Before You Begin

Before you start using these screens, ask yourself the following questions. See Section 5.7if some of the terms used here do not make sense to you.

- What wireless standards do the other wireless devices support (IEEE 802.11g, for example)? What is the most appropriate standard to use?
- What security options do the other wireless devices support (WPA-PSK, for example)?

What is the best one to use?

- Do the other wireless devices support WPS (Wi-Fi Protected Setup)? If so, you can set up a well-secured network very easily.

Even if some of your devices support WPS and some do not, you can use WPS to set up your network and then add the non-WPS devices manually, although this is somewhat more complicated to do.

- What advanced options do you want to configure, if any? If you want to configure advanced options, ensure that you know precisely what you want to do. If you do not want to configure advanced options, leave them alone.

5.2 The Wireless General Screen

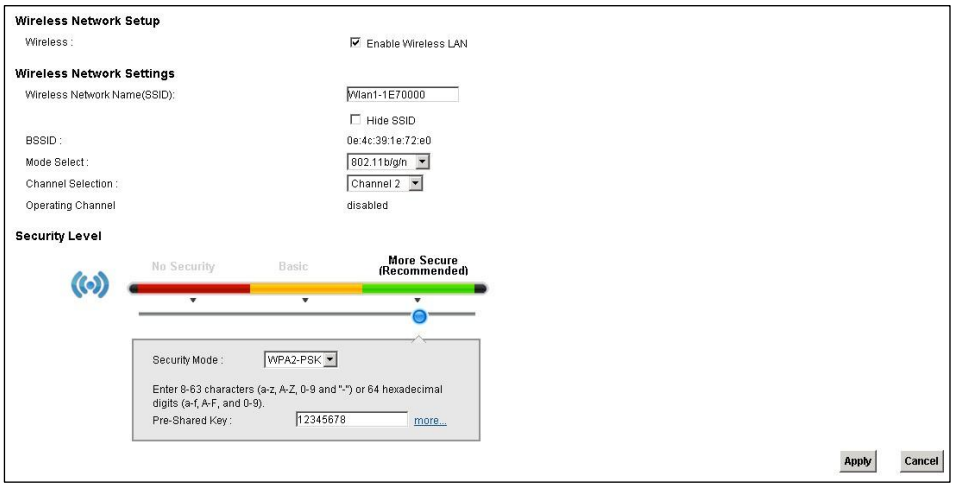
Use this screen to enable the Wireless LAN, enter the SSID and select the wireless security mode.

NOTE

If you are configuring the LTE Device from a computer connected to the wireless LAN and you change the LTE Device's SSID or security settings, you will lose your wireless connection when you press **Apply** to confirm. You must then change the wireless settings of your computer to match the LTE Device's new settings.

Click **Network Setting > Wireless to open the General** screen. Select the **Enable Wireless LAN** checkbox to show the Wireless configurations.

Figure 5-2 Network Setting >Wireless>General



The following table describes the labels in this screen.

Table 5-1 Network > Wireless LAN > General

LABEL	DESCRIPTION
Wireless Network Setup	
Wireless	Select the **Enable Wireless LAN** check box to activate the wireless LAN.
Wireless Network Settings	
Wireless Network Name (SSID)	The SSID (Service Set IDentity) identifies the service set with which a wireless device is associated. Wireless devices associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 English keyboard characters) for the wireless LAN.
Hide SSID	Select this check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.
BSSID	This shows the MAC address of the wireless interface on the LTE Device when wireless LAN is enabled.
Mode Select	This makes sure that only compliant WLAN devices can associate with the LTE Device. Select **802.11b/g/n** to allow IEEE802.11b, IEEE802.11g and IEEE802.11n compliant WLAN devices to associate with the LTE Device. The transmission rate of your LTE Device might be reduced. Select **802.11b/g** to allow both IEEE802.11b and IEEE802.11g compliant WLAN devices to associate with the LTE Device. The transmission rate of your LTE Device might be reduced. Select **802.11g Only** to allow only IEEE 802.11g compliant WLAN devices to associate with the LTE Device. Select **802.11n only in 2.4G**

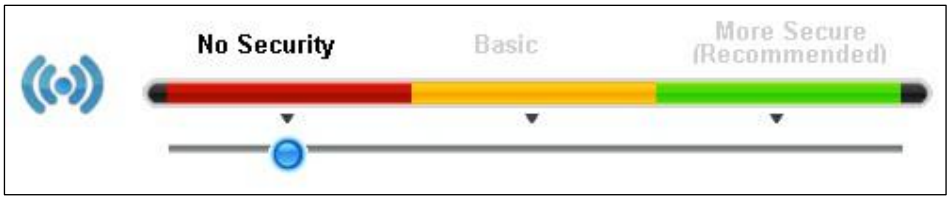
LABEL	DESCRIPTION
	band to allow only IEEE 802.11n compliant WLAN devices with the same frequency range (2.4 GHz) to associate with the LTE Device.
Channel Selection	Set the channel depending on your particular region. Select a channel or use **Auto** to have the LTE Device automatically determine a channel to use. If you are having problems with wireless interference, changing the channel may help. Try to use a channel that is as many channels away from any channels used by neighboring APs as possible. The channel number which the LTE Device is currently using then displays in the **Operating Channel** field.
Operating Channel	This is the channel currently being used by your AP.
Security Level	
Security Mode	Select **Basic** or **More Secure** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as the LTE Device. When you select to use a security, additional options appears in this screen. Or you can select **No Security** to allow any client to associate this network without any data encryption or authentication. See the following sections for more details about wireless security modes.
Apply	Click **Apply** to save your changes back to the LTE Device.
Cancel	Click **Cancel** to restore your previously saved settings.

No Security

NOTE
Select **No Security** to allow wireless stations to communicate with the access points without any data encryption or authentication.

NOTE
If you do not enable any wireless security on your LTE Device, your network is accessible to any wireless networking device that is within range.

Figure 5-3 Wireless> General: No Security



The following table describes the labels in this screen.

Table 5-2 Wireless > General: No Security

LABEL	DESCRIPTION
Security Level	Choose **No Security** from the sliding bar.

5.2.1 Basic (Static WEP/Shared WEP Encryption)

WEP encryption scrambles the data transmitted between the wireless stations and the access points (AP) to keep network communications private. Both the wireless stations and the access points must use the same WEP key.

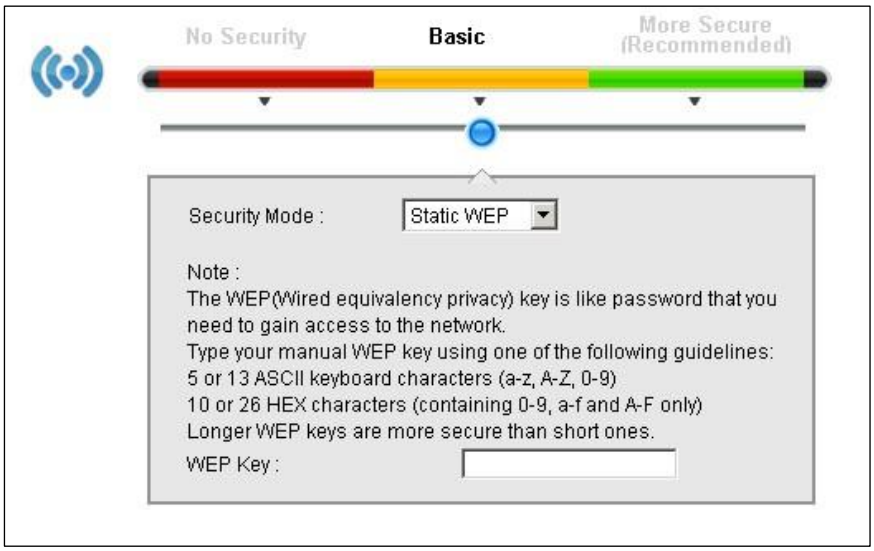
There are two types of WEP authentication namely, Open System (**Static WEP**) and Shared Key (Shared WEP).

Open system is implemented for ease-of-use and when security is not an issue. The wireless station and the AP or peer computer do not share a secret key. Thus the wireless stations can associate with any AP or peer computer and listen to any transmitted data that is not encrypted.

Shared key mode involves a shared secret key to authenticate the wireless station to the AP or peer computer. This requires you to enable the wireless LAN security and use same settings on both the wireless station and the AP or peer computer.

In order to configure and enable WEP encryption, click **Network Settings** > **Wireless** to display the **General** screen. Select **Basic** as the security level. Then select **Static WEP** or **Shared WEP** from the **Security Mode** list.

Figure 5-4 Wireless>General: Basic(Static WEP/SharedWEP)



The following table describes the labels in this screen.

Table 5-3 Wireless > General: Basic (Static WEP/Shared WEP)

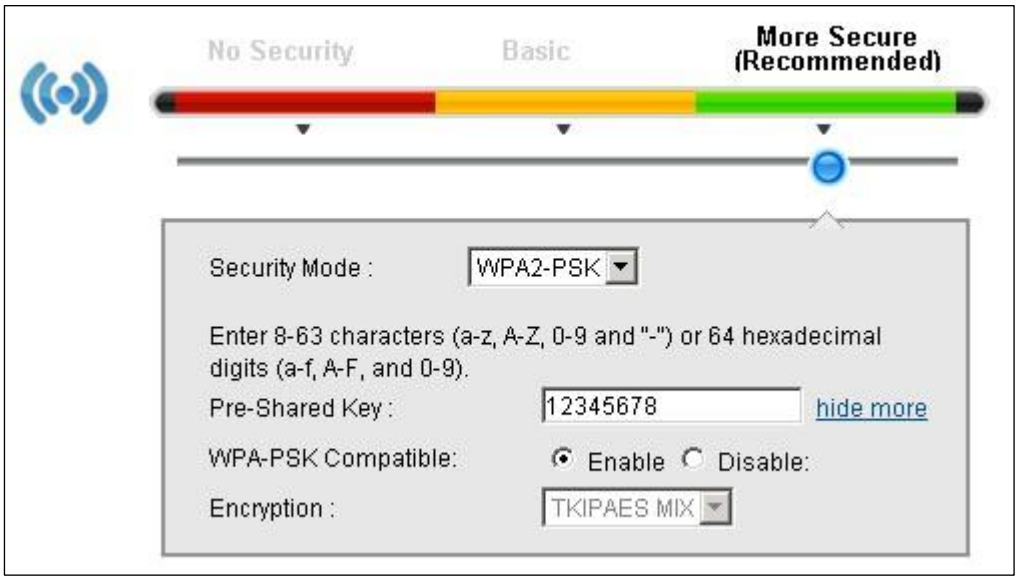
LABEL	DESCRIPTION
Security Mode	Choose **Static WEP** or **Shared WEP** from the drop-down list box. • Select **Static WEP** to have the LTE Device allow association with wireless clients that use Open System mode. Data transfer is encrypted as long as the wireless client has the correct WEP key for encryption. The LTE Device authenticates wireless clients using Shared Key mode that have the correct WEP key • Select **Shared WEP** to have the LTE Device authenticate only those wireless clients that use Shared Key mode and have the correct WEP key.
WEP Key	Enter a WEP key that will be used to encrypt data. Both the LTE Device and the wireless stations must use the same WEP key for data transmission.

5.2.2 More Secure (WPA(2)-PSK)

The WPA-PSK security mode provides both improved data encryption and user authentication over WEP. Using a Pre-Shared Key (PSK), both the LTE Device and the connecting client share a common password in order to validate the connection. This type of encryption, while robust, is not as strong as WPA, WPA2 or even WPA2-PSK. The WPA2-PSK security mode is a newer, more robust version of the WPA encryption standard. It offers slightly better security, although the use of PSK makes it less robust than it could be.

Click **Network Settings** > **Wireless** to display the **General** screen. Select **More Secure** as the security level. Then select **WPA-PSK** or **WPA2-PSK** from the **Security Mode** list.

Figure 5-5 Wireless > General: More Secure: WPA(2)-PSK



The following table describes the labels in this screen.

Table 5-4 Wireless > General: WPA(2)-PSK

LABEL	DESCRIPTION
Security Level	Select **More Secure** to enable WPA(2)-PSK data encryption.
Security Mode	Select **WPA-PSK** or **WPA2-PSK** from the drop-down list box.
Pre-Shared Key	The encryption mechanisms used for **WPA/WPA2** and **WPA-PSK/ WPA2-PSK** are the same. The only difference between the two is that **WPA-PSK/WPA2-PSK** uses a simple common password, instead of user- specific credentials. Type a pre-shared key from 8 to 63 case-sensitive ASCII characters or 64 hexadecimal digits.
more.../hide more	Click **more...** to show more fields in this section. Click **hide more** to hide them.
WPA-PSK Compatible	This field appears when you choose **WPA-PSK2** as the **Security Mode**. Check this field to allow wireless devices using **WPA-PSK** security mode to connect to your LTE Device. The LTE Device supports WPA-PSK and WPA2-PSK simultaneously.
Encryption	If the security mode is **WPA-PSK**, the encryption mode is set to **TKIP** to enable Temporal Key Integrity Protocol (TKIP) security on your wireless network. If the security mode is **WPA-PSK2** and **WPA-PSK Compatible** is disabled, the encryption mode is set to **AES** to enable Advanced Encryption System (AES) security on your wireless network. AES provides superior security to TKIP. If the security mode is **WPA-PSK2** and **WPA-PSK Compatible** is enabled, the encryption mode is set to **TKIPAES MIX** to allow both TKIP and AES types of security in your wireless network.

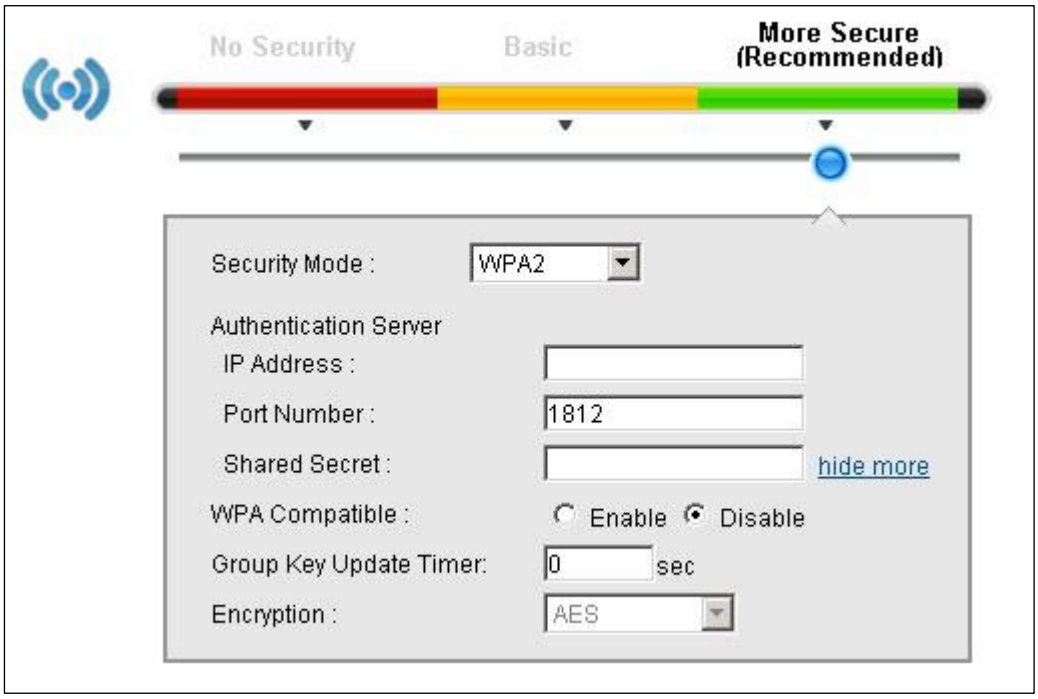
5.2.3 WPA(2) Authentication

The WPA2 security mode is currently the most robust form of encryption for wireless networks. It requires a RADIUS server to authenticate user credentials and is a full implementation the security protocol. Use this security option for maximum protection of your network. However, it is the least backwards compatible with older devices.

The WPA security mode is a security subset of WPA2. It requires the presence of a RADIUS server on your network in order to validate user credentials. This encryption standard is slightly older than WPA2 and therefore is more compatible with older devices.

Click **Network Settings** > **Wireless** to display the **General** screen. Select **More Secure** as the security level. Then select **WPA** or **WPA2** from the **Security Mode** list.

Figure 5-6 Wireless > General: More Secure: WPA(2)



The following table describes the labels in this screen.

Table 5-5 Wireless > General: More Secure: WPA(2)

LABEL	DESCRIPTION
Security Level	Select **More Secure** to enable WPA(2)-PSK data encryption.
Security Mode	Choose **WPA** or **WPA2** from the drop-down list box.
Authentication Server	
IP Address	Enter the IP address of the external authentication server in dotted decimal notation.
Port Number	Enter the port number of the external authentication server. The default port number is **1812**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Enter a password (up to 128 alphanumeric characters) as the key to be shared between the external authentication server and the LTE Device. The key must be the same on the external authentication server and your LTE Device. The key is not sent over the network.
more.../hide more	Click **more...** to show more fields in this section. Click **hide more** to hide them.
WPA Compatible	This field is only available for WPA2. Select this if you want the LTE Device to support WPA and WPA2 simultaneously.

LABEL	DESCRIPTION
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the RADIUS server sends a new group key out to all clients. If the value is set to "0", the update timer function is disabled.
Encryption	If the security mode is **WPA**, the encryption mode is set to **TKIP** to enable Temporal Key Integrity Protocol (TKIP) security on your wireless network. If the security mode is **WPA2**, the encryption mode is set to **AES** to enable Advanced Encryption System (AES) security on your wireless network. AES provides superior security to TKIP.

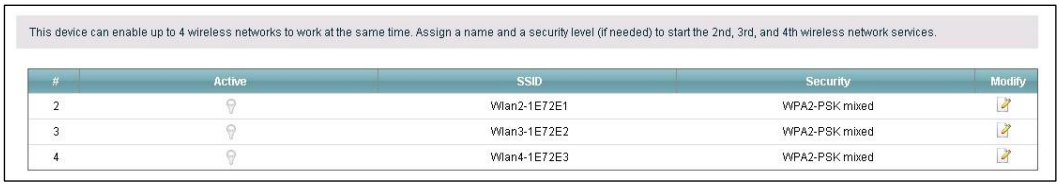
5.3 The More AP Screen

The LTE Device can broadcast up to four wireless network names at the same time. This means that users can connect to the LTE Device using different SSIDs. You can secure the connection on each SSID profile so that wireless clients connecting to the LTE Device using different SSIDs cannot communicate with each other.

This screen allows you to enable and configure multiple Basic Service Sets (BSSs) on the LTE Device.

Click **Network Settings > Wireless** > **More AP**. The following screen displays.

Figure 5-7 Network Settings > Wireless > More AP



The following table describes the labels in this screen.

Table 5-6 Network Settings > Wireless > More AP

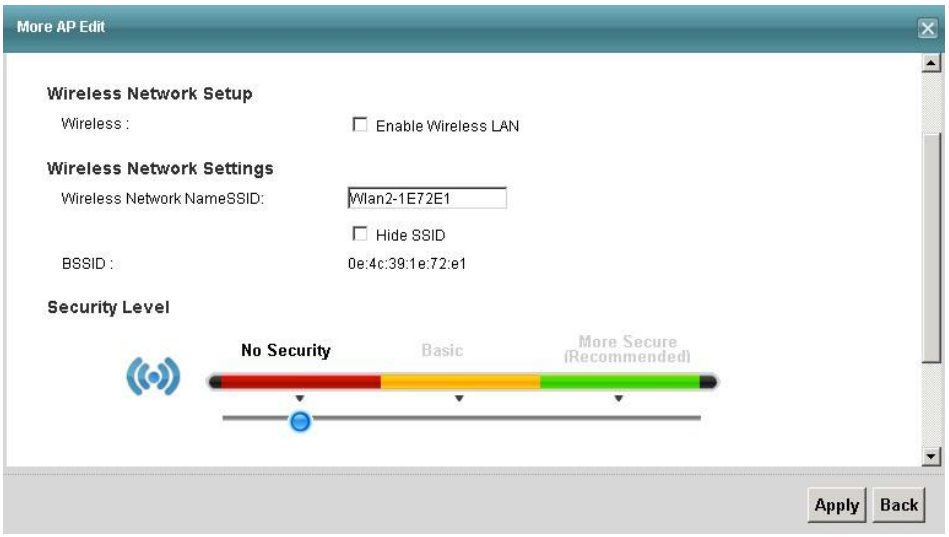
LABEL	DESCRIPTION
#	This is the index number of the entry.
Active	This field indicates whether this SSID is active. A yellow bulb signifies that this SSID is active. A gray bulb signifies that this SSID is not active.
SSID	An SSID profile is the set of parameters relating to one of the LTE Device's BSSs. The SSID (Service Set IDentifier) identifies the Service Set with which a wireless device is associated. This field displays the name of the wireless profile on the network. When a wireless client scans for an AP to associate with, this is the name that is

LABEL	DESCRIPTION
	broadcast and seen in the wireless client utility.
Security	This field indicates the security mode of the SSID profile.
Modify	Click the **Edit** icon to configure the SSID profile.

5.3.1 Edit More AP

Use this screen to edit an SSID profile. Click the **Edit** icon next to an SSID in the **More AP** screen. The following screen displays.

Figure 5-8 Wireless>MoreAP:Edit



The following table describes the fields in this screen.

Table 5-7 Wireless > More AP: Edit

LABEL	DESCRIPTION
Wireless Network Setup	
Wireless	Select the **Enable Wireless LAN** check box to activate the wireless LAN.
Wireless Network Settings	
Wireless Network Name (SSID)	The SSID (Service Set IDentity) identifies the service set with which a wireless device is associated. Wireless devices associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 English keyboard characters) for the wireless LAN.
Hide SSID	Select this check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.

LABEL	DESCRIPTION
BSSID	This shows the MAC address of the wireless interface on the LTE Device when wireless LAN is enabled.
Security Level	
Security Mode	Select **Basic (WEP)** or **More Secure (WPA(2)-PSK, WPA(2))** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as the LTE Device. After you select to use a security, additional options appears in this screen. Or you can select **No Security** to allow any client to associate this network without any data encryption or authentication. See Section 5.2.1 for more details about this field.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to exit this screen without saving.

5.4 The WPS Screen

Use this screen to configure WiFi Protected Setup (WPS) on your LTE Device.

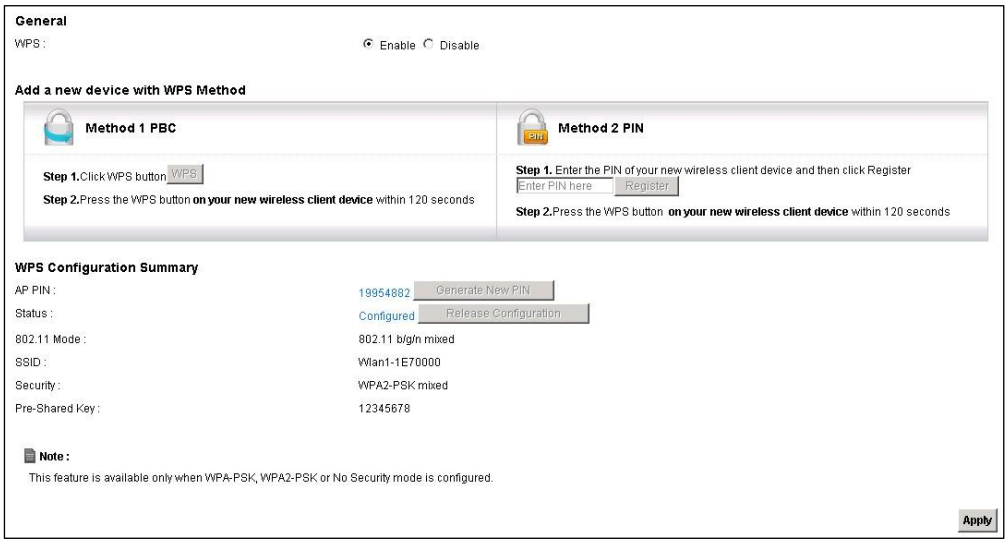
WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Set up each WPS connection between two devices. Both devices must support WPS. See 5.7.6 WiFi Protected Setup (WPS) for more information about WPS.

NOTE

The LTE Device applies the security settings of the **SSID1** profile (see 5.2 The Wireless General Screen). If you want to use the WPS feature, make sure you have set the security mode of **SSID1** to **WPA-PSK**, **WPA2-PSK** or **No Security**.

Click **Network Setting > Wireless > WPS**. The following screen displays. Select **Enable** and click **Apply** to activate the WPS function. Then you can configure the WPS settings in this screen.

Figure 5-9 Network Setting >Wireless>WPS



The following table describes the labels in this screen.

Table 5-8 Network Setting > Wireless > WPS

LABEL	DESCRIPTION
Enable WPS	Select **Enable** to activate WPS on the LTE Device.
Add a new device with WPS Method	
Method 1 PBC	Use this section to set up a WPS wireless network using Push Button Configuration (PBC).
WPS	Click this button to add another WPS-enabled wireless device (within wireless range of the LTE Device) to your wireless network. This button may either be a physical button on the outside of device, or a menu button similar to the **WPS button** on this screen. Note: You must press the other wireless device's WPS button within two minutes of pressing this button.
Method 2 PIN	Use this section to set up a WPS wireless network by entering the PIN (Personal Identification Number) of the client into the LTE Device.
Register	Enter the PIN of the device that you are setting up a WPS connection with and click **Register** to authenticate and add the wireless device to your wireless network. You can find the PIN either on the outside of the device, or by checking the device's settings. Note: You must also activate WPS on that device within two minutes to have it present its PIN to the LTE Device.
WPS Configuration Summary	
AP PIN	The PIN of the LTE Device is shown here. Enter this PIN in the configuration utility of the device you want to connect to using WPS.

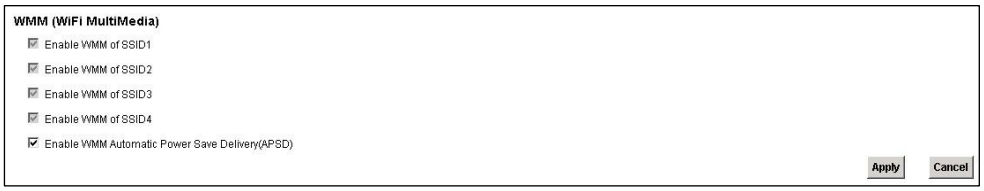
LABEL	DESCRIPTION
	The PIN is not necessary when you use WPS push-button method. Click the **Generate New PIN** button to have the LTE Device create a new PIN.
Status	This displays **Configured** when the LTE Device has connected to a wireless network using WPS or **Enable WPS** is selected and wireless or wireless security settings have been changed. The current wireless and wireless security settings also appear in the screen. This displays **Not Configured** when there is no wireless or wireless security changes on the LTE Device or you click **Release Configuration** to remove the configured wireless and wireless security settings.
Release Configuration	This button is available when the WPS status is **Configured.** Click this button to remove all configured wireless and wireless security settings for WPS connections on the LTE Device.
802.11 Mode	This is the 802.11 mode used. Only compliant WLAN devices can associate with the LTE Device.
SSID	This is the name of the wireless network.
Security	This is the type of wireless security employed by the network.
Apply	Click **Apply** to save your changes.

5.5 The WMM Screen

Use this screen to enable or disable WiFi MultiMedia (WMM) wireless networks for multimedia applications.

Click **Network Setting > Wireless > WMM**. The following screen displays.

Figure 5-10 Network Setting>Wireless>WMM



The following table describesthelabelsinthisscreen.

Table 5-9 Network Setting > Wireless > WMM

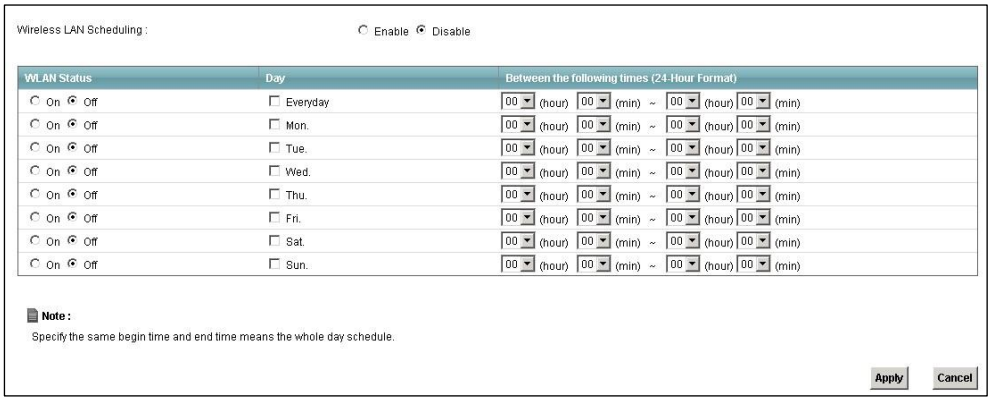
LABEL	DESCRIPTION
Enable WMM of SSID1~4	This enables the LTE Device to automatically give a service a priority level according to the ToS value in the IP header of packets it sends.

LABEL	DESCRIPTION
	WMM QoS (WiFi MultiMedia Quality of Service) gives high priority to voice and video, which makes them run more smoothly.
Enable WMM Automatic Power Save Deliver (APSD)	Click this to increase battery life for battery-powered wireless clients. APSD uses a longer beacon interval when transmitting traffic that does not require a short packet exchange interval.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

5.6 Scheduling Screen

Click **Network Setting > Wireless > Scheduling** to open the **Wireless LAN Scheduling** screen. Use this screen to configure when the LTE Device enables or disables the wireless LAN.

Figure 5-11 Network Setting > Wireless >Scheduling



The following table describes the labels in thisscreen.

Table 5-10 Network Setting > Wireless > Scheduling

LABEL	DESCRIPTION
Wireless LAN Scheduling	Select **Enable** to activate wireless LAN scheduling on your LTE Device.
WLAN status	Select **On** or **Off** to enable or disable the wireless LAN.
Day	Select the day(s) you want to turn the wireless LAN on or off.
Between the following times	Specify the time period during which to apply the schedule. For example, you want the wireless network to be only available during work hours. Check Mon ~ Fri in the day column, and specify 8:00 ~ 18:00 in the time table.

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

5.7 Technical Reference

This section discusses wireless LANs in depth.

5.7.1 Wireless Security Overview

By their nature, radio communications are simple to intercept. For wireless data networks, this means that anyone within range of a wireless network without security can not only read the data passing over the airwaves, but also join the network. Once an unauthorized person has access to the network, he or she can steal information or introduce malware (malicious software) intended to compromise the network. For these reasons, a variety of security systems have been developed to ensure that only authorized people can use a wireless data network, or understand the data carried on it.

These security standards do two things. First, they authenticate. This means that only people presenting the right credentials (often a username and password, or a "key" phrase) can access the network. Second, they encrypt. This means that the information sent over the air is encoded. Only people with the code key can understand the information, and only people who have been authenticated are given the code key.

These security standards vary in effectiveness. Some can be broken, such as the old Wired Equivalent Protocol (WEP). Using WEP is better than using no security at all, but it will not keep a determined attacker out. Other security standards are secure in themselves but can be

broken if a user does not use them properly. For example, the WPA-PSK security standard is very secure if you use a long key which is difficult for an attacker's software to guess - for example, a twenty-letter long string of apparently random numbers and letters - but it is not very secure if you use a short key which is very easy to guess - for example, a three-letter word from the dictionary.

Because of the damage that can be done by a malicious attacker, it's not just people who have sensitive information on their network who should use security. Everybody who uses any wireless network should ensure that effective security is in place.

A good way to come up with effective security keys, passwords and so on is to use obscure information that you personally will easily remember, and to enter it in a way that appears random and does not include real words. For example, if your mother owns a 1970 Dodge Challenger and her favorite movie is Vanishing Point (which you know was made in 1971) you could use "70dodchal71vanpoi" as your security key.

The following sections introduce different types of wireless security you can set up in the wireless network.

5.7.2.1 SSID

Normally, the LTE Device acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the LTE Device does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized wireless devices to get the SSID. In addition, unauthorized wireless devices can still see the information that is sent in the wireless network.

5.7.2.2 MAC Address Filter

Every device that can use a wireless network has a unique identification number, called a MAC address.1 A MAC address is usually written using twelve hexadecimal characters2; for example, 00A0C5000002 or 00:A0:C5:00:00:02. To get the MAC address for each device in the wireless network, see the device's User's Guide or other documentation.

You can use the MAC address filter to tell the LTE Device which devices are allowed or not allowed to use the wireless network. If a device is allowed to use the wireless network, it still has to have the correct information (SSID, channel, and security). If a device is not allowed to use the wireless network, it does not matter if it has the correct information.

This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized wireless devices to get the MAC address of an authorized device. Then, they can use that MAC address to use the wireless network.

1. Some wireless devices, such as scanners, can detect wireless networks but cannot use wireless networks. These kinds of wireless devices might not have MAC addresses.
2. Hexadecimal characters are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

5.7.2.3 User Authentication

Authentication is the process of verifying whether a wireless device is allowed to use the wireless network. You can make every user log in to the wireless network before using it. However, every device in the wireless network has to support IEEE 802.1x to do this.

For wireless networks, you can store the user names and passwords for each user in a RADIUS server. This is a server used in businesses more than in homes. If you do not have a RADIUS server, you cannot set up user names and passwords for your users.

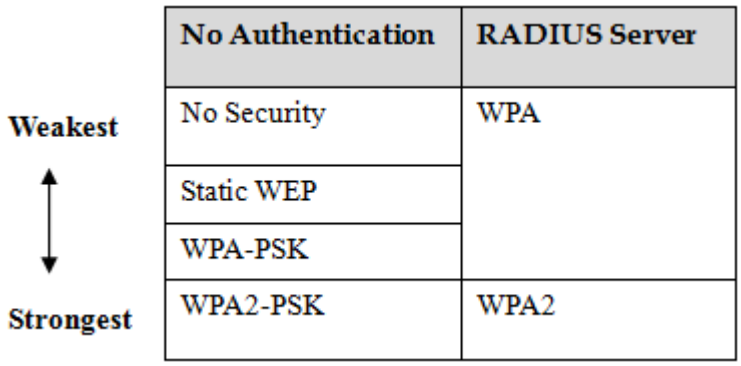
Unauthorized wireless devices can still see the information that is sent in the wireless network, even if they cannot use the wireless network. Furthermore, there are ways for unauthorized wireless users to get a valid user name and password. Then, they can use that user name and password to use the wireless network.

5.7.2.4 Encryption

Wireless networks can use encryption to protect the information that is sent in the wireless network. Encryption is like a secret code. If you do not know the secret code, you cannot understand the message.

The types of encryption you can choose depend on the type of authentication. (See Section 5.7.2 for information about this.)

Figure 5-12 Types of Encryption for Each Type of Authentication



For example, if the wireless network has a RADIUS server, you can choose **WPA** or **WPA2**. If users do not log in to the wireless network, you can choose no encryption, **Static WEP**, **WPA-PSK**, or **WPA2-PSK**.

Usually, you should set up the strongest encryption that every device in the wireless network supports. For example, suppose you have a wireless network with the LTE Device and you do not have a RADIUS server. Therefore, there is no authentication. Suppose the wireless network has two devices. Device A only supports WEP, and device B supports WEP and WPA. Therefore, you should set up **Static WEP** in the wireless network.

NOTE

It is recommended that wireless networks use **WPA-PSK**, **WPA**, or stronger encryption. The other types of encryption are better than none at all, but it is still possible for unauthorized wireless devices to figure out the original information pretty quickly.

When you select **WPA2** or **WPA2-PSK** in your LTE Device, you can also select an option (**WPA compatible**) to support WPA as well. In this case, if some of the devices support WPA and some support WPA2, you should set up **WPA2-PSK** or **WPA2** (depending on the type of wireless network login) and select the **WPA compatible** option in the LTE Device.

Many types of encryption use a key to protect the information in the wireless network. The longer the key, the stronger the encryption. Every device in the wireless network must have the same key.

5.7.2 Signal Problems

Because wireless networks are radio networks, their signals are subject to limitations of distance, interference and absorption.

Problems with distance occur when the two radios are too far apart. Problems with interference occur when other radio waves interrupt the data signal. Interference may come from other radio transmissions, such as military or air traffic control communications, or from machines that are coincidental emitters such as electric motors or microwaves. Problems with absorption occur when physical objects (such as thick walls) are between the two radios, muffling the signal.

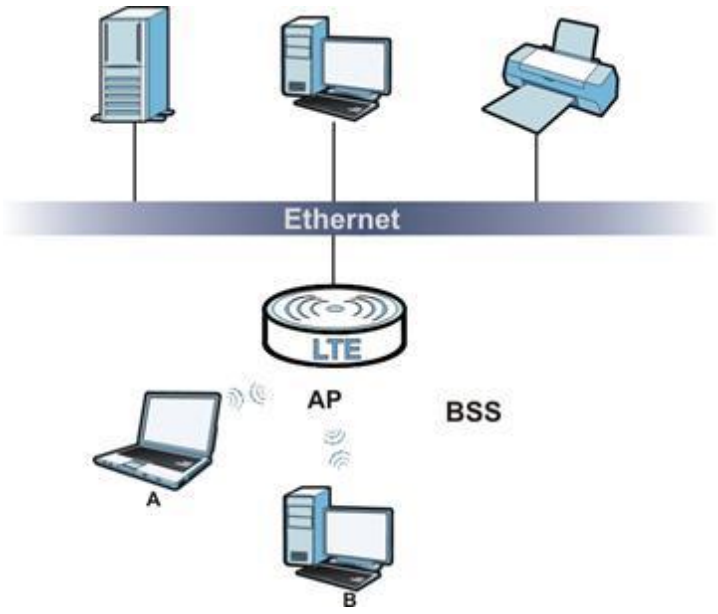
5.7.3 BSS

A Basic Service Set (BSS) exists when all communications between wireless stations or between a wireless station and a wired network client go through one access point (AP).

Intra-BSS traffic is traffic between wireless stations in the BSS. When Intra-BSS traffic blocking is disabled, wireless station A and B can access the wired network and communicate

with each other. When Intra-BSS traffic blocking is enabled, wireless station A and B can still access the wired network but cannot communicate with each other.

Figure 5-13 Basic Service set



5.7.4 MBSSID

Traditionally, you need to use different APs to configure different Basic Service Sets (BSSs). As well as the cost of buying extra APs, there is also the possibility of channel interference. The LTE Device's MBSSID (Multiple Basic Service Set IDentifier) function allows you to use one access point to provide several BSSs simultaneously. You can then assign varying QoS priorities and/or security modes to different SSIDs.

Wireless devices can use different BSSIDs to associate with the same AP.

5.7.5.1 Notes on Multiple BSSs

- A maximum of eight BSSs are allowed on one AP simultaneously.
- You must use different keys for different BSSs. If two wireless devices have different BSSIDs (they are in different BSSs), but have the same keys, they may hear each other's communications (but not communicate with each other).
- MBSSID should not replace but rather be used in conjunction with 802.1x security.

5.7.5 WiFi Protected Setup (WPS)

Your LTE Device supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one

device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

5.7.5.1 Push Button Configuration

WPS Push Button Configuration (PBC) is initiated by pressing a button on each WPS-enabled device, and allowing them to connect automatically. You do not need to enter any information.

Not every WPS-enabled device has a physical WPS button. Some may have a WPS PBC button in their configuration utilities instead of or in addition to the physical button. Take the following steps to set up WPS using the button.

Step 1 Ensure that the two devices you want to set up are within wireless range of one another.

Step 2 Look for a WPS button on each device. If the device does not have one, log into its configuration utility and locate the button (see the device's User's Guide for how to do this - for the LTE Device, see Section 5.4).

Step 3 Press the button on one of the devices (it doesn't matter which). For the LTE Device you must press the WPS button for more than three seconds.

Step 4 Within two minutes, press the button on the other device. The registrar sends the network name (SSID) and security key through a secure connection to the enrollee.

If you need to make sure that WPS worked, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

5.7.5.2 PIN Configuration

Each WPS-enabled device has its own PIN (Personal Identification Number). This may either be static (it cannot be changed) or dynamic (in some devices you can generate a new PIN by clicking on a button in the configuration interface).

Use the PIN method instead of the push-button configuration (PBC) method if you want to ensure that the connection is established between the devices you specify, not just the first two devices to activate WPS in range of each other. However, you need to log into the configuration interfaces of both devices to use the PIN method.

When you use the PIN method, you must enter the PIN from one device (usually the wireless client) into the second device (usually the Access Point or wireless router). Then, when WPS is activated on the first device, it presents its PIN to the second device. If the PIN matches, one device sends the network and security information to the other, allowing it to join the network.

Take the following steps to set up a WPS connection between an access point or wireless router (referred to here as the AP) and a client device using the PIN method.

Step 1 Ensure WPS is enabled on both devices.

Step 2 Access the WPS section of the AP's configuration interface. See the device's User's Guide for how to do this.

Step 3 Look for the client's WPS PIN; it will be displayed either on the device, or in the WPS section of the client's configuration interface (see the device's User's Guide for how to find the WPS PIN - for the LTE Device, see Section 5.4).

Step 4 Enter the client's PIN in the AP's configuration interface.

Step 5 If the client device's configuration interface has an area for entering another device's PIN, you can either enter the client's PIN in the AP, or enter the AP's PIN in the client - it does not matter which.

Step 6 Start WPS on both devices within two minutes.

Step 7 Use the configuration utility to activate WPS, not the push-button on the device itself.

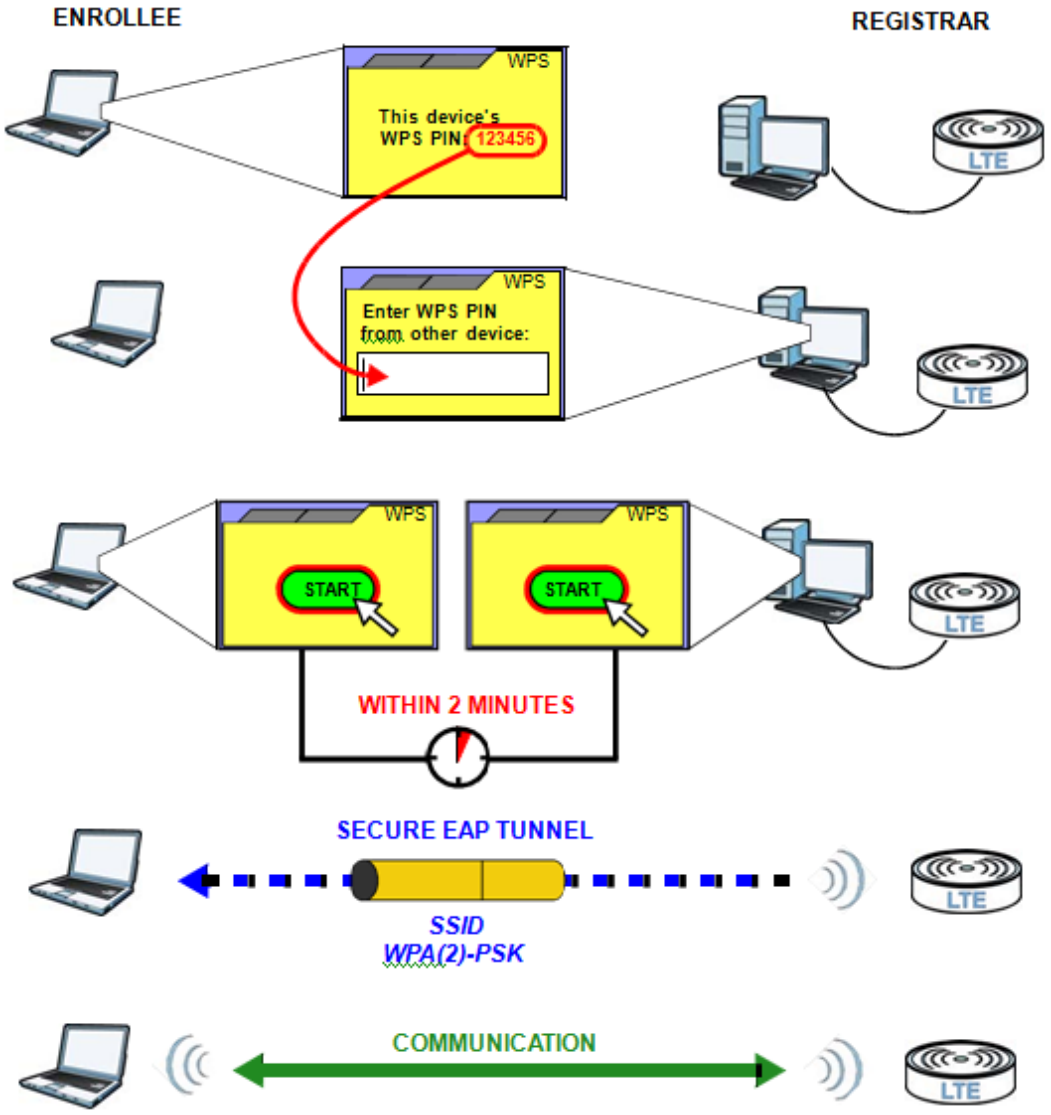
Step 8 On a computer connected to the wireless client, try to connect to the Internet. If you can connect, WPS was successful.

----End

If you cannot connect, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

The following figure shows a WPS-enabled wireless client (installed in a notebook computer) connecting to the WPS-enabled AP via the PIN method.

Figure 5-14 Example WPS Process: PIN Method

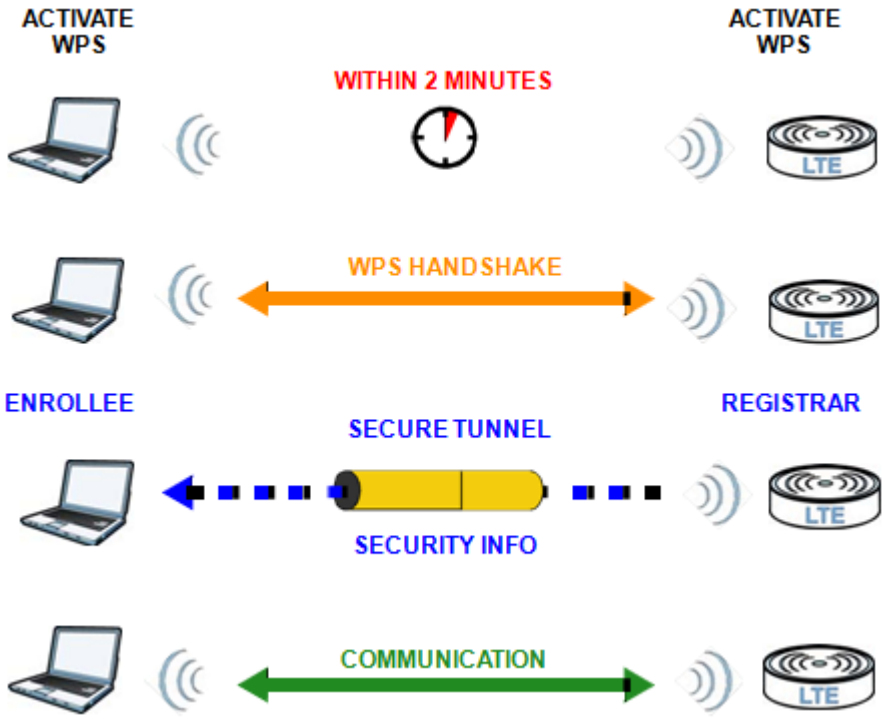


5.7.5.3 How WPS Works

When two WPS-enabled devices connect, each device must assume a specific role. One device acts as the registrar (the device that supplies network and security settings) and the other device acts as the enrollee (the device that receives network and security settings. The registrar creates a secure EAP (Extensible Authentication Protocol) tunnel and sends the network name (SSID) and the WPA-PSK or WPA2-PSK pre-shared key to the enrollee. Whether WPA-PSK or WPA2-PSK is used depends on the standards supported by the devices. If the registrar is already part of a network, it sends the existing information. If not, it generates the SSID and WPA(2)-PSK randomly.

The following figure shows a WPS-enabled client (installed in a notebook computer) connecting to a WPS-enabled access point.

Figure 5-15 Example WPS Process: PIN Method



The roles of registrar and enrollee last only as long as the WPS setup process is active (two minutes). The next time you use WPS, a different device can be the registrar if necessary.

The WPS connection process is like a handshake; only two devices participate in each WPS transaction. If you want to add more devices you should repeat the process with one of the existing networked devices and the new device.

Note that the access point (AP) is not always the registrar, and the wireless client is not always the enrollee. All WPS-certified APs can be a registrar, and so can some WPS-enabled wireless clients.

By default, a WPS device is "unconfigured". This means that it is not part of an existing network and can act as either enrollee or registrar (if it supports both functions). If the registrar is unconfigured, the security settings it transmits to the enrollee are randomly- generated. Once a WPS-enabled device has connected to another device using WPS, it becomes "configured". A configured wireless client can still act as enrollee or registrar in subsequent WPS connections, but a configured access point can no longer act as enrollee. It will be the registrar in all subsequent WPS connections in which it is involved. If you want a configured AP to act as an enrollee, you must reset it to its factory defaults.

5.7.5.4 Example WPS Network Setup

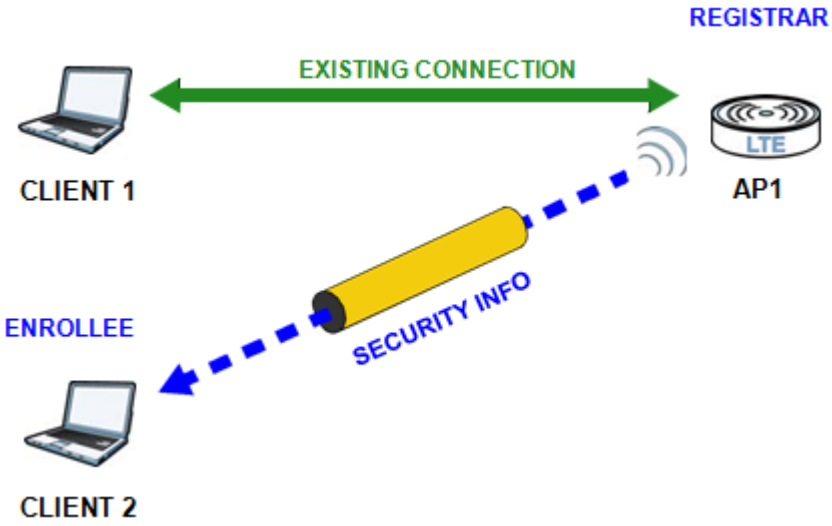
This section shows how security settings are distributed in an example WPS setup.

The following figure shows an example network. In step **1**, both **AP1** and **Client 1** are unconfigured. When WPS is activated on both, they perform the handshake. In this example, **AP1** is the registrar, and **Client 1** is the enrollee. The registrar randomly generates the security information to set up the network, since it is unconfigured and has no existing information.

Figure 5-16 WPS: Example Network Step 1

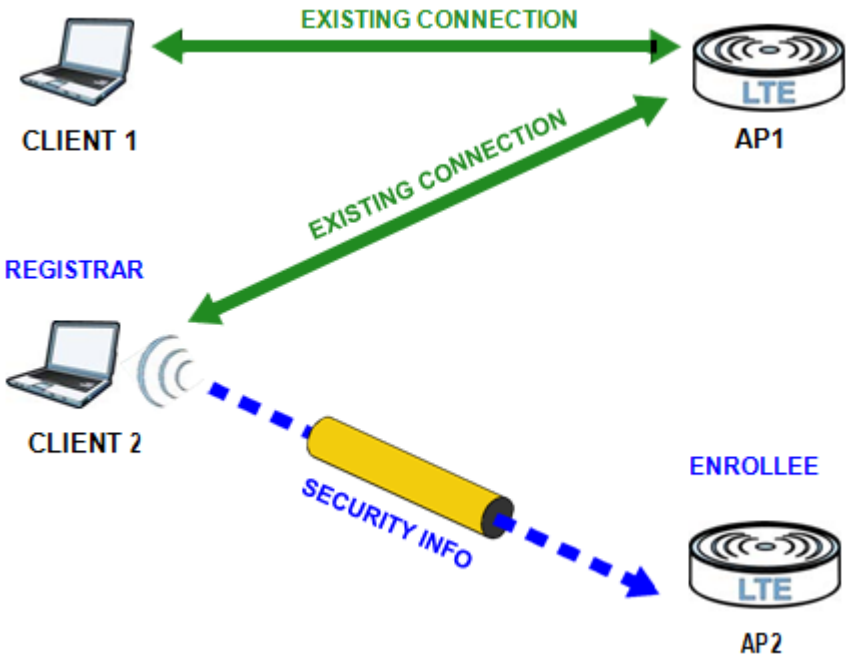
In step **2**, you add another wireless client to the network. You know that **Client 1** supports registrar mode, but it is better to use **AP1** for the WPS handshake with the new client since you must connect to the access point anyway in order to use the network. In this case, **AP1** must be the registrar, since it is configured (it already has security information for the network). **AP1** supplies the existing security information to **Client 2**.

Figure 5-17 WPS: Example Network Step 2



In step 3, you add another access point (**AP2**) to your network. **AP2** is out of range of **AP1**, so you cannot use **AP1** for the WPS handshake with the new access point. However, you know that **Client 2** supports the registrar function, so you use it to perform the WPS handshake instead.

Figure 5-18 WPS: Example Network Step 3



5.7.5.5 Limitations of WPS

WPS has some limitations of which you should be aware.

- WPS works in Infrastructure networks only (where an AP and a wireless client communicate). It does not work in Ad-Hoc networks (where there is no AP).
- When you use WPS, it works between two devices only. You cannot enroll multiple devices simultaneously; you must enroll one after the other.

For instance, if you have two enrollees and one registrar you must set up the first enrollee (by pressing the WPS button on the registrar and the first enrollee, for example), then check that it successfully enrolled, then set up the second device in the same way.

- WPS works only with other WPS-enabled devices. However, you can still add non-WPS devices to a network you already set up using WPS.

WPS works by automatically issuing a randomly-generated WPA-PSK or WPA2-PSK pre-shared key from the registrar device to the enrollee devices. Whether the network uses WPA-PSK or WPA2-PSK depends on the device. You can check the configuration interface of the registrar device to discover the key the network is using (if the device supports this feature). Then, you can enter the key into the non-WPS device and join the network as normal (the non-WPS device must also support WPA-PSK or WPA2-PSK).

- When you use the PBC method, there is a short period (from the moment you press the button on one device to the moment you press the button on the other device) when any WPS-enabled device could join the network. This is because the registrar has no way of identifying the "correct" enrollee, and cannot differentiate between your enrollee and a rogue device. This is a possible way for a hacker to gain access to a network.

You can easily check to see if this has happened. WPS works between only two devices simultaneously, so if another device has enrolled your device will be unable to enroll, and will not have access to the network. If this happens, open the access point's configuration interface

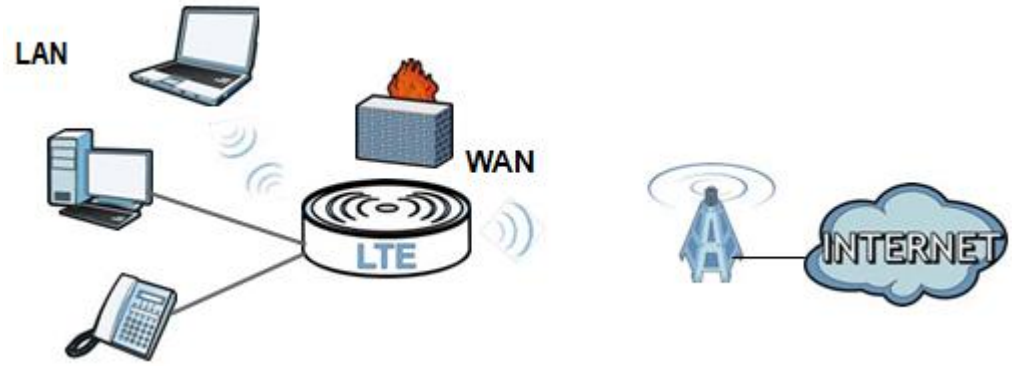
and look at the list of associated clients (usually displayed by MAC address). It does not matter if the access point is the WPS registrar, the enrollee, or was not involved in the WPS handshake; a rogue device must still associate with the access point to gain access to the network. Check the MAC addresses of your wireless clients (usually printed on a label on the bottom of the device). If there is an unknown MAC address you can remove it or reset the AP.

6 Home Networking

6.1 Overview

A Local Area Network (LAN) is a shared communication system to which many computers are attached. A LAN is usually located in one immediate area such as a building or floor of a building.

The LAN screens can help you configure a LAN DHCP server and manage IP addresses.



6.1.1 What You Need To Know

The following terms and concepts may help as you read this chapter.

6.1.1.1 About LAN IP Address

Similar to the way houses on a street share a common street name, so too do computers on a LAN share one common network number. This is known as an Internet Protocol address.

Subnet Mask

The subnet mask specifies the network number portion of an IP address. Your LTE Device will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the LTE Device unless you are instructed to do otherwise.

DHCP

DHCP (Dynamic Host Configuration Protocol) allows clients to obtain TCP/IP configuration at start-up from a server. This LTE Device has a built-in DHCP server capability that assigns IP addresses and DNS servers to systems that support DHCP client capability.

DNS

DNS (Domain Name System) maps a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The DNS server addresses you enter when you set up DHCP are passed to the client machines along with the assigned IP address and subnet mask.

6.1.1.2 About UPnP

How do I know if I'm using UPnP?

UPnP hardware is identified as an icon in the Network Connections folder (Windows XP). Each UPnP compatible device installed on your network will appear as a separate icon. Selecting the icon of a UPnP device will allow you to access the information and properties of that device.

Cautions with UPnP

The automated nature of NAT traversal applications in establishing their own services and opening firewall ports may present network security issues. Network information and configuration may also be obtained and modified by users in some network environments.

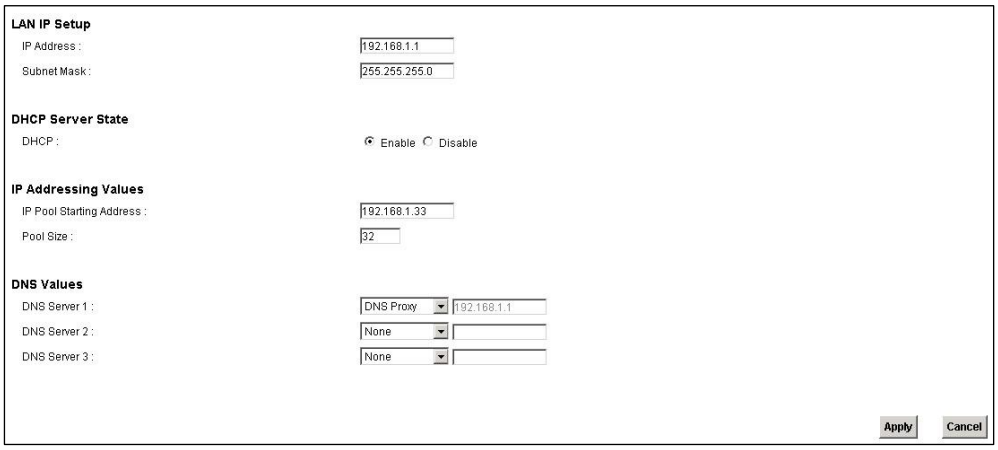
When a UPnP device joins a network, it announces its presence with a multicast message. For security reasons, the LTE Device allows multicast messages on the LAN only.

All UPnP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP if this is not your intention.

6.2 The LAN Setup Screen

Click **Network Setting > Home Networking** to open the **LAN Setup** screen. Use this screen to set the Local Area Network IP address and subnet mask of your LTE Device and configure the DNS server information that the LTE Device sends to the DHCP client devices on the LAN.

Figure 6-1 Network Setting > Home Networking > LAN Setup



The following table describes the fields in this screen.

Table 6-1 Network Setting > Home Networking > LAN Setup

LABEL	DESCRIPTION
LAN IP Setup	
IP Address	Enter the LAN IP address you want to assign to your LTE Device in dotted decimal notation, for example, 192.168.1.1 (factory default).
IP Subnet Mask	Type the subnet mask of your network in dotted decimal notation, for example 255.255.255.0 (factory default). Your LTE Device automatically computes the subnet mask based on the IP address you enter, so do not change this field unless you are instructed to do so.
DHCP Server State	
DHCP	Select **Enable** to have your LTE Device assign IP addresses, an IP default gateway and DNS servers to LAN computers and other devices that are DHCP clients. If you select **Disable**, you need to manually configure the IP addresses of the computers and other devices on your LAN. When DHCP is used, the following fields need to be set.
IP Addressing Values	
IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool.
Pool Size	This field specifies the size, or count of the IP address pool.
DNS Values	

LABEL	DESCRIPTION
DNS Server 1-3	Select **From ISP** if your ISP dynamically assigns DNS server information (and the LTE Device's WAN IP address). Select **DNS-Proxy** to have the LTE Device send its own address to the LAN clients for them to use as the DNS server. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User- Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. You must have another DHCP sever on your LAN, or else the computers must have their DNS server addresses manually configured. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

6.3 The Static DHCP Screen

This table allows you to assign IP addresses on the LAN to specific individual computers based on their MAC Addresses.

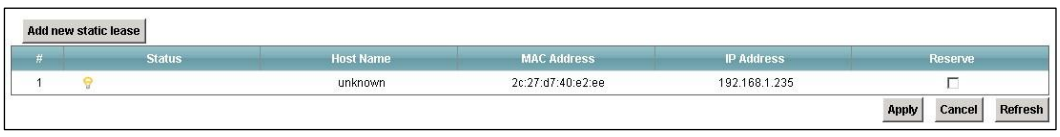
Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.

6.3.1 Before You Begin

Find out the MAC addresses of your network devices if you intend to add them to the **Static DHCP** screen.

Use this screen to change your LTE Device's static DHCP settings. Click **Network Setting > Home Networking > Static DHCP** to open the following screen.

Figure 6-2 Network Setting > Home Networking > Static DHCP



The following table describes the labels in this screen.

Table 6-2 Network Setting > Home Networking > Static DHCP

LABEL	DESCRIPTION
Add new static lease	Click this to add a new static DHCP entry.
#	This is the index number of the entry.
Status	This field displays whether the client is connected to the LTE Device.
Host Name	This field displays the client host name.
MAC Address	The MAC (Media Access Control) or Ethernet address on a LAN (Local Area Network) is unique to your computer (six pairs of hexadecimal notation). A network interface card such as an Ethernet adapter has a hardwired address that is assigned at the factory. This address follows an industry standard that ensures no other adapter has a similar address.
IP Address	This field displays the IP address relative to the # field listed above.
Reserve	Select the check box in the heading row to automatically select all check boxes or select the check box(es) in each entry to have the LTE Device always assign the selected entry(ies)'s IP address(es) to the corresponding MAC address(es) (and host name(s)). You can select up to 128 entries in this table.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.
Refresh	Click **Refresh** to reload the DHCP table.

If you click **Add new static lease** in the **Static DHCP** screen, the following screen displays.

Figure 6-3 Static DHCP: Add

The following table describes the labels in this screen.

Table 6-3 Static DHCP: Add

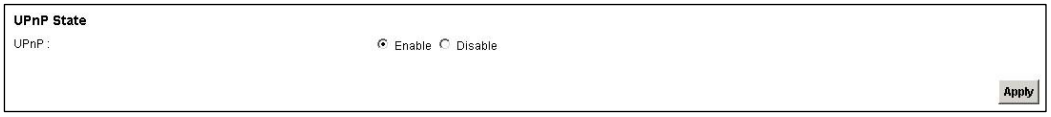
LABEL	DESCRIPTION
MAC Address	Enter the MAC address of a computer on your LAN.
IP Address	Enter the IP address that you want to assign to the computer on your LAN with the MAC address that you will also specify.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to exit this screen without saving.

6.4 The UPnP Screen

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use.

Use the following screen to configure the UPnP settings on your LTE Device. Click **Network Setting** > **Home Networking** > **Static DHCP** > **UPnP** to display the screen shown next.

Figure 6-4 Network Setting > Home Networking > UPnP



The following table describes the labels in this screen.

Table 6-4 Network Settings > Home Networking > UPnP

LABEL	DESCRIPTION
UPnP	Select **Enable** to activate UPnP. Be aware that anyone could use a UPnP application to open the web configurator's login screen without entering the LTE Device's IP address (although you must still enter the password to access the web configurator).
Apply	Click **Apply** to save your changes.

6.5 The File Sharing Screen

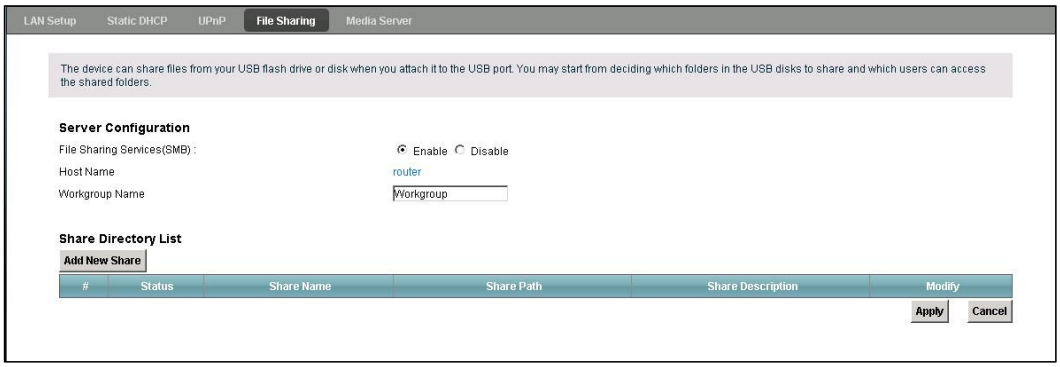
CAUTION

CPE Only support FAT32 and maximun disk size 1TB for USB memory stick or hard drive

You can share files on a USB memory stick or hard drive connected to your LTE Device with users on your network. Use this screen to set up file sharing using the LTE Device.

To access this screen, click **Network Setting > Home Networking > File Sharing**.

Figure 6-5 Network Setting > Home Networking > File Sharing

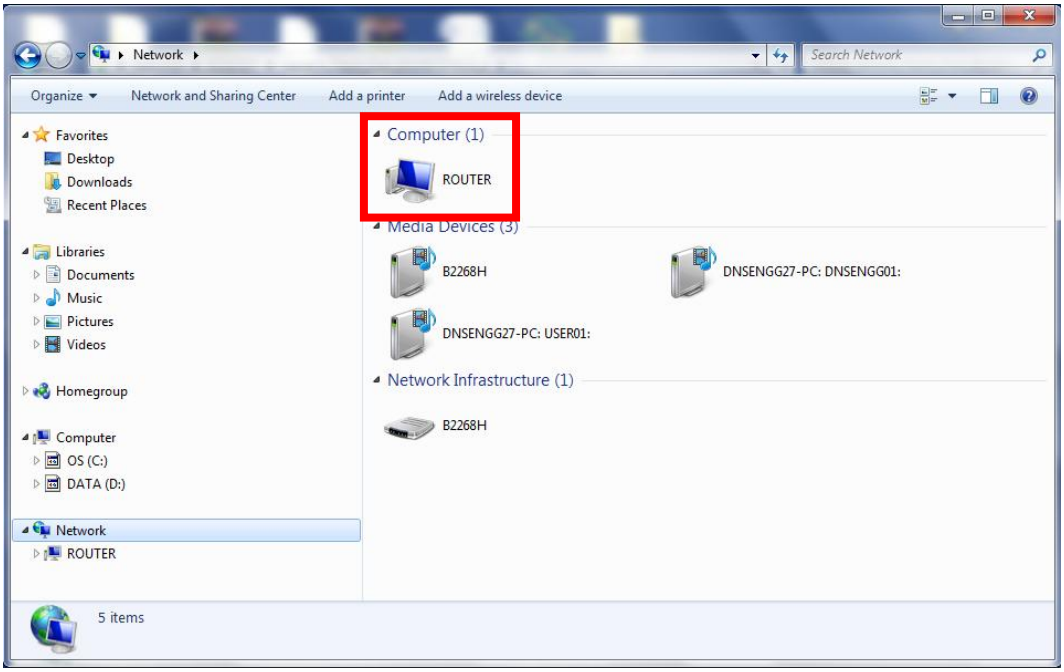


Each field is described in the following table.

Table 6-5 Network Settings > Home Networking > File Sharing

LABEL	DESCRIPTION
File Sharing Services (SMB)	Select **Enable** and click **Apply** to activate file sharing through the LTE Device.
Host Name	The name of the LTE Device.
Workgroup Name	Type your workgroup name in this field. A workgroup is a group of computers on a network that can share files.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

Click **Computer->Network** on your PC and click **ROUTER** which is your USB.



6.6 The Media Server Screen

The media server feature lets anyone on your network play video, music, and photos from the USB storage device connected to your LTE Device (without having to copy them to another computer). The LTE Device can function as a DLNA-compliant media server. The LTE Device streams files to DLNA-compliant media clients (like Windows Media Player). The Digital Living Network Alliance (DLNA) is a group of personal computer and electronics companies that works to make products compatible in a home network.

The LTE Device media server enables you to:

• Publish all shares for everyone to play media files in the USB storage device connected to the LTE Device.

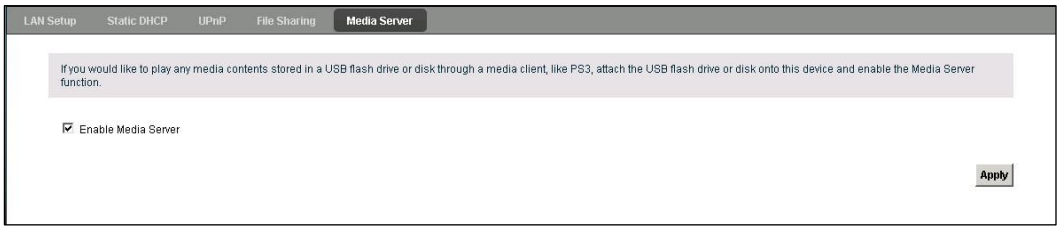
• Use hardware-based media clients to play the files.

NOTE

Anyone on your network can play the media files in the published shares. No username and password or other form of security is used. The media server is enabled by default with the video, photo, and music shares published.

To change your LTE Device's media server settings, click **Network Setting > Home Networking > Media Server**. The screen appears as shown.

Figure 6-6 Network Setting > Home Networking > Media Server

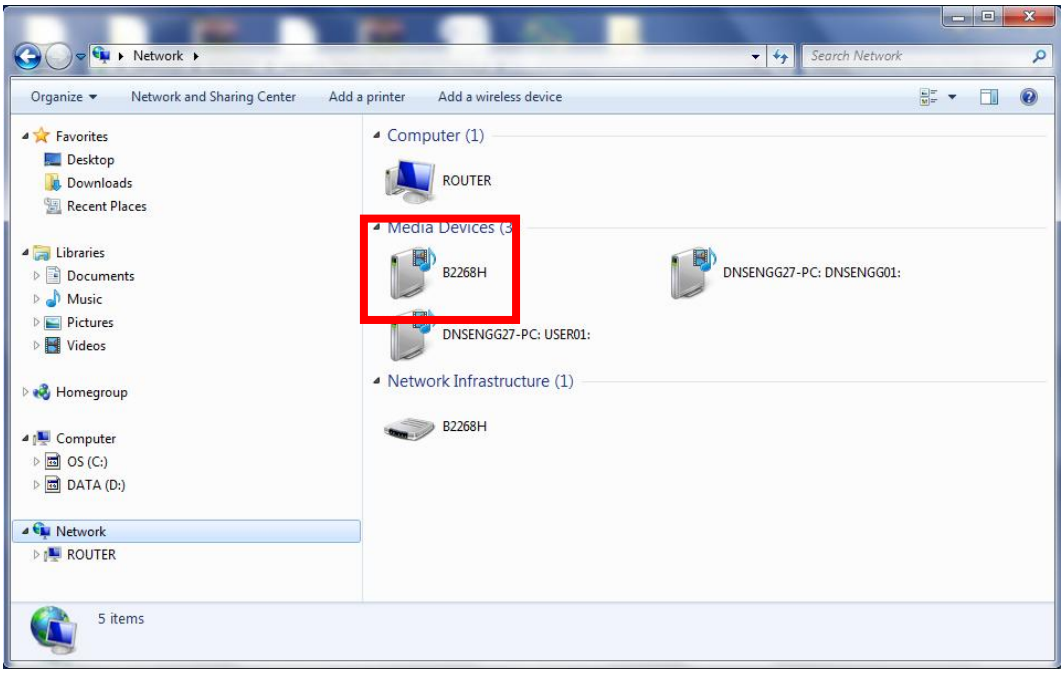


Each field is described in the following table.

Table 6-6 Network Settings > Home Networking > Media Server

LABEL	DESCRIPTION
Enable Media Server	Select **Enable** to have the LTE Device function as a DLNA-compliant media server. Enable the media server to let (DLNA-compliant) media clients on your network play media files located in the shares.
Apply	Click **Apply** to save your changes.

Click **Computer->Network** on your PC and click **B2268H** under **Media Devices.**



Here is your Media files from your USB


Windows Media Player
B2268H
Play
Burn
Sync
Organize
Stream
Create playlist
Search
Library
Playlists
Music
Artist
Album
Genre
Videos
Pictures
Recorded TV
Other Libraries
B2268H
Music
Videos
Pictures
Recorded TV
user01 (dnsengg27-pc)
Title
Music
Videos
Pictures
Recorded TV
Playlists
Media Guide

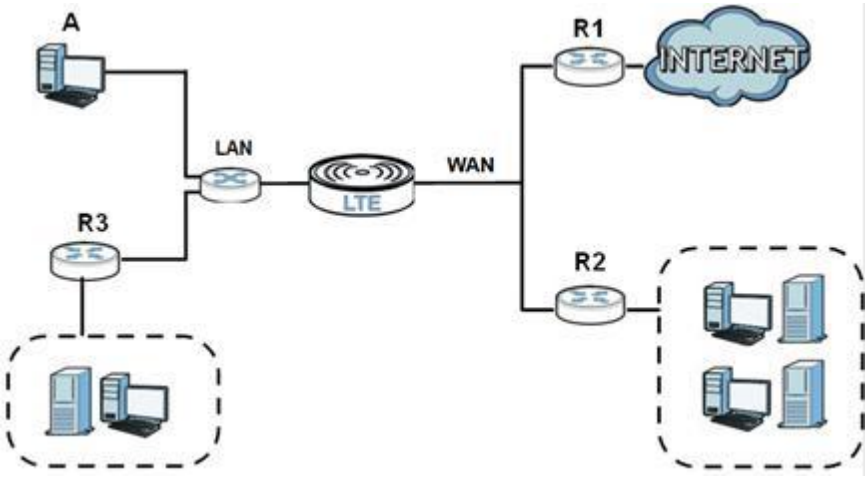
7 Routing

7.1 Overview

The LTE Device usually uses the default gateway to route outbound traffic from computers on the LAN to the Internet. To have the LTE Device send data to devices not reachable through the default gateway, use static routes.

For example, the next figure shows a computer (**A**) connected to the LTE Device's LAN interface. The LTE Device routes most traffic from **A** to the Internet through the LTE Device's default gateway (**R1**). You create one static route to connect to services offered by your ISP behind router **R2**. You create another static route to communicate with a separate network behind a router **R3** connected to the LAN.

Figure 7-1 Example of Static Routing Topology



7.2 Configuring Static Route

Use this screen to view and configure IPv4 static routes on the LTE Device. Click **Network Setting** > **Static Route** to open the following screen.

Figure 7-2 Network Setting >StaticRoute

The following table describes the labels in this screen.

Table 7-1 Network Setting > Static Route

LABEL	DESCRIPTION
Add New Static Route	Click this to set up a new IPv4 static route on the LTE Device.
#	This is the number of an individual static route.
Active	This indicates whether the route is active or not. A yellow bulb signifies that this static route is active. A gray bulb signifies that this static route is not active.
Status	This shows whether the static route is currently in use or not. A yellow bulb signifies that this static route is in use. A gray bulb signifies that this static route is not in use.
Name	This is the name that describes or identifies this route.
Destination IP	This parameter specifies the IPv4 IP network address of the final destination. Routing is always based on network number.
Gateway	This is the IPv4 IP address of the gateway. The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.
Subnet Mask	This parameter specifies the IP network subnet mask of the final destination.
Interface	This indicates which interface handles the traffic forwarded by this route.
Modify	Click the **Edit** icon to go to the screen where you can set up a static route on the LTE Device. Click the **Delete** icon to remove a static route from the LTE Device.

7.2.1 Add/Edit Static Route

Click **add new Static Route** in the **Routing** screen or click the **Edit** icon next to a rule. The following screen appears. Use this screen to configure the required information for a static route.

Figure 7-3 Routing: Add/Edit

The following table describes the labels in this screen.

Table 7-2 Routing: Add/Edit

LABEL	DESCRIPTION
Active	Click this to activate this static route.
Route Name	Enter the name of the IP static route. Leave this field blank to delete this static route.
Destination IP Address	This parameter specifies the IP network address of the final destination. Routing is always based on network number. If you need to specify a route to a single host, use a subnet mask of 255.255.255.255 in the subnet mask field to force the network number to be identical to the host ID.
IP Subnet Mask	Enter the IP subnet mask here.
Gateway IP Address	You can decide if you want to forward packets to a gateway IP address or a bound interface. If you want to configure **Gateway IP Address**, enter the IP address of the next-hop gateway. The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.
Bound Interface	You can decide if you want to forward packets to a gateway IP address or a bound interface. If you want to configure **Bound Interface**, select the check box and choose an interface through which the traffic is sent.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to exit this screen without saving.

8 Network Address Translation (NAT)

8.1 Overview

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet, for example, the source address of an outgoing packet, used within one network to a different IP address known within another network.

8.1.1 What You Need To Know

The following terms and concepts may help as you read this chapter.

Inside/Outside and Global/Local

Inside/outside denotes where a host is located relative to the LTE Device, for example, the computers of your subscribers are the inside hosts, while the web servers on the Internet are the outside hosts.

Global/local denotes the IP address of a host in a packet as the packet traverses a router, for example, the local address refers to the IP address of a host when the packet is in the local network, while the global address refers to the IP address of the host when the same packet is traveling in the WAN side.

NAT

In the simplest form, NAT changes the source IP address in a packet received from a subscriber (the inside local address) to another (the inside global address) before forwarding the packet to the WAN side. When the response comes back, NAT translates the destination address (the inside global address) back to the inside local address before forwarding it to the original inside host.

Port Forwarding

A port forwarding set is a list of inside (behind NAT on the LAN) servers, for example, web or FTP, that you can make visible to the outside world even though NAT makes your whole inside network appear as a single computer to the outside world.

Finding Out More

See Section 9.5 for advanced technical information on NAT.

8.2 The Port Forwarding Screen

Use the **Port Forwarding** screen to forward incoming service requests to the server(s) on your local network.

You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers. You can allocate a server IP address that corresponds to a port or a range of ports.

Please refer to RFC 1700 for further information about port numbers.

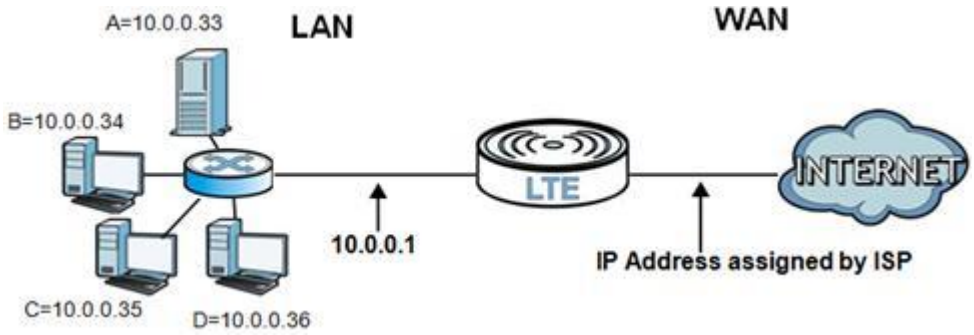
NOTE

Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.

Configuring Servers Behind Port Forwarding (Example)

Let's say you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 10.0.0.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

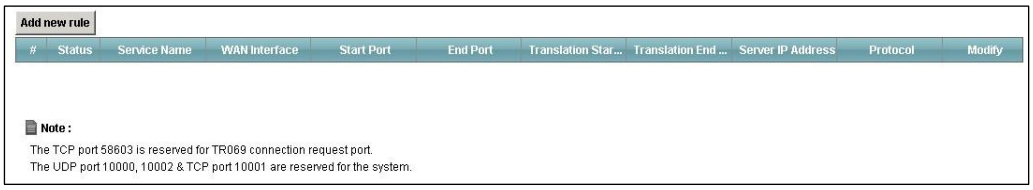
Figure 8-1 Multiple Servers Behind NAT Example



8.2.1 The Port Forwarding Screen

Click **Network Setting > NAT** to open the Port Forwarding screen.

Figure 8-2 Network Setting >NAT >Port Forwarding



The following table describes the fields in this screen.

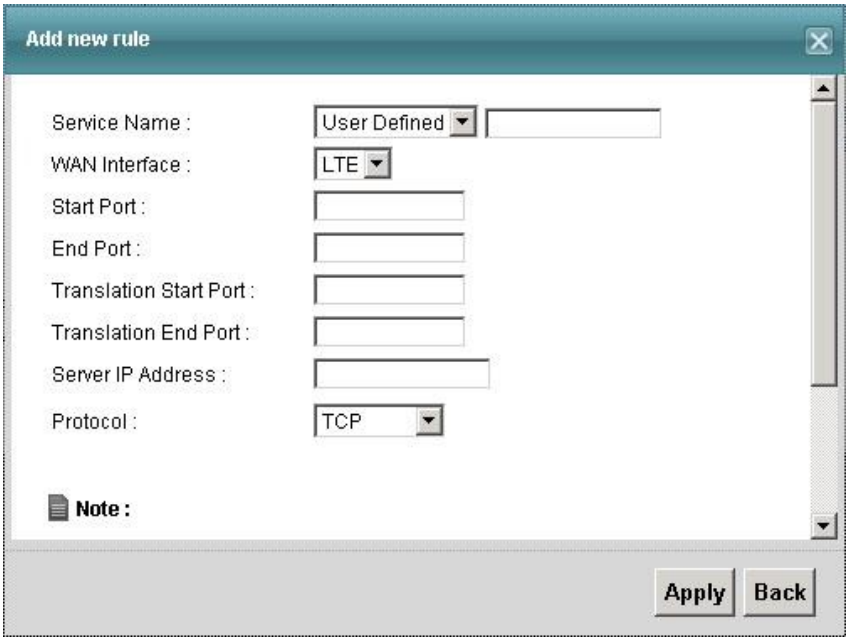
Table 8-1 Network Setting > NAT > Port Forwarding

LABEL	DESCRIPTION
Add new rule	Click this to add a new port forwarding rule.
#	This is the index number of the entry.
Status	This field indicates whether the rule is active or not. A yellow bulb signifies that this rule is active. A gray bulb signifies that this rule is not active.
Service Name	This is the service's name. This shows **User Defined** if you manually added a service. You can change this by clicking the edit icon.
WAN Interface	This shows the WAN interface through which the service is forwarded.
Start Port	This is the first external port number that identifies a service.
End Port	This is the last external port number that identifies a service.
Translation Start Port	This is the first internal port number that identifies a service.
Translation End Port	This is the last internal port number that identifies a service.
Server IP Address	This is the server's IP address.
Protocol	This shows the IP protocol supported by this virtual server, whether it is TCP, UDP, or TCP/UDP.
Modify	Click the **Edit** icon to edit the port forwarding rule. Click the **Delete** icon to delete an existing port forwarding rule. Note that subsequent address mapping rules move up by one when you take this action.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

8.2.2 The Port Forwarding Edit Screen

This screen lets you create or edit a port forwarding rule. Click **Add new rule** in the **Port Forwarding** screen or the **Edit** icon next to an existing rule to open the following screen.

Figure 8-3 Port Forwarding: Add/Edit



The following table describes the labels in this screen.

Table 8-2 Port Forwarding: Add/Edit

LABEL	DESCRIPTION
Service Name	Enter a name to identify this rule using keyboard characters (A-Z, a-z, 1-2 and so on).
WAN Interface	This is the WAN interface through which the service is forwarded.
Start Port	Enter the original destination port for the packets. To forward only one port, enter the port number again in the **External** End Port field. To forward a series of ports, enter the start port number here and the end port number in the **External End Port** field.
End Port	Enter the last port of the original destination port range. To forward only one port, enter the port number in the **External Start Port** field above and then enter it again in this field. To forward a series of ports, enter the last port number in a series that begins with the port number in the **External Start Port** field above.
Translation Start Port	This shows the port number to which you want the LTE Device to translate the incoming port. For a range of ports, enter the first number of the range to which you want the incoming ports translated.
Translation End Port	This shows the last port of the translated port range.
Server IP Address	Enter the inside IP address of the virtual server here.

LABEL	DESCRIPTION
Protocol	Select the protocol supported by this virtual server. Choices are **TCP**, **UDP**, or **TCP/UDP**.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to return to the previous screen without saving.

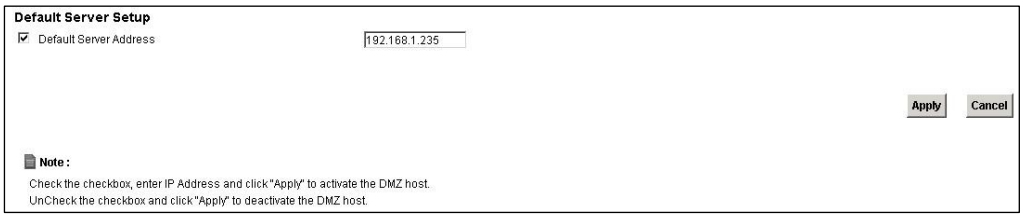
8.3 The DMZ Screen

Use this page to set the IP address of your network DMZ (if you have one) for the LTE Device. All incoming packets received by this LTE Device's WAN interface will be forwarded to the default server you set.

Click **Network Setting > NAT > DMZ** to display the following screen.

NOTE
The configuration you set in this screen takes priority than the **Network Setting > NAT > Port Forwarding** screen.

Figure 8-4 Network Setting > NAT > DMZ



The following table describes the fields in this screen.

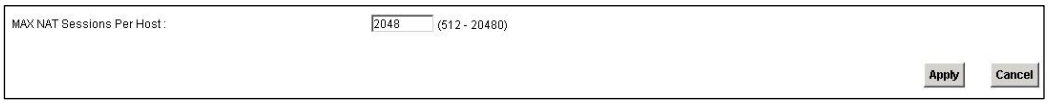
Table 8-3 Network Setting > NAT > DMZ

LABEL	DESCRIPTION
Default Server Address	Enter the IP address of your network DMZ host, if you have one. **0.0.0.0** means this feature is disabled.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

8.4 The Sessions Screen

Use the **Sessions** screen to limit the number of concurrent NAT sessions each client can use. Click **Network Setting > NAT > Sessions** to display the following screen.

Figure 9-5 Network Setting > NAT > Sessions



The following table describes the fields in this screen.

Table 8-4 Network Setting > NAT > Sessions

LABEL	DESCRIPTION
MAX NAT Session	Use this field to set a common limit to the number of concurrent NAT sessions each client computer can have. If only a few clients use peer to peer applications, you can raise this number to improve their performance. With heavy peer to peer application use, lower this number to ensure no single client uses too many of the available NAT sessions.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

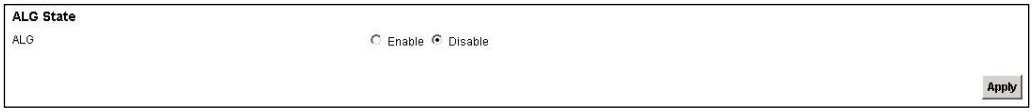
8.5 The ALG Screen

Use the **ALG** screen to enable or disable SIP Application Layer Gateway (ALG) on the LTE Device. Click **Apply** to save your change.

The SIP ALG allows SIP calls to pass through NAT by examining and translating IP addresses embedded in the data stream. When the LTE Device registers with the SIP register server, the SIP ALG translates the LTE Device's private IP address inside the SIP data stream to a public IP address. You do not need to use STUN or an outbound proxy if you enable the SIP ALG.

For the LTE environment, the LTE interface may experience heavy overhead when sending SIP re-registration requests due to SIP server NAT session timeout. This default NAT session timeout value (3600 seconds) helps to decrease the chance of this happening.

Figure 8-5 Network Setting > NAT > ALG



8.6 Technical Reference

This section provides some technical background information about the topics covered in this chapter.

8.6.1 NAT Definitions

Inside/outside denotes where a host is located relative to the LTE Device, for example, the computers of your subscribers are the inside hosts, while the web servers on the Internet are the outside hosts.

Global/local denotes the IP address of a host in a packet as the packet traverses a router, for example, the local address refers to the IP address of a host when the packet is in the local network, while the global address refers to the IP address of the host when the same packet is traveling in the WAN side.

Note that inside/outside refers to the location of a host, while global/local refers to the IP address of a host used in a packet. Thus, an inside local address (ILA) is the IP address of an inside host in a packet when the packet is still in the local network, while an inside global address (IGA) is the IP address of the same inside host when the packet is on the WAN side. The following table summarizes this information.

Table 8-5 NAT Definitions

ITEM	DESCRIPTION
Inside	This refers to the host on the LAN.
Outside	This refers to the host on the WAN.
Local	This refers to the packet address (source or destination) as the packet travels on the LAN.
Global	This refers to the packet address (source or destination) as the packet travels on the WAN.

NAT never changes the IP address (either local or global) of an outside host.

8.6.2 What NAT Does

In the simplest form, NAT changes the source IP address in a packet received from a subscriber (the inside local address) to another (the inside global address) before forwarding the packet to the WAN side. When the response comes back, NAT translates the destination address (the inside global address) back to the inside local address before forwarding it to the original inside host. Note that the IP address (either local or global) of an outside host is never changed.

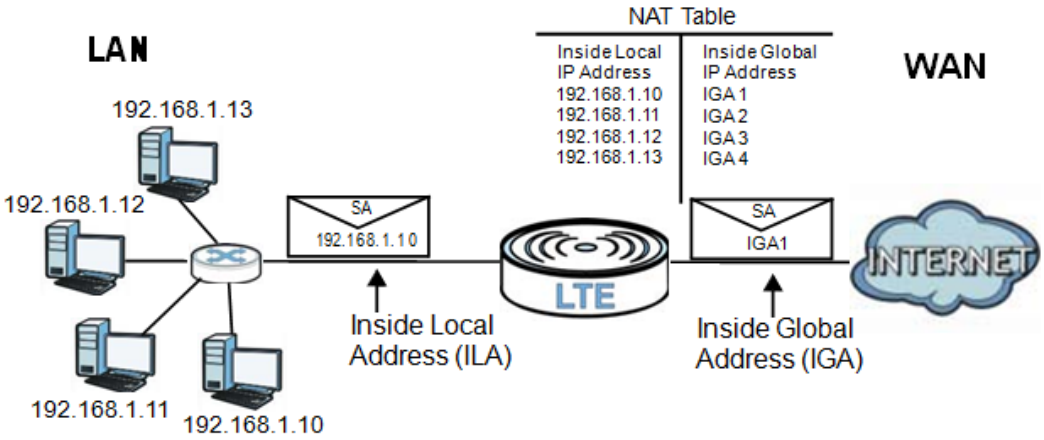
The global IP addresses for the inside hosts can be either static or dynamically assigned by the ISP. In addition, you can designate servers, for example, a web server and a Telnet server, on your local network and make them accessible to the outside world. If you do not define any servers, NAT offers the additional benefit of firewall protection. With no servers defined, your LTE Device filters out all incoming inquiries, thus preventing intruders from probing your network. For more information on IP address translation, refer to *RFC 1631, The IP Network Address Translator (NAT)*.

8.6.3 How NAT Works[h1]

Each packet has two addresses-a source address and a destination address. For outgoing packets, the ILA (Inside Local Address) is the source address on the LAN, and the IGA (Inside Global Address) is the source address on the WAN. For incoming packets, the ILA is the destination address on the LAN, and the IGA is the destination address on the WAN. NAT maps private

(local) IP addresses to globally unique ones required for communication with hosts on other networks. It replaces the original IP source address (and TCP or UDP source port numbers for Many-to-One and Many-to-Many Overload NAT mapping) in each packet and then forwards it to the Internet. The LTE Device keeps track of the original addresses and port numbers so incoming reply packets can have their original values restored. The following figure illustrates this.

Figure 8-6 How NAT Works



9 Dynamic DNS

9.1 Overview

This chapter discusses how to configure your LTE Device to use Dynamic DNS. Dynamic DNS allows you to update your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you (in applications such as NetMeeting and CU-SeeMe). You can also access your FTP server or Web site on your own computer using a domain name (for instance myhost.dhs.org, where myhost is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect. Your friends or relatives will always be able to call you even if they don't know your IP address.

First of all, you need to have registered a dynamic DNS account with www.dyndns.org. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a domain name. The Dynamic DNS service provider will give you a password or key.

9.1.1 What You Need To Know

DYNDNS Wildcard

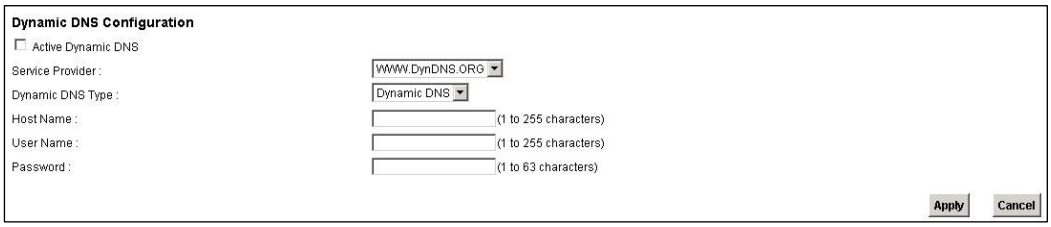
Enabling the wildcard feature for your host causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.

If you have a private WAN IP address, then you cannot use Dynamic DNS.

9.2 The Dynamic DNS Screen

Use the **Dynamic DNS** screen to enable DDNS and configure the DDNS settings on the LTE Device. To change your LTE Device's DDNS, click **Network Setting** > **Dynamic DNS**. The screen appears as shown.

Figure 9-1 Network Setting > Dynamic DNS



The following table describes the fields in this screen.

Table 9-1 Network Setting > DNS

LABEL	DESCRIPTION
Dynamic DNS Configuration	
Active Dynamic DNS	Select this check box to use dynamic DNS.
Service Provider	Select the name of your Dynamic DNS service provider.
Dynamic DNS Type	Select the type of service that you are registered for from your Dynamic DNS service provider.
Host Name	Type the domain name assigned to your LTE Device by your Dynamic DNS provider. You can specify up to two host names in the field separated by a comma (",").
User Name	Type your user name.
Password	Type the password assigned to you.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

10 Firewall

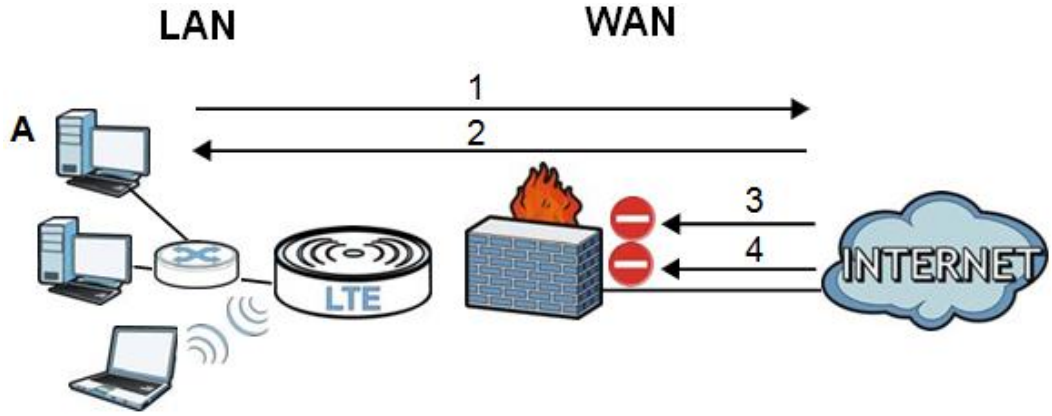
10.1 Overview

Use the LTE Device firewall screens to enable and configure the firewall that protects your LTE Device and network from attacks by hackers on the Internet and control access to it. By default the firewall:

- Allows traffic that originates from your LAN and WLAN computers to go to all other networks.
- Blocks traffic that originates on other networks from going to the LAN and WLAN.

The following figure illustrates the default firewall action. User **A** can initiate an IM (Instant Messaging) session from the LAN to the WAN (**1**). Return traffic for this session is also allowed (**2**). However other traffic initiated from the WAN is blocked (**3** and **4**).

Figure 10-1 Default Firewall Action



10.1.1 What You Need to Know

DoS

Denials of Service (DoS) attacks are aimed at devices and networks with a connection to the Internet. Their goal is not to steal information, but to disable a device or network so users no

longer have access to network resources. The LTE Device is pre-configured to automatically detect and thwart all known DoS attacks.

Firewall

The LTE Device's firewall feature physically separates the LAN/WLAN and the WAN and acts as a secure gateway for all data passing between the networks.

It is designed to protect against Denial of Service (DoS) attacks when activated. The LTE Device's purpose is to allow a private Local Area Network (LAN) to be securely connected to the Internet. The LTE Device can be used to prevent theft, destruction and modification of data, as well as log events, which may be important to the security of your network.

The LTE Device is installed between the LAN/WLAN and a broadband modem connecting to the Internet. This allows it to act as a secure gateway for all data passing between the Internet and the LAN.

The LTE Device has one Ethernet WAN port and four Ethernet LAN ports, which are used to physically separate the network into two areas. The WAN (Wide Area Network) port attaches to the broadband (cable or DSL) modem to the Internet.

The LAN (Local Area Network) port attaches to a network of computers, which needs security from the outside world. These computers will have access to Internet services such as e-mail, FTP and the World Wide Web. However, "inbound access" is not allowed (by default) unless the remote host is authorized to use a specific service.

NOTE
Enabling the firewall may impact the system performance.

ICMP

Internet Control Message Protocol (ICMP) is a message control and error-reporting protocol between a host server and a gateway to the Internet. ICMP uses Internet Protocol (IP) datagrams, but the messages are processed by the TCP/IP software and directly apparent to the application user.

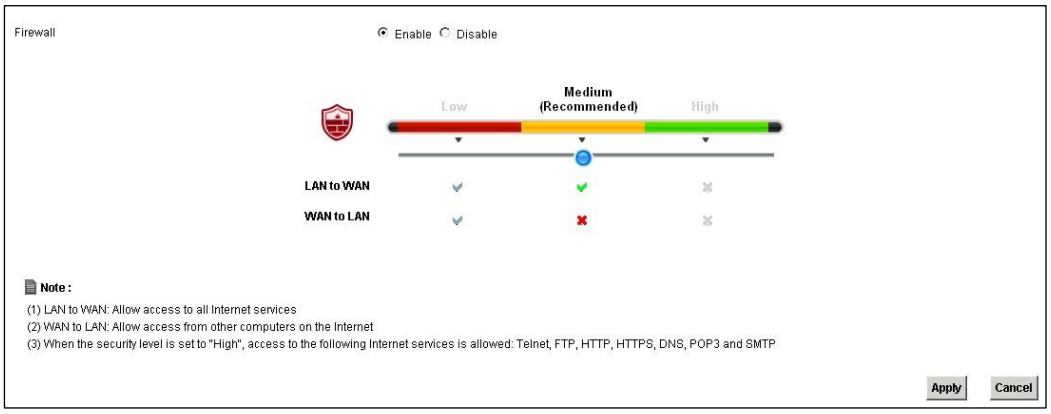
Finding Out More

See Section 11.6 for advanced technical information on firewall.

10.2 The General Screen

Use this screen to enable or disable the LTE Device's firewall. Click **Security > Firewall** to open the **General** screen.

Figure 10-2 Security > Firewall > General



The following table describes the labels in this screen.

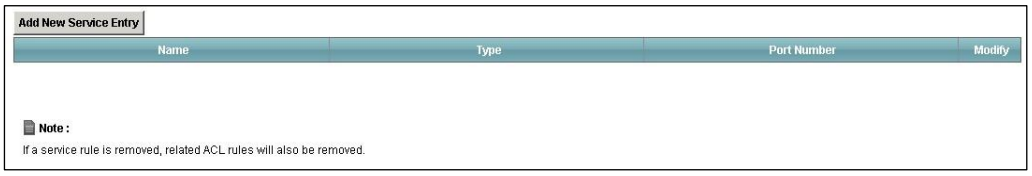
Table 10-1 Security > Firewall > General

LABEL	DESCRIPTION
Firewall	Select **Enable** to activate the firewall. The LTE Device performs access control and protects against Denial of Service (DoS) attacks when the firewall is activated.
Easy, Medium, High	Select **Easy** to have the firewall allow both LAN-to-WAN and WAN-to- LAN traffic to flow through the LTE Device. Select **Medium** to have the firewall only allow traffic sent from the LAN to the WAN. All traffic sent or access from the WAN will be blocked. Select **High** to have the firewall only allow Telnet, FTP, HTTP, HTTPS, DNS, POP3, and SMTP traffic sent from the LAN to the WAN. Other traffic will be blocked.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

10.3 The Services Screen

Use this screen to view the configured service list. To access this screen, click **Security > Firewall > Services**. You have to configure at least one service in this screen before configuring the **Security > Firewall > Access Control > Add New ACL Rule/Edit** screen.

Figure 10-3 Security > Firewall > Services



Each field is described in the following table.

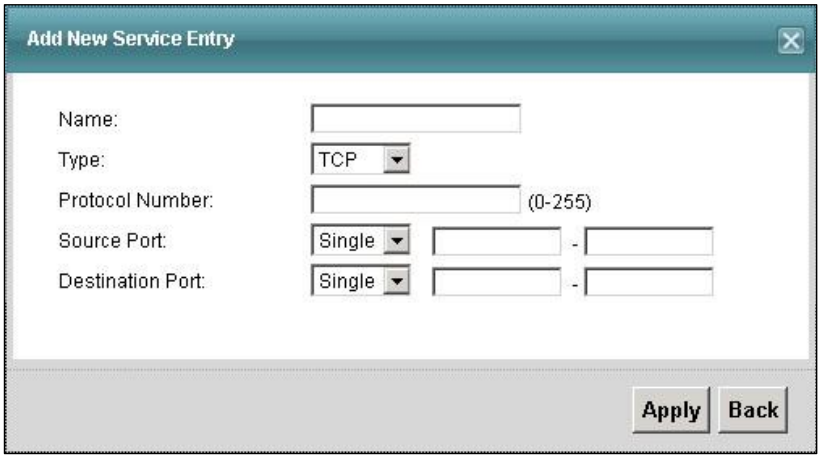
Table 10-2 Security > Firewall > Services

LABEL	DESCRIPTION
Add New Service Entry	Click this to define a new service.
Name	This is the name of a configured service.
Type	This is the protocol type (**TCP**, **UDP**, **ICMP or Others)** of the service.
Port Number	This displays a range of port numbers that defines the service.
Modify	Click the **Edit** icon to edit the service. Click the **Delete** icon to delete the service. Note that subsequent rules move up by one when you take this action. Deleting a service rule also deletes the related ACL rules which are configured in the **Security > Firewall > Access Control** screen.

10.3.1 The Add New Services Entry Screen

Use this screen to configure a service that you want to use in an ACL rule in the **Security > Firewall > Access Control > Add New ACL Rule/Edit** screen. To access this screen, click **Security > Firewall > Services** and then the **Add New Service Entry** button.

Figure 10-4 Security > Firewall > Services > Add New Service Entry



Each field is described in the following table.

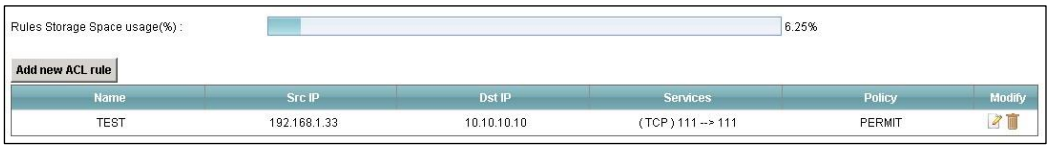
Table 10-3 Security > Firewall > Services > Add New Service Entry

LABEL	DESCRIPTION
Name	Type a descriptive name for the service.
Type	Select the protocol type (**TCP**, **UDP** or **ICMP or Others**) of the service.
Protocol Number	Enter the protocol number of the service type.
Source Port, Destination Port	The source port defines from which port number(s) the service traffic is sent. The destination port defines the port number(s) the destination hosts use to receive the service traffic. Select **Single** if the service uses one and only one source or destination port, then enter the port number. Select **Multiple** if the service uses two or more source or destination ports, then enter a port range. For example, suppose you want to define the Gnutella service. Select **TCP** type and enter a port range of **6345-6349**.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to exit this screen without saving your changes.

10.4 The Access Control Screen

Click **Security > Firewall > Access Control** to display the following screen. This screen displays a list of the configured incoming or outgoing filtering rules.

Figure 10-5 Security > Firewall > Access Control



Each field is described in the following table.

Table 10-4 Security > Firewall > Access Control

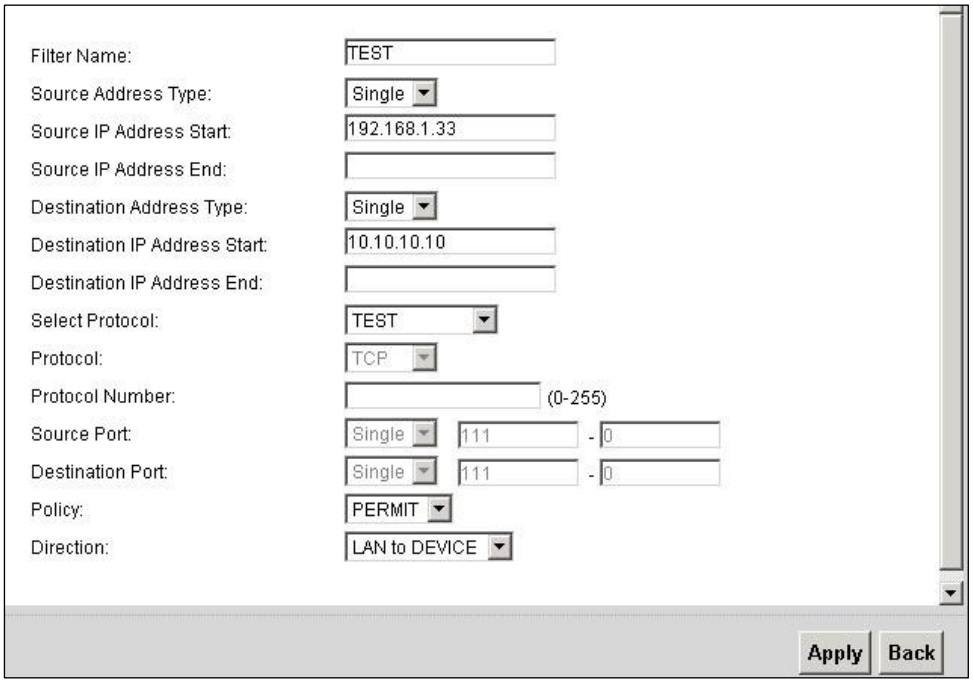
LABEL	DESCRIPTION
Rules Storage Space usage(%)	This bar shows the percentage of the LTE Device's space has been used. If the usage is almost full, you may need to remove an existing filter rule before you create a new one.
Add new ACL rule	Click this to go to add a filter rule for incoming or outgoing IP traffic.

LABEL	DESCRIPTION
Name	This displays the name of the rule.
Src IP	This displays the source IP addresses to which this rule applies. Please note that a blank source address is equivalent to **Any**.
Dst IP	This displays the destination IP addresses to which this rule applies. Please note that a blank destination address is equivalent to **Any**.
Services	This displays the protocol type and a port range that define the service to which this rule applies.
Policy	This field displays whether the rule silently discards packets (**DROP**), discards packets and sends a TCP reset packet or an ICMP destination-unreachable message to the sender (**REJECT**) or allows the passage of packets (**PERMIT**).
Modify	Click the **Edit** icon to edit the rule. Click the **Delete** icon to delete an existing rule. Note that subsequent rules move up by one when you take this action.

10.4.1 The Add New ACL Rule/Edit Screen

Click **Add New ACL Rule** or the **Edit** icon next to an existing ACL rule in the **Access Control** screen. The following screen displays.

Figure 11-6 Security > Firewall > Access Control > Add New ACL Rule/Edit



Each field is described in the following table.

Table 10-5 Security > Firewall > Access Control > Add New ACL Rule/Edit

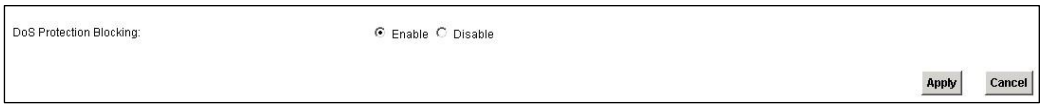
LABEL	DESCRIPTION
Filter Name	Enter a descriptive name of up to 16 alphanumeric characters, not including spaces, underscores, and dashes. You must enter the filter name to add an ACL rule. This field is read-only if you are editing the ACL rule.
Source Address Type	Select **Single** or **Range** depending on whether you want to enter a single or a range of source IP address(es) to which the ACL rule applies. Select **Any** to indicate any source IP address.
Source IP Address Start	Enter an IP address or the starting IP address of the source IP range.
Source IP Address End	Enter the ending IP address of the source IP range.
Destination Address Type	Select **Single** or **Range** depending on whether you want to enter a single or a range of destination IP address(es) to which the ACL rule applies. Select **Any** to indicate any destination IP address.
Destination IP Address Start	Enter an IP address or the starting IP address of the destination IP range.
Destination IP Address End	Enter the ending IP address of the destination IP range.
Select Protocol	Select the name of a configured service or **Select Service** to define a new service in this screen.
Protocol	This field is available when you **Select Service** in **Select Protocol**. Choose the protocol type (**TCP**, **UDP**, **ICMP** or **Others**) of the service.
Protocol Number	This field is available when you select **Others** in **Protocol**. Enter the protocol number of the service type to which this ACL rule applies.
Source Port	This field is displayed only when you **Select Service** in **Select Protocol** and **TCP** or **UDP** in **Protocol**. Select **Single** or **Range** and then enter a single port number or the range of port numbers of the source. Select **Any** to indicate any source port.
Destination Port	This field is displayed only when you **Select Service** in **Select** Protocol and TCP or UDP in Protocol. Select **Single** or **Range** and then enter a single port number or the range of port numbers of the destination. Select **Any** to indicate any destination port.
Policy	Use the drop-down list box to select whether to silently discard (**DROP**), deny and send an ICMP destination-unreachable message to the sender of (**REJECT**) or allow the passage of (**PERMIT**) packets that match this rule.
Direction	Use the drop-down list box to select the direction of traffic to which this rule applies. The possible options are **LAN to DEVICE**, **LAN to**

LABEL	DESCRIPTION
	WAN, **WAN to LAN**, and **WAN to DEVICE**.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to exit this screen without saving your changes.

10.5 The DoS Screen

Click **Security > Firewall > DoS** to display the following screen. Use this screen to enable or disable Denial of Service (DoS) protection.

Figure 10-6 Security > Firewall > DoS



Each field is described in the following table.

Table 10-6 Security > Firewall > DoS

LABEL	DESCRIPTION
DoS Protection Blocking	DoS (Denial of Service) attacks can flood your Internet connection with invalid packets and connection requests, using so much bandwidth and so many resources that Internet access becomes unavailable. Select **Enable** to enable protection against DoS attacks or **Disable** to disable it.
Apply	Click **Apply** to save the DoS Protection settings.
Cancel	Click **Cancel** to restore your previously saved settings.

10.6 Firewall Technical Reference

This section provides some technical background information about the topics covered in this chapter.

10.6.1 Guidelines For Enhancing Security With Your Firewall

Step 1 Change the default password via web configurator.

Step 2 Think about access control before you connect to the network in any way.

Step 3 Limit who can access your LTE Device.

Step 4 Don't enable any local service (such as Telnet or FTP) that you don't use. Any enabled service could present a potential security risk. A determined hacker might be able to find creative ways to misuse the enabled services to access the firewall or the network.

Step 5 For local services that are enabled, protect against misuse. Protect by configuring the services to communicate only with specific peers, and protect by configuring rules to block packets for the services at specific interfaces.

Step 6 Keep the firewall in a secured (locked) room.

----End

10.6.2 Security Considerations

NOTE

Incorrectly configuring the firewall may block valid access or introduce security risks to the LTE Device and your protected network. Use caution when creating or deleting firewall rules and test your rules after you configure them.

Consider these security ramifications before creating a rule:

Step 1 Does this rule stop LAN users from accessing critical resources on the Internet? For example, if IRC is blocked, are there users that require this service?

Step 2 Is it possible to modify the rule to be more specific? For example, if IRC is blocked for all users, will a rule that blocks just certain users be more effective?

Step 3 Does a rule that allows Internet users access to resources on the LAN create security vulnerability? For example, if FTP ports (TCP 20, 21) are allowed from the Internet to the LAN, Internet users may be able to connect to computers with running FTP servers.

Step 4 Does this rule conflict with any existing rules?

----End

Once these questions have been answered, adding rules is simply a matter of entering the information into the correct fields in the web configurator screens.

11 MAC Filter

11.1 Overview

This chapter discusses MAC address filtering.

You can configure the LTE Device to permit access to clients based on their MAC addresses in the **MAC Filter** screen. This applies to wired and wireless connections.

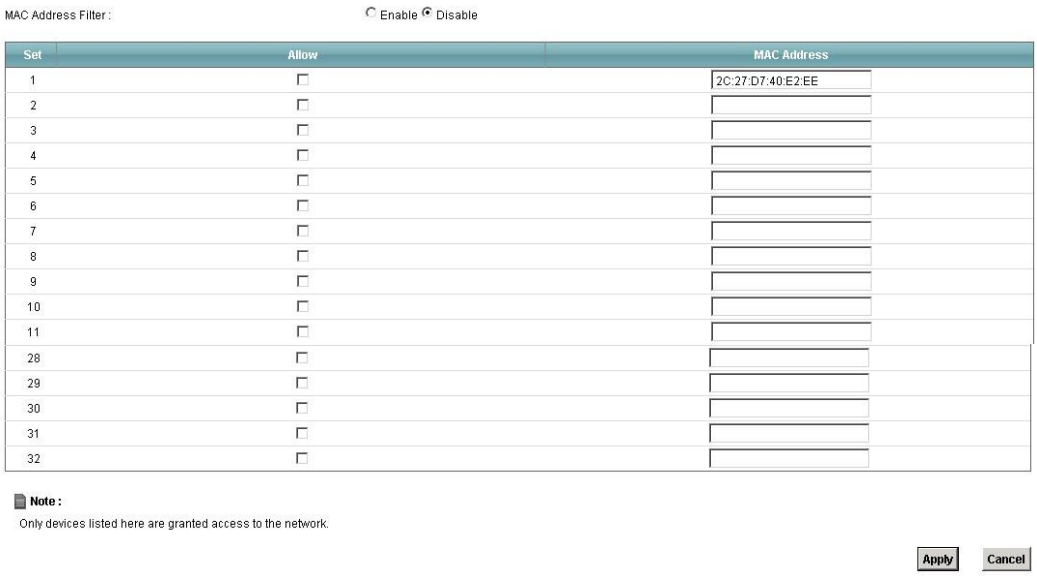
11.1.1 What You Need to Know

Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the devices to configure this screen.

11.2 The MAC Filter Screen

Use the **MAC Filter** screen to allow wireless and LAN client's access to the LTE Device. To change your LTE Device's MAC filter settings, click **Security** > **MAC Filter**. The screen appears as shown.

Figure 11-1 Security > MAC Filter



The following table describes the labels in this menu.

Table 11-1 Security > MAC Filter

LABEL	DESCRIPTION
MAC Address Filter	Select **Enable** to activate MAC address filtering.
Set	This is the index number of the MAC address.
Allow	Select **Allow, to** permit access to the LTE Device. MAC addresses not listed will be denied access to the LTE Device. If you clear this, the **MAC Address** field for this set clears.
MAC Address	Enter the MAC addresses of the wireless station and LAN devices that are allowed access to the LTE Device in these address fields. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

12 Parental Control

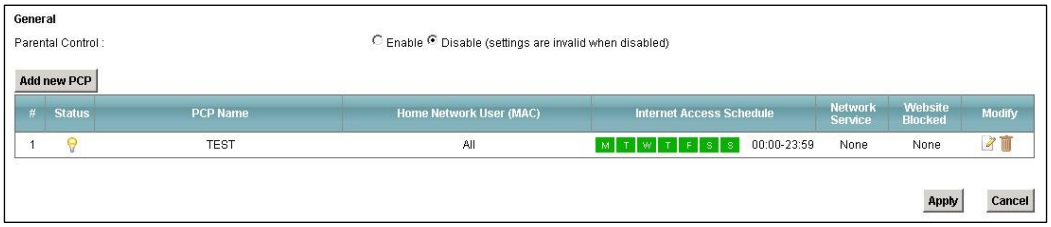
12.1 Overview

Parental control allows you to block web sites with the specific URL. You can also define time periods and days during which the LTE Device performs parental control on a specific user.

12.2 The Parental Control Screen

Use this screen to enable parental control, view the parental control rules and schedules. Click **Security > Parental Control** to open the following screen.

Figure 12-1 Security > Parental Control



The following table describes the fields in this screen.

Table 12-1 Parental Control > Parental Control

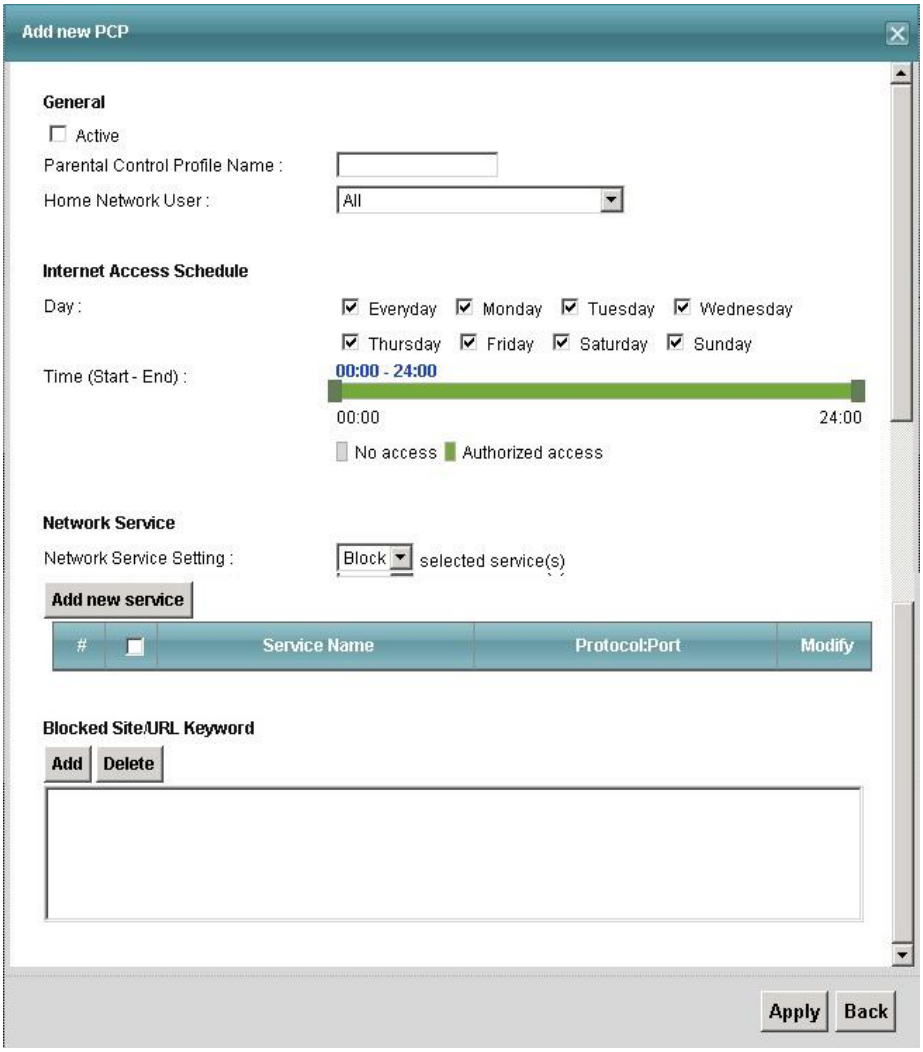
LABEL	DESCRIPTION
Parental Control	Select **Enable** to activate parental control.
Add new PCP	Click this if you want to configure a new parental control rule.
#	This shows the index number of the rule.
Status	This indicates whether the rule is active or not. A yellow bulb signifies that this rule is active. A gray bulb signifies that this rule is not active.

LABEL	DESCRIPTION
PCP Name	This shows the name of the rule.
Home Network User (MAC)	This shows the MAC address of the LAN user's computer to which this rule applies.
Internet Access Schedule	This shows the day(s) and time on which parental control is enabled.
Network Service	This shows whether the network service is configured. If not, **None** will be shown.
Website Block	This shows whether the website block is configured. If not, **None** will be shown.
Modify	Click the **Edit** icon to go to the screen where you can edit the rule. Click the **Delete** icon to delete an existing rule.
Add	Click **Add** to create a new schedule.
Apply	Click **Apply** to save your changes back to the LTE Device.

12.2.1 Add/Edit a Parental Control Rule

Click **Add new PCP** in the **Parental Control** screen to add a new rule or click the **Edit** icon next to an existing rule to edit it. Use this screen to configure a restricted access schedule and/ or URL filtering settings to block the users on your network from accessing certain web sites.

Figure 12-2 Add/Edit Parental Control Rule



The following table describes the fields in this screen.

Table 12-2 Add/Edit Parental Control Rule

LABEL	DESCRIPTION
General	
Active	Select the checkbox to activate this parental control rule.
Parental Control Profile Name	Enter a descriptive name for the rule.
Home Network User	Select the LAN user that you want to apply this rule to from the drop-down list box. If you select **Custom**, enter the LAN user's MAC address. If you select **All**, the rule applies to all LAN users.
Internet Access Schedule	
Day	Select check boxes for the days that you want the LTE Device to

LABEL	DESCRIPTION
	perform parental control.
Start Blocking Time End Blocking Time	Enter the time period of each day, in 24-hour format, during which parental control will be enforced.
Time	Drag the time bar to define the time that the LAN user is allowed access.
Network Service	
Network Service Setting	If you select **Block**, the LTE Device prohibits the users from viewing the Web sites with the URLs listed below. If you select **Access**, the LTE Device blocks access to all URLs except ones listed below.
Add new service	Click this to show a screen in which you can add a new service rule. You can configure the **Service Name**, **Protocol**, and **Port** of the new rule.
#	This shows the index number of the rule. Select the checkbox next to the rule to activate it.
Service Name	This shows the name of the rule.
Protocol:Port	This shows the protocol and the port of the rule.
Modify	Click the **Edit** icon to go to the screen where you can edit the rule. Click the **Delete** icon to delete an existing rule.
Blocked Site/URL Keyword	Click **Add** to show a screen to enter the URL of web site or URL keyword to which the LTE Device blocks access. Click **Delete** to remove it.
Apply	Click this button to save your settings back to the LTE Device.
Back	Click this button to return to the previous screen without saving any changes.

13 VoIP

CAUTION

VoIP is not supported

13.1 Overview

Use this chapter to:

- Connect an analog phone to the LTE Device.
- Make phone calls over the Internet, as well as the regular phone network.
- Configure settings such as speed dial.
- Configure network settings to optimize the voice quality of your phone calls.

13.1.1 What You Need to Know

The following terms and concepts may help as you read this chapter.

VoIP

VoIP stands for Voice over IP. IP is the Internet Protocol, which is the message-carrying standard the Internet runs on. So, Voice over IP is the sending of voice signals (speech) over the Internet (or another network that uses the Internet Protocol).

SIP

SIP stands for Session Initiation Protocol. SIP is a signaling standard that lets one network device (like a computer or the LTE Device) send messages to another. In VoIP, these messages are about phone calls over the network. For example, when you dial a number on your LTE

Device, it sends a SIP message over the network asking the other device (the number you dialed) to take part in the call.

SIP Accounts

A SIP account is a type of VoIP account. It is an arrangement with a service provider that lets you make phone calls over the Internet. When you set the LTE Device to use your SIP account to make calls, the LTE Device is able to send all the information about the phone call to your service provider on the Internet.

Strictly speaking, you don't need a SIP account. It is possible for one SIP device (like the LTE Device) to call another without involving a SIP service provider. However, the networking difficulties involved in doing this make it impractical under normal circumstances. Your SIP account provider removes these difficulties by taking care of the call routing and setup - figuring out how to get your call to the right place in a way that you and the other person can talk to one another.

Voice Activity Detection/Silence Suppression

Voice Activity Detection (VAD) detects whether or not speech is present. This lets the LTE Device reduce the bandwidth that a call uses by not transmitting "silent packets" when you are not speaking.

Comfort Noise Generation

When using VAD, the LTE Device generates comfort noise when the other party is not speaking. The comfort noise lets you know that the line is still connected as total silence could easily be mistaken for a lost connection.

Echo Cancellation

G.168 is an ITU-T standard for eliminating the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.

Use this screen to maintain basic information about each SIP account. You can also enable and disable each SIP account, configure the volume, echo cancellation and VAD (Voice Activity Detection) settings for each individual phone port on the LTE Device.

How to Find Out More

See Section 16.6 for advanced technical information on SIP.

13.1.2 Before You Begin

- Before you can use these screens, you need to have a VoIP account already set up. If you don't have one yet, you can sign up with a VoIP service provider over the Internet.
- You should have the information your VoIP service provider gave you ready, before you start to configure the LTE Device.

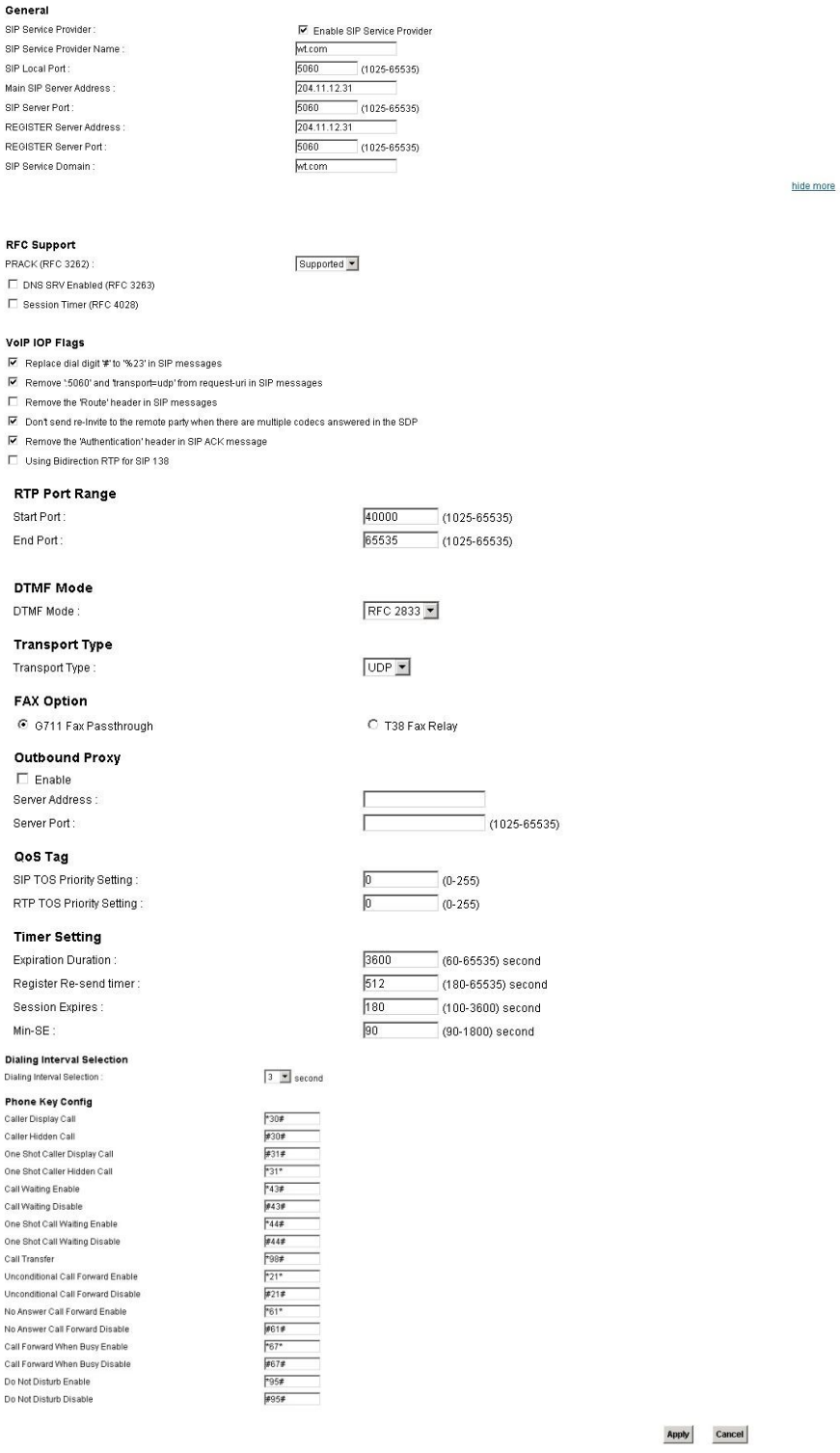
13.2 The SIP Service Provider Screen

Use this screen to configure the SIP server information, QoS for VoIP calls, the numbers for certain phone functions and dialing plan. Click **VoIP > SIP** to open the **SIP Service Provider** screen.

NOTE

Click **more...** to see all the fields in the screen. You don't necessarily need to use all these fields to set up your account. Click **hide more** to see and configure only the fields needed for this feature.

Figure 13-1 VoIP > SIP > SIP Service Provider



The following table describes the labels in this screen.

Table 13-1 VoIP > SIP > SIP Service Provider

LABEL	DESCRIPTION
SIP Service Provider Selection	
Service Provider Selection	Select the SIP service provider profile you want to use for the SIP account you configure in this screen. If you change this field, the screen automatically refreshes.
General	
SIP ServiceProvider	Select this if you want the LTE Device to use this SIP provider. Clear it if you do not want the LTE Device to use this SIP provider.
SIP Service Provider Name	Enter the name of your SIP service provider.
SIP Local Port	Enter the LTE Device's listening port number, if your VoIP service provider gave you one. Otherwise, keep the default value.
Main SIP Server Address	Enter the IP address or domain name of the SIP server provided by your VoIP service provider. You can use up to 95 printable ASCII characters. It does not matter whether the SIP server is a proxy, redirect or register server.
SIP Server Port	Enter the SIP server's listening port number, if your VoIP service provider gave you one. Otherwise, keep the default value.
REGISTER Server Address	Enter the IP address or domain name of the SIP register server, if your VoIP service provider gave you one. Otherwise, enter the same address you entered in the **SIP Server Address** field. You can use up to 95 printable ASCII characters.
REGISTER Server Port	Enter the SIP register server's listening port number, if your VoIP service provider gave you one. Otherwise, enter the same port number you entered in the **SIP Server Port** field.
SIP Service Domain	Enter the SIP service domain name. In the full SIP URI, this is the part after the @ symbol. You can use up to 127 printable ASCII Extended set characters.
VoIP IOP Flags - Select VoIP inter-operability settings.	
Replace dial digit '#' to '%23' in SIP messages	
Remove ':5060' and 'transport=udp' from request-uri in SIP messages	
Remove the 'Route' header in SIP messages	
Don't send re-Invite to the remote party when there are multiple codecs answered in the SDP	
Remove the 'Authorization' header in SIP ACK message	
Using Bidirection RTP for SIP 138	
RFC Support	
PRACK (RFC 3262)	RFC 3262 defines a mechanism to provide reliable transmission of SIP provisional response messages, which convey information on the processing progress of the request. This uses the option tag **100rel** and

LABEL	DESCRIPTION
	the Provisional Response ACKnowledgement (PRACK) method. Select **Supported** or **Required** to have the LTE Device include a SIP Require/Supported header field with the option tag 100rel in all INVITE requests. When the LTE Device receives a SIP response message indicating that the phone it called is ringing, the LTE Device sends a PRACK message to have both sides confirm the message is received. If you select **Supported**, the peer device supports the option tag 100rel to send provisional responses reliably. If you select **Required**, the peer device requires the option tag 100rel to send provisional responses reliably. Select **Disabled** to turn off this function.
DNS SRV Enabled (RFC 3263)	Select this option to have the LTE Device use DNS procedures to resolve the SIP domain and find the SIP server's IP address, port number and supported transport protocol(s). The LTE Device first uses DNS Name Authority Pointer (NAPTR) records to determine the transport protocols supported by the SIP server. It then performs DNS Service (SRV) query to determine the port number for the protocol. The LTE Device resolves the SIP server's IP address by a standard DNS address record lookup.
Session Timer (RFC 4028)	Select this to have the LTE Device support RFC 4028. This makes sure that SIP sessions do not hang and the SIP line can always be available for use.
RTP Port Range	
Start Port End Port	Enter the listening port number(s) for RTP traffic, if your VoIP service provider gave you this information. Otherwise, keep the default values. To enter one port number, enter the port number in the **Start Port** and **End Port** fields. To enter a range of ports, • Enter the port number at the beginning of the range in the **Start Port** field. • Enter the port number at the end of the range in the **End Port** field.
DTMF Mode	
DTMF Mode	Control how the LTE Device handles the tones that your telephone makes when you push its buttons. You should use the same mode your VoIP service provider uses. **RFC2833** - send the DTMF tones in RTP packets. **PCM** - send the DTMF tones in the voice data stream. This method works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729 and G.726) can distort the tones. **SIP INFO** - send the DTMF tones in SIP messages.
Transport Type	
Transport Type	Select the transport layer protocol **UDP** or **TCP** (usually UDP) used for

LABEL	DESCRIPTION
	SIP.
FAX Option	This field controls how the LTE Device handles fax messages.
G711 Fax Passthrough	Select this if the LTE Device should use G.711 to send fax messages. The peer devices must also use G.711.
T38 Fax Relay	Select this if the LTE Device should send fax messages as UDP or TCP/IP packets through IP networks. This provides better quality, but it may have inter-operability problems. The peer devices must also use T.38.
Outbound Proxy	
Enable	Select this if your VoIP service provider has a SIP outbound server to handle voice calls. This allows the LTE Device to work with any type of NAT router and eliminates the need for STUN.
Server Address	Enter the IP address or domain name of the SIP outbound proxy server.
Server Port	Enter the SIP outbound proxy server's listening port, if your VoIP service provider gave you one. Otherwise, keep the default value.
QoS Tag	
SIP TOS Priority Setting	Enter the DSCP (DiffServ Code Point) number for SIP message transmissions. The LTE Device creates Class of Service (CoS) priority tags with this number to SIP traffic that it transmits.
RTP TOS Priority Setting	Enter the DSCP (DiffServ Code Point) number for RTP voice transmissions. The LTE Device creates Class of Service (CoS) priority tags with this number to RTP traffic that it transmits.
Timer Setting	
Expiration Duration	Enter the number of seconds your SIP account is registered with the SIP register server before it is deleted. The LTE Device automatically tries to re-register your SIP account when one-half of this time has passed. (The SIP register server might have a different expiration.)
Register Re-send timer	Enter the number of seconds the LTE Device waits before it tries again to register the SIP account, if the first try failed or if there is no response.
Session Expires	Enter the number of seconds the LTE Device lets a SIP session remain idle (without traffic) before it automatically disconnects the session.
Min-SE	Enter the minimum number of seconds the LTE Device lets a SIP session remain idle (without traffic) before it automatically disconnects the session. When two SIP devices start a SIP session, they must agree on an expiration time for idle sessions. This field is the shortest expiration time that the LTE Device accepts.
Dialing Interval Selection	
Dialing Interval Selection	Enter the number of seconds the LTE Device should wait after you stop dialing numbers before it makes the phone call. The value depends on how quickly you dial phone numbers.

LABEL	DESCRIPTION
Phone Key Config Use this section to customize the phone keypad combinations you use to access certain features on the LTE Device.	
Caller Display Call	This code is used to display the caller ID for outgoing calls.
Caller Hidden Call	This code is used to hide the caller ID for outgoing calls.
One Shot Caller Display Call	This code is used to display the caller ID only for the phone call you are going to make.
One Shot Caller Hidden Call	This code is used to hide the caller ID only for the phone call you are going to make.
Call Waiting Enable	This code is used to turn the Call Waiting feature on. With call waiting, you hear a special beep notifying another incoming call while you are answering a call. It allows you to place the first incoming call on hold and answer the second call so that you won't miss any important calls.
Call Waiting Disable	This code is used to turn the Call Waiting feature off.
One Shot Call Waiting Enable	This code is used to enable call waiting only for the phone call you are going to make. See the description for the Call Waiting Enable field for more information.
One Shot Call Waiting Disable	This code is used to disable one shot call waiting.
Call Transfer	This code is used to enable call transfer that allows you to transfer an incoming call (that you have answered) to another phone.
Unconditional Call Forward Enable	This code is used to enable unconditional call forwarding. Incoming calls are always forwarded to a specified number without any condition.
Unconditional Call Forward Disable	This code is used to disable unconditional call forwarding.
No Answer Call Forward Enable	This code is used to enable call forwarding when there is no answer at a SIP number.
No Answer Call Forward Disable	This code is used to disable call forwarding when there is no answer at a SIP number.
Call Forward When Busy Enable	This code is used to enable call forwarding when the phone is busy.
Call Forward When Busy Disable	This code is used to disable call forwarding when the phone is busy.
Do Not Disturb	This code is used to turn the Do Not Disturb feature on. This has the LTE

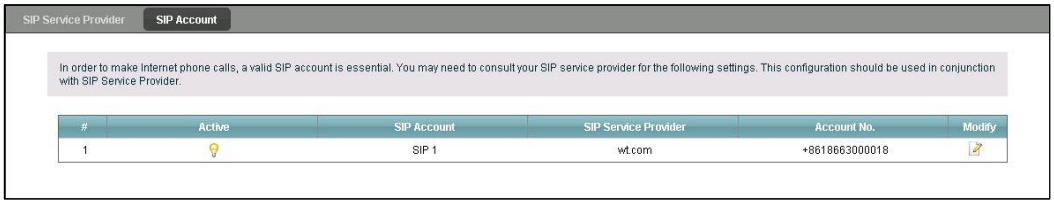
LABEL	DESCRIPTION
Enable	Device not forward calls to the phone line.
Do Not Disturb Disable	This code is used to turn the Do Not Disturb feature off.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

13.3 The SIP Account Screen

The LTE Device uses a SIP account to make outgoing VoIP calls and check if an incoming call's destination number matches your SIP account's SIP number. In order to make or receive a VoIP call, you need to enable and configure a SIP account, and map it to a phone port. The SIP account contains information that allows your LTE Device to connect to your VoIP service provider.

See Section 16.3 for how to map a SIP account to a phone port. To access the following screen, click **VoIP > SIP > SIP Account**.

Figure 13-2 VoIP > SIP > SIP Account



The following table describes the labels in this screen.

Table 13-2 VoIP > SIP > SIP Account

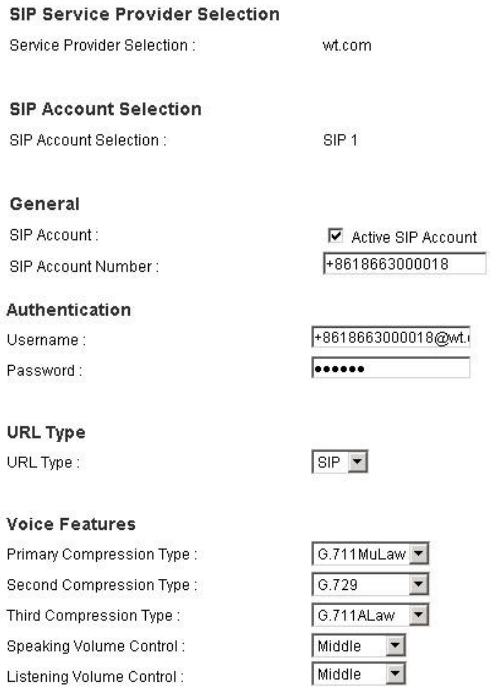
LABEL	DESCRIPTION
#	This is the index number of the entry.
Active	This shows whether the SIP account is activated or not. A yellow bulb signifies that this SIP account is activated. A gray bulb signifies that this SIP account is activated.
SIP Account	This shows the name of the SIP account.
SIP Service Provider	This shows the name of the SIP service provider.
Account No.	This shows the SIP number.
Modify	Click the **Edit** icon to configure the SIP account.

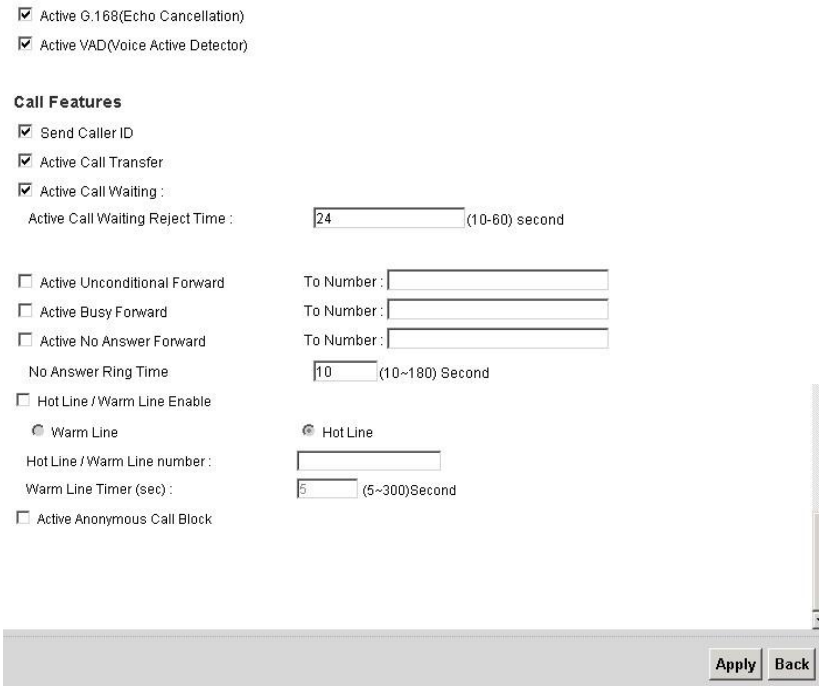
LABEL	DESCRIPTION
	Click the **Delete** icon to delete this SIP account from the LTE Device.

13.3.1 Edit SIP Account

You can configure the SIP account. To access this screen, click **Edit** icon next to an existing account.

Figure 13-3 SIP Account:Edit





Each field is described in the following table.

Each field is described in the following table.

Table 13-3 SIP Account: Edit

LABEL	DESCRIPTION
SIP Service Provider Selection	
Service Provider Selection	Select the SIP service provider profile you want to use for the SIP account you configure in this screen. This field is view-only if you are editing the SIP account.
SIP Account Selection	
SIP Account Selection	This shows the SIP account you are configuring.
General	
SIP Account	Select the **Active SIP Account** check box if you want to use this account. Clear it if you do not want to use this account.
SIP Account Number	Enter your SIP number. In the full SIP URI, this is the part before the @ symbol. You can use up to 127 printable ASCII characters.
Authentication	
Username	Enter the user name for registering this SIP account, exactly as it was given to you. You can use up to 95 printable ASCII characters.
Password	Enter the password for registering this SIP account, exactly as it was given to you. You can use up to 95 printable ASCII characters.

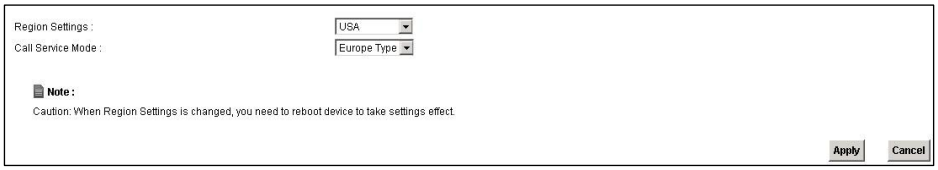
LABEL	DESCRIPTION
URL Type	
URL Type	Select whether or not to include the SIP service domain name when the LTE Device sends the SIP number. **SIP** - include the SIP service domain name. **TEL** - do not include the SIP service domain name.
Voice Features	
Primary Compression Type Secondary Compression Type Third Compression Type	Select the type of voice coder/decoder (codec) that you want the LTE Device to use. G.711 provides higher voice quality but requires more bandwidth (64 kbps). • **G.711MuLaw** is typically used in North America and Japan. • **G.711ALaw** is typically used in Europe. • **G.729** only requires 8 kbps. Select the LTE Device's first choice for voice coder/decoder. Select the LTE Device's second choice for voice coder/decoder. Select **None** if you only want the LTE Device to accept the first choice. Select the LTE Device's third choice for voice coder/decoder. Select **None** if you only want the LTE Device to accept the first or second choice.
Speaking Volume Control	Enter the loudness that the LTE Device uses for speech that it sends to the peer device. **Minimum** is the quietest, and **Maximum** is the loudest.
Listening Volume Control	Enter the loudness that the LTE Device uses for speech that it receives from the peer device. **Minimum** is the quietest, and **Maximum** is the loudest.
Active G.168 (Echo Cancellation)	Select this if you want to eliminate the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.
Active VAD (Voice Active Detector)	Select this if the LTE Device should stop transmitting when you are not speaking. This reduces the bandwidth the LTE Device uses.
Call Features	
Send Caller ID	Select this if you want to send identification when you make VoIP phone calls. Clear this if you do not want to send identification.
Active Call Transfer	Select this to enable call transfer on the LTE Device. This allows you to transfer an incoming call (that you have answered) to another phone.
Active Call Waiting	Select this to enable call waiting on the LTE Device. This allows you to place a call on hold while you answer another incoming call on the same telephone (directory) number.
Active Call Waiting Reject Time	Specify a time of seconds that the LTE Device waits before rejecting the second call if you do not answer it.
Active	Select this if you want the LTE Device to forward all incoming calls to the

LABEL	DESCRIPTION
Unconditional Forward	specified phone number. Specify the phone number in the **To Number** field on the right.
Active Busy Forward	Select this if you want the LTE Device to forward incoming calls to the specified phone number if the phone port is busy. Specify the phone number in the **To Number** field on the right. If you have call waiting, the incoming call is forwarded to the specified phone number if you reject or ignore the second incoming call.
Active No Answer Forward	Select this if you want the LTE Device to forward incoming calls to the specified phone number if the call is unanswered. (See **No Answer Time**.) Specify the phone number in the **To Number** field on the right.
No Answer Ring Time	This field is used by the **Active No Answer Forward** feature. Enter the number of seconds the LTE Device should wait for you to answer an incoming call before it considers the call is unanswered.
Hot Line/ Warm Line Enable	Enable **Warm Line** or **Hot Line** feature on the LTE Device. A hot line or warm line number is a phone number.
Hot Line/ Warm Line number	Enter the number to be dialed once the phone is off the hook immediately (Hot Line) or after the time the phone remains off the hook has surpassed the delay period (Warm Line).
Warm Line Timer (sec)	Enter the duration the phone can remain off the hook before automatically dialing the warm line number. You can set the delay from 1 to 15 seconds.
Active Anonymous Call Block	Select this if you do not want the phone to ring when someone tries to call you with caller ID deactivated.
Apply	Click **Apply** to save your changes.
Back	Click **Back** to return to the previous screen without saving.

13.4 The Phone Region Screen

Use this screen to maintain settings that depend on which region of the world the LTE Device is in. To access this screen, click **VoIP > Phone > Region**.

Figure 13-4 VoIP> Phone > Region



Each field is described in the following table.

Table 13-4 VoIP > Phone > Region

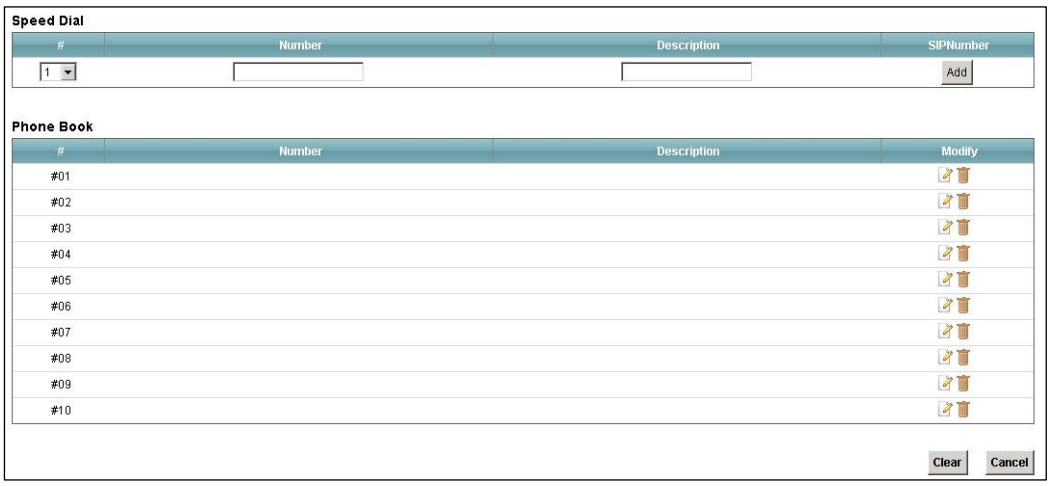
LABEL	DESCRIPTION
Region Settings	Select the place in which the LTE Device is located.
Call Service Mode	Select the mode for supplementary phone services (call hold, call waiting, call transfer and three-way conference calls) that your VoIP service provider supports. • **Europe Type** - use supplementary phone services in European mode. • **USA Type** - use supplementary phone services American mode. You might have to subscribe to these services to use them. Contact your VoIP service provider.
Apply	Click this to save your changes and to apply them to the LTE Device.
Cancel	Click this to set every field in this screen to its last-saved value.

13.5 The Call Rule Screen

Use this screen to add, edit, or remove speed-dial numbers for outgoing calls. Speed dial provides shortcuts for dialing frequently-used (VoIP) phone numbers. You also have to create speed-dial entries if you want to call SIP numbers that contain letters. Once you have configured a speed dial rule, you can use a shortcut (the speed dial number, #01 for example) on your phone's keypad to call the phone number.

To access this screen, click **VoIP > Call Rule**.

Figure 13-5 VoIP > Call Rule



Each field is described in the following table.

Table 13-5 VoIP > Call Rule

LABEL	DESCRIPTION
Speed Dial	Use this section to create or edit speed-dial entries.
#	Select the speed-dial number you want to use for this phone number.
Number	Enter the SIP number you want the LTE Device to call when you dial the speed-dial number.
Description	Enter a short description to identify the party you call when you dial the speed- dial number. You can use up to 127 printable ASCII characters.
Add	Click this to use the information in the **Speed Dial** section to update the **Speed** Dial Phone Book section.
Phone Book	Use this section to look at all the speed-dial entries and to erase them.
#	This field displays the speed-dial number you should dial to use this entry.
Number	This field displays the SIP number the LTE Device calls when you dial the speed-dial number.
Description	This field displays a short description of the party you call when you dial the speed-dial number.
Modify	Use this field to edit or erase the speed-dial entry. Click the **Edit** icon to copy the information for this speed-dial entry into the **Speed Dial** section, where you can change it. Click **Add** when you finish editing to change the configurations. Click the **Delete** icon to erase this speed-dial entry.
Clear	Click this to erase all the speed-dial entries.
Cancel	Click this to set every field in this screen to its last-saved value.

13.6 Technical Reference

This section contains background material relevant to the **VoIP** screens.

13.6.1 VoIP

VoIP is the sending of voice signals over Internet Protocol. This allows you to make phone calls and send faxes over the Internet at a fraction of the cost of using the traditional circuit- switched telephone network. You can also use servers to run telephone service applications like PBX services and voice mail. Internet Telephony Service Provider (ITSP) companies provide VoIP service.

Circuit-switched telephone networks require 64 kilobits per second (Kbps) in each direction to handle a telephone call. VoIP can use advanced voice coding techniques with compression to reduce the required bandwidth.

13.6.2 SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering and tearing down of voice and multimedia sessions over the Internet.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

SIP Identities

A SIP account uses an identity (sometimes referred to as a SIP address). A complete SIP identity is called a SIP URI (Uniform Resource Identifier). A SIP account's URI identifies the SIP account in a way similar to the way an e-mail address identifies an e-mail account. The format of a SIP identity is SIP-Number@SIP-Service-Domain.

SIP Number

The SIP number is the part of the SIP URI that comes before the "@" symbol. A SIP number can use letters like in an e-mail address (johndoe@your-ITSP.com for example) or numbers like a telephone number (1122334455@VoIP-provider.com for example).

SIP Service Domain

The SIP service domain of the VoIP service provider is the domain name in a SIP URI. For example, if the SIP address is 1122334455@VoIP-provider.com, then "VoIP-provider.com" is the SIP service domain.

SIP Registration

Each LTE Device is an individual SIP User Agent (UA). To provide voice service, it has a public IP address for SIP and RTP protocols to communicate with other servers.

A SIP user agent has to register with the SIP registrar and must provide information about the users it represents, as well as its current IP address (for the routing of incoming SIP requests). After successful registration, the SIP server knows that the users (identified by their dedicated SIP URIs) are represented by the UA, and knows the IP address to which the SIP requests and responses should be sent.

Registration is initiated by the User Agent Client (UAC) running in the VoIP gateway (the LTE Device). The gateway must be configured with information letting it know where to send the REGISTER message, as well as the relevant user and authorization data.

A SIP registration has a limited lifespan. The User Agent Client must renew its registration within this lifespan. If it does not do so, the registration data will be deleted from the SIP registrar's database and the connection broken.

The LTE Device attempts to register all enabled subscriber ports when it is switched on. When you enable a subscriber port that was previously disabled, the LTE Device attempts to register the port immediately.

Authorization Requirements

SIP registrations (and subsequent SIP requests) require a username and password for authorization. These credentials are validated via a challenge / response system using the HTTP digest mechanism (as detailed in RFC3261, "SIP: Session Initiation Protocol").

SIP Servers

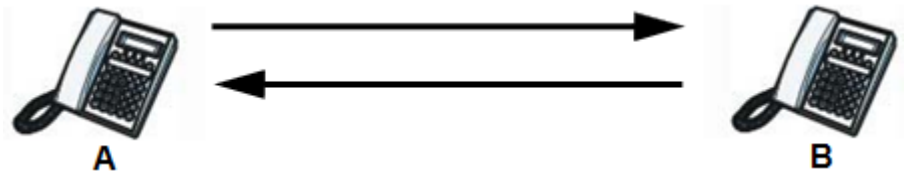
SIP is a client-server protocol. A SIP client is an application program or device that sends SIP requests. A SIP server responds to the SIP requests.

When you use SIP to make a VoIP call, it originates at a client and terminates at a server. A SIP client could be a computer or a SIP phone. One device can act as both a SIP client and a SIP server.

SIP User Agent

A SIP user agent can make and receive VoIP telephone calls. This means that SIP can be used for peer-to-peer communications even though it is a client-server protocol. In the following figure, either **A** or **B** can act as a SIP user agent client to initiate a call. **A** and **B** can also both act as a SIP user agent to receive the call.

Figure 13-6 SIP User Agent



SIP Proxy Server

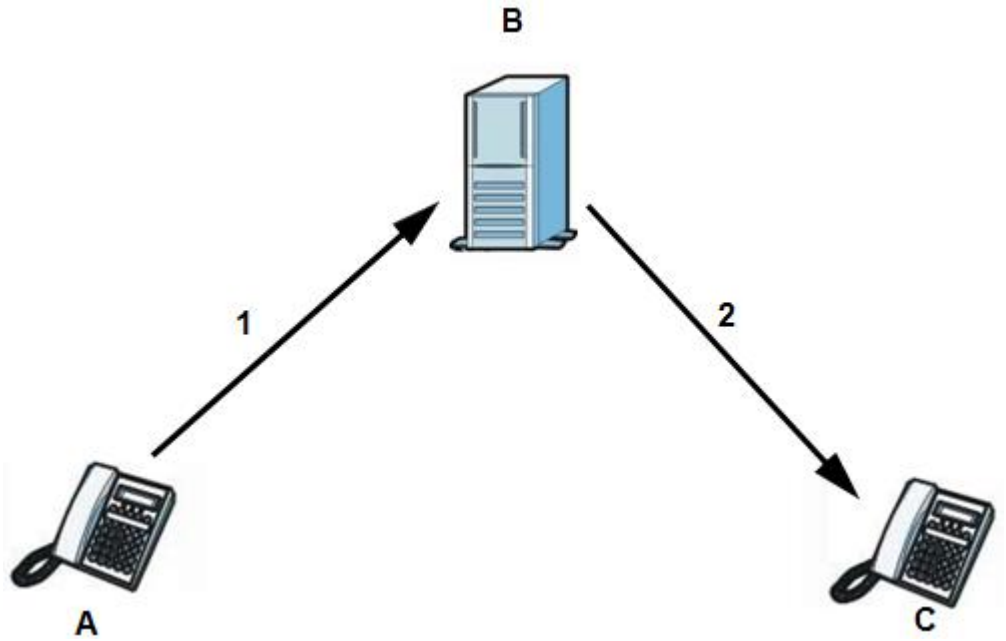
A SIP proxy server receives requests from clients and forwards them to another server.

In the following example, you want to use client device **A** to call someone who is using client device **C**.

Step 1 The client device (**A** in the figure) sends a call invitation to the SIP proxy server **B**.

Step 2 The SIP proxy server forwards the call invitation to **C**.

Figure 13-7 SIP Proxy Server



----End

SIP Redirect Server

A SIP redirect server accepts SIP requests, translates the destination address to an IP address and sends the translated IP address back to the device that sent the request. Then the client device that originally sent the request can send requests to the IP address that it received back from the redirect server. Redirect servers do not initiate SIP requests.

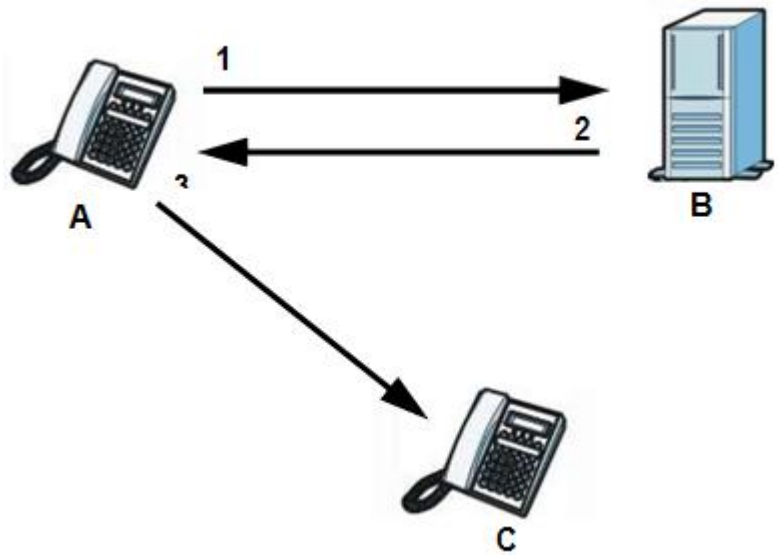
In the following example, you want to use client device **A** to call someone who is using client device **C**.

Step 1 Client device **A** sends a call invitation for **C** to the SIP redirect server **B**.

Step 2 The SIP redirect server sends the invitation back to **A** with **C**'s IP address (or domain name).

Step 3 Client device **A** then sends the call invitation to client device **C**.

Figure 13-8 SIP Redirect Server



----End

SIP Register Server

A SIP register server maintains a database of SIP identity-to-IP address (or domain name) mapping. The register server checks your user name and password when you register.

RTP

When you make a VoIP call using SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 3550 for details on RTP.

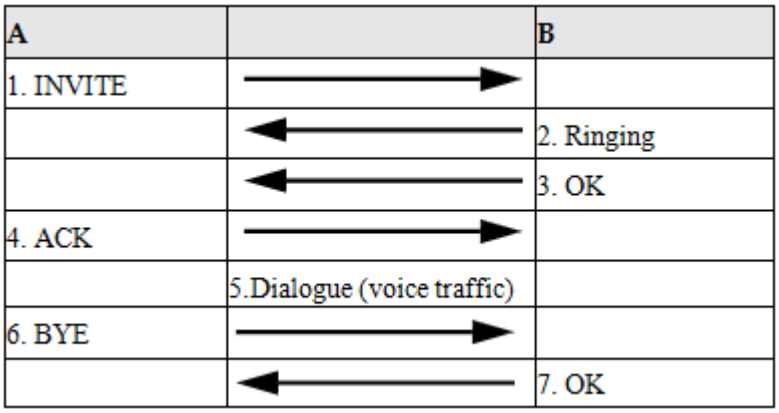
Pulse Code Modulation

Pulse Code Modulation (PCM) measures analog signal amplitudes at regular time intervals and converts them into bits.

SIP Call Progression

The following figures displays the basic steps in the setup and tear down of a SIP call. A calls B.

Figure 13-9 SIP Call Progression



Step 1 A sends a SIP INVITE request to B. This message is an invitation for B to participate in a SIP telephone call.

Step 2 B sends a response indicating that the telephone is ringing.

Step 3 B sends an OK response after the call is answered.

Step 4 A then sends an ACK message to acknowledge that B has answered the call.

Step 5 Now A and B exchange voice media (talk).

Step 6 After talking, A hangs up and sends a BYE request.

Step 7 B replies with an OK response confirming receipt of the BYE request and the call is terminated.

----End

Voice Coding

A codec (coder/decoder) codes analog voice signals into digital signals and decodes the digital signals back into analog voice signals. The LTE Device supports the following codecs.

- G.711 is a Pulse Code Modulation (PCM) waveform codec. PCM measures analog signal amplitudes at regular time intervals and converts them into digital samples. G.711 provides very good sound quality but requires 64 kbps of bandwidth.
- G.726 is an Adaptive Differential PCM (ADPCM) waveform codec that uses a lower bitrate than standard PCM conversion. ADPCM converts analog audio into digital signals based on the difference between each audio sample and a prediction based on previous samples. The more similar the audio sample is to the prediction, the less space needed to describe it. G.726 operates at 16, 24, 32 or 40 kbps.
- G.729 is an Analysis-by-Synthesis (AbS) hybrid waveform codec that uses a filter based on information about how the human vocal tract produces sounds. G.729 provides good sound quality and reduces the required bandwidth to 8 kbps.

MWI (Message Waiting Indication)

Enable Message Waiting Indication (MWI) enables your phone to give you a message– waiting (beeping) dial tone when you have a voice message(s). Your VoIP service provider must have a messaging system that sends message waiting status SIP packets as defined in RFC 3842.

13.6.3 Quality of Service (QoS)

Quality of Service (QoS) refers to both a network's ability to deliver data with minimum delay, and the networking methods used to provide bandwidth for real-time multimedia applications.

Type of Service (ToS)

Network traffic can be classified by setting the ToS (Type of Service) values at the data source (for example, at the LTE Device) so a server can decide the best method of delivery, that is the least cost, fastest route and so on.

DiffServ

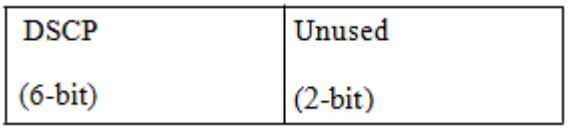
DiffServ is a class of service (CoS) model that marks packets so that they receive specific per-hop treatment at DiffServ-compliant network devices along the route based on the application types and traffic flow. Packets are marked with DiffServ Code Points (DSCP) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.3

DSCP and Per-Hop Behavior

DiffServ defines a new DS (Differentiated Services) field to replace the Type of Service (TOS) field in the IP header. The DS field contains a 2-bit unused field and a 6-bit DSCP field which can define up to 64 service levels. The following figure illustrates the DS field.

DSCP is backward compatible with the three precedence bits in the ToS octet so that non-DiffServ compliant, ToS-enabled network device will not conflict with the DSCP mapping.

Figure 13-10 DiffServ: Differentiated Service Field



The LTE Device does not support DiffServ at the time of writing.

The DSCP value determines the forwarding behavior, the PHB (Per-Hop Behavior), that each packet gets across the DiffServ network. Based on the marking rule, different kinds of traffic can be marked for different priorities of forwarding. Resources can then be allocated according to the DSCP values and the configured policies.

13.6.4 Phone Services Overview

Supplementary services such as call hold, call waiting, and call transfer. are generally available from your VoIP service provider. The LTE Device supports the following services:

- Call Hold
- Call Waiting
- Making a Second Call

- Call Transfer
- Three-Way Conference
- Do not Disturb

NOTE

To take full advantage of the supplementary phone services available through the LTE Device's phone ports, you may need to subscribe to the services from your VoIP service provider.

The Flash Key

Flashing means to press the hook for a short period of time (a few hundred milliseconds) before releasing it. On newer telephones, there should be a "flash" key (button) that generates the signal electronically. If the flash key is not available, you can tap (press and immediately release) the hook by hand to achieve the same effect. However, using the flash key is preferred since the timing is much more precise. With manual tapping, if the duration is too long, it may be interpreted as hanging up by the LTE Device.

You can invoke all the supplementary services by using the flash key.

Europe Type Supplementary Phone Services

This section describes how to use supplementary phone services with the **Europe Type Call Service Mode**. Commands for supplementary services are listed in the table below.

After pressing the flash key, if you do not issue the sub-command before the default sub-command time-out (2 seconds) expires or issue an invalid sub-command, the current operation will be aborted.

Table 13-6 European Flash Key Commands

COMMAND	SUB- COMMAND	DESCRIPTION
Flash	NA	Put a current call on hold to place a second call. Switch back to the call (if there is no second call).
Flash	0	Drop the call presently on hold or reject an incoming call which is waiting for answer.
Flash	1	Disconnect the current phone connection and answer the incoming call or resume with caller presently on hold.
Flash	2	1. Switch back and forth between two calls. 2. Put a current call on hold to answer an incoming call. 3. Separate the current three-way conference call into two individual calls (one is on-line, the other is on hold).
Flash	3	Create three-way conference connection.
Flash	*98#	Transfer the call to another phone.

European Call Hold

Call hold allows you to put a call (**A**) on hold by pressing the flash key.

If you have another call, press the flash key and then "2" to switch back and forth between caller **A** and **B** by putting either one on hold.

Press the flash key and then "0" to disconnect the call presently on hold and keep the current call on line.

Press the flash key and then "1" to disconnect the current call and resume the call on hold. If you hang up the phone but a caller is still on hold, there will be a remind ring.

European Call Waiting

This allows you to place a call on hold while you answer another incoming call on the same telephone (directory) number.

If there is a second call to a telephone number, you will hear a call waiting tone. Take one of the following actions.

- Reject the second call.

Press the flash key and then press "0".

- Disconnect the first call and answer the second call.

Either press the flash key and press "1", or just hang up the phone and then answer the phone after it rings.

- Put the first call on hold and answer the second call.

Press the flash key and then "2".

European Call Transfer

Do the following to transfer a call (that you have answered) to another phone number.

Step 1 Press the flash key to put the caller on hold.

Step 2 When you hear the dial tone, dial "*98#" followed by the number to which you want to transfer the call. to operate the Intercom.

Step 3 After you hear the ring signal or the second party answers it, hang up the phone.

----End

European Three-Way Conference

Use the following steps to make three-way conference calls.

Step 1 When you are on the phone talking to someone, press the flash key to put the call on hold and get a dial tone.

Step 2 Dial a phone number directly to make another call.

Step 3 When the second call is answered, press the flash key and press "3" to create a three-way conversation.

Step 4 Hang up the phone to drop the connection.

Step 5 If you want to separate the activated three-way conference into two individual connections (one is on-line, the other is on hold), press the flash key and press "2".

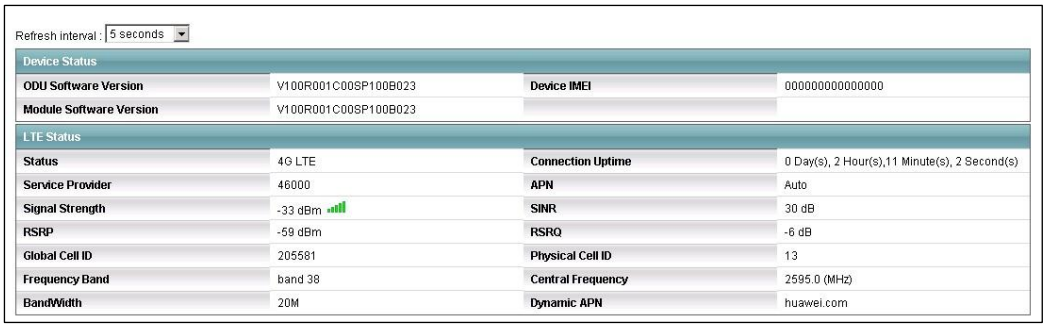
----End

14 LTE Status

14.1 Overview

Use the **LTE Status** screens to look at LTE related signaling status.

Figure 14-1 System Monitor> LTE Status



15 Logs

15.1 Overview

The web configurator allows you to choose which categories of events and/or alerts to have the LTE Device log and then display the logs or have the LTE Device send them to an administrator (as e-mail) or to a syslog server.

15.1.1 What You Need To Know

The following terms and concepts may help as you read this chapter.

Alerts and Logs

An alert is a type of log that warrants more serious attention. They include system errors, attacks (access control) and attempted access to blocked web sites. Some categories such as **System Errors** consist of both logs and alerts. You may differentiate them by their color in the **View Log** screen. Alerts display in red and logs display in black.

Syslog Overview

The syslog protocol allows devices to send event notification messages across an IP network to syslog servers that collect the event messages. A syslog-enabled device can generate a syslog message and send it to a syslog server.

Syslog is defined in RFC 3164. The RFC defines the packet format, content and system log related information of syslog messages. Each syslog message has a facility and severity level. The syslog facility identifies a file in the syslog server. Refer to the documentation of your syslog program for details. The following table describes the syslog severity levels.

Table 15-1 Syslog Severity Levels

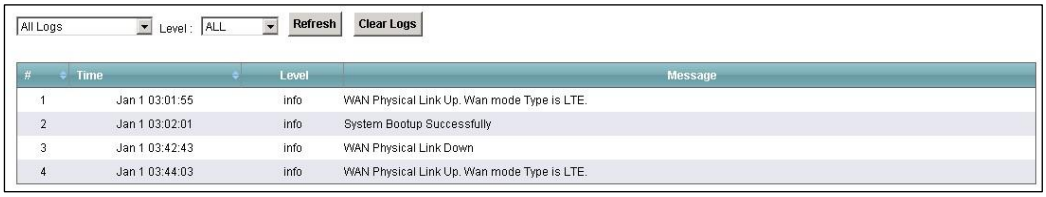
CODE	SEVERITY
0	Emergency (EMERG): The system is unusable.
1	Alert (ALERT): Action must be taken immediately.
2	Critical (CRIT): The system condition is critical.
3	Error (ERROR): There is an error condition on the system.

CODE	SEVERITY
4	Warning (WARNING): There is a warning condition on the system.
5	Notice (NOTICE): There is a normal but significant condition on the system.
6	Informational (INFO): The syslog contains an informational message.
7	Debug (DEBUG): The message is intended for debug-level purposes.

15.2 The System Log Screen

Click **System Monitor > Log** to open the **System Log** screen. Use the **System Log** screen to see the system logs for the categories that you select in the upper left drop-down list box.

Figure 15-1 System Monitor > Log > System Log



The following table describes the fields in this screen.

Table 15-2 System Monitor > Log > System Log

LABEL	DESCRIPTION
Select the type of the logs that you want to search in the first drop-down list box.	
Level	Select a severity level from this drop-down list box. This filters search results according to the severity level you have selected. When you select a severity, the LTE Device searches through all logs of that severity or higher. See Table 18-1 for more information about severity levels.
Refresh	Click this to renew the log screen.
Clear Logs	Click this to delete all the logs.
#	This field is a sequential value and is not associated with a specific entry.
Time	This field displays the date and time the log was recorded.
Level	This field displays the severity level of the logs that the device is to send to this syslog server.
Message	This field states the reason for the log.

15.3 The Phone Log Screen

Click **System Monitor > Log** to open the **Phone Log** screen. Use this screen to view phone logs and alert messages. You can select the type of log and level of severity to display.

Figure 15-2 System Monitor > Log > Phone Log

The following table describes the fields in this screen.

Table 15-3 System Monitor > Log > Phone Log

LABEL	DESCRIPTION
	Select a category of logs to view from the drop-down list box. Select **All Logs** to view all logs.
Level	Select the severity level that you want to view.
Refresh	Click this to renew the log screen.
Clear Logs	Click this to delete all the logs.
#	This field is a sequential value and is not associated with a specific entry.
Time	This field displays the time the log was recorded.
Level	This field displays the severity level of the logs that the device is to send to this syslog server.
Message	This field states the reason for the log.

15.4 The VoIP Call History Screen

Click **System Monitor > Log > VoIP Call History** to open the **VoIP Call History** screen. Use this screen to see the details of the calls performed on the LTE Device.

Figure 15-3 System Monitor > Log > VoIP Call History

The following table describes the fields in this screen.

Table 15-4 System Monitor > Log > VoIP Call History

LABEL	DESCRIPTION
	Select a category of call records to view from the drop-down list box. Select **All Call History** to view all call records.
Refresh	Click this to renew the log screen.
Clear Logs	Click this to delete all the logs.
#	This field is a sequential value and is not associated with a specific entry.
Time	This field displays the time the call was recorded.
Local Number	This field displays the phone number you used to make or receive this call.
Peer Number	This field displays the phone number you called or from which this call is made.
Interface	This field displays the type of the call.
Duration	This field displays how long the call lasted.

16 Traffic Status

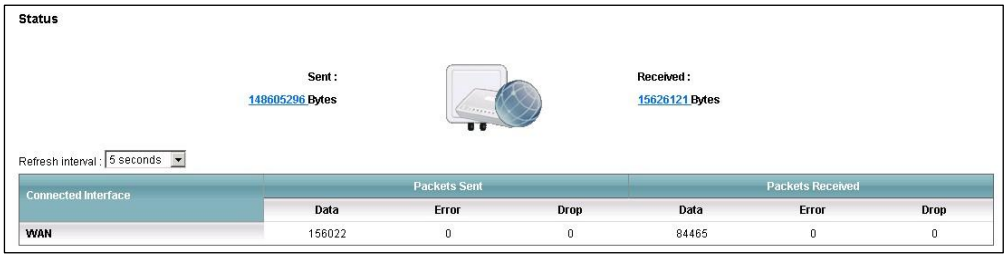
16.1 Overview

Use the **Traffic Status** screens to look at network traffic status and statistics of the WAN, LAN interfaces and NAT.

16.2 The WAN Status Screen

Click **System Monitor > Traffic Status** to open the **WAN** screen. You can view the WAN traffic statistics in this screen.

Figure 16-1 System Monitor > Traffic Status > WAN



The following table describes the fields in this screen.

Table 16-1 System Monitor > Traffic Status > WAN

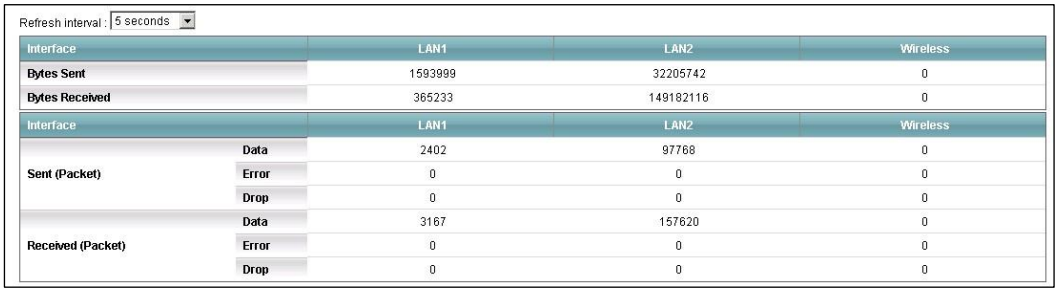
LABEL	DESCRIPTION
Status	This shows the number of bytes received and sent through the WAN interface of the LTE Device.
Refresh Interval	Select how often you want the LTE Device to update this screen from the drop-down list box.
Connected Interface	This shows the name of the WAN interface that is currently connected.
Packets Sent	

LABEL	DESCRIPTION
Data	This indicates the number of transmitted packets on this interface.
Error	This indicates the number of frames with errors transmitted on this interface.
Drop	This indicates the number of outgoing packets dropped on this interface.
Packets Received	
Data	This indicates the number of received packets on this interface.
Error	This indicates the number of frames with errors received on this interface.
Drop	This indicates the number of received packets dropped on this interface.

16.3 The LAN Status Screen

Click **System Monitor > Traffic Status > LAN** to open the following screen. You can view the LAN traffic statistics in this screen.

Figure 16-2 System Monitor > Traffic Status > LAN



The following table describes the fields in this screen.

Table 16-2 System Monitor > Traffic Status > LAN

LABEL	DESCRIPTION
Refresh interval	Select how often you want the LTE Device to update this screen from the drop-down list box.
Interface	This shows the LAN or WLAN interface.
Bytes Sent	This indicates the number of bytes transmitted on this interface.
Bytes Received	This indicates the number of bytes received on this interface.
Interface	This shows the LAN or WLAN interface.
Sent (Packet)	

LABEL	DESCRIPTION
Data	This indicates the number of transmitted packets on this interface.
Error	This indicates the number of frames with errors transmitted on this interface.
Drop	This indicates the number of outgoing packets dropped on this interface.
Received (Packet)	
Data	This indicates the number of received packets on this interface.
Error	This indicates the number of frames with errors received on this interface.
Drop	This indicates the number of received packets dropped on this interface.

16.4 The NAT Status Screen

Click **System Monitor > Traffic Status > NAT** to open the following screen. You can view the NAT status of the LTE Device's client(s) in this screen.

Figure 16-3 System Monitor > Traffic Status > NAT

The following table describes the fields in this screen.

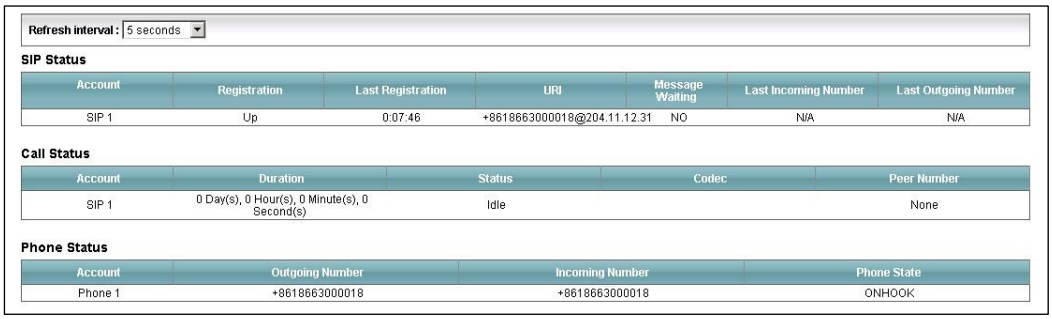
Table 16-3 System Monitor > Traffic Status > NAT

LABEL	DESCRIPTION
Refresh Interval	Select how often you want the LTE Device to update this screen from the drop-down list box.
Device Name	This shows the name of the client.
IP Address	This shows the IP address of the client.
MAC Address	This shows the MAC address of the client.
No. of Open Session	This shows the number of NAT sessions used by the client.

16.5 The VoIP Status Screen

Click **System Monitor > VoIP Status** to open the following screen. You can view the VoIP traffic statistics in this screen.

Figure 16-4 System Monitor > VoIP Status



The following table describes the fields in this screen.

Table 16-4 System Monitor > VoIP Status

LABEL	DESCRIPTION
Refresh interval	Select how often you want the LTE Device to update this screen from the drop-down list box.
SIP Status	
Account	This column displays each SIP account in the LTE Device.
Registration	This field displays the current registration status of the SIP account. You can change this in the **Status** screen. **Registered** - The SIP account is registered with a SIP server. **Not Registered** - The last time the LTE Device tried to register the SIP account with the SIP server, the attempt failed. The LTE Device automatically tries to register the SIP account when you turn on the LTE Device or when you activate it. **Inactive** - The SIP account is not active. You can activate it in **VoIP > SIP > SIP Account**.
Last Registration	This field displays the last time you successfully registered the SIP account. The field is blank if you never successfully registered this account.
URI	This field displays the account number and service domain of the SIP account. You can change these in the **VoIP > SIP** screens.
Message Waiting	This field indicates whether or not there are any messages waiting for the SIP account.
Last Incoming Number	This field displays the last number that called the SIP account. The field is blank if no number has ever dialed the SIP account.

LABEL	DESCRIPTION
Last Outgoing Number	This field displays the last number the SIP account called. The field is blank if the SIP account has never dialed a number.
Call Status	
Account	This column displays the SIP account in the LTE Device.
Duration	This field displays how long the current call has lasted.
Status	This field displays the current state of the phone call. **Idle** - There are no current VoIP calls, incoming calls or outgoing calls being made. **Dial** - The called phone is ringing. **Ring** - The phone is ringing for an incoming VoIP call. **Process** - There is a VoIP call in progress. **DISC** - The called line is busy, the called line has hung up or the phone was left off the hook.
Codec	This field displays what voice codec is being used for a current VoIP call through a phone port.
Peer Number	This field displays the SIP number of the party that is currently engaged in a VoIP call through a phone port.
Phone Status	
Account	This field displays the phone accounts of the LTE Device.
Outgoing Number	This field displays the SIP number that you use to make calls on this phone port.
Incoming Number	This field displays the SIP number that you use to receive calls on this phone port.
Phone State	This field shows whether or the phone connected to the subscriber port is on-hook **ONHOOK**) or off-hook (**OFFHOOK**).

17 User Account

17.1 Overview

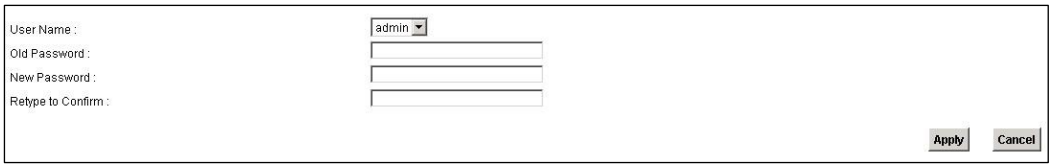
You can configure system password for different user accounts in the **User Account** screen.

17.2 The User Account Screen

Use the **User Account** screen to configure system password.

Click **Maintenance > User Account** to open the following screen.

Figure 17-1 Maintenance > User Account



The following table describes the labels in this screen.

Table 17-1 Maintenance > User Account

LABEL	DESCRIPTION
User Name	You can configure the password for the **Power User** and **Admin** accounts.
Old Password	Type the default password or the existing password you use to access the system in this field.
New Password	Type your new system password (up to 30 characters). Note that as you type a password, the screen displays a (*) for each character you type. After you change the password, use the new password to access the LTE Device.
Retype to Confirm	Type the new password again for confirmation.

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

18 Remote MGMT

18.1 Overview

Remote MGMT allows you to manage your LTE Device from a remote location through the following interfaces:

- LAN and WLAN
- WAN only

NOTE
The LTE Device is managed using the web configurator.

18.1.1 What You Need to Know

The following terms and concepts may help as you read this chapter.

18.2 The Remote MGMT Screen

Use this screen to decide what services you may use to access which LTE Device interface. Click **Maintenance > Remote MGMT** to open the following screen.

Figure 18-1 Maintenance > Remote MGMT

The following table describes the fields in this screen.

Table 18-1 Maintenance > Remote MGMT

LABEL	DESCRIPTION
Services	This is the service you may use to access the LTE Device.

LABEL	DESCRIPTION
LAN/WLAN	Select the **Enable** check box for the corresponding services that you want to allow access to the LTE Device from the LAN and WLAN.
WAN	Select the **Enable** check box for the corresponding services that you want to allow access to the LTE Device from the WAN.
Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service for remote management.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

19 System

19.1 Overview

You can configure system settings, including the host name, domain name and the inactivity time-out interval in the **System** screen.

19.1.1 What You Need to Know

The following terms and concepts may help as you read this chapter.

Domain Name

This is a network address that identifies the owner of a network connection. For example, in the network address “www.example.com/support/files”, the domain name is “www.example.com”.

19.2 The System Screen

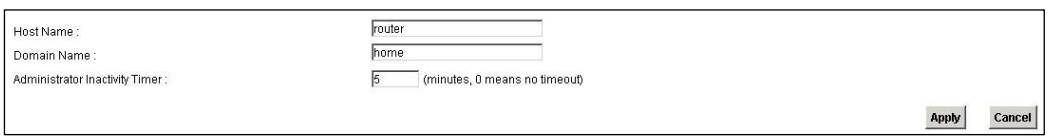
Use the **System** screen to configure the system's host name, domain name, and inactivity time-out interval.

The **Host Name** is for identification purposes. However, because some ISPs check this name you should enter your computer's "Computer Name". Find the system name of your Windows computer.

In Windows XP, click **start**, **My Computer**, **View system information** and then click the **Computer Name** tab. Note the entry in the **Full computer name** field and enter it as the LTE Device **System Name**.

Click **Maintenance > System** to open the following screen.

Figure 19-1 Maintenance > System



The following table describes the labels in this screen.

Table 19-1 Maintenance > System

LABEL	DESCRIPTION
Host Name	Choose a descriptive name for identification purposes. It is recommended you enter your computer's "Computer name" in this field. This name can be up to 30 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted.
Domain Name	Enter the domain name (if you know it) here. If you leave this field blank, the ISP may assign a domain name via DHCP. The domain name entered by you is given priority over the ISP assigned domain name.
Administrator Inactivity Timer	Type how many minutes a management session (either via the web configurator) can be left idle before the session times out. The default is 5 minutes. After it times out you have to log in with your password again. Very long idle timeouts may have security risks. A value of "0" means a management session never times out, no matter how long it has been left idle (not recommended).
Apply	Click this to save your changes back to the LTE Device.
Cancel	Click this to begin configuring this screen afresh.

20 Time Setting

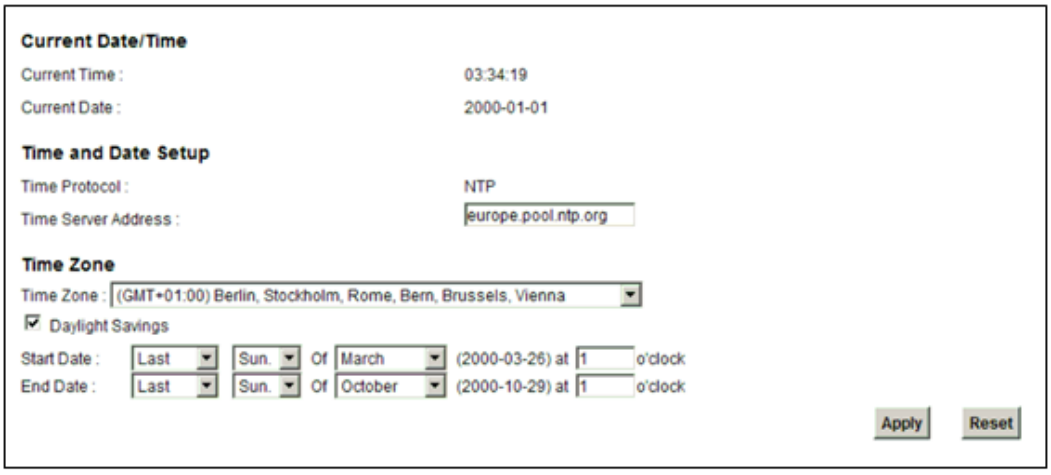
20.1 Overview

You can configure the system's time and date in the **Time Setting** screen.

20.2 The Time Setting Screen

To change your LTE Device's time and date, click **Maintenance > Time**. The screen appears as shown. Use this screen to configure the LTE Device's time based on your local time zone.

Figure 20-1 Maintenance > Time Setting



The following table describes the fields in this screen.

Table 20-1 Maintenance > System > Time Setting

LABEL	DESCRIPTION
Current Date/Time	
Current	This field displays the time of your LTE Device.

LABEL	DESCRIPTION
Time	
Current Date	This field displays the date of your LTE Device.
Time and Date Setup	
Time Protocol	This shows the time service protocol that your time server sends when you turn on the LTE Device.
Time Server Address	Enter the IP address or URL (up to 31 extended ASCII characters in length) of your time server. Check with your ISP/network administrator if you are unsure of this information.
Time Zone	Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Daylight Savings	Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening. Select this option if you use Daylight Saving Time.
Start Date	Configure the day and time when Daylight Saving Time starts if you selected **Daylight Savings**. The **o'clock** field uses the 24 hour format. Here are a couple of examples: Daylight Saving Time starts in most parts of the United States on the second Sunday of March. Each time zone in the United States starts using Daylight Saving Time at 2 A.M. local time. So in the United States you would select **Second**, **Sunday**, **March** and type **2** in the **o'clock** field. Daylight Saving Time starts in the European Union on the last Sunday of March. All of the time zones in the European Union start using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would select **Last**, **Sunday**, **March**. The time you type in the **o'clock** field depends on your time zone. In Germany for instance, you would type **2** because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
End Date	Configure the day and time when Daylight Saving Time ends if you selected **Daylight Savings**. The **o'clock** field uses the 24 hour format. Here are a couple of examples: Daylight Saving Time ends in the United States on the first Sunday of November. Each time zone in the United States stops using Daylight Saving Time at 2 A.M. local time. So in the United States you would select **First**, **Sunday**, **November** and type **2** in the **o'clock** field. Daylight Saving Time ends in the European Union on the last Sunday of October. All of the time zones in the European Union stop using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would select **Last**, **Sunday**, **October**. The time you type in the **o'clock** field depends on your time zone. In Germany for instance, you would type **2** because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
Apply	Click **Apply** to save your changes.
Reset	Click **Reset** to begin configuring this screen afresh.

21 Log Setting

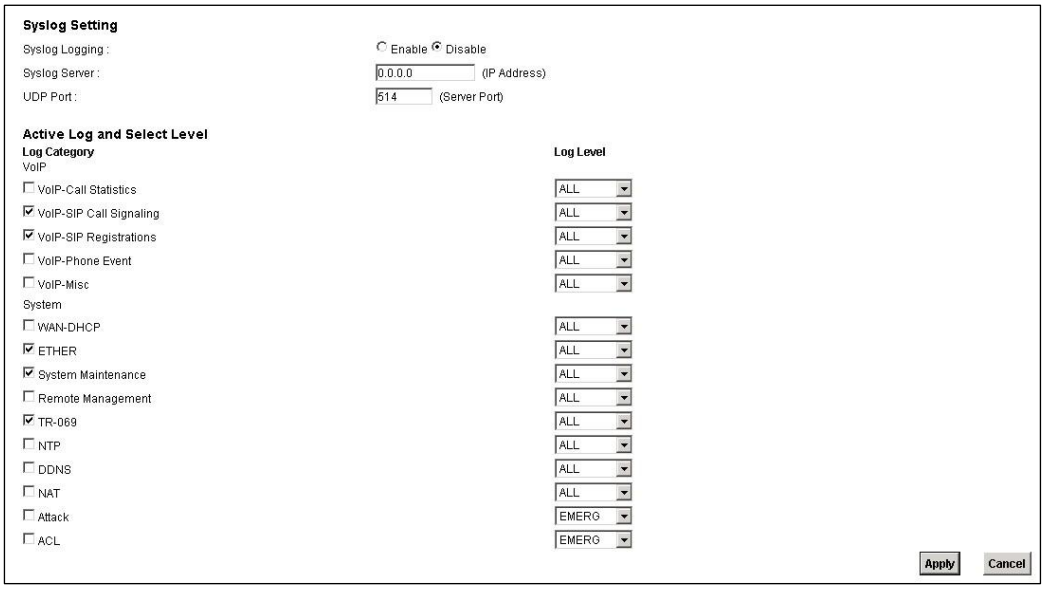
21.1 Overview

You can configure where the LTE Device sends logs and which logs and/or immediate alerts the LTE Device records in the **Log Setting** screen.

21.2 The Log Setting Screen

To change your LTE Device's log settings, click **Maintenance > Log Setting**. The screen appears as shown.

Figure 21-1 Maintenance > Log Setting



The following table describes the fields in this screen.

Table 21-1 Maintenance > Log Setting

LABEL	DESCRIPTION
Syslog Setting	
Syslog Logging	The LTE Device sends a log to an external syslog server. Select the **Enable** check box to enable syslog logging.
Syslog Server	Enter the server name or IP address of the syslog server that will log the selected categories of logs.
UDP Port	Enter the port number used by the syslog server.
Active Log and Select Level	
Log Category	Select the categories of logs that you want to record.
Log Level	Select the severity level of logs that you want to record. If you want to record all logs, select **ALL**.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

22 Software Upgrade

22.1 Overview

This chapter explains how to upload new firmware to your LTE Device.

CAUTION

Only use firmware for your device's specific model. Refer to the label on the bottom of your LTE Device.

22.2 FOTA Upgrade

Your LTE Device supports Firmware update Over The Air (FOTA).

Click **Maintenance > Software Upgrade** to open the **following** screen.

Enter the update server in URL, click **SAVE URL** button to save the server URL;

Click **CHECK** button to check new firmware available from the server;

Please note the server URL is provided by your service provider and must match your CPE model.

Please refer to Table 22-1 for the definition of the **Check** and **SaveURL** buttons.

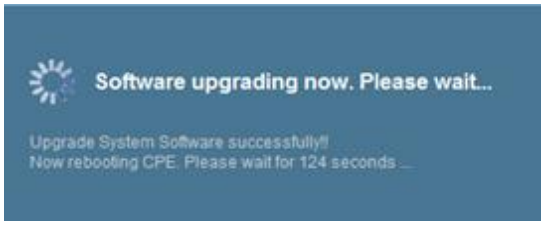
If there is new firmware to upgrade, a popup window will display to show the new firmware info and ask for your permission to proceed.

Figure 22-1 New firmware files are available for both the IDU and ODU

Figure 22-2 Only a new firmware file is available for the IDU

Once the Yes button is pressed, the LTE Device will download, update and restart itself after you confirm the download action. During the process, you will see a popup window to show the system is upgrading.

Figure 22-3 System upgrading



Normally, the upgrade process may take around 6 minutes for both the IDU and ODU. The login page appears again after the upgrade is done.

In the FOTA process, you only need to confirm whether to update or not without using any other update software tools and hardware devices.

If the FOTA process fails, the LTE Device will go back to the previous firmware version and state.

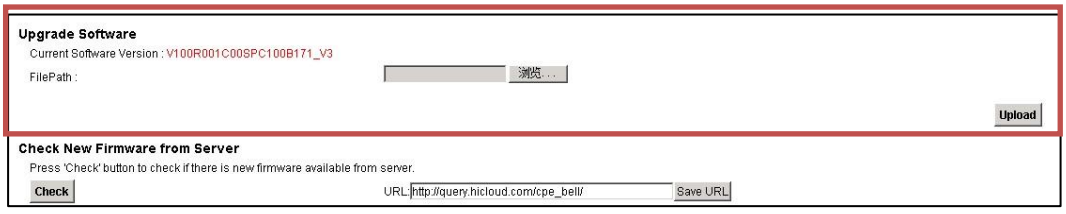
22.3 The Software Upgrade

Click **Maintenance > Software Upgrade** to open the **following** screen. The upload process uses HTTP (Hypertext Transfer Protocol) and may take up to three minutes. After a successful upload, the system will reboot.

CAUTION

Do NOT turn off the LTE Device while firmware upload is in progress!

Figure 22-4 Maintenance > Software Upgrade



The following table describes the labels in this screen.

Table 22-1 Maintenance > Software Upgrade

LABEL	DESCRIPTION
Upgrade Software	

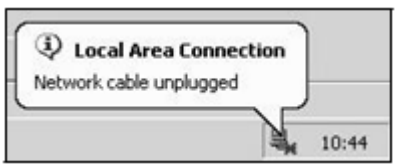
LABEL	DESCRIPTION
Current Software Version	This is the present Firmware version.
File Path	Type in the location of the file you want to upload in this field or click Browse ... to find it.
Browse...	Click this to find the .bin file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Upload	Click this to begin the upload process. This process may take up to three minutes.
Check New Firmware from Server	
Check	Enter the IP address or URL of the update server and click the **Check** button to check if a new firmware file is available on the server.
SaveURL	Click this to save the specified server URL so it can be used after a power cycle.

After you see the firmware updating screen, wait a few minutes before logging into the LTE Device again.

Figure 22-5 Firmware Uploading

The LTE Device automatically restarts in this time causing a temporary network disconnect. In some operating systems, you may see the following icon on your desktop.

Figure 22-6 Network Temporarily Disconnected



After two minutes, log in again and check your new firmware version in the **Status** screen.

If the upload was not successful, an error screen will appear. Click **OK** to go back to the **Software Upgrade** screen.

Error Message

23 Backup/Restore

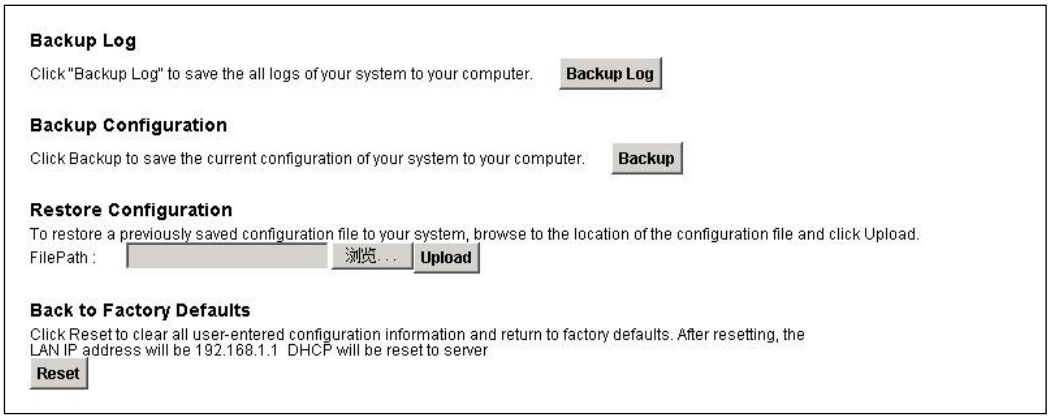
23.1 Overview

The **Backup/Restore** screen allows you to backup and restore device configurations. You can also reset your device settings back to the factory default.

23.2 The Backup/Restore Screen

Click **Maintenance > Backup/Restore**. Information related to factory defaults, backup configuration, and restoring configuration appears in this screen, as shown next.

Figure 23-1 Maintenance > Backup/Restore



Backup Log

Backup Log allows you to back up (save) the LTE Device's logs to a file on your computer. Once your LTE Device has unusual behavior, it is highly recommended that you back up your log file before making any changes. The backup log file will be useful in case you need to ask the customer service.

Click **Backup Log** to save the LTE Device's logs to your computer.

Backup Configuration

Backup Configuration allows you to back up (save) the LTE Device's current configuration to a file on your computer. Once your LTE Device is configured and functioning properly, it is highly recommended that you back up your configuration file before making configuration changes. The backup configuration file will be useful in case you need to return to your previous settings.

Click **Backup** to save the LTE Device's current configuration to your computer.

Restore Configuration

Restore Configuration allows you to upload a new or previously saved configuration file from your computer to your LTE Device.

Table 23-1 Restore Configuration

LABEL	DESCRIPTION
File Path	Type in the location of the file you want to upload in this field or click Browse ... to find it.
Browse...	Click this to find the file you want to upload. Remember that you must decompress compressed (.ZIP) files before you can upload them.
Upload	Click this to begin the upload process.
Reset	Click this to reset your device settings back to the factory default.

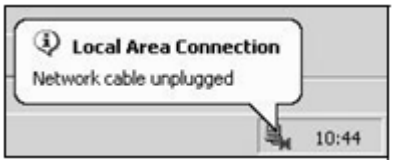
CAUTION

Do not turn off the LTE Device while configuration file upload is in progress.

After the LTE Device configuration has been restored successfully, the login screen appears. Login again to restart the LTE Device.

The LTE Device automatically restarts in this time causing a temporary network disconnect. In some operating systems, you may see the following icon on your desktop.

Figure 23-2 Network Temporarily Disconnected



If you restore the default configuration, you may need to change the IP address of your computer to be in the same subnet as that of the default device IP address (192.168.1.1).

If the upload was not successful, an error screen will appear. Click **OK** to go back to the Configuration screen.

Reset to Factory Defaults

Click the **Reset** button to clear all user-entered configuration information and return the LTE Device to its factory defaults. The following warning screen appears.

Figure 23-3 Reset Warning Message

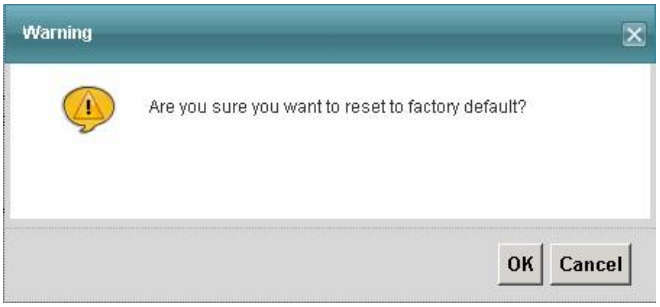
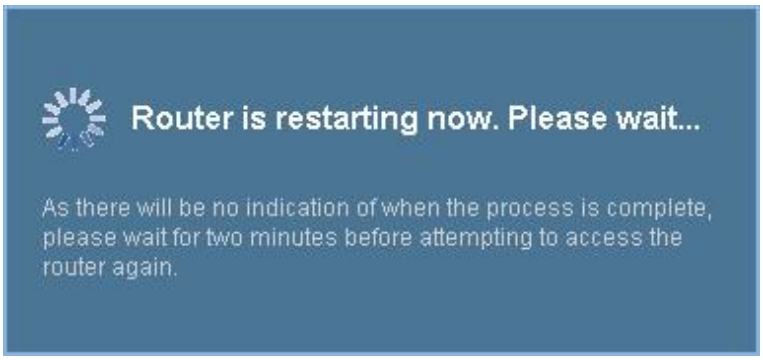


Figure 23-4 Reset In Process Message



You can also press the **RESET** button on the back panel to reset the factory defaults of your LTE Device. Refer to Section 1.7 on page 6 for more information on the **RESET** button.

23.3 The Reboot Screen

System restart allows you to reboot the LTE Device remotely without turning the power off. You may need to do this if the LTE Device hangs, for example.

Click **Maintenance> Reboot**. Click the **Reboot** button to have the LTE Device reboot. This does not affect the LTE Device's configuration.

Figure 23-5 Reboot

24 Diagnostic

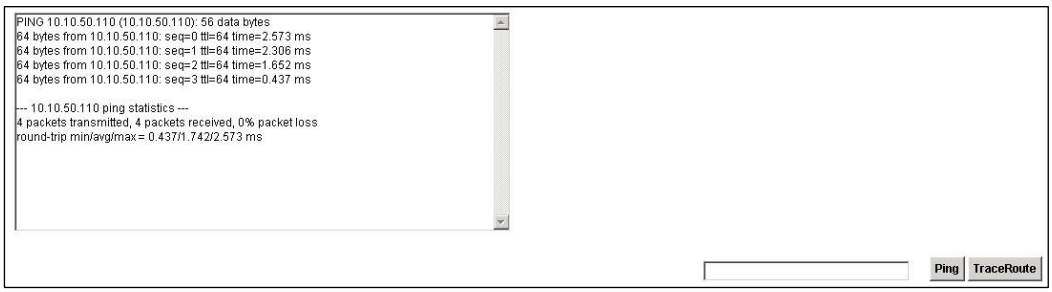
24.1 Overview

You can use different diagnostic methods to test a connection and see the detailed information. These read-only screens display information to help you identify problems with the LTE Device.

24.2 The Ping/TraceRoute Screen

Ping and traceroute help check availability of remote hosts and also help troubleshoot network or Internet connections. Click **Maintenance > Diagnostic** to open the **Ping/TraceRoute** screen shown next.

Figure 24-1 Maintenance > Diagnostic > Ping/TraceRoute



The following table describes the fields in this screen.

Table 24-1 Maintenance > Diagnostic > Ping/TraceRoute

LABEL	DESCRIPTION
Ping	Type the IP address of a computer that you want to ping in order to test a connection. Click **Ping** and the ping statistics will show in the diagnostic.
TraceRoute	Click this button to perform the traceroute function. This determines the path a packet takes to the specified host.

25 Troubleshooting

25.1 Overview

This chapter offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories.

- Power, Hardware Connections, and LEDs
- LTE Device Access and Login
- Internet Access
- Wireless Internet Access
- Phone Calls and VoIP
- UPnP

25.2 Power, Hardware Connections, and LEDs

The LTE Device does not turn on. None of the LEDs turn on.

Step 1 Make sure the LTE Device is turned on.

Step 2 Make sure you are using the power adaptor or cord included with the LTE Device.

Step 3 Make sure the power adaptor or cord is connected to the LTE Device and plugged in to an appropriate power source. Make sure the power source is turned on.

Step 4 Turn the LTE Device off and on.

Step 5 If the problem continues, contact the vendor.

----End

One of the LEDs does not behave as expected.

Step 1 Make sure you understand the normal behavior of the LED. See Section 1.6.

Step 2 Check the hardware connections. See the Quick Start Guide.

Step 3 Inspect your cables for damage. Contact the vendor to replace any damaged cables.

Step 4 Turn the LTE Device off and on.

Step 5 If the problem continues, contact the vendor.

----End

25.3 LTE Device Access and Login

I forgot the IP address for the LTE Device.

Step 1 The default IP address is 192.168.1.1.

Step 2 If you changed the IP address and have forgotten it, you might get the IP address of the LTE Device by looking up the IP address of the default gateway for your computer. To do this in most Windows computers, click **Start > Run**, enter **cmd**, and then enter **ipconfig**. The IP address of the **Default Gateway** might be the IP address of the LTE Device (it depends on the network), so enter this IP address in your Internet browser.

Step 3 If this does not work, you have to reset the device to its factory defaults. See Section 1.7.

----End

I forgot the password.

Step 1 The default password is **LTEcpe**.

Step 2 If you can't remember the password, you have to reset the device to its factory defaults. See Section 1.7 on page 6.

----End

I cannot see or access the **Login** screen in the web configurator.

Step 1 Make sure you are using the correct IP address.

The default IP address is 192.168.1.1.

If you changed the IP address, use the new IP address.

If you changed the IP address and have forgotten it, see the troubleshooting suggestions for I forgot the IP address for the LTE Device.

Step 2 Check the hardware connections, and make sure the LEDs are behaving as expected. See the Quick Start Guide.

Step 3 Check to make sure your computer does not have a static IP address.

Step 4 Check to make sure your web browser is not using proxy.

Step 5 Make sure your Internet browser does not block pop-up windows and has JavaScript and Java enabled.

Step 6 Reset the device to its factory defaults, and try to access the LTE Device with the default IP address. See Section 1.7 on page 6.

Step 7 If the problem continues, contact the network administrator or vendor, or try one of the advanced suggestions.

----End

Advanced Suggestions

- Try to access the LTE Device using another service, such as Telnet. If you can access the LTE Device, check the remote management settings and firewall rules to find out why the LTE Device does not respond to HTTP.
- If your computer is connected to the **WAN** port or is connected wirelessly, use a computer that is connected to an **ETHERNET** port.

I can see the **Login** screen, but I cannot log in to the LTE Device.

Step 1 Make sure you have entered the user name and password correctly. The default user name is **admin**. These fields are case-sensitive, so make sure [Caps Lock] is not on.

Step 2

Step 3 You cannot log in to the web configurator while someone is using Telnet to access the LTE Device. Log out of the LTE Device in the other session, or ask the person who is logged in to log out.

Step 4 Turn the LTE Device off and on.

Step 5 If this does not work, you have to reset the device to its factory defaults. See Section 25.2 on page 154.

----End

25.4 Internet Access

I cannot access the Internet.

Step 1 Check the hardware connections, and make sure the LEDs are behaving as expected. See the Quick Start Guide and Section 1.6.

Step 2 Make sure you entered your service provider's LTE APN information correctly.

Step 3 If you are trying to access the Internet wirelessly, make sure the wireless settings in the wireless client are the same as the settings in the AP.

Step 4 If you are trying to access the Internet wirelessly, make sure you have enabled the wireless LAN by the WPS/WLAN button or the Network Setting > Wireless > General screen.

Step 5 Disconnect all the cables from your device, and follow the directions in the Quick Start Guide again.

Step 6 If the problem continues, contact your ISP.

----End

I cannot access the Internet anymore. I had access to the Internet (with the LTE Device), but my Internet connection is not available anymore.

Step 1 Check the hardware connections, and make sure the LEDs are behaving as expected. See the Quick Start Guide and Section 1.6.

Step 2 Turn the LTE Device off and on.

Step 3 If the problem continues, contact your ISP.

----End

The Internet connection is slow or intermittent.

Step 1 There might be a lot of traffic on the network. Look at the LEDs, and check Section 1.6. If the LTE Device is sending or receiving a lot of information, try closing some programs that use the Internet, especially peer-to-peer applications.

Step 2 Turn the LTE Device off and on.

Step 3 If the problem continues, contact the network administrator or vendor, or try one of the advanced suggestions.

----End

Advanced Suggestions

Check the settings for QoS. If it is disabled, you might consider activating it. If it is enabled, you might consider raising or lowering the priority for some applications.

25.5 Wireless Internet Access

What factors may cause intermittent or unstable wireless connection? How can I solve this problem?

The following factors may cause interference:

- Obstacles: walls, ceilings, furniture, and so on.
- Building Materials: metal doors, aluminum studs.
- Electrical devices: microwaves, monitors, electric motors, cordless phones, and other wireless devices.
- To optimize the speed and quality of your wireless connection, you can:
- Move your wireless device closer to the AP if the signal strength is low.
- Reduce wireless interference that may be caused by other wireless networks or surrounding wireless electronics such as cordless phones.
- Place the AP where there are minimum obstacles (such as walls and ceilings) between the AP and the wireless client.
- Reduce the number of wireless clients connecting to the same AP simultaneously, or add additional APs if necessary.
- Try closing some programs that use the Internet, especially peer-to-peer applications. If the wireless client is sending or receiving a lot of information, it may have too many programs open that use the Internet.

What wireless security modes does my LTE Device support?

Wireless security is vital to your network. It protects communications between wireless stations, access points and the wired network.

The available security modes in your device are as follows:

- **WPA2-PSK:** (recommended) this uses a pre-shared key with the WPA2 standard.
- **WPA-PSK:** This has the device use either WPA-PSK or WPA2-PSK depending on which security mode the wireless client uses.

- **WPA2:** WPA2 (IEEE 802.11i) is a wireless security standard that defines stronger encryption, authentication and key management than WPA. It requires the use of a RADIUS server and is mostly used in business networks.
- **WPA:** Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. It requires the use of a RADIUS server and is mostly used in business networks.
- **WEP:** Wired Equivalent Privacy (WEP) encryption scrambles the data transmitted between the wireless stations and the access points to keep network communications private.

25.6 Phone Calls and VoIP

The telephone port won't work or the telephone lacks a dial tone.

Step 1 Check the telephone connection and telephone wire.

----End

I can access the Internet, but cannot make VoIP calls.

Step 1 The **PHONE** light should come on. Make sure that your telephone is connected to the PHONE port.

Step 2 You can also check the VoIP status in the **System Info** screen.

Step 3 If the VoIP settings are correct, use speed dial to make peer-to-peer calls. If you can make a call using speed dial, there may be something wrong with the SIP server, contact your VoIP service provider.

----End

25.7 UPnP

When using UPnP and the LTE Device reboots, my computer cannot detect UPnP and refresh

My Network Places > Local Network.

Step 1 Disconnect the Ethernet cable from the LTE Device's LAN port or from your computer.

Step 2 Re-connect the Ethernet cable.

----End

The **Local Area Connection** icon for UPnP disappears in the screen. Restart your computer.

I cannot open special applications such as white board, file transfer and video when I use the MSN messenger.

Step 1 Wait more than three minutes.

Step 2 Restart the applications.

----End

