User Manual

OX-350I

WiMAX Outdoor CPE

Version: 1.3

Date: Oct. 26, 2011

Previous History

Revision	Date of Issue	Scope	Author
1.0	2011/08/31	Initial document	Alpha C.
1.1	2011/09/21	Add FCC Warning Wording	Tony Kao
1.2	2011/10/04	Modify Important Notice content in page 4	Tony Kao
1.3	2011/10/26	Add a note for Max. Antenna Gain limitation in page 4	Tony Kao

Federal Communication Commission Interference Statement :

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 60cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Due to the essential high output power natural of WiMAX device, use of this device with other transmitter at the same time may exceed the FCC RF exposure limit and such usage must be prohibited (unless such co-transmission has been approved by FCC in the future).

IMPORTANT NOTE:

1. *According to FCC regulation (FCC 05-56), in order for the device to safely operate in the 3.675~3.700 GHz range, the device shall be connected to a Base station which supports "listen mode" and can instruct this device accordingly.*
2. *The max. gain of antenna used in this product is limited to be under 17.04dBi.*

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1. Introduction

The CPE Software platform comes with a Web-based Configuration Manager, which gives users the ability to manage, configure and analyze the platforms environment. The Connection Manager works with all versions of Windows after Windows 95.

The supported browser version:

- Internet Explorer Ver 8.06001 or later (Recommended)
- FireFox Ver.3.6.3 and higher
- Google Chrome Ver.5.0.375.125 and higher
- Opera Ver.9.64 and higher
- Safari Ver.4.05 and higher

1.1. Connect

Users need to connect to the CPE platform. It's assumed that the user has a fully working CPE platform and properly connected. From the web browser connect to the device, entering the IP address of the device; it will prompt user to enter the username and password. The default IP address, usernames and passwords are as follows.

Default IP Address

- 192.168.0.254

Username/Password

- admin/admin
- guest/guest

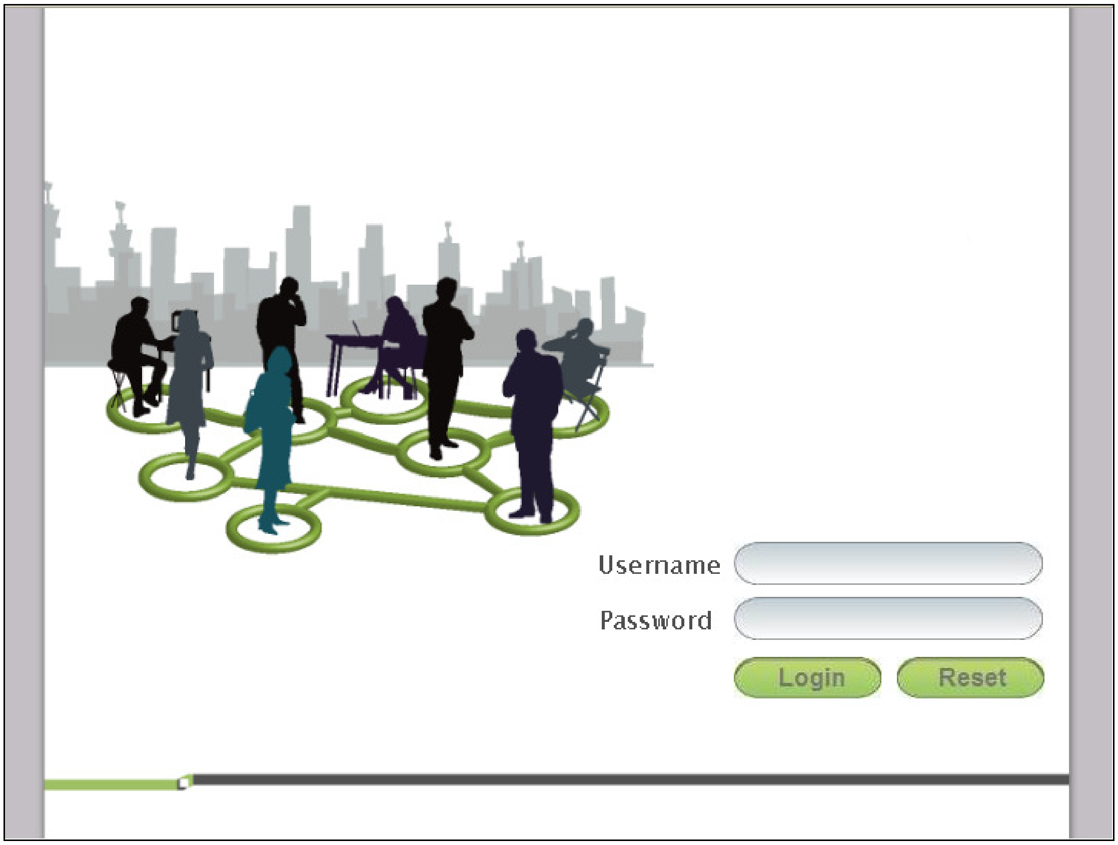
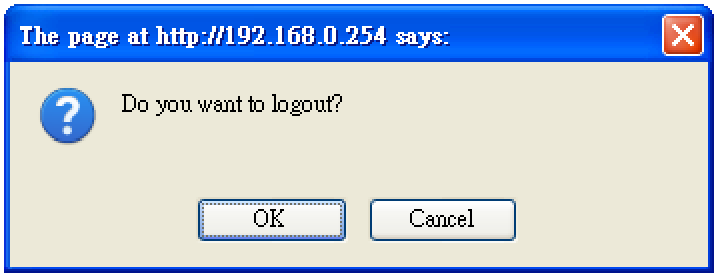


Figure 1 Login

1.2. Logout

The "Logout" window allows users to disconnect from the device and exit the Web-based Configuration Manager.


The page at http://192.168.0.254 says:

Do you want to logout?

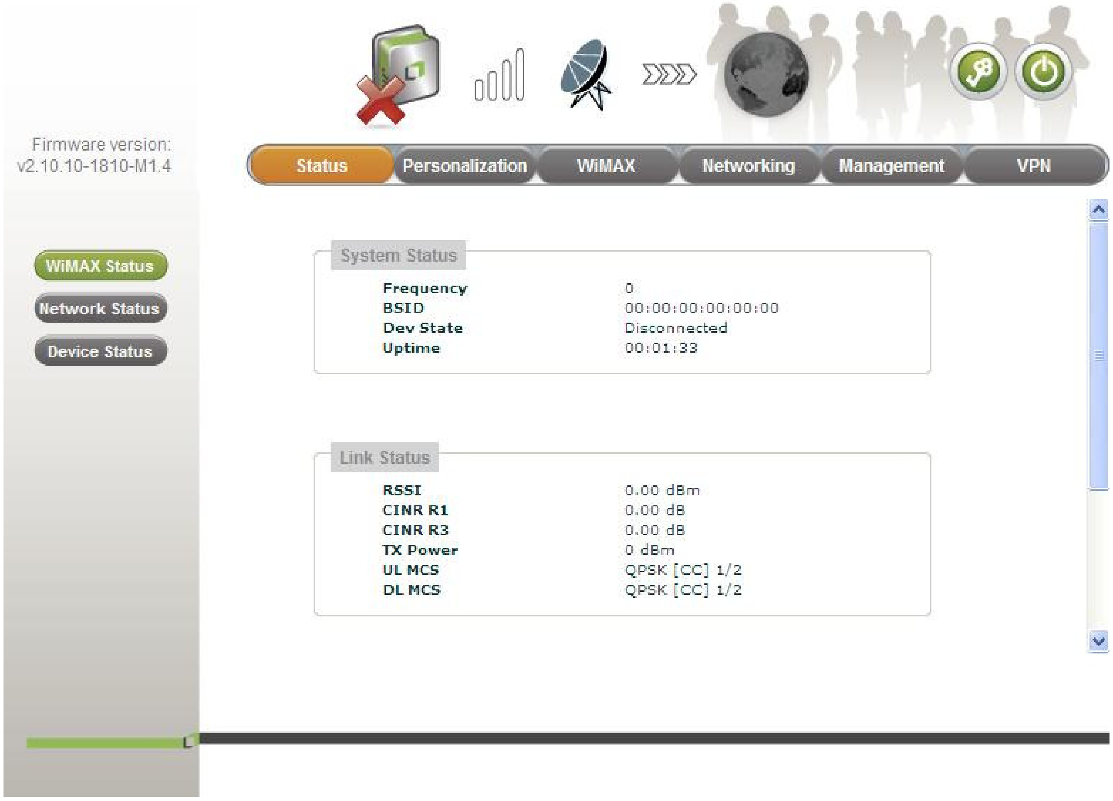
Figure 2 Logout

2. Status

After user has established a connection, user will see the “Status” window. It gives user an initial overview of the current status of the device.

2.1. WiMAX Status

This window shows the information of system status, WiMAX link status and service flow status.



System Status

Frequency	0
BSID	00:00:00:00:00:00
Dev State	Disconnected
Uptime	00:01:33

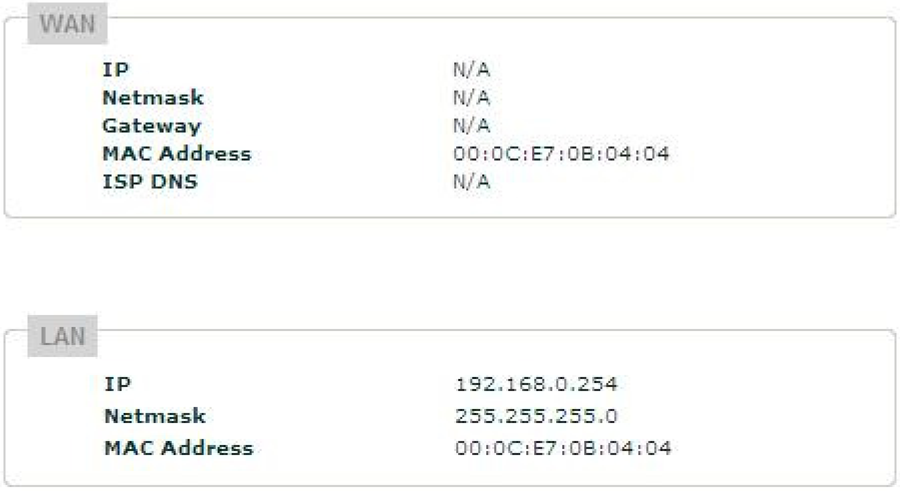
Link Status

RSSI	0.00 dBm
CINR R1	0.00 dB
CINR R3	0.00 dB
TX Power	0 dBm
UL MCS	QPSK [CC] 1/2
DL MCS	QPSK [CC] 1/2

Figure 3 Status>WiMAX Status

2.2. Network Status

This window shows the information of WAN status and LAN status.



WAN

IP	N/A
Netmask	N/A
Gateway	N/A
MAC Address	00:0C:E7:0B:04:04
ISP DNS	N/A

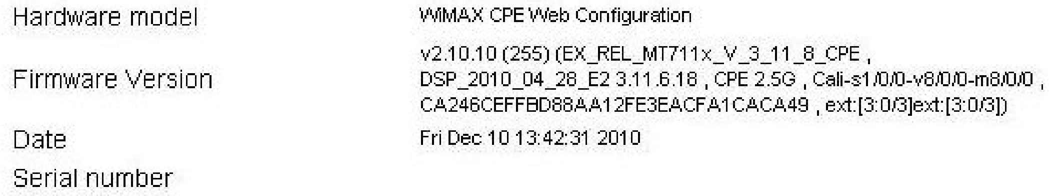
LAN

IP	192.168.0.254
Netmask	255.255.255.0
MAC Address	00:0C:E7:0B:04:04

Figure 4 Status>Network Status

2.3. Device Status

This window shows the information of device status.



Hardware model	WiMAX CPE Web Configuration
Firmware Version	v2.10.10 (255) (EX_REL_MT711x_V_3_11_8_CPE , DSP_2010_04_28_E2 3.11.6.18 , CPE 2.5G , Cali-s1/0/0-v8/0/0-m8/0/0 , CA246CEFFBD88AA12FE3EACFA1CACA49 , ext:[3:0/3]ext:[3:0/3])
Date	Fri Dec 10 13:42:31 2010
Serial number	

Figure 5 Status>Device Status

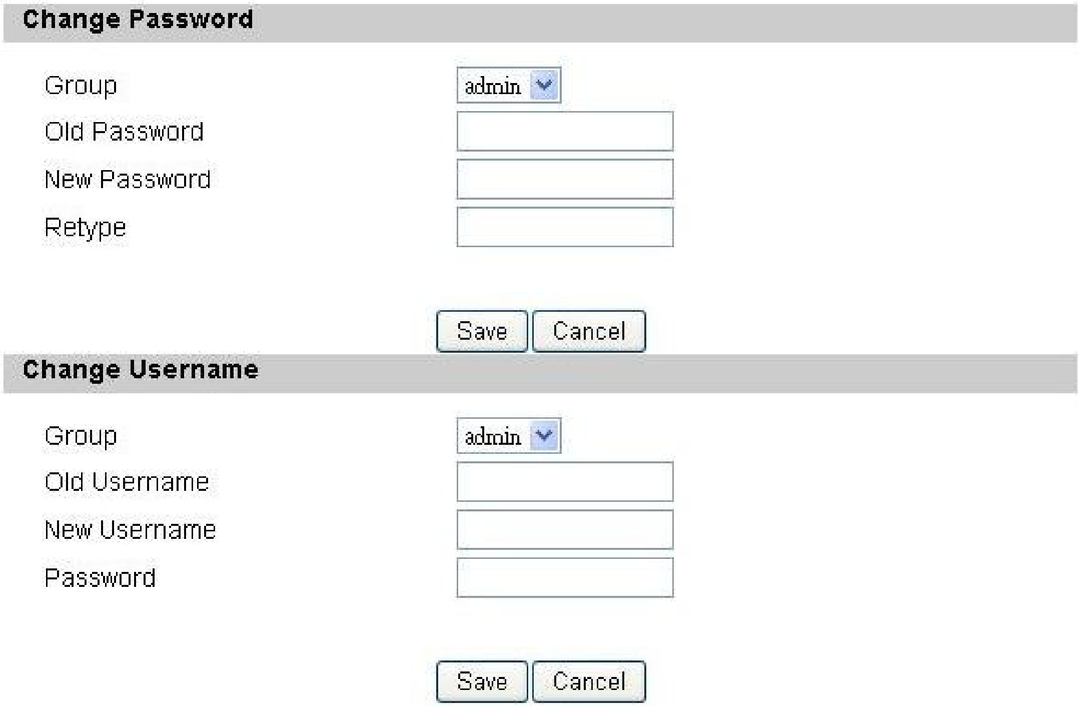
3. Personalization

3.1. Account

Note: The default usernames and passwords are admin/admin and guest/guest.

The user with administrative privileges (belonging to the “admin” group) has access to all the features in the software. A user with “guest” privileges (belonging to the “guest” group) only has a subset of the features available to them.

Note: There can only be one username in each of the groups (one to one relationship).



Change Password

Group: admin

Old Password

New Password

Retype

Change Username

Group: admin

Old Username

New Username

Password

Figure 6 Personalization>Account

Name	Description
Change Password	

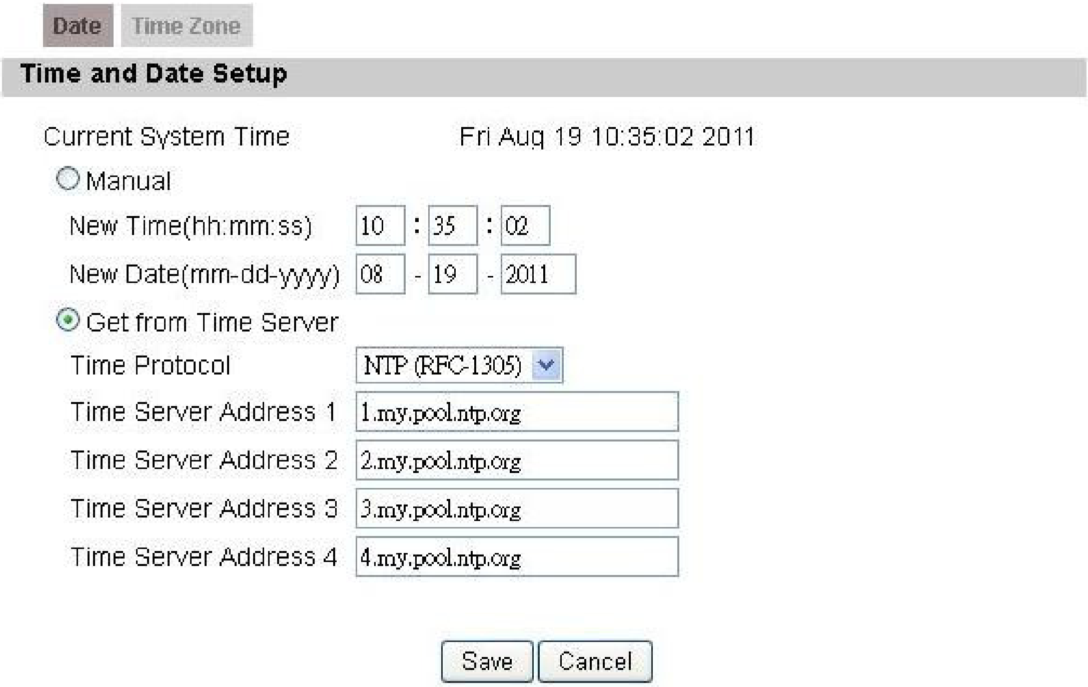
Group	Select which group the user belongs to that user would like to change the password for. ● admin, if the user is part of the admin group, they have full access to all the features. ● guest, if the user is part of the guest group, they have limited access to the features.
Old Password	Enter the old password.
New Password	Enter the new password.
Retype	Retype the new password.
Save	Commit the changes made and save to CPE, it will only commit the change made to the password.
Cancel	Reset fields to the last saved values.
Change Username	
Group	Select which group the user belongs to that user would like to change the username for. ● admin, if the user is part of the admin group, they have full access to the features. ● guest, if the user is part of the guest group, they have limited access to the features.
Old Username	Enter the username user wants to change.
New Username	Enter the new username.
Password	Enter the original password, the password will not change. If user enter an incorrect or different password the change will not be committed
Save	Commit the changes made and save to CPE, it will only commit the change made to the username.
Cancel	Reset fields to the last saved values.

Table 1 Field definition for Personalization>Account

3.2. Date

User can configure the date and time on the device. The user can manually configure the system time, or choose to get the date and time from a time server. The “Save” button will commit the configuration, and the “Cancel” button will clear the fields. The “Time Zone” tab will allow user to set the time zone and set the starting and finish time for daylight saving period. User can also enable or disable “Daylight Savings Time”.

Note: If user doesn’t configure the time on the CPE it will use the default system starting time which is set to 1970/1/1 00:00:00



Time and Date Setup

Current System Time Fri Aug 19 10:35:02 2011

○ Manual

New Time(hh:mm:ss) 10 : 35 : 02

New Date(mm-dd-yyyy) 08 - 19 - 2011

● Get from Time Server

Time Protocol NTP (RFC-1305)

Time Server Address 1 1.my.pool.ntp.org

Time Server Address 2 2.my.pool.ntp.org

Time Server Address 3 3.my.pool.ntp.org

Time Server Address 4 4.my.pool.ntp.org

Figure 7 Personalization>Date>Date

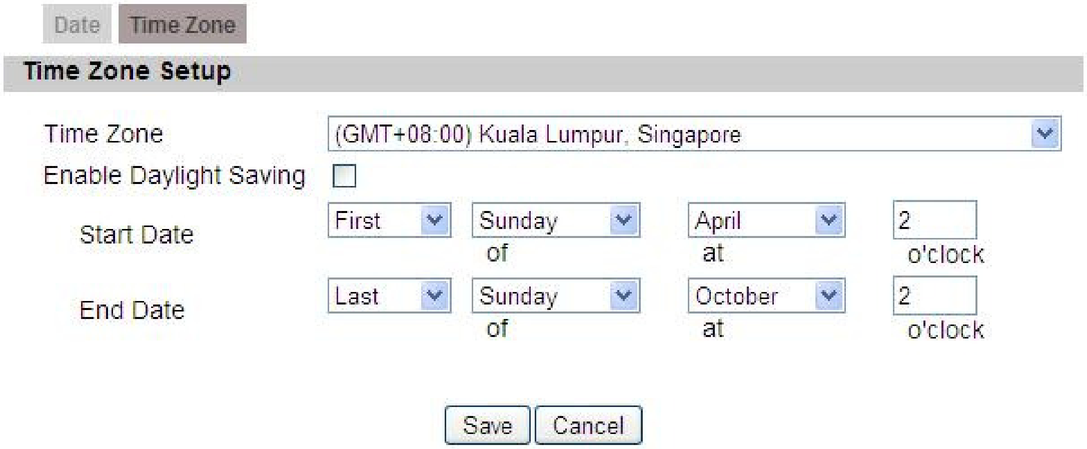
3.2.1. Date

Name	Description
Time and Date Setup	
Manual	If user selects the Manual option, then user needs to enter the time and date manually.
New Time	New time manually entered
New Date	New date manually entered
Get From Time Server	If user selects this option it will get the local time from a time server automatically.
Time Protocol	Select the Time protocol

Name	Description
Time Server Address	Enter the address of the time server.
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 2 Field definition for Personalization>Date>Date

3.2.2. Time Zone



Time Zone (GMT+08:00) Kuala Lumpur, Singapore

Enable Daylight Saving □

Start Date First Sunday of April at 2 o'clock

End Date Last Sunday of October at 2 o'clock

Figure 8 Personalization>Date>Time Zone

Name	Description
Time Zone Setup	
Time Zone	Enter the time zone of for the location
Enable Daylight Savings	If user wants to enable Daylight Savings Time, user needs to check the box.
Start Date	Enter the beginning date for Daylight Savings time
End Date	Enter the end date for Daylight Savings time.
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 3 Field definition for Personalization>Date>Time Zone

4. WiMAX

This technology is based on the IEEE 802.16 standard, enabling the delivery of last mile wireless broadband access.

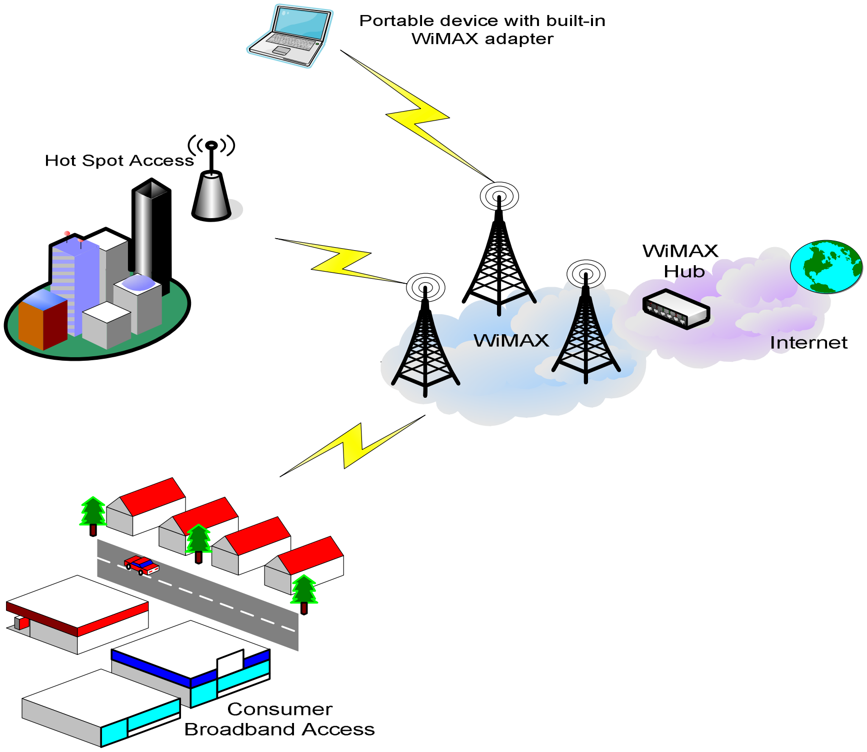
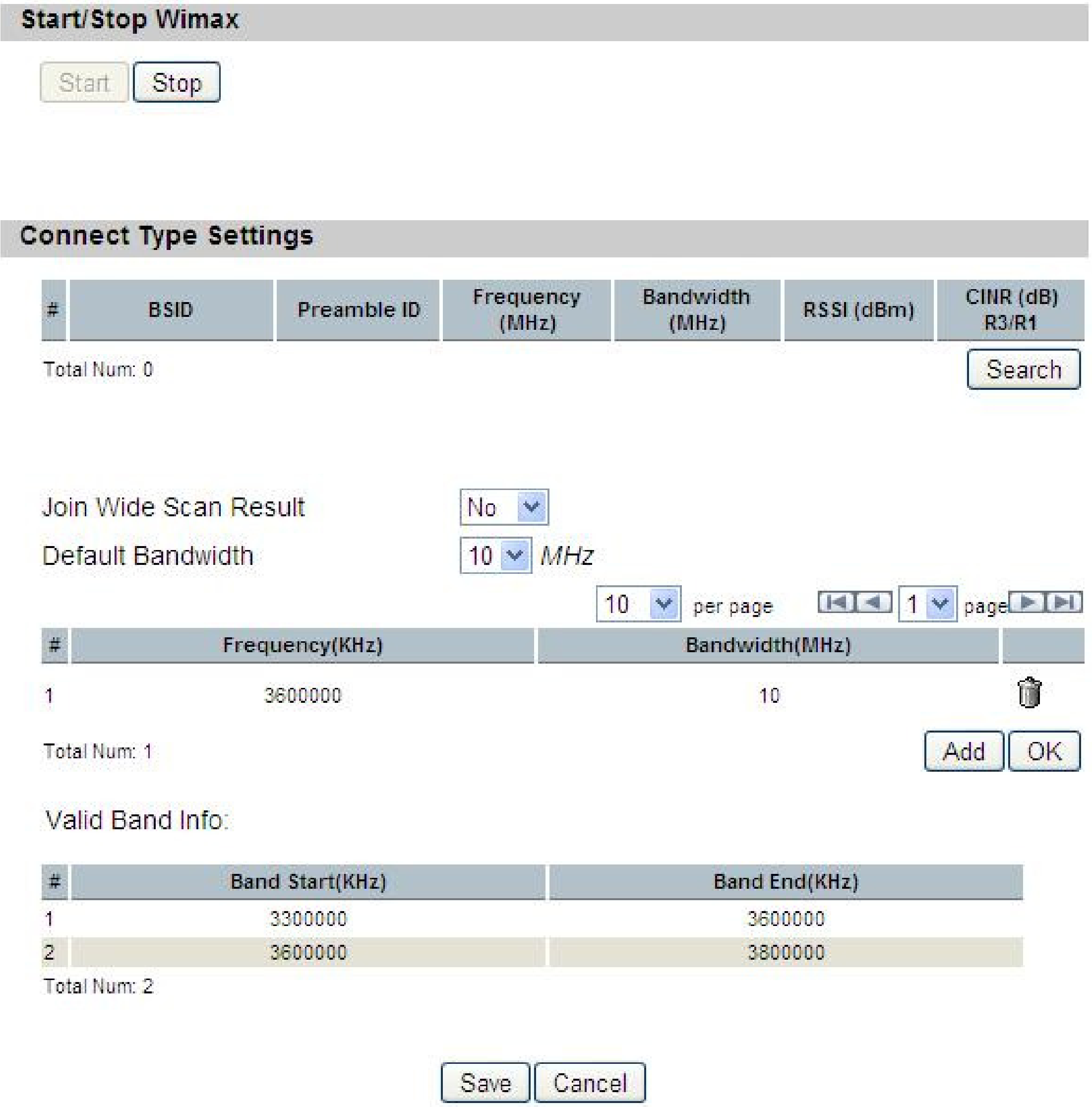

Portable device with built-in WiMAX adapter
Hot Spot Access
WiMAX Hub
WiMAX
Internet
Consumer Broadband Access

Figure 9 Wireless Broadband Access

4.1. Scanner

The user can set WiMAX standard settings, which include how to establish a connection and get frequency information.

The frequency list window will display all the configured frequencies and their bandwidth. To set additional frequencies, click on the “Add” button.



#	BSID	Preamble ID	Frequency (MHz)	Bandwidth (MHz)	RSSI (dBm)	CINR (dB) R3/R1

Total Num: 0

Join Wide Scan Result: No

Default Bandwidth: 10 MHz

10 per page 1 page

#	Frequency(KHz)	Bandwidth(MHz)	
1	3600000	10	🗑

Total Num: 1

Valid Band Info:

#	Band Start(KHz)	Band End(KHz)
1	3300000	3600000
2	3600000	3800000

Total Num: 2

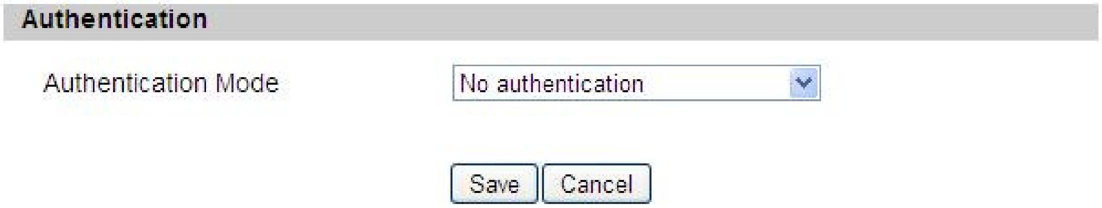
Figure 10 WiMAX>Scanner

Name	Description
Start/Stop Wimax	
Start	Click the “Start” button to connect to a BSID
Stop	Click the “Stop” button to terminate the connection
Connect Type Settings	
Search	Click the “Search” button to scan the frequency
Joint Wide Scan Result	Yes means to append wide scan result to the frequency setting.
Default Bandwidth	Select the default bandwidth to be used in Frequency List ● 5 MHz

Name	Description
	● 7 MHz ● 10 MHz
Valid Band Info	Valid band information. If the frequencies aren’t located using the valid band range, the frequency setting will be rejected.
Add	The "Add" button will allow user to enter more frequency lists
OK	Click the "OK" button to exit table edit mode
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 4 Field definition for WiMAX>Scanner

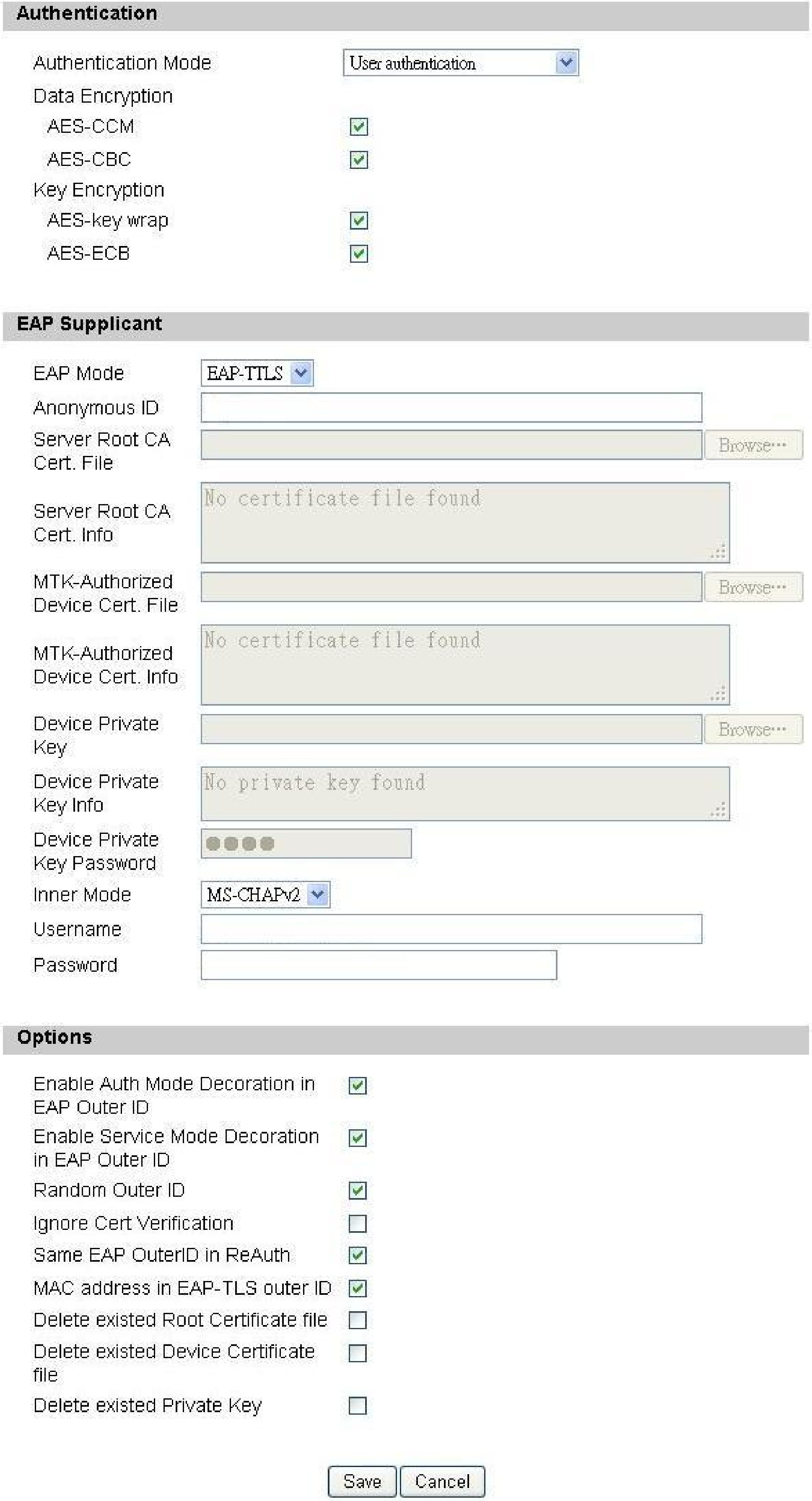
4.2. Authentication



Authentication

Authentication Mode: No authentication

Figure 11 WiMAX>Authentication(No authentication)



Authentication

Authentication Mode	User authentication
Data Encryption	
AES-CCM	☑
AES-CBC	☑
Key Encryption	
AES-key wrap	☑
AES-ECB	☑

EAP Supplicant

EAP Mode	EAP-TTLS
Anonymous ID	
Server Root CA Cert. File	Browse···
Server Root CA Cert. Info	No certificate file found
MTK-Authorized Device Cert. File	Browse···
MTK-Authorized Device Cert. Info	No certificate file found
Device Private Key	Browse···
Device Private Key Info	No private key found
Device Private Key Password	●●●●
Inner Mode	MS-CHAPv2
Username	
Password	

Options

Enable Auth Mode Decoration in EAP Outer ID	☑
Enable Service Mode Decoration in EAP Outer ID	☑
Random Outer ID	☑
Ignore Cert Verification	□
Same EAP OuterID in ReAuth	☑
MAC address in EAP-TLS outer ID	☑
Delete existed Root Certificate file	□
Delete existed Device Certificate file	□
Delete existed Private Key	□

Figure 12 WiMAX>Authentication(User authentication)

Name	Description
Authentication	
Authentication Mode	The method used in authentication. ● No Authentication ● User Authentication ● Device Authentication ● User and Device Authentication
Data Encryption AES-CCM	Enable MS’s capability of encrypting/decrypting traffic by AES-CCM.
Data Encryption AES-CBC	Enable MS's capability of encrypting/decrypting traffic by AES-CBC.
Key Encryption AES-key wrap	Enable MS's capability of decrypting TEK by AES-Key wrap.
Key Encryption AES-ECB	Enable MS's capability of decrypting TEK by AES-ECB.
EAP Supplicant	
EAP Mode	The EAP method used in authentication
Anonymous ID	The identity encoded in EAP Identity Response message. User needs to fill the Outer ID at this field.
Server Root CA Cert. File	The root CA's X.509 certificate.
Server Root CA Cert. Info	The root CA's certificate information.
MTK-Authorized Device Cert. File	The MS's X.509 certificate.
MTK-Authorized Device Cert. Info	The root MS's certificate information.
Device Private Key	The MS's private key file corresponding to the public key enhanced in x.509 certificate
Device Private Key Info	The MS's private key information.
Device Private Key Password	The key used to decrypt the MS’s private key file
Inner Mode	The EAP-TTLS inner method

Name	Description
User name	The user name used in EAP-TTLS inner method
Password	The password used in EAP-TTLS inner method.
Options	

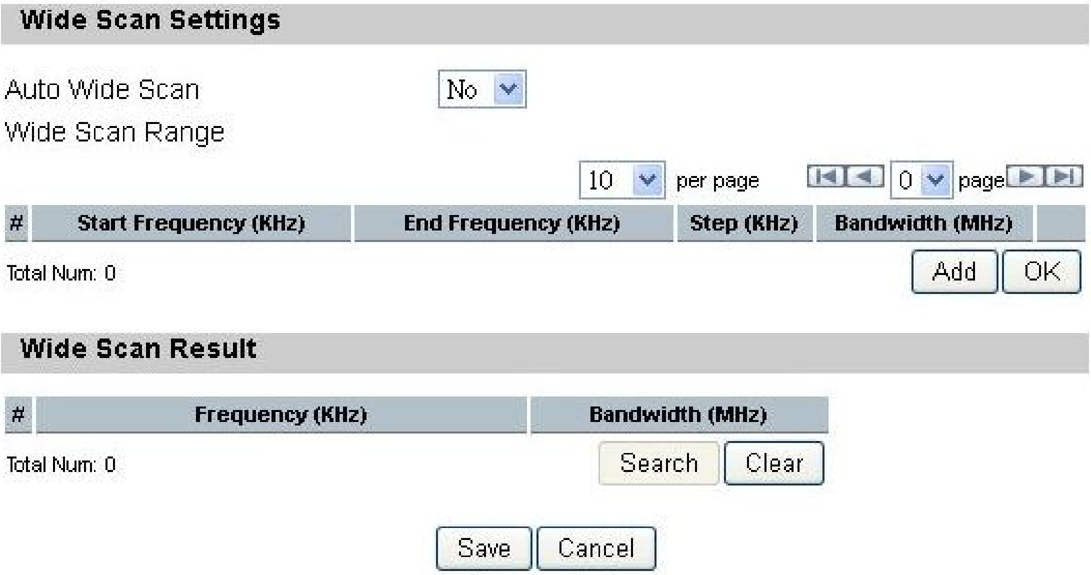
Enable Auth Mode Decoration in EAP Outer ID	puts {am=i} in EAP outer ID
	i = 1: user authentication
	i = 2: device authentication
	i = 3: user & device authentication

Enable Service Mode Decoration in EAP Outer ID	puts {sm=1} in EAP outer ID
Random Outer ID	Enable MS to generate 16-bytes random number as the user name in the EAP Identity Response message.
Ignore Cert Verification	MS skips to verify the BS's certificate received in the EAP-TLS or EAP-TTLS procedure.
Same EAP Outer ID in ReAuth	Use the same EAP outer ID when doing re-auth
MAC address in EAP-TLS outer ID	Add MAC address in outer ID when EAP mode is EAP-TLS
Delete existed Root Certificate file	Remove the files loaded from UI
Delete existed Device Certificate file	Delete device certificate file which was uploaded in the field “MTK-authorized Device Certificate”
Delete existed Private Key	Delete device private key which was uploaded in the field “Device Private Key”
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 5 Field definition for WiMAX>Authentication

4.3. Wide Scan

The “Wide Scan” function is used for scanning BS based on scanning rule. User can set the scan rule with defining start, stop frequency, step, and channel bandwidth, and CPE will base on this rule to scan the BS as shown in Figure 13. The definition for each field is shown on Table 6.



Wide Scan Settings

Auto Wide Scan: No

Wide Scan Range

10 per page | 0 page

#	Start Frequency (KHz)	End Frequency (KHz)	Step (KHz)	Bandwidth (MHz)	

Total Num: 0

Wide Scan Result

#	Frequency (KHz)	Bandwidth (MHz)

Total Num: 0

Figure 13 WiMAX>Wide Scan

Name	Description
Wide Scan Settings	
Auto Wide Scan	Select “Yes” to do “wide scan” automatically when there are no available BS
Wide Scan Range	User can specify the wide scan range to reduce search time
Add	Click the "Add" button to create a new wide scan range
OK	Click the "OK" button will exit the table edit mode
Wide Scan Result	
Search	Show the result of wide scan. Search button can trigger wide scan
Clear	Clear button clear current search result
Save/Cancel	Save/Cancel current setting

Table 6 Field definition for WiMAX>Wide Scan

5. Networking

Refer to Figure 14 for proper network connection.

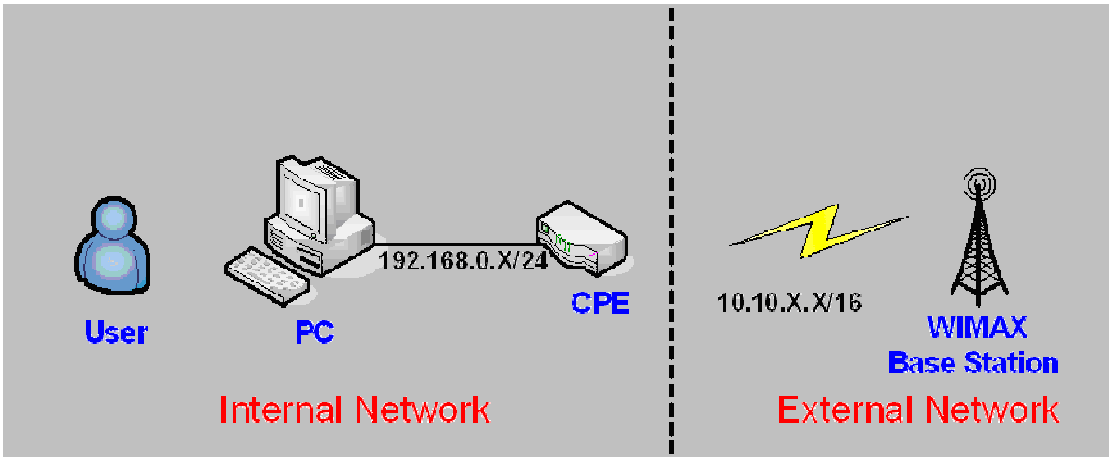
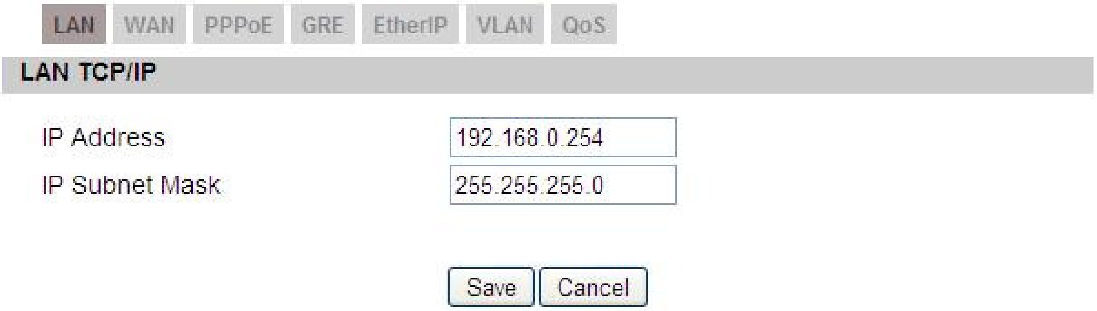


Figure 14 Network Topology

5.1. Bridge/NAT mode

5.1.1. LAN

From the “Networking>Bridge/NAT mode>LAN” window, user can update the LAN information as shown in Figure 15. The definition for each field is shown on Table 7.



LAN TCP/IP

IP Address 192.168.0.254

IP Subnet Mask 255.255.255.0

Figure 15 Networking>Bridge/NAT mode>LAN

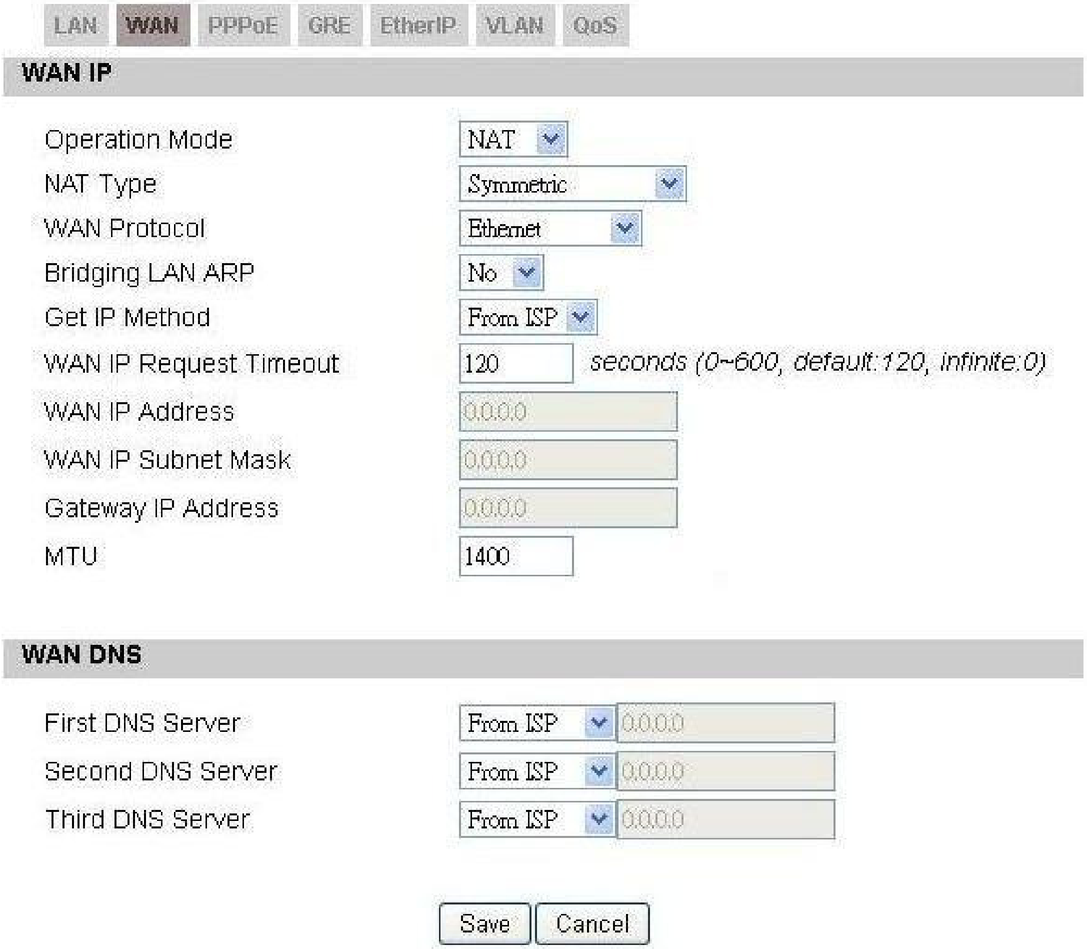
Name	Description
LAN TCP/IP	

Name	Description
IP Address	IP address of CPE
IP Subnet Mask	Subnet Mask of CPE
Save	Commits the changes made, and set the LAN IP information, some services will be reloaded.
Cancel	Reset the fields to the last saved values

Table 7 Field definition for Networking>Bridge/NAT mode>LAN

5.1.2. WAN

In Figure 16, it demonstrates how to configure WAN settings on CPE web page. The definition for each field is shown on Table 8.



WAN IP

Operation Mode	NAT
NAT Type	Symmetric
WAN Protocol	Ethernet
Bridging LAN ARP	No
Get IP Method	From ISP
WAN IP Request Timeout	120 seconds (0~600, default:120, infinite:0)
WAN IP Address	0.0.0.0
WAN IP Subnet Mask	0.0.0.0
Gateway IP Address	0.0.0.0
MTU	1400

WAN DNS

First DNS Server	From ISP	0.0.0.0
Second DNS Server	From ISP	0.0.0.0
Third DNS Server	From ISP	0.0.0.0

Figure 16 Networking>Bridge/NAT mode>WAN

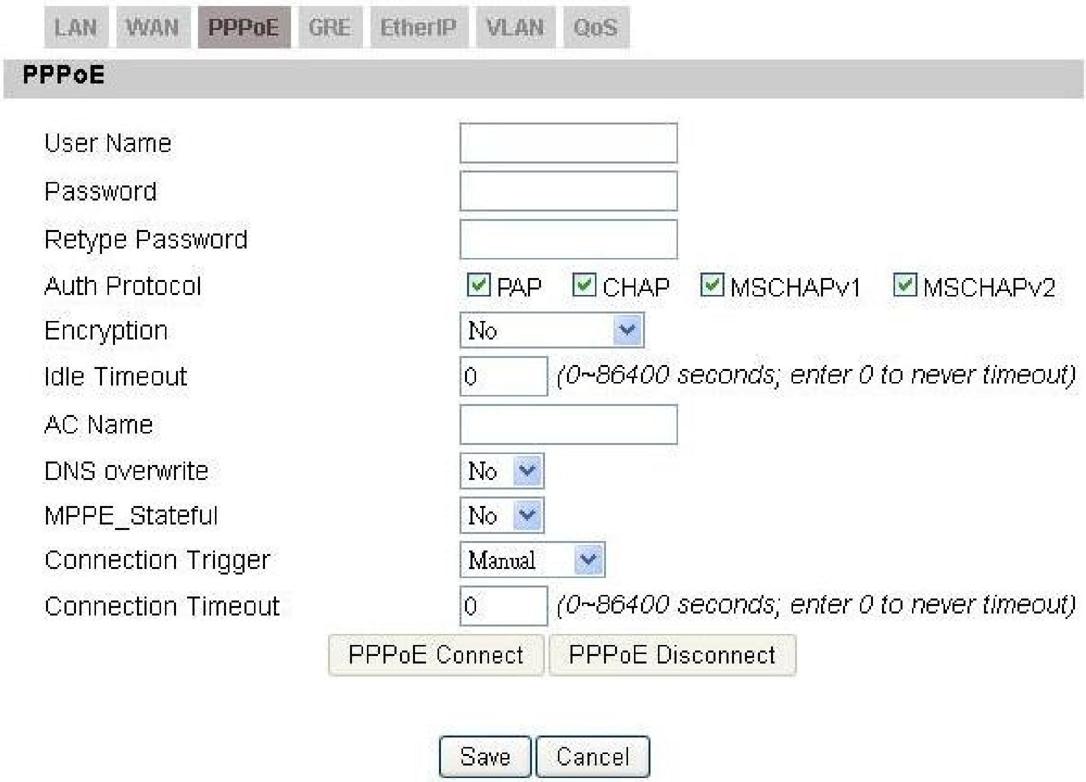
Name	Description
WAN IP	
Operation Mode	Select the WAN operation mode ● Bridge ● Routing ● NAT
NAT Type	Select the NAT Type ● Symmetric, ● Full cone, ● Restricted cone, ● Port-Restricted cone,
WAN Protocol	Select the WAN encapsulation protocol ● Ethernet ● PPPoE ● GRE Tunnel ● EtherIP Tunnel
Bridging LAN ARP	Allow Bridging LAN ARP ● Yes ● No
Get IP Method	Select the IP method ● From ISP ● User
WAN IP Request Timeout	The time the DHCP client waits to receive the IP address from the BS. If it doesn't get the IP, it will timeout and the CPE will disconnect the WiMAX connection. The default value is 120 seconds. If user enters 0, it will wait to receive the IP address infinitely until it's stopped by the user.
WAN IP Address	If user chooses "Static" for IP Method, user should enter the WAN IP address
WIN IP Subnet Mask	If user chooses "Static" for IP Method, user should enter the WAN IP subnet mask.
Gateway IP Address	If user chooses "Static" for IP Method, user should enter IP gateway address
MTU	Enter the MTU

Name	Description
WAN DNS	
First DNS Server Second DNS Server Third DNS Server	User can specify three DNS servers and select how the DNS Server is assigned. There are three options for assigning the DNS server. ● From ISP ● User Defined If user selects "User Define", user needs to enter a valid IP address for the DNS server.
Save	Commit the changes made and save to CPE, after clicking the Save button user will get a message asking if user wants to reboot the CPE. Reboot is necessary for the device to switch to a different profile.
Cancel	Reset field to the last saved values

Table 8 Field definition for Networking>Bridge/NAT mode>WAN

5.1.3. PPPoE

In Figure 17, it demonstrates how to configure PPPoE on CPE web page. The definition for each field is shown on Table 9.



PPPoE

User Name	
Password	
Retype Password	
Auth Protocol	☑ PAP ☑ CHAP ☑ MSCHAPv1 ☑ MSCHAPv2
Encryption	No
Idle Timeout	0 *(0~86400 seconds; enter 0 to never timeout)*
AC Name	
DNS overwrite	No
MPPE_Stateful	No
Connection Trigger	Manual
Connection Timeout	0 *(0~86400 seconds; enter 0 to never timeout)*

Figure 17 Networking>Bridge/NAT mode>PPPoE

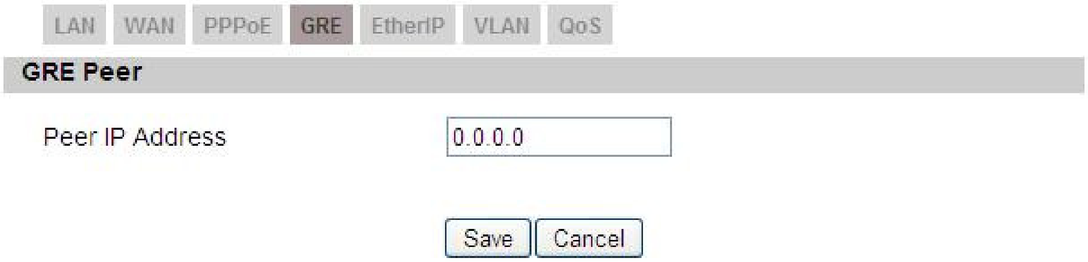
Name	**Description**
PPPoE	
User Name	The user name to connect PPPoE server via the selected Auth Protocol
Password	The password of the corresponding username
Retype Password	Type the “Password” again
Auth Protocol	The authentication protocol of the peer required. Select which Authentication protocol to use. ● PAP ● CHAP ● MSCHAPv1 ● MSCHAPv2
Encryption	Encryption Scheme ● No ● MPPE 40 bits: 40-bit encryption with MPPE ● MPPE 128 bits: 128-bit encryption with MPPE ● Auto: automatically selected

Name	Description
Idle Timeout	Disconnect if the link is idle for the assigned seconds
AC Name	The name of the access concentrator to connection to
DNS Overwrite	● Yes ● No
MPPE_Stateful	● Yes ● No
Connection Trigger	● Always On ● Manual
Connection Timeout	Time to attempt to connect, if connection attempt fails after that time it will halt attempting to connect
Save	Commit the changes made and save to CPE, after clicking the Save button user will get a message asking if user wants to reboot the CPE. Reboot is necessary for the device to switch to a different profile.
Cancel	Reset field to the last saved values

Table 9 Field definition for Networking>Bridge/NAT mode>PPPoE

5.1.4. GRE

In Figure 18, it demonstrates how to configure GRE on CPE web page. The definition for each field is shown on Table 9.



GRE Peer

Peer IP Address 0.0.0.0

Figure 18 Networking>Bridge/NAT mode>GRE

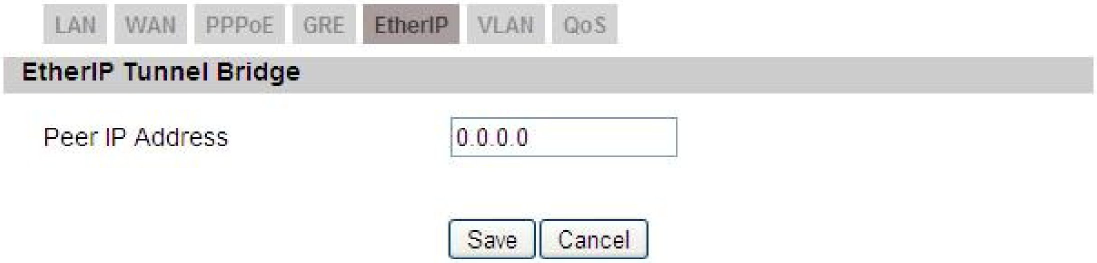
Name	Description
GRE Peer	
Peer IP Address	Enter the IP address of its GRE Peer

Name	Description
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 10 Field definition for Networking>Bridge/NAT mode>GRE

5.1.5. EtherIP

In Figure 19, it demonstrates how to configure EtherIP on CPE web page. The definition for each field is shown on Table 9.



Peer IP Address: 0.0.0.0

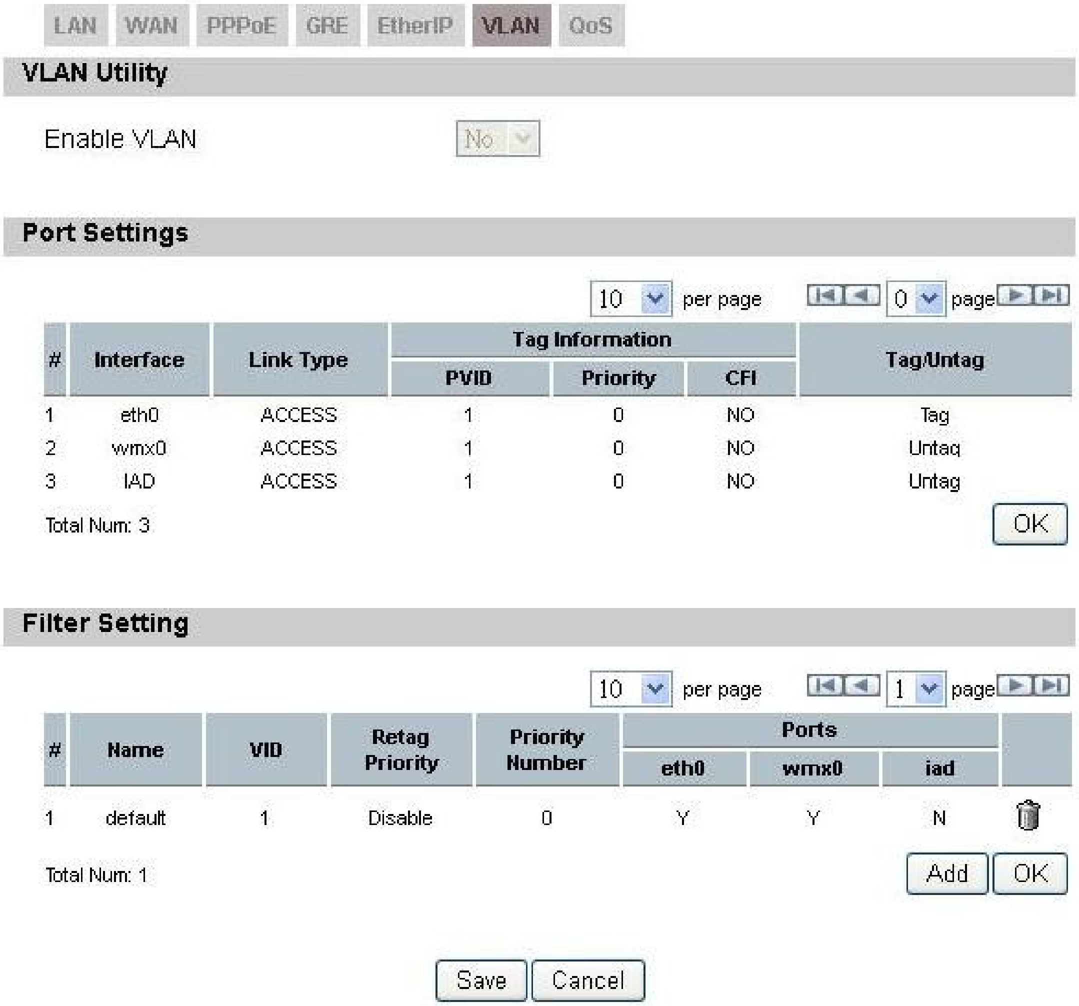
Figure 19 Networking>Bridge/NAT mode>EtherIP

Name	Description
EtherIP Tunnel Bridge	
Peer IP Address	Enter the IP address of its EtherIP Peer
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 11 Field definition for Networking>Bridge/NAT mode>EtherIP

5.1.6. VLAN

In Figure 20Figure 17, it demonstrates how to configure VLAN on CPE web page. The definition for each field is shown on Table 12.



VLAN Utility

Enable VLAN: No

Port Settings

#	Interface	Link Type	Tag Information			Tag/Untag
			PVID	Priority	CFI	
1	eth0	ACCESS	1	0	NO	Tag
2	wmx0	ACCESS	1	0	NO	Untag
3	IAD	ACCESS	1	0	NO	Untag

Total Num: 3

Filter Setting

#	Name	VID	Retag Priority	Priority Number	Ports			
					eth0	wmx0	iad	
1	default	1	Disable	0	Y	Y	N	🗑

Total Num: 1

Figure 20 Networking>Bridge/NAT mode>VLAN

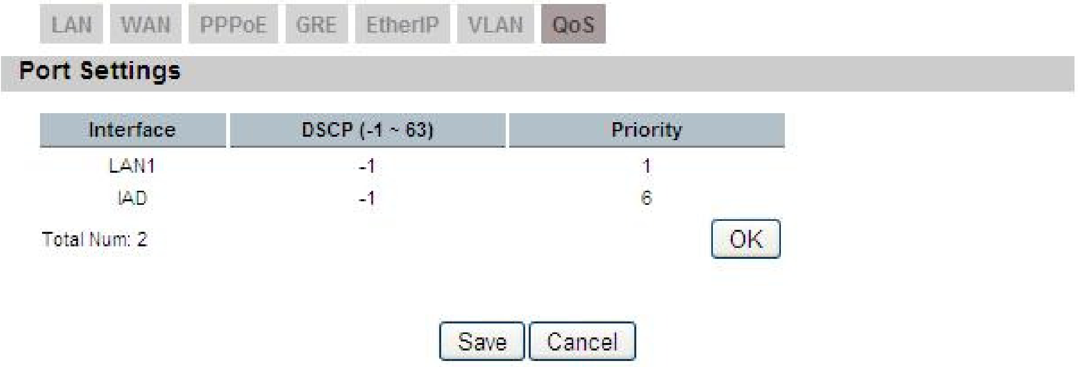
Name	Description
VLAN Utility	
Enable VLAN	Set the WAN mode to Bridge to allow VLAN to be enabled, otherwise it will be disabled.
Port Settings	
Display per page	Enter the number of interfaces displayed per page, if there are more than can be the number given, then you can use the navigation buttons to go to the next page. Number of allowed display per page are as follows: 10, 20, 30, 50, 80, 100.
Edit Mode	To edit any of the editable fields you need to click on the field you want to edit, all the available editable field for

Name	Description
	that entry will be available for editing.
OK	Click the OK button to exit edit mode.
Filter Setting	
Display per page	Same as Port Settings Display per page.
Edit Mode	To edit any of the editable fields you need to click on the field you want to edit, all the available editable fields for that entry will be available for editing.
Add	Click the Add button to add a new entry.
OK	Click the OK button to exit edit mode.
Save	Commit the changes made and save to CPE.
Cancel	Reset field to the last saved values

Table 12 Field definition for Networking>Bridge/NAT mode>VLAN

5.1.7. QoS

In Figure 21, it demonstrates how to configure QoS on CPE web page. The definition for each field is shown on Table 13.



Port Settings

Interface	DSCP (-1 ~ 63)	Priority
LAN1	-1	1
IAD	-1	6

Total Num: 2

Figure 21 Networking>Bridge/NAT mode>QoS

Name	Description
Port Settings	
	Click on any of the fields to enable edit mode. User can exit edit mode by clicking the OK button. Priority levels allowed are from 1-6.

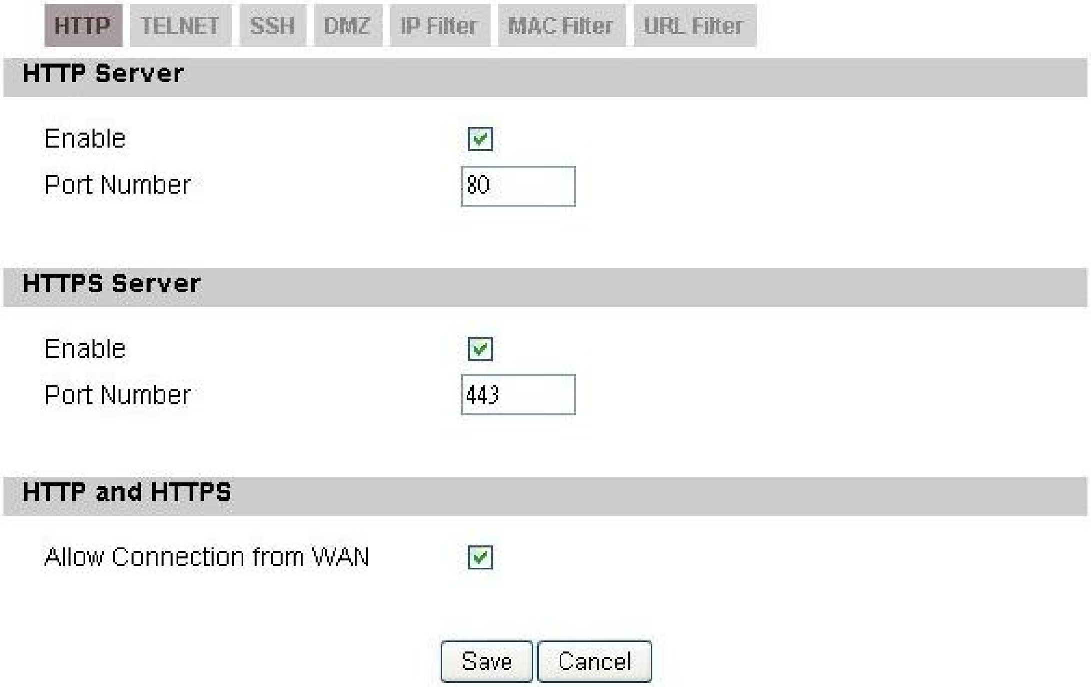
Name	Description
OK	Exit the edit mode.
Save	Commit the changes made and save to CPE,
Cancel	Reset field to the last saved values

Table 13 Field definition for Networking>Bridge/NAT mode>QoS

5.2. Firewall

In networking, firewalls are used to block un-wanted traffic. It will prevent unauthorized devices to enter a trusted network.

5.2.1. HTTP



HTTP Server

Enable ☑

Port Number 80

HTTPS Server

Enable ☑

Port Number 443

HTTP and HTTPS

Allow Connection from WAN ☑

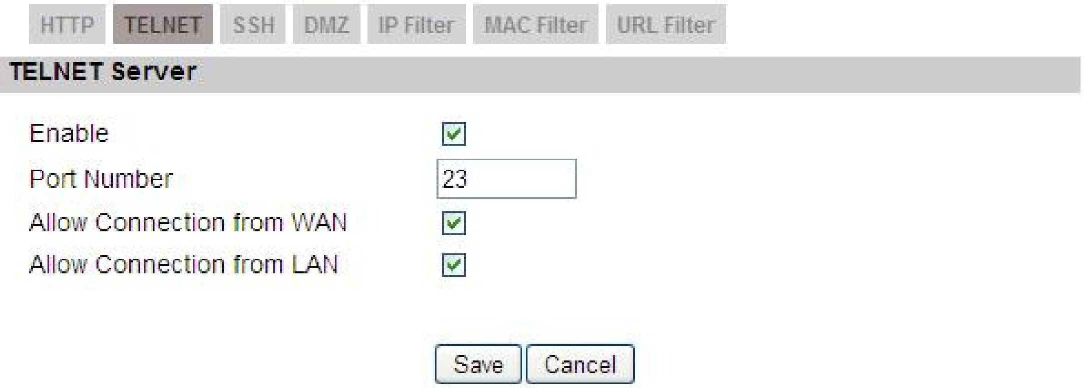
Figure 22 Networking>Firewall>HTTP

Name	Description
HTTP Server	
Enable	Check the box to allow http connections.
Port Number	Enter the http port number (default is port 80)

Name	Description
HTTPS Server	
Enable	Check the box to allow https connections.
Port Number	Enter the https port number (default is port 443)
HTTP and HTTPS	
Allow Connection from WAN	Check the check-box to allow connections from WAN.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 14 Field definition for Networking>Firewall>HTTP

5.2.2. TELNET



TELNET Server

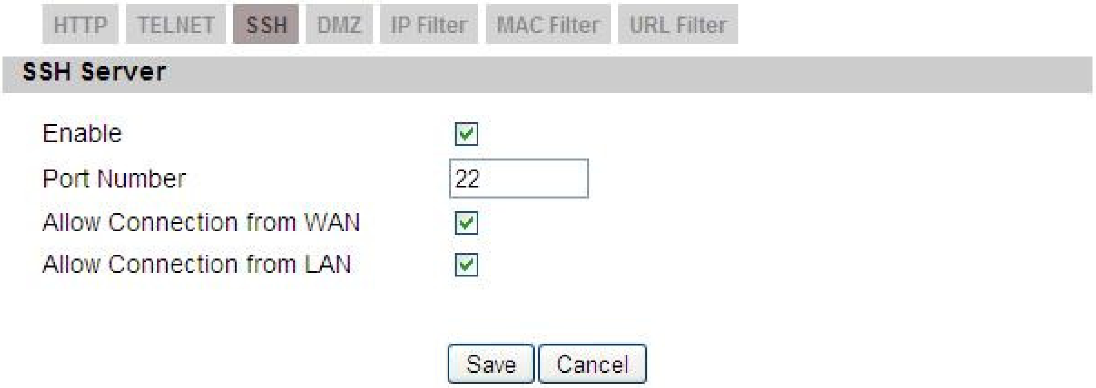
Enable	☑
Port Number	23
Allow Connection from WAN	☑
Allow Connection from LAN	☑

Figure 23 Networking>Firewall>TELNET

Name	Description
TELNET Server	
Enable	Check the box to allow Telnet connections.
Port Number	Enter the Telnet port number (default is port 23)
Allow Connection from WAN	Check the check-box to allow connections from WAN.
Allow Connection from LAN	Check the check-box to allow connections from LAN.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 15 Field definition for Networking>Firewall>TELNET

5.2.3. SSH



SSH Server

Enable ☑

Port Number 22

Allow Connection from WAN ☑

Allow Connection from LAN ☑

Figure 24 Networking>Firewall>SSH

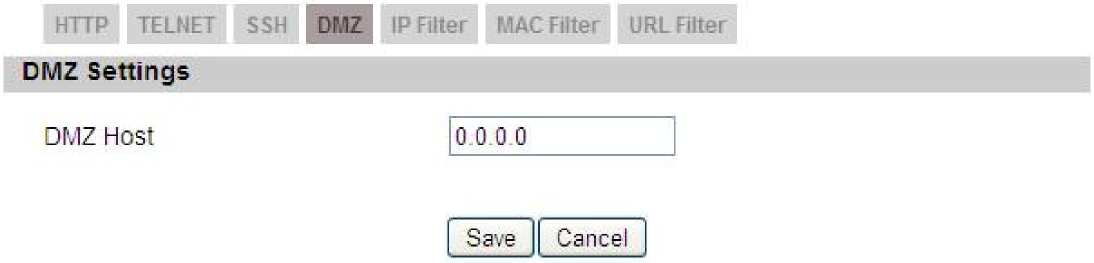
Name	Description
SSH Server	
Enable	Check the box to allow SSH connections.
Port Number	Enter the SSH port (default is port 22)
Allow Connection from WAN	Check the check-box to allow connections from WAN.
Allow Connection from LAN	Check the check-box to allow connections from LAN.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 16 Field definition for Networking>Firewall>SSH

5.2.4. DMZ

DMZ stands for Demilitarized Zone. It is a physical or logical sub-network that contains and exposes an organization's external services to a larger un-trusted network, usually the Internet. The term is normally referred to as a DMZ by IT professionals. It is sometimes referred to as a Perimeter Network. The purpose of a DMZ is to add an additional layer of security to an organization's LAN; an external attacker only has access to equipment in the DMZ, rather than any other part of the network.

The "Networking>Firewall>DMZ" tab allows user to configure a DMZ host IP address as shown in Figure 25. In DMZ Settings, user needs to enter the IP address of the DMZ host. The "Save" button will save the changes to CPE and the "Cancel" button will reset the field to last saved value. It will disable DMZ host when entering "0.0.0.0".



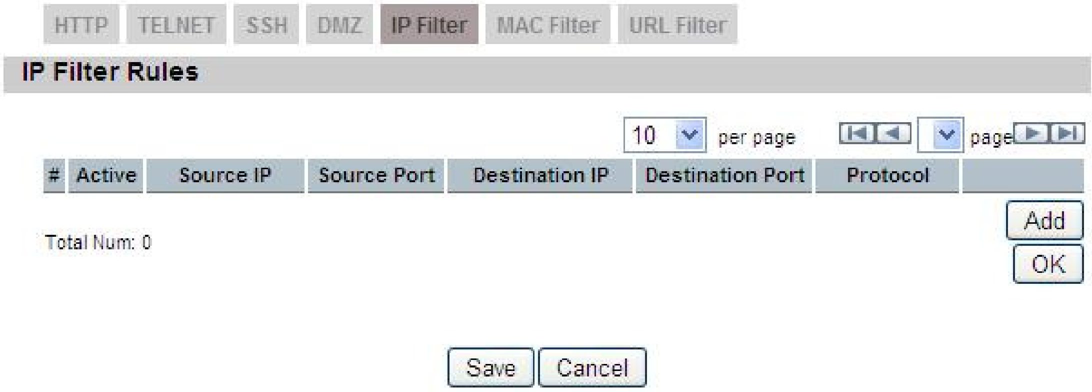
DMZ Settings

DMZ Host: 0.0.0.0

Figure 25 Networking>Firewall>DMZ

5.2.5. IP Filiter

The IP filter rules will drop or discard traffic that fits the filter criteria. User can define IP filter rules as shown in Figure 26. The definition for each field is shown on Table 17.



IP Filter Rules

10 per page

#	Active	Source IP	Source Port	Destination IP	Destination Port	Protocol	

Total Num: 0

Figure 26 Networking>Firewall>IP Filter

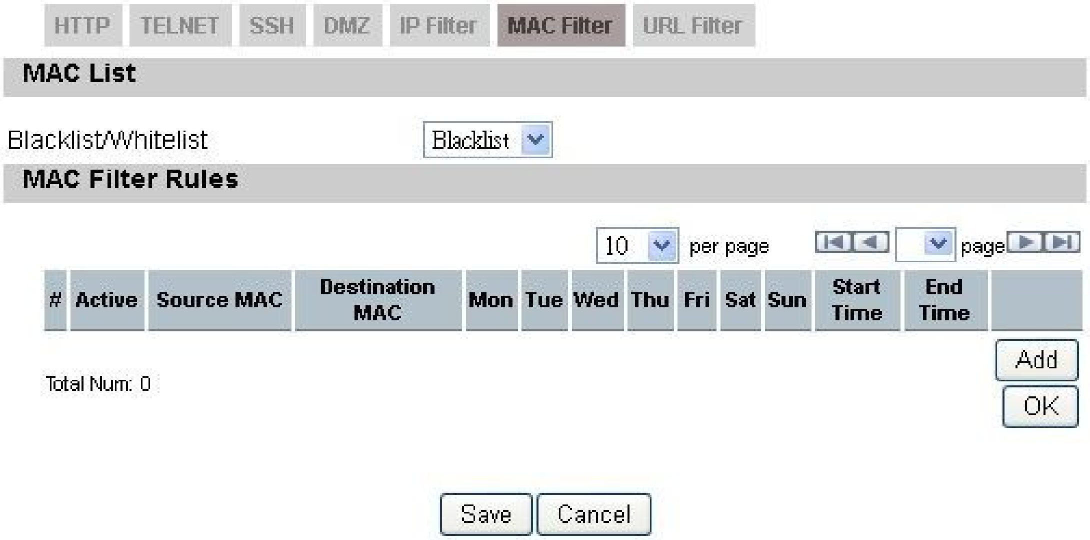
Name	Description
IP Filter Rules	

Name	Description
Add	Click the "Add" button to create a new IP Filter rule
OK	Click the "OK" button will exit the table edit mode
Active	Check the box to activate the IP Filter rule
Source IP	Source IP to filter on. It can be in one of the following formats: IP address (ex. 192.168.0.222) Subnet (ex. 192.168.1.0/24) IP range (ex. 192.168.0.150~192.168.0.160) 0.0.0.0/0 means any
Source Port	Source Port to filter on. It can be one of the following formats: Port number (ex. 8080) Port Range (ex. 1024~2048)
Destination IP	Destination IP to filter on. It can be in one of the following formats: IP address (ex. 192.168.0.222) Subnet (ex. 192.168.1.0/24) IP range (ex. 192.168.0.150~192.168.0.160) 0.0.0.0/0 means any
Destination Port	Destination port to filter on. It can be one of the following formats: Port number (ex. 8080) Port Range (ex. 1024~2048)
Protocol	Protocol to filter on
Trash	Delete the IP Filter rule
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 17 Field definition for Networking>Firewall>IP Filter

5.2.6. MAC Filiter

The MAC filter rules will drop or discard traffic that the filter criteria. User can define MAC filter rules as shown in Figure 27. The definition for each field is shown on Table 18.



MAC List

Blacklist/Whitelist: Blacklist

MAC Filter Rules

#	Active	Source MAC	Destination MAC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	

Total Num: 0

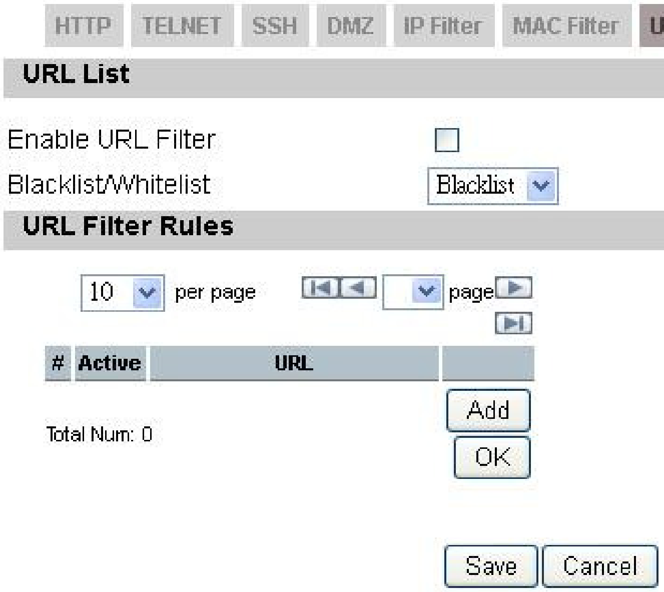
Figure 27 Networking>Firewall>MAC Filter

Name	Description
MAC List	
Blacklist/Whitelist	Blacklist or Whitelist
MAC Filter Rules	
Active	Enable/Disable this rule
Source MAC	Source MAC address of filter rule
Destination MAC	Destination MAC address of filter rule
Day of the Week	What day to activate the rule
Start Time	What time to start
End Time	Rule Activated period
Trash	Delete the MAC Filter rule
Add	Click the "Add" button to create a new MAC Filter rule
OK	Click the "OK" button will exit the table edit mode
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 18 Field definition for Networking>Firewall>MAC Filter

5.2.7. URL Filiter

Content Filter is used to filter WWW traffic by URL. Currently, the white/black list is maintained by OpenDNS (http://www.opendns.com). If user wants to use this function, an OpenDNS account should be applied first.



Enable URL Filter □

Blacklist/Whitelist Blacklist

10 per page

Total Num: 0

Figure 28 Networking>Firewall>URL Filter

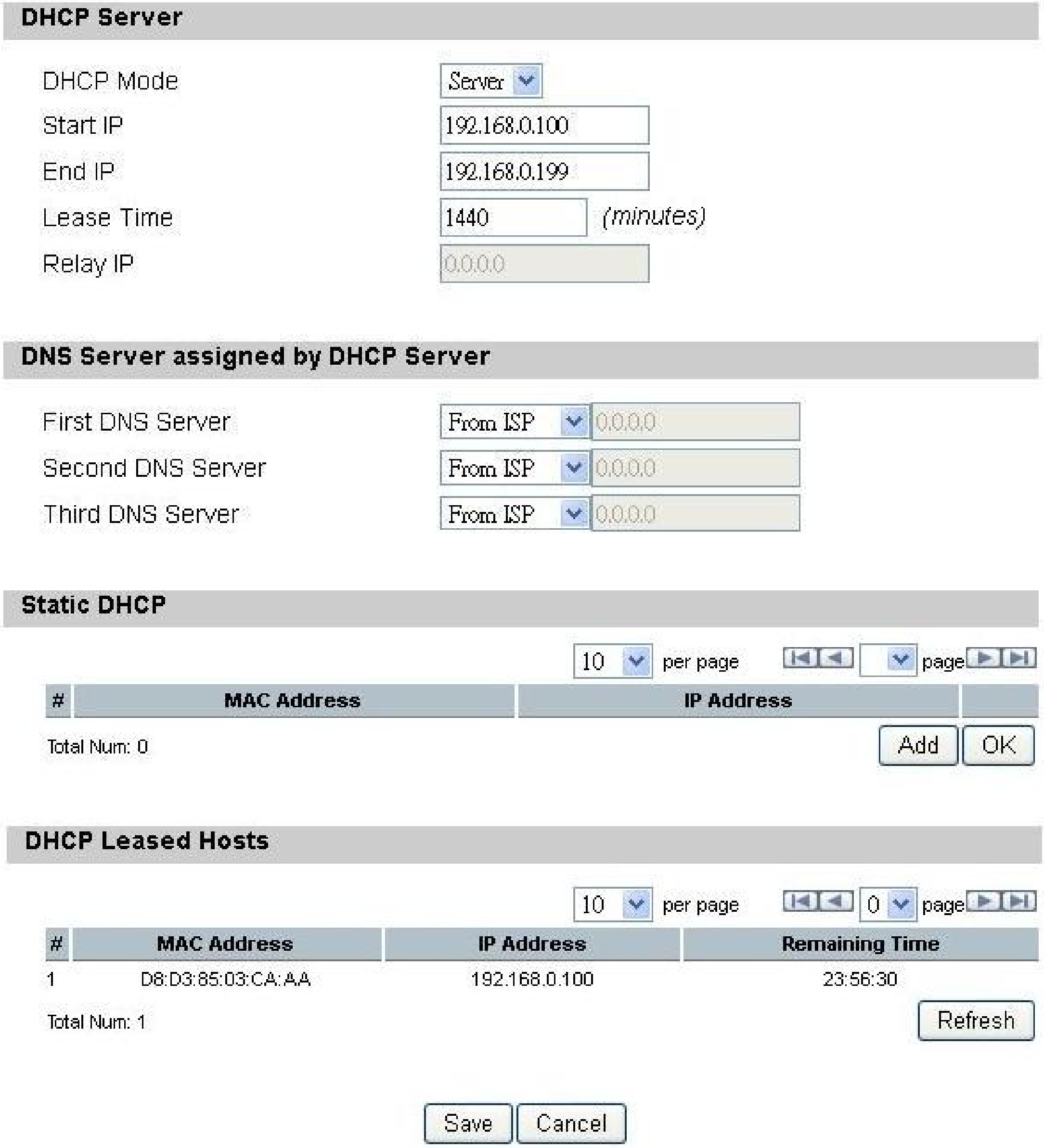
Name	Description
URL List	
Enable Content Filter	Check the check box to enable Content Filter
Blacklist/Whitelist	Select Blacklist or Whitelist
URL Filter Rules	
Add	Add a new URL filter rule
Trash	Delete a URL filter rule
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 19 Field definition for Networking>Firewall>URL Filter

5.3. DHCP Server

Use the “Networking> DHCP Server” tab to configure the DHCP server information. The default DHCP Server setup is enabled, and user could disable this function from setup as shown in Figure 29. When user disables the DHCP server, it requires setting a static IP address on host PC for CPE to configure. Please be noted that without the static IP address set properly on the host PC, user can not open the CPE web page for configuration.

When DHCP server is enabled, user needs to define the IP pool range for dynamically assigning the IP address. The advantage of using DHCP server is that the addresses which are no longer in use will be returned to the IP address pool so that the server can reallocate them to other machines in the network. There are three DNS servers the user can configure to assign an IP address. Static DHCP will assign an IP address on the LAN to a specific device based on its MAC address. The definition for each field is shown on Table 20.



DHCP Server

DHCP Mode	Server
Start IP	192.168.0.100
End IP	192.168.0.199
Lease Time	1440 *(minutes)*
Relay IP	0.0.0.0

DNS Server assigned by DHCP Server

First DNS Server	From ISP	0.0.0.0
Second DNS Server	From ISP	0.0.0.0
Third DNS Server	From ISP	0.0.0.0

Static DHCP

10 per page page

#	MAC Address	IP Address	

Total Num: 0

DHCP Leased Hosts

10 per page 0 page

#	MAC Address	IP Address	Remaining Time
1	D8:D3:85:03:CA:AA	192.168.0.100	23:56:30

Total Num: 1

Figure 29 Networking>DHCP Server

Name	**Description**
DHCP Server	
DHCP Mode	Select DHCP mode: ● None: disable DHCP mode. ● Server: enable DHCP server mode ● Relay: enable DHCP relay mode
DHCP start IP address	Starting IP address range

Name	**Description**
DHCP end IP address	Ending IP address range
Lease Time	The lease time is a controlled time period, allowing the DHCP server to reclaim (and then reallocate) IP addresses that are not renewed (dynamic re-use of IP addresses). Lease time is measured in minutes in the Configuration Manager.
Relay IP	Enter the IP address of DHCP relay.
DNS Server assigned by DHCP Server	
First DNS Server Second DNS Server Third DNS Server	User can specify three DNS servers and select how the DNS Server is assigned. There are three options for assigning the DNS server. ● From ISP ● User Defined ● None If user selects "None", then the DHCP server will not give clients the DNS server information. If all the three DNS servers setting are set to "None", then the DHCP server will use the LAN IP address as the DNS server information for the clients. If the user chooses "User Defined" and leaves the IP address as "0.0.0.0" it will change the field to "None".
Static DHCP	
Static DHCP	Enter MAC address and IP address for static DHCP addresses.
Add	Click on the "Add" button to enter a static leased IP address. Enter the MAC address of the Ethernet device and enter the IP address.
OK	Click the "OK" button to exit out of edit mode.
DHCP Leased Hosts	
DHCP Leased Hosts	List of Leased IP addresses. The "Refresh" button will display an updated list of leased addresses.
Save	Commit the changes made and save to CPE, some services will be reloaded.
Cancel	Reset fields to the last saved values.

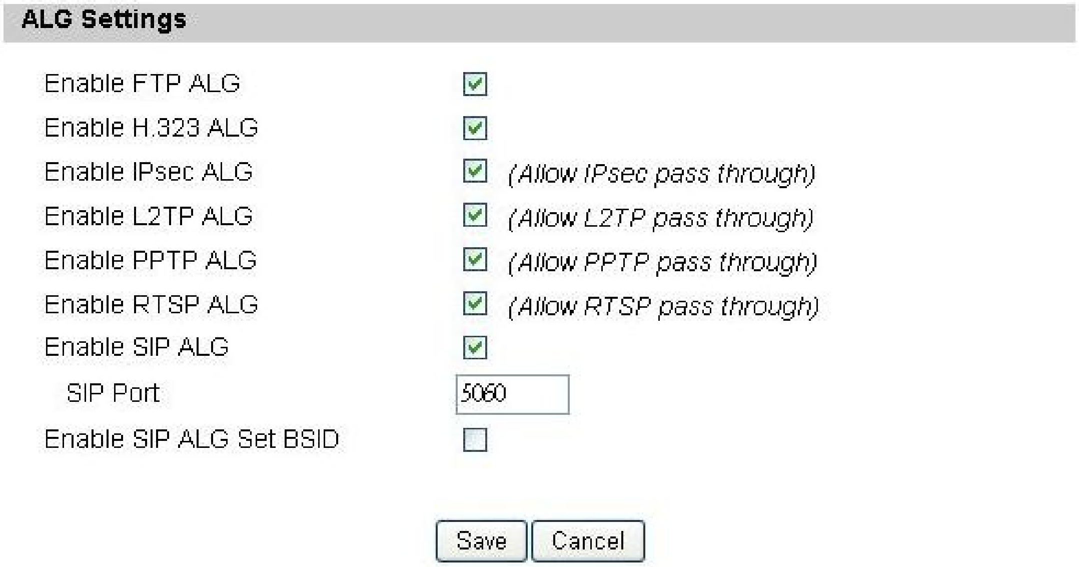
Table 20 Field definition for Networking>DHCP Server

5.4. NAT ALG

There are some ALG settings that user can enable from “Networking>NAT ALG”. ALG allows legitimate application traffic to pass through the CPE that would have otherwise restricted. Without ALGs, some application may not work well because of NAT/firewall settings. User could click on the check box to enable ALGs.

Note: If user is using any of these types of application protocols user needs to enable them in the ALG settings.

- FTP ALG
- H.323 ALG
- IPsec ALG
- L2TP ALG
- PPTP ALG
- RTSP ALG
- SIP ALG
  - SIP Port
- SIP ALG Set BSID



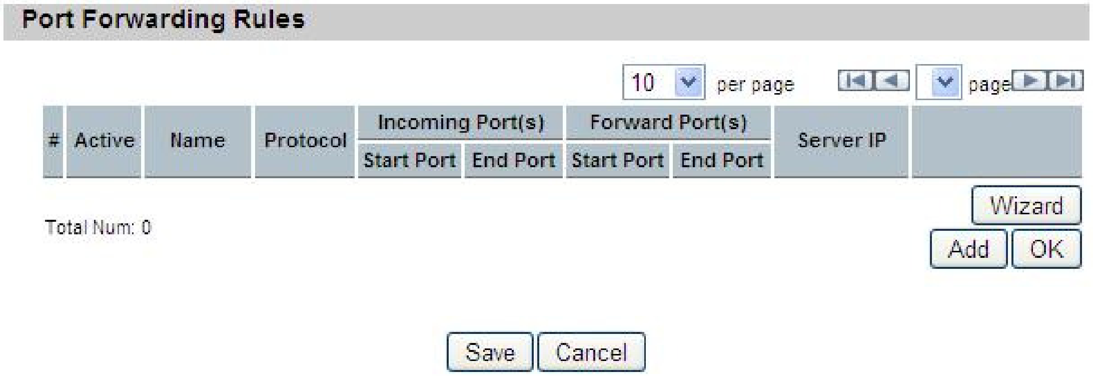
ALG Settings

Enable FTP ALG	☑	
Enable H.323 ALG	☑	
Enable IPsec ALG	☑	*(Allow IPsec pass through)*
Enable L2TP ALG	☑	*(Allow L2TP pass through)*
Enable PPTP ALG	☑	*(Allow PPTP pass through)*
Enable RTSP ALG	☑	*(Allow RTSP pass through)*
Enable SIP ALG	☑	
SIP Port	5060	
Enable SIP ALG Set BSID	□	

Figure 30 Networking>NAT ALG

5.5. Forwarding

Forwarding is the act of forwarding the data from WAN side to the particular port of the private IP. This function can allow remote computers to reach a port on a private IP address within a private LAN. In the following, it will introduce how to setup for Port Forward. First, user needs to click the “Add” button and then select which forward type, TCP or UDP or TCP/UDP, is preferred to trigger the special application as shown in Figure 31 and Figure 32. User needs to assign some specific port for the WAN IP to be forwarded to the defined LAN IP and port, and then click the “Save” button to add a Port Forward rule. The definition for each field is shown on Table 21.

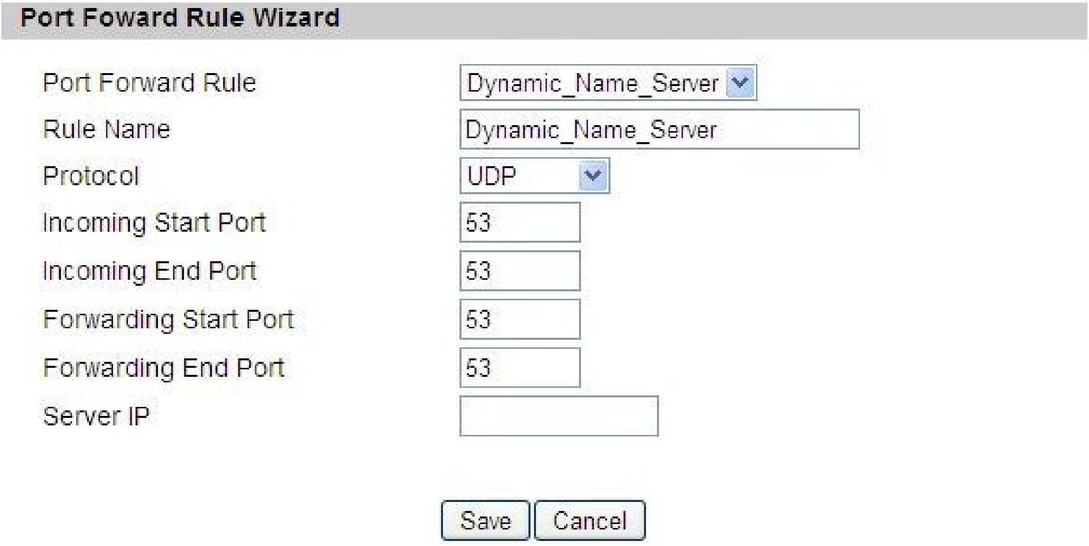


Port Forwarding Rules

#	Active	Name	Protocol	Incoming Port(s)		Forward Port(s)		Server IP	
				Start Port	End Port	Start Port	End Port		

Total Num: 0

Figure 31 Networking>Forwarding



Port Foward Rule Wizard

Port Forward Rule	Dynamic_Name_Server
Rule Name	Dynamic_Name_Server
Protocol	UDP
Incoming Start Port	53
Incoming End Port	53
Forwarding Start Port	53
Forwarding End Port	53
Server IP	

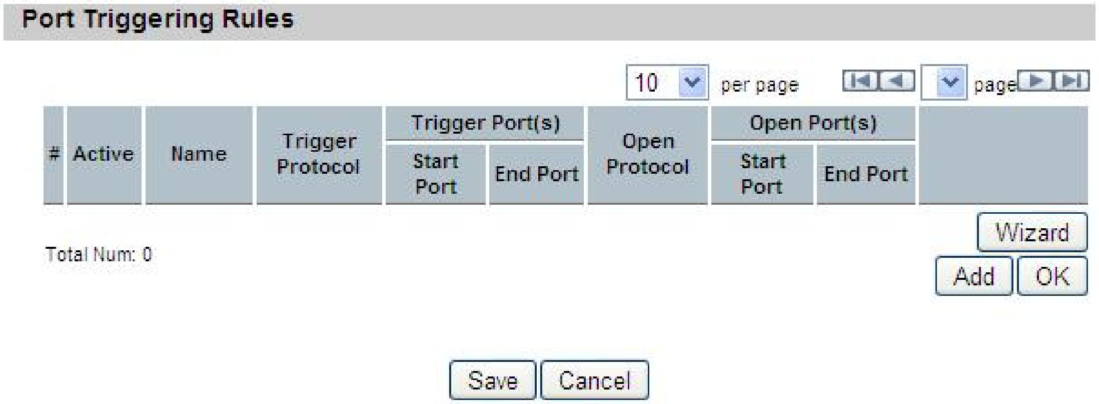
Figure 32 Networking>Forwarding>Wizard

Name	Description
Port Forwarding Rules	
Active	Check the box to active the port forward rule
Name	Name of the port forward rule
Protocol	User needs to define the desired protocol for rule. Available options are: TCP, UDP, or TCP/UDP
Incoming Port(s)	User needs to define incoming port range for port forwarding rule.
Forward Port(s)	User needs to define to which port range will be translated for port forwarding rule. The packet will be forwarded to one of these ports if it matches the rule.
Server IP	User needs to define which IP address will be translated to if it matches the Port Forwarding rule. The packet will be forwarded to this IP address if it matches the rule.
Trash	Delete the Port Forward rule
Wizard	Click the ”Wizard” button to go to the Port Forward Rule Wizard
Add	Click the “Add” button to create a new Port Forward rule
OK	Click the “OK” button to exit table edit mode
Save	Commit the changes made and save to the CPE
Cancel	Reset field to the last saved values.

Table 21 Field definition for Networking>Forwarding

5.6. Trigger

The “Networking>Trigger” allows user to configure Port Trigger rules. Port Trigger is a way to automate port forwarding in which outbound traffic on predetermined ports (‘trigger port’) causes inbound traffic to specific incoming ports to be dynamically forwarded to the initiating host, while the outbound ports are in use. This allows users behind CPE on the LAN to provide services that would normally require the computer to have IP address on the LAN. Port triggering triggers an open incoming port (‘open port’) when a client on the local network makes an outgoing connection on a predetermined port or range of ports. The definition for each field is shown on Table 22.



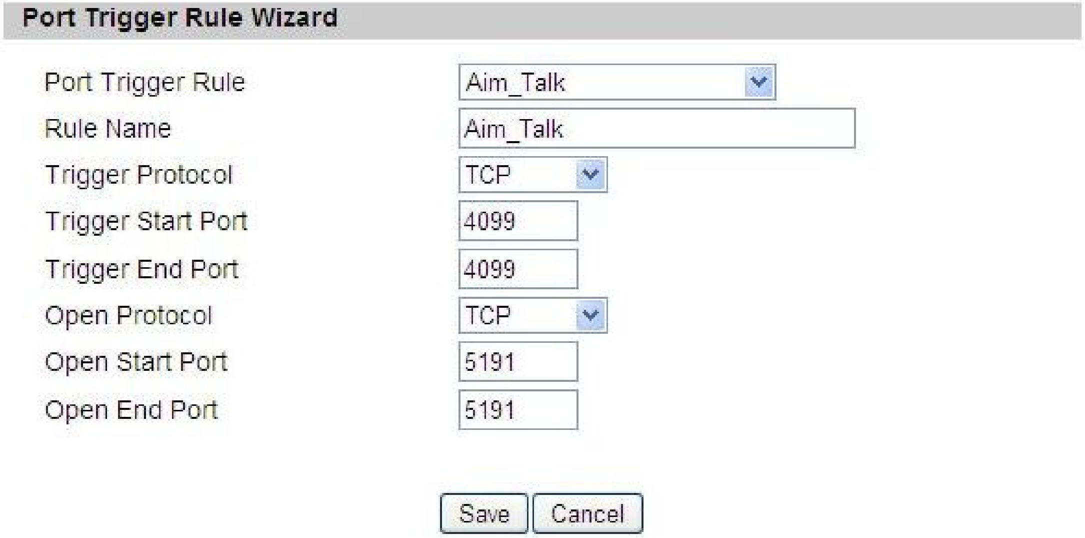
Port Triggering Rules

10 per page page

#	Active	Name	Trigger Protocol	Trigger Port(s)		Open Protocol	Open Port(s)		
				Start Port	End Port		Start Port	End Port	

Total Num: 0

Figure 33 Networking>Trigger



Port Trigger Rule Wizard

Port Trigger Rule	Aim_Talk
Rule Name	Aim_Talk
Trigger Protocol	TCP
Trigger Start Port	4099
Trigger End Port	4099
Open Protocol	TCP
Open Start Port	5191
Open End Port	5191

Figure 34 Networking>Trigger>Wizard

Name	Description
Port Triggering Rules	
Active	Check the box to active the Port Trigger rule
Name	Name of the Port Trigger rule
Trigger Protocol	It defines which protocol the outgoing packet used will trigger the rule. Available options are TCP, UDP or TCP/UDP
Trigger Port(s)	It defines which port range the outgoing packet will trigger the rule. User needs to enter the starting and ending port range
Open Protocol	It defines which protocol will be opened if the rule had

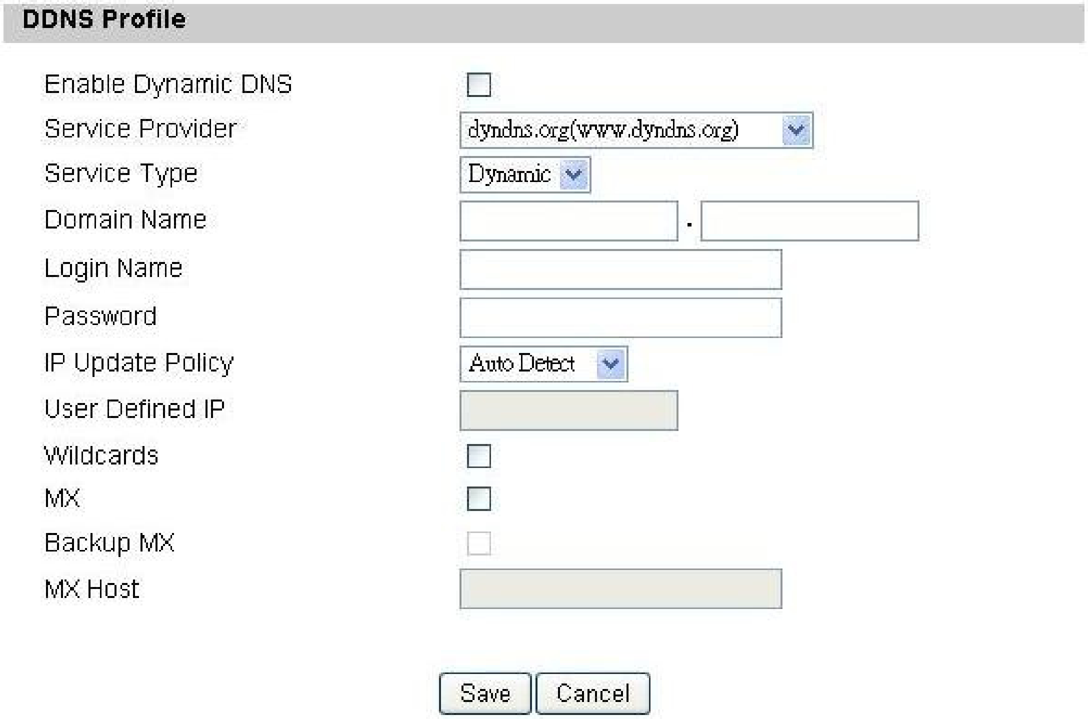
Name	Description
	been triggered. Available options are TCP, UDP or TCP/UDP
Open Port(s)	It defines which protocol port will be opened if the rule had been triggered. User needs to enter the starting and ending port range
Trash	Delete the Port Trigger rule
Wizard	Click the ”Wizard” button to go to the Port Trigger Rule Wizard
Add	Click the “Add” button to enter a Port Trigger rule
OK	Click the “OK” button to exit, table edit mode.
Save	Commit the changes made and save to the CPE
Cancel	Reset fields to the last saved values

Table 22 Field definition for Networking>Trigger

5.7. DDNS

DDNS stands for Dynamic Domain Name Services. It provides a function to convert the domain name to the unique IP address. With DDNS, users is able to find and connect to CPE no matter what IP address CPE is currently using, that is, DDNS can map CPE's dynamic IP address to a static hostname. The best profit of this function allows user to access CPE from everywhere.

In Figure 35, it demonstrates how to configure DDNS on CPE web page. The definition for each field is shown on Table 23.



DDNS Profile

Enable Dynamic DNS	□
Service Provider	dyndns.org(www.dyndns.org)
Service Type	Dynamic
Domain Name	.
Login Name	
Password	
IP Update Policy	Auto Detect
User Defined IP	
Wildcards	□
MX	□
Backup MX	□
MX Host	

Figure 35 Networking>DDNS

Name	**Description**
DDNS Profile	
Enable Dynamic DNS	Click the check box to enable dynamic DNS
Service Provider	Enter the URL of the Service Provider
Service Type*	Enter the service type (DYNDNS only) ● Dynamic ● Static ● Custom
Domain Name	Enter the domain name
Login Name	Enter the username
Password	Enter the password
IP Update Policy	Select the Policy to be used ● Auto Detect ● WAN IP ● User Defined
User Defined IP	If user selects "User Defined" as the IP policy, user has to enter the IP address.
Wildcards*	Allow hostname to use wildcards such as "*". It will allow

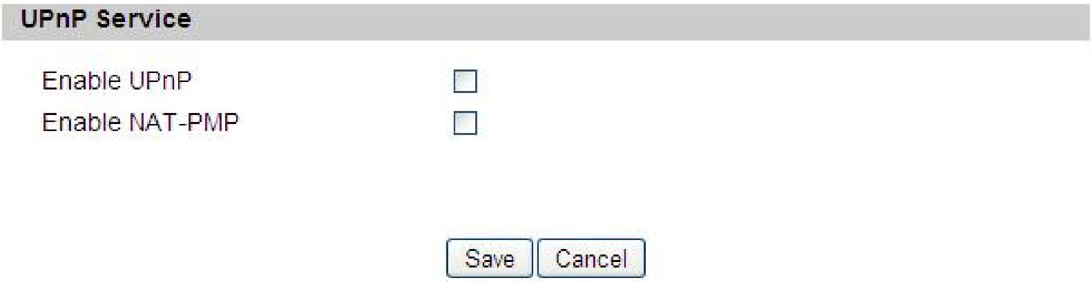
Name	Description
	"*host.dyndns.org" to be aliased to the same IP address as "host.hyndns.org"
MX*	Enable mail routing
Backup MX*	Enable Second mail routing
MX Host*	Host that mail will be routed to
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Note: * Supported by DYNDNS service provider.

Table 23 Field definition for Networking>DDNS

5.8. UPnP

Two methods of simplifying the process of connecting a device to the network are available as shown in Figure 36. UPnP allows devices to connect seamlessly to networks in the home (data sharing, communications, and entertainment) and in corporate environments for simplified installation of computer components. NAT Port Mapping Protocol (NAP-PMP) allows a computer in a private network (behind a NAT router) to automatically configure the router to allow parties outside the private network to contact itself. The definition for each field of UPnP Setting is shown on Table 24.



UPnP Service

Enable UPnP □

Enable NAT-PMP □

Figure 36 Networking>UPnP

Name	Description
UPnP Service	
Enable UPnP	Check the check box to enable UPnP

Name	Description
Enable NAT-PMP	Check the check box to enable NAT-PMP
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 24 Field definition for Networking>UPnP

5.9. Ping

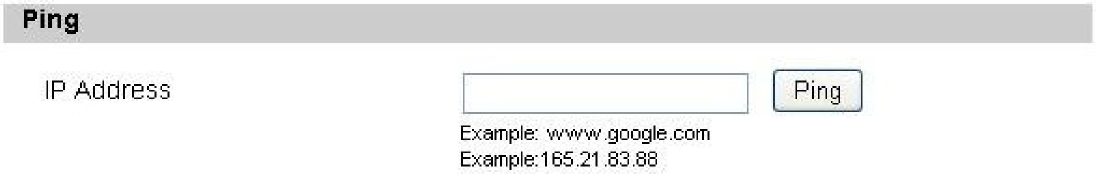


Figure 37 Networking>Ping

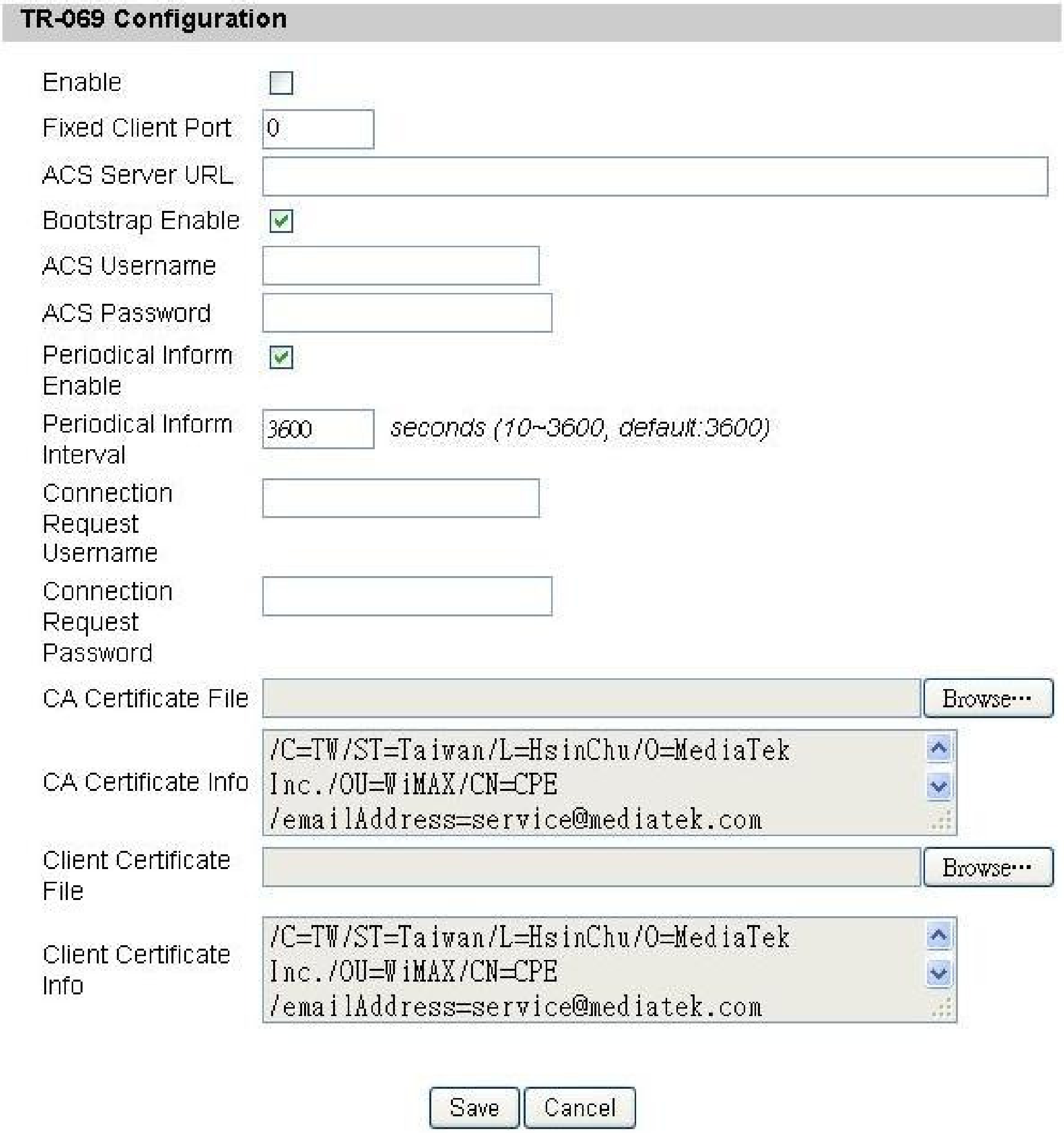
Name	Description
Ping	
IP Address	The destination IP address for ping test. It can be in one of the following formats: ● IP address (ex. 165.21.83.88) ● Domain name (ex. www.google.com)
Ping	Commit the ping test request

Table 25 Field definition for Networking>Ping

6. Management

6.1. TR-069

Using TR-069 the terminals can communicate with the Auto Configuration Servers (ACS) and establish the configuration automatically. It's the current standard for activation of terminals in the DSL broadband market.



TR-069 Configuration

Enable	☐
Fixed Client Port	0
ACS Server URL	
Bootstrap Enable	☑
ACS Username	
ACS Password	
Periodical Inform Enable	☑
Periodical Inform Interval	3600 *seconds (10~3600, default:3600)*
Connection Request Username	
Connection Request Password	
CA Certificate File	Browse…
CA Certificate Info	/C=TW/ST=Taiwan/L=HsinChu/O=MediaTek Inc./OU=WiMAX/CN=CPE /emailAddress=service@mediatek.com
Client Certificate File	Browse…
Client Certificate Info	/C=TW/ST=Taiwan/L=HsinChu/O=MediaTek Inc./OU=WiMAX/CN=CPE /emailAddress=service@mediatek.com

Figure 38 Management>TR-069

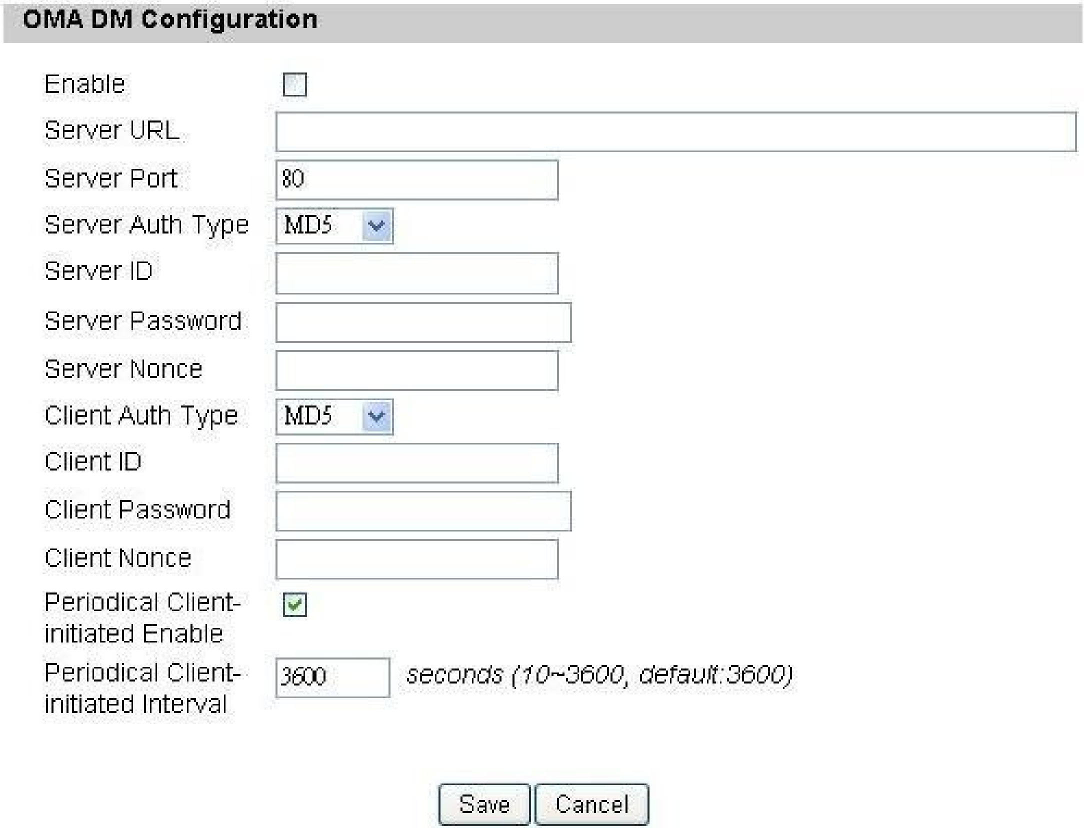
Name	Description

Name	Description
TR-069 Configuration	
Enable	To enable or disable the TR-069 activity on the CPE.
Fixed Client Port	To specify fixed client port
ACS Server URL	The ACS URL for CPE to connect to.
Bootstrap Enable	Check the box to enable bootstrap.
ACS Username	The username for the CPE when connected to ACS.
ACS Password	The password for the CPE when connected to ACS.
Periodical Inform Enable	To enable or disable the periodical inform to ACS for CPE.
Periodical Inform Interval	The interval between two periodical inform.
Connection Request Username	Enter the username for the ACS to perform connection request to CPE.
Connection Request Password	Enter the password for the ACS to perform connection request to CPE.
CA Certificate File	The CA certificate file is used to identify the certificate of ACS when D-230 communicated ACS with HTTPS URL.
CA Certificate Info	Displays the subject field of the CA Certificate.
Client Certificate File	The CLIENT certificate file is used when CPE communicates with HTTPS URL.
Client Certificate Info	Displays the subject field of the CLIENT Certificate.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 26 Field definition for Management>TR-069

6.2. OMA-DM

Using OMA DM the terminals can communicate with the OMA DM Server and establish the configuration automatically. It's the current standard for activation of terminals in OMA (Open Mobile Alliance).



OMA DM Configuration

Enable	□
Server URL	
Server Port	80
Server Auth Type	MD5
Server ID	
Server Password	
Server Nonce	
Client Auth Type	MD5
Client ID	
Client Password	
Client Nonce	
Periodical Client-initiated Enable	☑
Periodical Client-initiated Interval	3600 seconds (10~3600, default:3600)

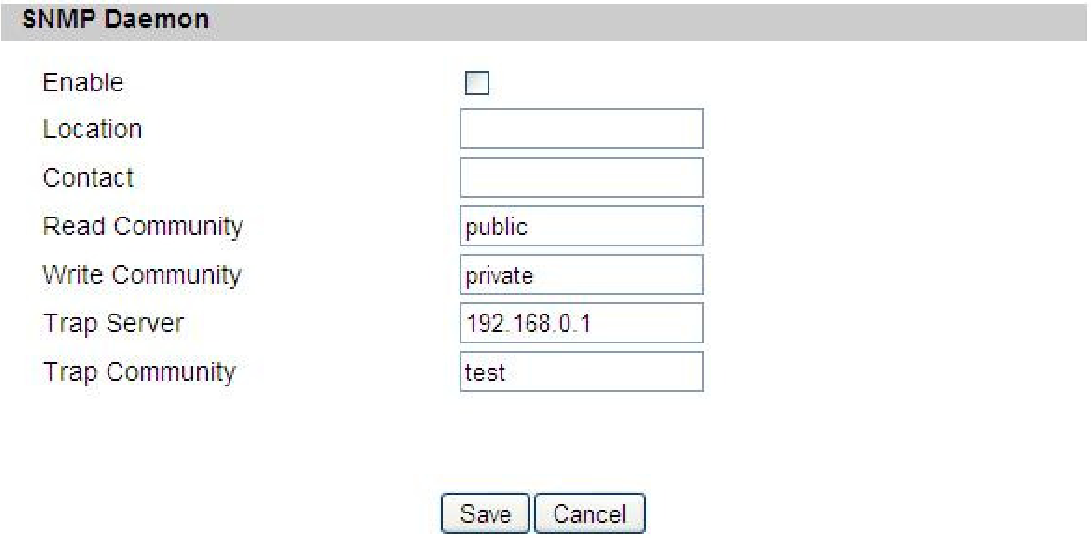
Figure 39 Management>OMA-DM

Name	Description
OMA DM Configuration	
Enable	To enable or disable the OMA-DM activity of CPE.
Server URL	The DM Server URL for CPE to connect to.
Server Port	The DM Server Port for CPE to connect to.
Server Auth Type	The DM Server authentication type.
Server ID	The Server ID for CPE when connected to DM Server.
Server Password	The Server password for CPE when connected to DM Server.
Server Nonce	Server nonce used in authentication credential calculation.
Client Auth Type	The DM Client authentication type.
Client ID	The Client ID for CPE when connected to DM Server.
Client Password	The Client password for CPE when connected to DM Server.

Name	Description
Client Nonce	Client nonce used in authentication credential calculation.
Periodical Client-initiated Enable	To enable or disable the periodical client-initiated session to DM server for CPE.
Periodical Client-initiated Interval	The interval between two periodical client-initiated sessions.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 27 Field definition for Management>OMA-DM

6.3. SNMP



SNMP Daemon

Enable	□
Location	
Contact	
Read Community	public
Write Community	private
Trap Server	192.168.0.1
Trap Community	test

Figure 40 Management>SNMP

Name	Description
SNMP Daemon	
Enable	Checking the enable button will allow SNMP applications to query and set some of the SNMP variables.
Location	Enter the Location SNMP string variable.
Contact	Enter the Contact SNMP string variable.
Read Community	Enter Read community string to query SNMP data.

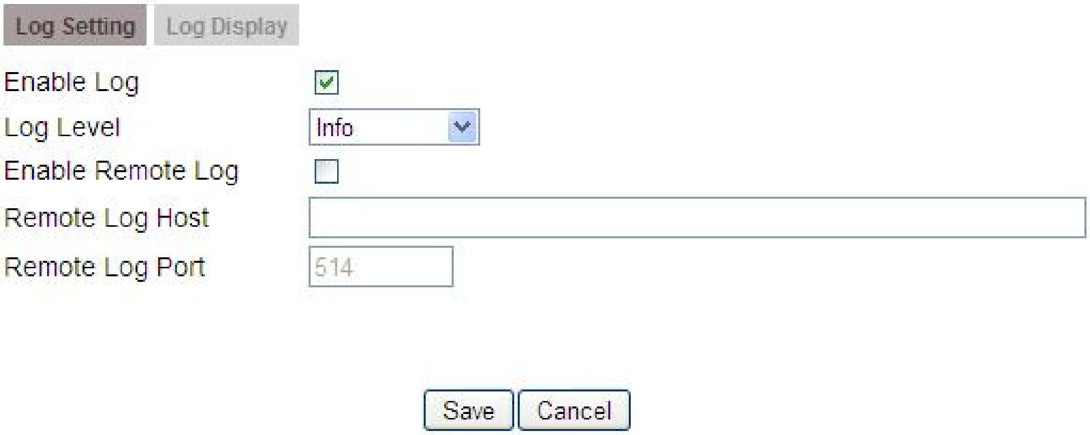
Name	Description
Write Community	Enter Write community string to query SNMP variables.
Trap Server	Enter the IP Address of trap server where user wants trap notifications to be sent to.
Trap community	Enter the Trap community to act as a password for sending trap notifications to the target SNMP manager.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 28 Field definition for Management>SNMP

6.4. Log

6.4.1. Log Setting

The “Management>Log>Log Setting” allows user to set the remote log configure. The “Refresh” button will clear the log window and display the most current system log information.



Enable Log ☑

Log Level Info

Enable Remote Log □

Remote Log Host

Remote Log Port 514

Figure 41 Management>Log>Log Setting

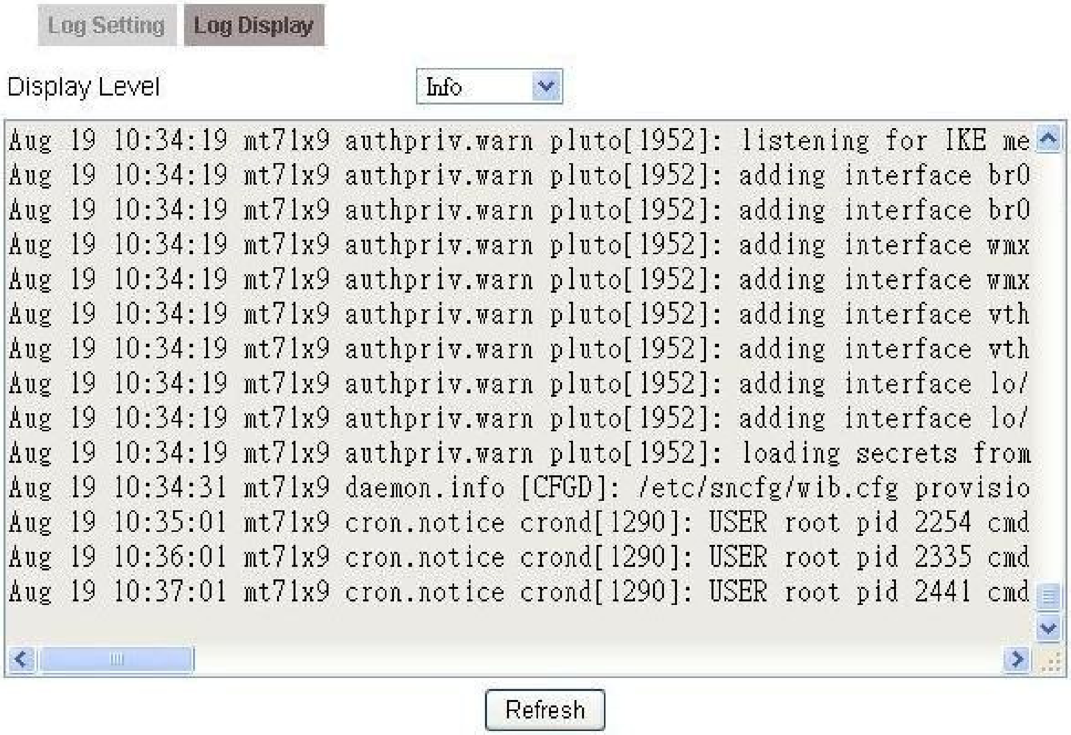
Name	Description
Enable Log	Check the box to enable the log feature.
Log Level	Select the log level.

Name	Description
Enable Remote Log	Enable / Disable transfer log to remote syslog server.
Remote Log Host	Location of the remote syslog server.
Remote Log Port	What port to use for remote logging.
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.

Table 29 Field definition for Management>Log>Log Setting

6.4.2. Log Display

The “Management>Log>Log Display” will display system log output. The “Refresh” button will clear the log window and display the most current system log information.



Display Level: Info

```
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: listening for IKE me
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface br0
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface br0
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface wmx
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface wmx
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface vth
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface vth
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface lo/
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: adding interface lo/
Aug 19 10:34:19 mt71x9 authpriv.warn pluto[1952]: loading secrets from
Aug 19 10:34:31 mt71x9 daemon.info [CFGD]: /etc/sncfg/wib.cfg provisio
Aug 19 10:35:01 mt71x9 cron.notice crond[1290]: USER root pid 2254 cmd
Aug 19 10:36:01 mt71x9 cron.notice crond[1290]: USER root pid 2335 cmd
Aug 19 10:37:01 mt71x9 cron.notice crond[1290]: USER root pid 2441 cmd
```

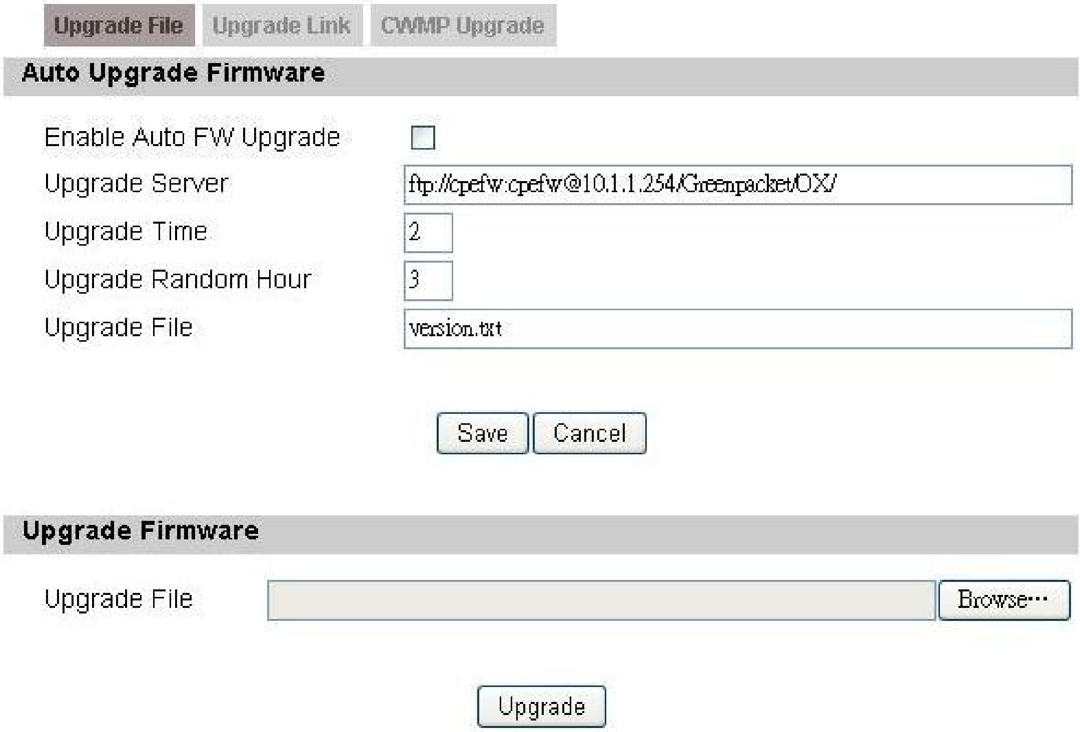
Figure 42 Management>Log>Log Display

6.5. Upgrade

The “Upgrade” window allows user to upgrade the firmware on the device. Users can choose to upgrade the firmware by entering the file path.

Note: After pressing the “Upgrade” button. It will automatically reboot the CPE and upgrade the firmware with the specified file. User will be prompted to login to CPE after the upgrade is complete.

6.5.1. Upgrade File



Auto Upgrade Firmware

Enable Auto FW Upgrade □

Upgrade Server ftp://cpefw:cpefw@10.1.1.254/Greenpacket/OX/

Upgrade Time 2

Upgrade Random Hour 3

Upgrade File version.txt

Upgrade Firmware

Upgrade File

Figure 43 Management>Upgrade>Upgrade File

Name	Description
Auto Upgrade Firmware	
Enable Auto FW Upgrade	To enable or disable the Auto Upgrade Firmware of CPE.
Upgrade Server	Auto Firmware Update checking URL.

Name	Description
Upgrade Hour	The service stating time.
Upgrade Random Time	The random period of sleep time before actually connection to server for checking and updating.
Upgrade File	The "Version File" in the URL. "Version File" format : 1st line : "firmware package version" 2nd line : "firmware package tar-ball" (in the same URL path)
Save	Commit the changes made and save to CPE.
Cancel	Reset fields to the last saved values.
Upgrade Firmware	
Browse	Enter the full path of the file user wants to upgrade. The “browse” button will help user to find the file on the server.
Upgrade	It will start upgrading the file
Status	The status bar will display which segment it's processing and what percentage of the upgrade has been completed.

Table 30 Field definition for Management>Upgrade>Upgrade File

6.5.2. Upgrade Link

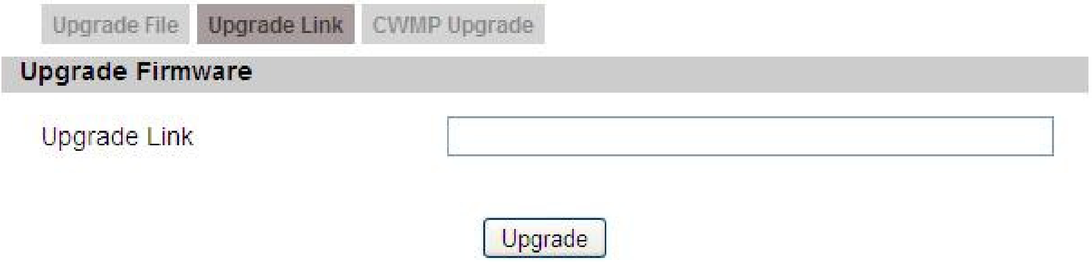


Figure 44 Management>Upgrade>Upgrade Link

Name	Description
Upgrade Firmware	
Upgrade Link	Enter the complete URL path of the file that user wants to upgrade
Upgrade	It will start upgrading the file

Name	Description
Status	The status bar will display which segment it's processing and what percentage of the upgrade has been completed.

Table 31 Field definition for Management>Upgrade>Upgrade Link

6.5.3. CWMP Upgrade

TR-069 technical specification entitled CPE WAN Management Protocol (CWMP). It defines an application layer protocol for remote management of end-user devices.

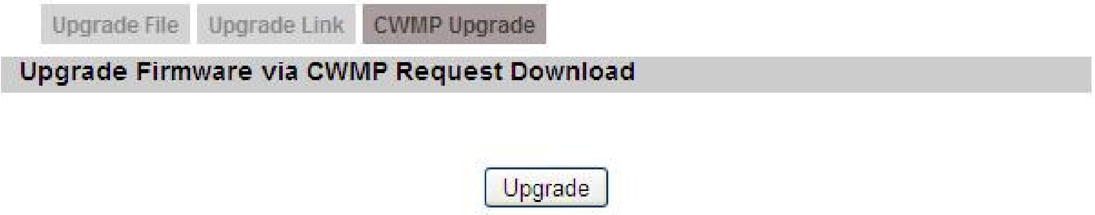


Figure 45 Management>Upgrade>CWMP Upgrade

Name	Description
Upgrade Firmware via CWMP Request Download	
Upgrade	It will start upgrading

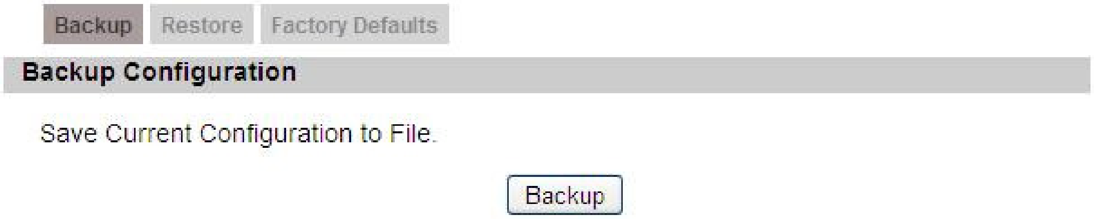
Table 32 Field definition for Management>Upgrade>CWMP Upgrade

6.6. Recovery

Recovery will set all the configurations back to factory defaults. Any configurations that user has made will be changed back to the factory default settings. After selecting “Factory Default” button, user will be prompted with a window to confirm or cancel the action.

Warning: Restore factory defaults will clear any IP addresses and setting that may have been configured on the CPE.

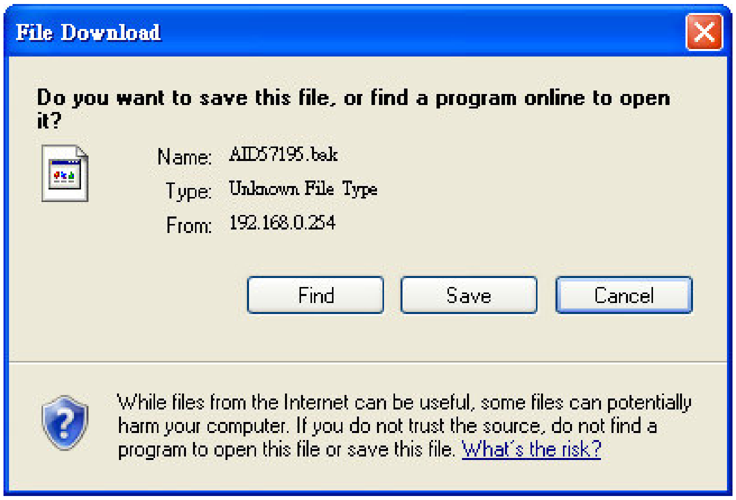
6.6.1. Backup



Backup Configuration

Save Current Configuration to File.

Figure 46 Management>Recovery>Backup



Do you want to save this file, or find a program online to open it?

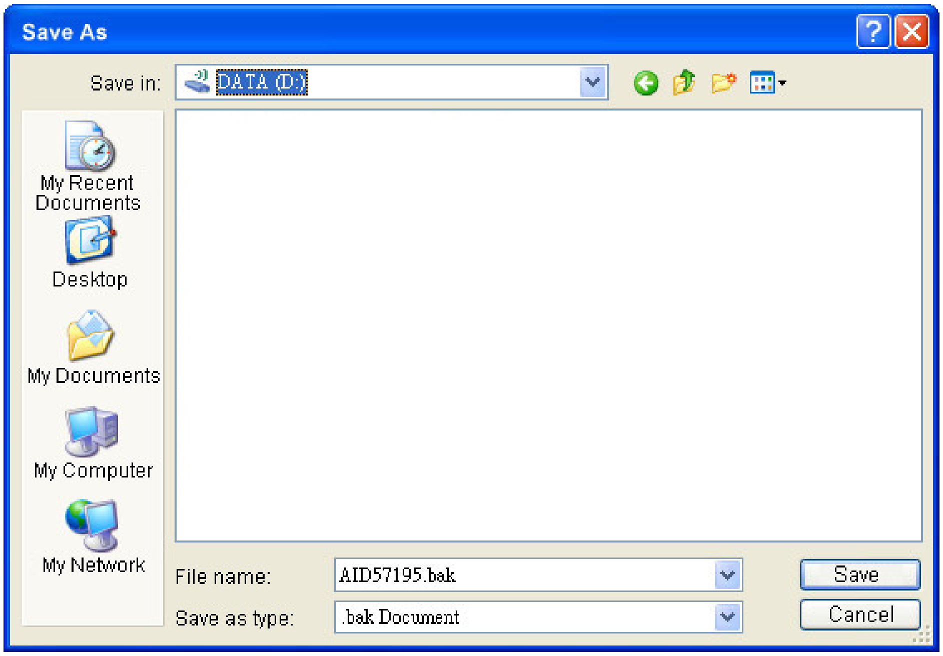
Name: AID57195.bak

Type: Unknown File Type

From: 192.168.0.254

While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not find a program to open this file or save this file. What's the risk?

Figure 47 File Download



File name: AID57195.bak

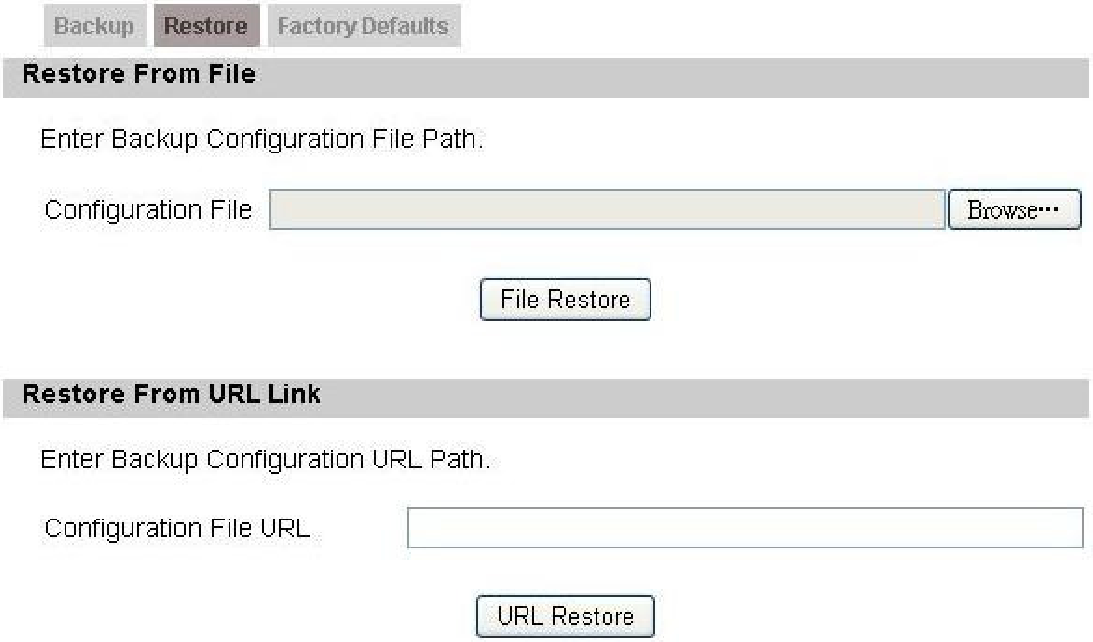
Save as type: .bak Document

Figure 48 Save File As

Name	Description
Backup Configuration	
Backup	Click the "Backup" button o save the current configuration on the CPE. After user clicks the "Backup" button "File Download" window will pop-up and prompt user to save the file. In the "Save As" window, enter the name and location, where user wishes to download the file to.

Table 33 Field definition for Management>Recovery>Backup

6.6.2. Restore



Restore From File

Enter Backup Configuration File Path.

Configuration File

Restore From URL Link

Enter Backup Configuration URL Path.

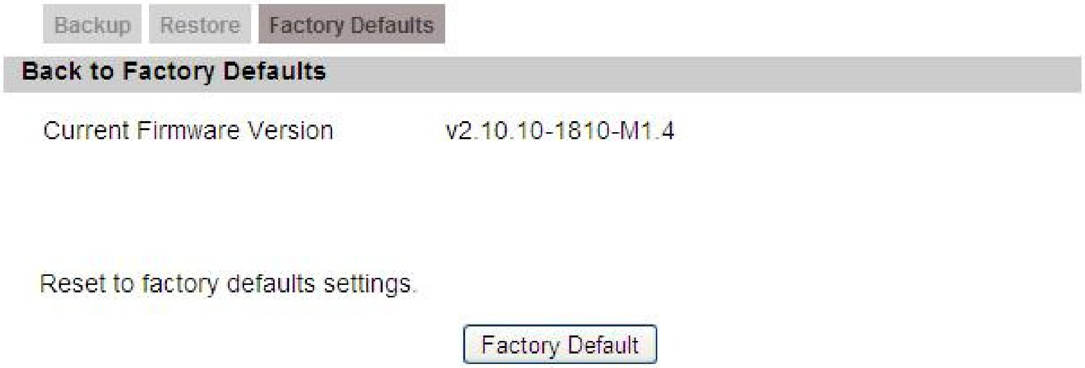
Configuration File URL

Figure 49 Management>Recovery>Restore

Name	Description
Restore From File	
File Restore	Enter the path of the configuration file user wants to restore. Click on the "Browse" button to help user to navigate through directories and search for the file. After user enters the complete file path, click the "File Restore" button. It will begin restoring the configuration from the file specified.
Restore From URL Link	
URL Restore	Enter the configuration URL path user wants to restore from. After entering the complete URL path, click the "URL Restore" button. It will begin restoring the configuration from the URL location user specified.

Table 34 Field definition for Management>Recovery>Restore

6.6.3. Factory Defaults

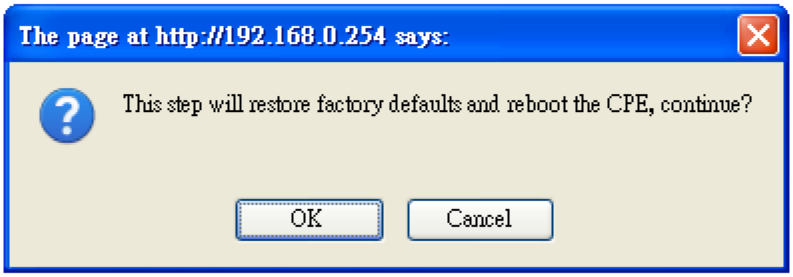


Back to Factory Defaults

Current Firmware Version v2.10.10-1810-M1.4

Reset to factory defaults settings.

Figure 50 Management>Recovery>Factory Defaults



The page at http://192.168.0.254 says:

This step will restore factory defaults and reboot the CPE, continue?

Figure 51 Restore to factory reset warning

7. VPN

VPN (Virtual Private Network) is a network that is implemented in an additional software layer on top of an existing larger network for the purpose of providing a secure extension of a private network into an insecure network such as the Internet. The links between nodes of a VPN are formed over logical connections or virtual circuits between hosts of the larger network.

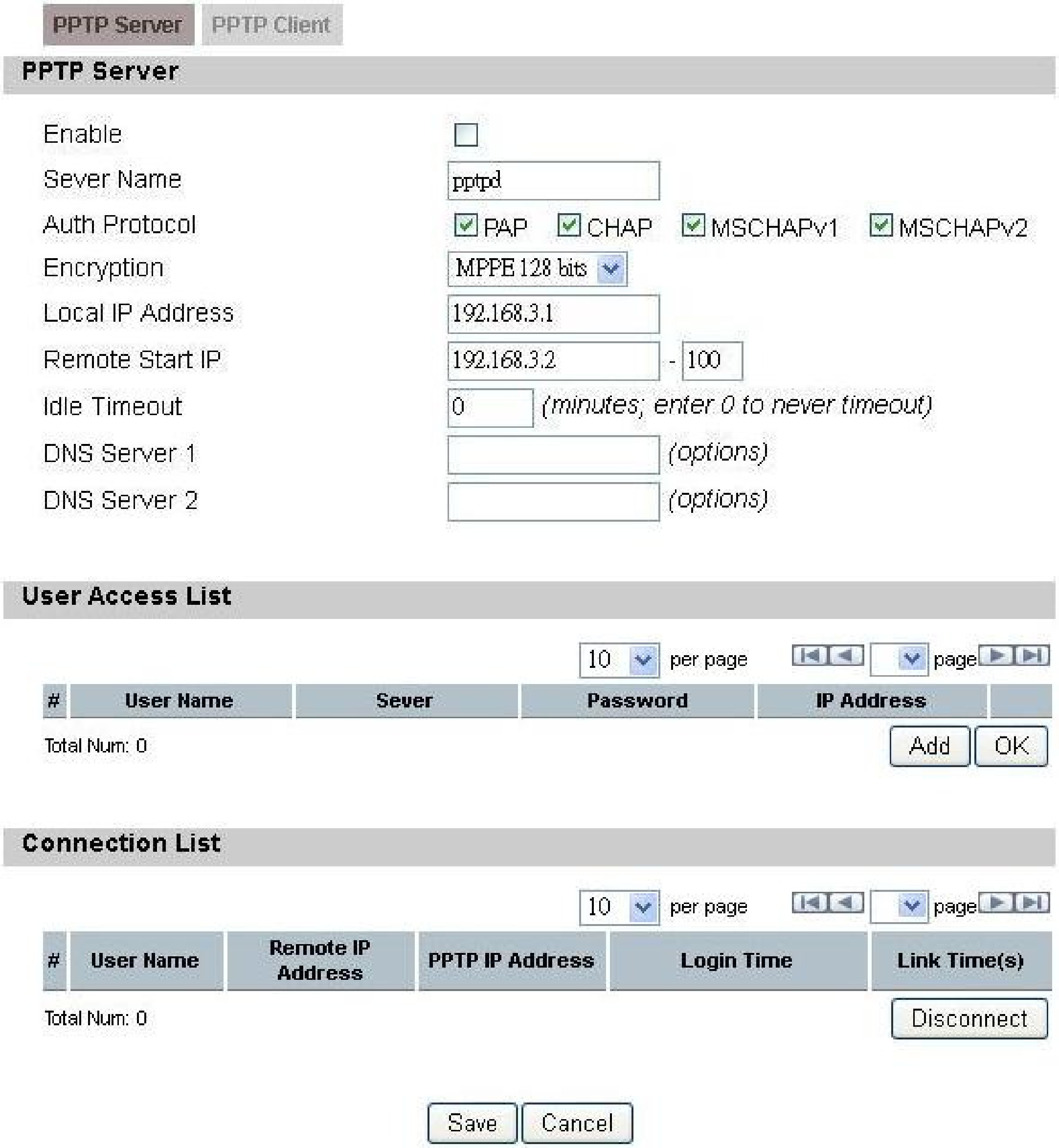
VPNs are often installed by organizations to provide remote access to a secure organizational network. Generally, a VPN has a network topology more complex than a point-to-point connection. VPNs are also used to mask the IP address of individual computers within the Internet in order, for instance, to surf the World Wide Web anonymously or to access location restricted services, such as Internet television. Here, VPN Settings allow user to set rules for VPN, and it supports PPTP, L2TP, and IPsec.

7.1. PPTP

The Point-to-Point Tunneling Protocol (PPTP) is a method for implementing virtual private networks. PPTP does not provide confidentiality or encryption; it relies on the protocol being tunneled to provide privacy.

7.1.1. PPTP Server

A PPTP Server (Point-To-Point Tunneling Protocol) allows user to connect securely from a place (such as the house) to a LAN located in another location, such as the office. This way user can use the services provided in the office at the comfort of the house. The definition for each field of PPTP Server is shown on Table 35.



PPTP Server

Enable	□
Sever Name	pptpd
Auth Protocol	☑ PAP ☑ CHAP ☑ MSCHAPv1 ☑ MSCHAPv2
Encryption	MPPE 128 bits
Local IP Address	192.168.3.1
Remote Start IP	192.168.3.2 - 100
Idle Timeout	0 *(minutes; enter 0 to never timeout)*
DNS Server 1	*(options)*
DNS Server 2	*(options)*

User Access List

#	User Name	Sever	Password	IP Address	

Total Num: 0

Connection List

#	User Name	Remote IP Address	PPTP IP Address	Login Time	Link Time(s)

Total Num: 0

Figure 52 VPN>PPTP>PPTP Server

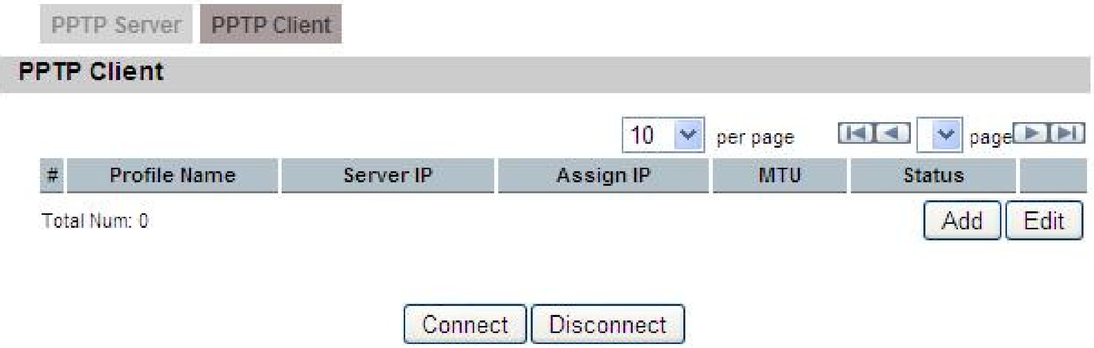
Name	Description
PPTP Server	
Enable	Activate PPTP server.
Server Name	Offer a service name
Auth Protocol	Require the peer to authenticate itself before allowing network packets to be sent or received. We support the following protocol: ● PAP: Password Authentication Protocol

Name	Description
	● CHAP: Challenge Handshake Authentication Protocol ● MSCHAP: Microsoft Challenge Handshake Authentication Protocol ● MSCHAPv2: Microsoft Challenge Handshake Authentication Protocol, Version 2
Encryption	Encryption Scheme: ● No ● MPPE 40 bits: 40-bit encryption with MPPE ● MPPE 128 bits: 128-bit encryption with MPPE ● Auto: automatically select
Local IP Address	The IP of router
Remote Start IP	As sessions are established, IP addresses are assigned starting from “Remote Start IP”
Idle Timeout	Disconnect if the link is idle for the assigned seconds
DNS Server 1	The primary DNS (Domain Name Server) addresses to clients
DNS Server 2	The secondary DNS (Domain Name Server) addresses to clients
User Access List	
User name	User ID to connect PPTP server via the selected Auth Protocol
Server	Server protocol type
Password	Password to connect PPTP server via the selected Auth Protocol
IP address	IP address of the connected client
Connection List	
User name	The user name of the connection
Remote IP address	The peer address of the connection
PPTP IP address	The assigned IP address of PPTP
Login Time	The time of the connection created
Link Time(s)	Timer from the connected time
Save	Commit the changes made and save to the CPE
Cancel	Reset fields to the last saved values

Table 35 Field definition for VPN>PPTP>PPTP Server

7.1.2. PPTP Client

User could setup PPTP Client as shown in Figure 53 and Figure 54. The definition for each field of PPTP Client is shown on Table 36.



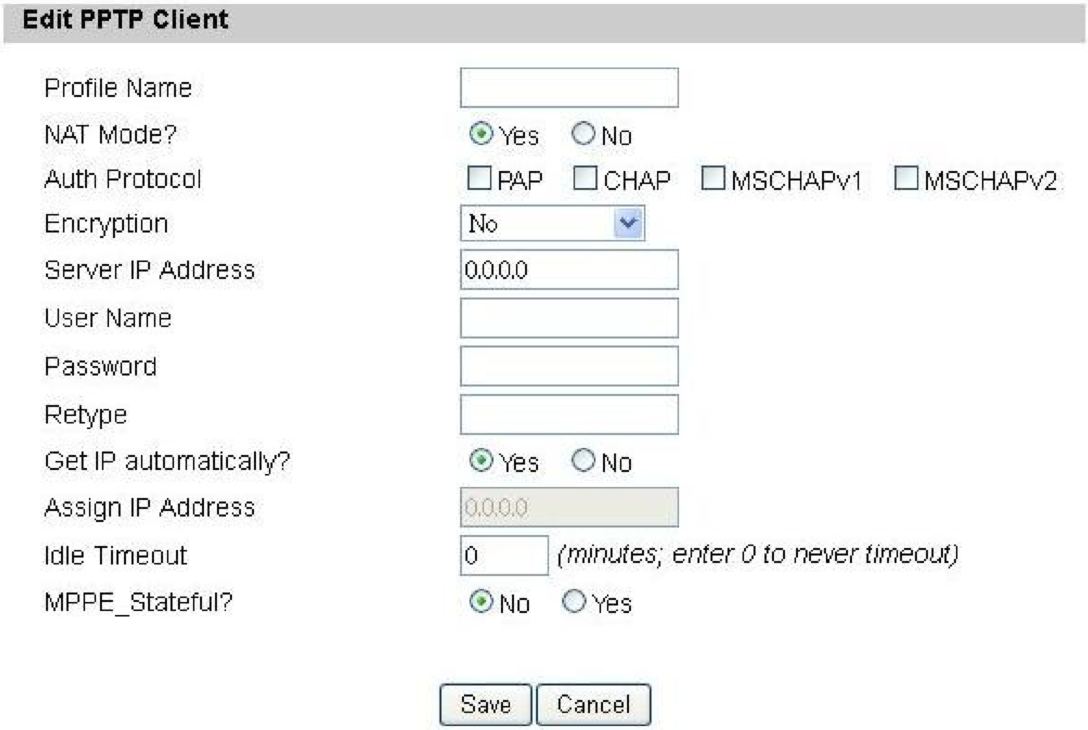
PPTP Client

10 per page page

#	Profile Name	Server IP	Assign IP	MTU	Status	

Total Num: 0

Figure 53 VPN>PPTP>PPTP Client



Edit PPTP Client

Profile Name	
NAT Mode?	● Yes ○ No
Auth Protocol	□ PAP □ CHAP □ MSCHAPv1 □ MSCHAPv2
Encryption	No
Server IP Address	0.0.0.0
User Name	
Password	
Retype	
Get IP automatically?	● Yes ○ No
Assign IP Address	0.0.0.0
Idle Timeout	0 *(minutes; enter 0 to never timeout)*
MPPE_Stateful?	● No ○ Yes

Figure 54 VPN>PPTP>PPTP Client>Add

Name	Description

Name	Description
PPTP Client	
Add	Add a new connection setting
Edit	Edit the existed connection setting
Edit PPTP Client	
Profile Name	The name for this connection setting
NAT Mode?	Enable or disable NAT when connected to PPTP server. ● Yes: enable ● No: disable
Auth Protocol	The Authentication protocol of the peer required. Select which Authentication protocol to use. ● PAP ● CHAP ● MSCHAPv1 ● MSCHAPv2
Encryption	Encryption scheme
Server IP Address	The IP address of PPTP server
Username	The user ID to connect PPTP server via the selected Auth Protocol
Password	The password of the corresponding user ID
Retype	Type the "Password" again
Get IP automatically?	Obtain the dynamic IP address, assigned by the PPTP server
Assign IP Address	Assign the static IP address for this connection setting
Idle Timeout	Disconnect if the link is idle for the assigned seconds
MPPE_Stateful	Allow MPPE to use stateful mode. Stateless mode is still attempted first. The default is to disallow stateful mode.
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

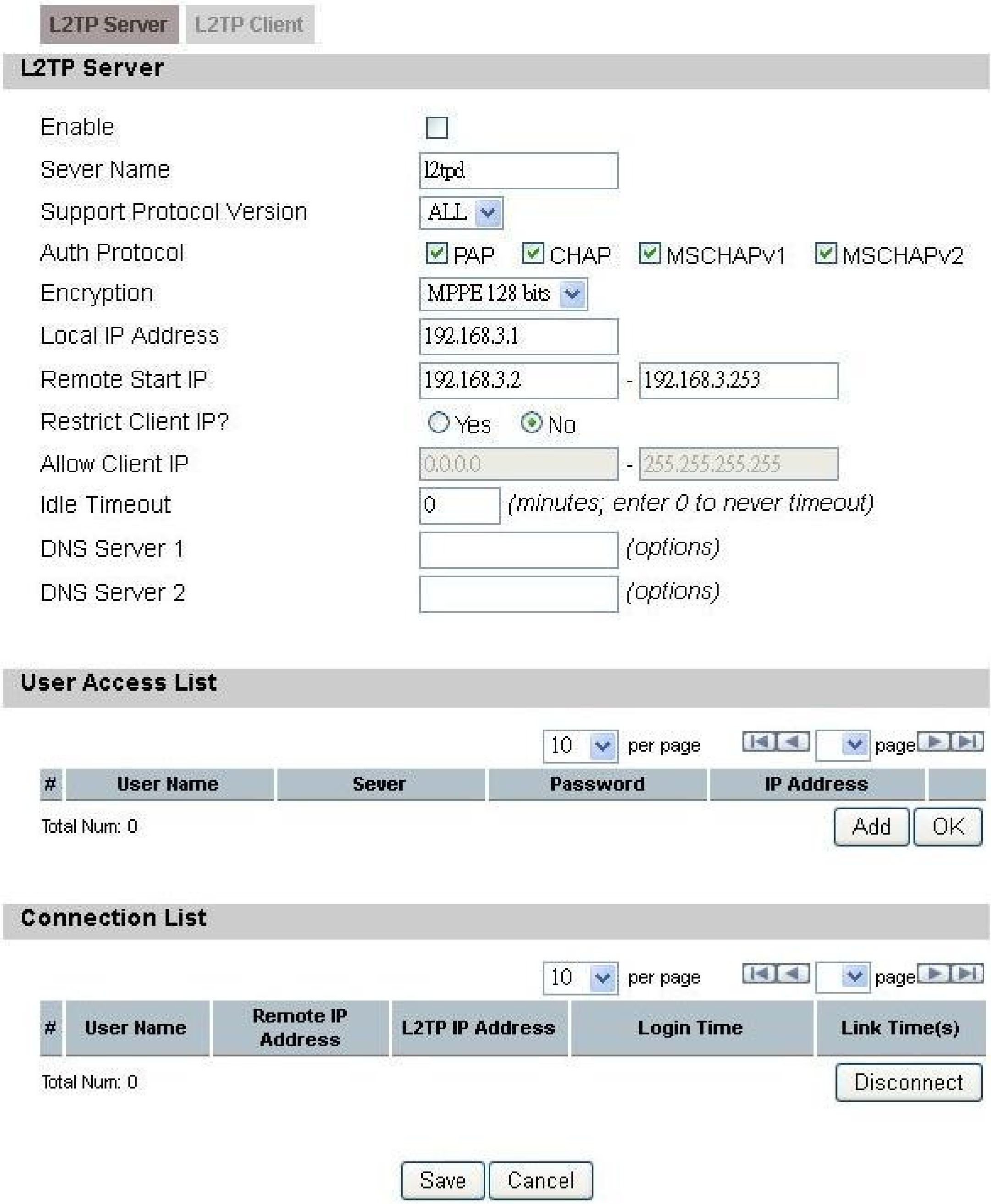
Table 36 Field definition for VPN>PPTP>PPTP Client

7.2. L2TP

In computer networking, Layer 2 Tunneling Protocol (L2TP) is a tunneling protocol used to support virtual private networks (VPNs). It does not provide any encryption or confidentiality by itself. It relies on an encryption protocol that it passes within the tunnel to provide privacy. The entire L2TP packet, including payload and L2TP header, is sent within a UDP datagram. It is common to carry Point-to-Point Protocol (PPP) session within an L2TP tunnel. L2TP does not provide confidentiality or strong authentication by itself. IPsec is often used to secure L2TP packets by providing confidentiality, authentication and integrity.

7.2.1. L2TP Server

User can setup CPE from web page as shown in Figure 55. The definition for each field of PPTP Server is shown on Table 37.



L2TP Server

Enable	□
Sever Name	l2tpd
Support Protocol Version	ALL
Auth Protocol	☑ PAP ☑ CHAP ☑ MSCHAPv1 ☑ MSCHAPv2
Encryption	MPPE 128 bits
Local IP Address	192.168.3.1
Remote Start IP	192.168.3.2 - 192.168.3.253
Restrict Client IP?	○ Yes ● No
Allow Client IP	0.0.0.0 - 255.255.255.255
Idle Timeout	0 *(minutes; enter 0 to never timeout)*
DNS Server 1	*(options)*
DNS Server 2	*(options)*

User Access List

10 per page page

#	User Name	Sever	Password	IP Address	

Total Num: 0

Connection List

10 per page page

#	User Name	Remote IP Address	L2TP IP Address	Login Time	Link Time(s)

Total Num: 0

Figure 55 VPN>L2TP>L2TP Server

Name	**Description**
L2TP Server	
Enable	Check the check box to activate L2TP server.
Server Name	Enter a service name
Support Protocol Version	The supported protocol of L2TP messages ● ALL: L2TPv2 and L2TPv3

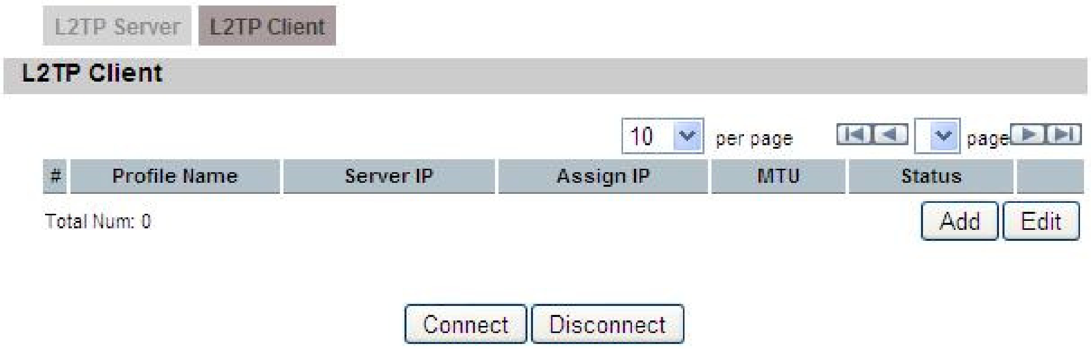
Name	Description
	● 2: L2TPv2 only ● 3: L2TPv3 only
Auth Protocol	Require the peer to authenticate itself before allowing network packets to be sent or received. The following protocols are supported: ● PAP: Password Authentication Protocol ● CHAP: Challenge Handshake Authentication protocol ● MSCHAPv1: Microsoft Challenge Handshake Authentication Protocol ● MSCHAPv2: Microsoft Challenge Handshake Authentication Protocol, Version 2
Encryption	Encryption Scheme ● No ● MPPE 40 bits: 40-bit encryption with MPPE ● MPPE 128 bits: 128-bit encryption with MPPE ● Auto: automatically select
Local IP Address	The IP of router
Remote Start IP	As sessions are established, IP addresses are assigned starting from “Remote Start IP”
Restrict Client IP?	To restrict client IP address range for the client
Allow Client IP	The IP address range for the client
Idle Timeout	Disconnect if the link is idle for the given number of seconds
DNS Server 1	The primary DNS (Domain Name Server) addresses to the clients
DNS Server 2	The secondary DNS (Domain Name Server) addresses to the clients
User Access List	
User Name	User ID to connect L2TP server via the selected Auth Protocol
Server	Server Protocol type
Password	Password to connect L2TP server via the selected Auth Protocol

Name	Description
IP Address	IP address of the connected client
Connection List	
User Name	The user name of the connection
Remote IP Address	The peer address of the connection
L2TP IP Address	The assigned IP address of L2TP
Login Time	The time of the connection created
Link Time(s)	Elapsed time connected
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 37 Field definition for VPN>L2TP>L2TP Server

7.2.2. L2TP Client

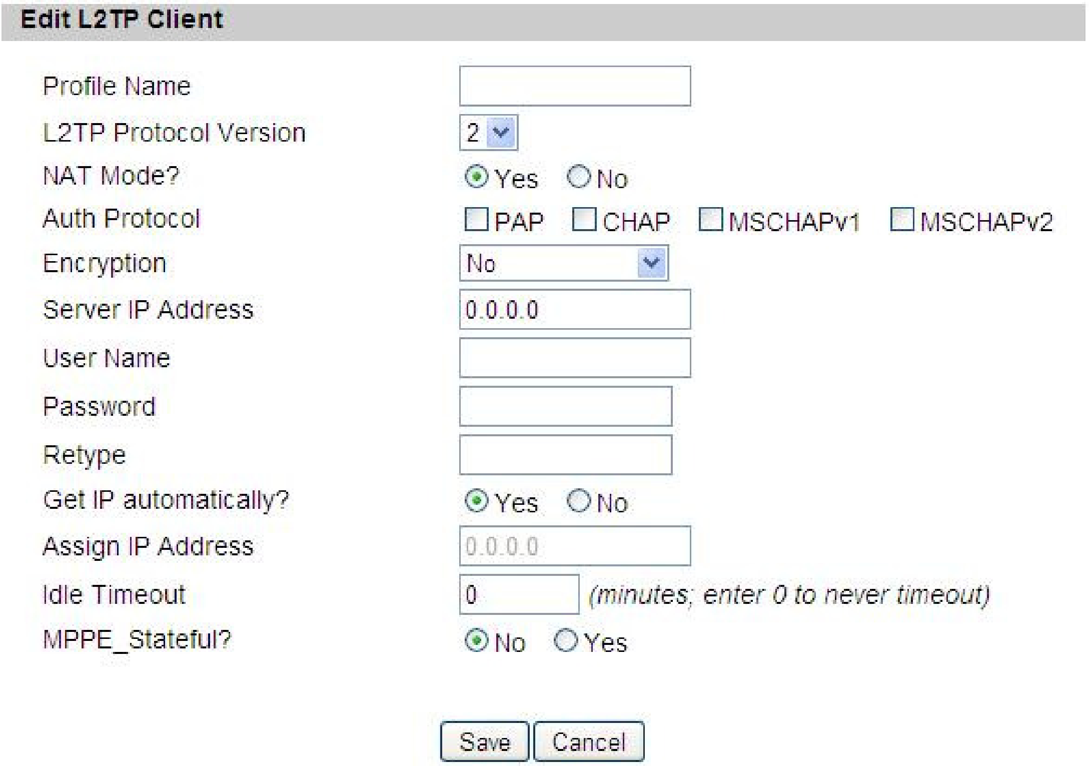
User could setup PPTP Client as shown in Figure 56 and Figure 57. The definition for each field of PPTP Client is shown on Table 38.



#	Profile Name	Server IP	Assign IP	MTU	Status	

Total Num: 0

Figure 56 VPN>L2TP>L2TP Client



Edit L2TP Client

Profile Name	
L2TP Protocol Version	2
NAT Mode?	● Yes ○ No
Auth Protocol	□ PAP □ CHAP □ MSCHAPv1 □ MSCHAPv2
Encryption	No
Server IP Address	0.0.0.0
User Name	
Password	
Retype	
Get IP automatically?	● Yes ○ No
Assign IP Address	0.0.0.0
Idle Timeout	0 *(minutes; enter 0 to never timeout)*
MPPE_Stateful?	● No ○ Yes

Figure 57 VPN>L2TP>L2TP Client>Add

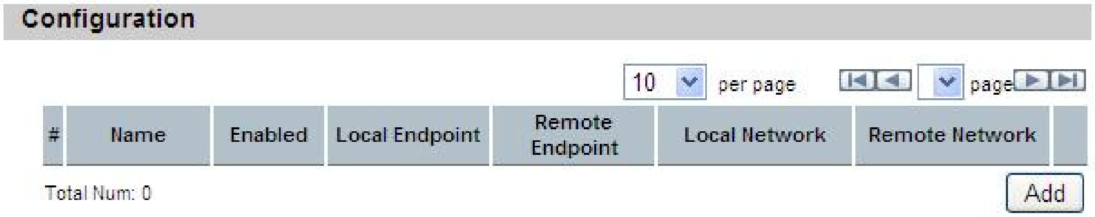
Name	Description
L2TP Client	
Add	Add a new connection setting
Edit	Edit the existed connection setting
Edit L2TP Client	
Profile Name	The name of this connection setting
L2TP Protocol Version	The message of L2TP protocol version for this connection setting ● 2: L2TPv2 only ● 3: L2TPv3 only
NAT Mode?	Enable or disable NAT when connected to PPTP server ● Yes: enable ● No: disable
Auth Protocol	The Authentication Protocol of the peer required. Select which Authentication protocol to use. ● PAP ● CHAP

Name	Description
	● MSCHAPv1 ● MSCHAPv2
Encryption	Encryption Scheme
Server IP Address	The IP address of L2TP server
Username	The username to connect L2TP server via the selected Auth Protocol
Password	The password of the corresponding username
Retype	Type the “Password” again
Get IP Automatically?	Obtain the dynamic IP address, assigned by the L2TP server
Assign IP Address	Assign the static IP address for this connection setting
Idle Timeout	Disconnect if the link is idle for the assigned seconds
MPPE_Stateful	Allow MPPE to use stateful mode. Stateless mode is still attempted first. The default is to disallow stateful mode.
Save	Commit the changes made and save to CPE
Cancel	Reset fields to the last saved values

Table 38 Field definition for VPN>L2TP>L2TP Client

7.3. IPsec

Internet Protocol Security (IPsec) is an end-to-end security solution and operated at the IP Layer. It provides secure communication between pairs of hosts, pairs of security gateways or between security gateways and a host. It’s based on a suite of protocols for securing IP traffic by authenticating and encrypting each IP packet of the data stream.

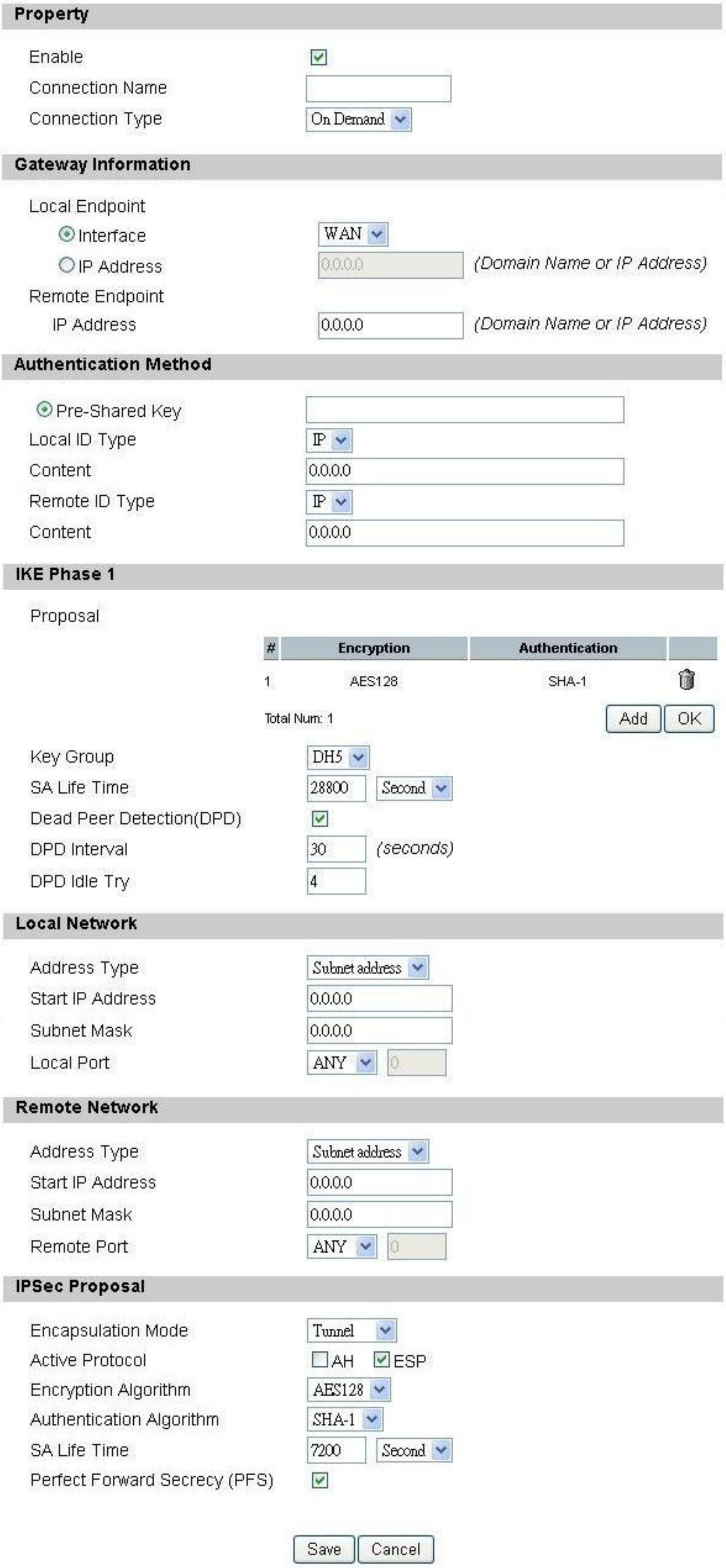


Configuration

#	Name	Enabled	Local Endpoint	Remote Endpoint	Local Network	Remote Network	

Total Num: 0

Figure 58 VPN>IPsec Overview



Property

Enable	☑
Connection Name	
Connection Type	On Demand

Gateway Information

Local Endpoint		
● Interface	WAN	
○ IP Address	0.0.0.0	*(Domain Name or IP Address)*
Remote Endpoint		
IP Address	0.0.0.0	*(Domain Name or IP Address)*

Authentication Method

● Pre-Shared Key	
Local ID Type	IP
Content	0.0.0.0
Remote ID Type	IP
Content	0.0.0.0

IKE Phase 1

Proposal

#	Encryption	Authentication	
1	AES128	SHA-1	🗑

Total Num: 1

Key Group	DH5	
SA Life Time	28800	Second
Dead Peer Detection(DPD)	☑	
DPD Interval	30	*(seconds)*
DPD Idle Try	4	

Local Network

Address Type	Subnet address	
Start IP Address	0.0.0.0	
Subnet Mask	0.0.0.0	
Local Port	ANY	0

Remote Network

Address Type	Subnet address	
Start IP Address	0.0.0.0	
Subnet Mask	0.0.0.0	
Remote Port	ANY	0

IPSec Proposal

Encapsulation Mode	Tunnel	
Active Protocol	□ AH	☑ ESP
Encryption Algorithm	AES128	
Authentication Algorithm	SHA-1	
SA Life Time	7200	Second
Perfect Forward Secrecy (PFS)	☑	

Figure 59 VPN>IPsec>Add

Name	Description
Add	Click the "Add" button to add an IPsec connection rule
Property	
Enable	Enable IPsec connection.
Connection Name	The name of the connection
Connection Type	Select the connection type ● Initiator ● On Demand ● Responder
Gateway Information	
Local Endpoint Interface	The interface of the CPE public-network interface
Local Endpoint IP Address	The IP address or Domain Name of the CPE public-network interface
Remote Endpoint IP Address	The IP address or Domain Name of the remote peer.
Authentication Method	
Pre-Shared Key	The pre-share key that two security gateways use to authenticate
Local ID Type	States how the CPE should be identified for authentication IP: The CPE is identified by the assigned IP for authentication. The default value is 0.0.0.0.
Content	The IP address
Remote ID Type	States how the remote peer should be identified for authentication IP: The remote peer is identified by the assigned IP for authentication. The default value is 0.0.0.0, and this means CPE will accept any IP.
Content	The IP address
IKE Phase 1	

Name	**Description**
Proposal Add	Press the Add button to enter an Encryption and Authentication algorithm. Click the trash to remove the selected algorithm. Encryption Algorithm: ● DES ● 3DES ● AES128 ● AES192 ● AES256 Authentication Algorithm: ● MD5 ● SHA-1
Proposal OK	Click the OK button to exit the table edit mode
Key Group	The DH group used to negotiate the IKE/ISAKMP SA.
SA Life Time	The period that the keying channel of a connection (IKE/ISAKMP SA) should last before being renegotiated.
Dead Peer Detection (DPD)	Enable or disable the Dead Peer Detection protocol (RFC 3706)
DPD Interval	The time interval when R_U_THERE messages are sent to the peer.
DPD Idle Try	The retry counter for DPD. The timeout interval is "DPD interval" multiplied by "DPD Idle Try". After the timeout interval all connections to the peer are deleted if they are inactive.
Local Network	The private subnet behind the CPE.
Address Type	Single Address: The private subnet consisting of one IP address. Subnet address: The private subnet consisting within the subnet IP addresses.
Start IP Address	The only IP address allowed in the subnet
Subnet Mask	The netmask of the subnet (Subnet address)
Local Port	Restrict the traffic selector to a single protocol and/or port.

Name	Description
	● Any: No restriction ● ICMP: Restrict the traffic selector to ICMP protocol. ● TCP: Restrict the traffic selector to TCP protocol. If the port number is 0, all TCP port numbers are accepted. ● UDP: Restrict the traffic selector to UDP protocol. If the port number is 0, all UDP port numbers are accepted.
Remote Network	The private subnet behind the remote peer.
Address Type	Single Address: The private subnet consisting of one IP address. Subnet address: The private subnet consisting of subnet IP addresses.
Start IP Address	The only IP address allowed in the subnet
Subnet Mask	The netmask of the subnet (Subnet address)
Remote Port	Restrict the traffic selector to a single protocol and/or port. ● Any: No restriction ● ICMP: Restrict the traffic selector to ICMP protocol. ● TCP: Restrict the traffic selector to TCP protocol. If the port number is 0, all TCP port numbers are accepted. ● UDP: Restrict the traffic selector to UDP protocol. If the port number is 0, all UDP port numbers are accepted.
IPSec Proposal	
Encapsulation Mode	The type of the connection: ● Tunnel: signifying a host-to-host, host-to-subnet, or subnet-to subnet tunnel. ● Transport: signifying host-to-host transport made.
Active Protocol	Whether authentication should be done as part of ESP encryption and/or separately using the AH protocol.
Encryption Algorithm	● NULL ● AES128

Name	Description
	● AES192 ● AES256 ● DES ● 3DES
Authentication Algorithm	● MD5 ● SHA-1
SA Life Time	The time interval a particular instance of a connection (a set of encryption/authentication key for user packets) should last, from successful negotiation to expiry.
Perfect Forward Secrecy (PFS)	Whether Perfect Forward Secrecy of keys is desired on the connection's keying channel.
Save	Commit the changes made and save to the CPE device
Cancel	Reset fields to the last saved values.

Table 39 Field definition for VPN>IPsec>Add

8. Installation and Grounding Device

Before installing the Outdoor CPE Device

Before installing, it is important to comply with the precautions listed below.

- It must be installed by qualified service personnel who are well-trained in the correct procedures for handling and installing the equipment.
- Avoid installing or working on equipment in adverse weather conditions. Once it must be installed in adverse weather conditions, it’s necessary to well protect the equipment.
- Do not install the device near overhead power lines or power circuits, or where the device can fall onto such power lines or circuits.
- Do not disassemble the product. Opening or removing covers may expose you to electric shock. Warranty void if seal is broken.
- Do not place or construct objects in close proximity to the device.
- Be sure to check the supplied mounting accessory is correct as listed in Figure 60. Please be noted that the mounting kits should be used for the pole with diameter between 34 ~ 49 mm.
- Under normal operating condition, it should be at least 60 cm away from the body of the user.

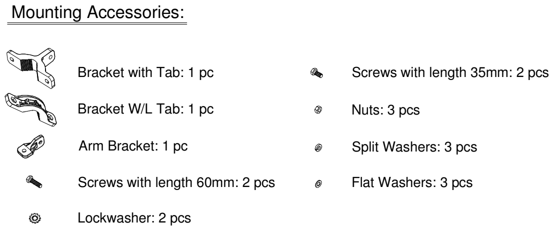


Figure 60 Mounting accessory list

An Overview of the Outdoor CPE Device Installation

Service personnel needs to follow the steps for installing Outdoor CPE Device

1. Pole-mounting or Wall-mounting the Outdoor CPE Device.
2. Grounding the Outdoor CPE Device
3. Connect the Outdoor CPE Device to PoE unit
4. Connect PC to PoE unit for configuring the Outdoor CPE Device
5. Connect the PoE unit to the power source to power up the Outdoor CPE Device
6. Use PC to configure the Outdoor CPE Device

Pole-Mounting the Outdoor CPE Device

In the following steps, it introduces how to pole-mounting the Outdoor CPE Device.

1. Assemble the mounting hardware brackets onto pole first: Take the Screws with 60mm length to pass through the Split washer and Flat washer in order, and then screw the Brackets together with nuts.
2. Use the Screw with 35mm length to attach the Outdoor CPE Device to the tab of the Bracket. Ensure the Lockwasher is located between the Bracket's tab and the Outdoor CPE Device's tab. Be sure to orient the Outdoor CPE Device with the connector towards the bottom. Remember to orderly add the Split washer, Flat washer and Nuts as shown in Figure 61. Do not over-tighten before finishing the Outdoor CPE Device alignment.
3. Adjust the azimuth and elevation of the Outdoor CPE Device toward the direction of WiMAX Base Station location.
4. Tighten the screws to secure the Outdoor CPE Device tightly.

It is not necessary to use Arm Bracket for pole-mounting. Arm Bracket is only used for wall-mounting.

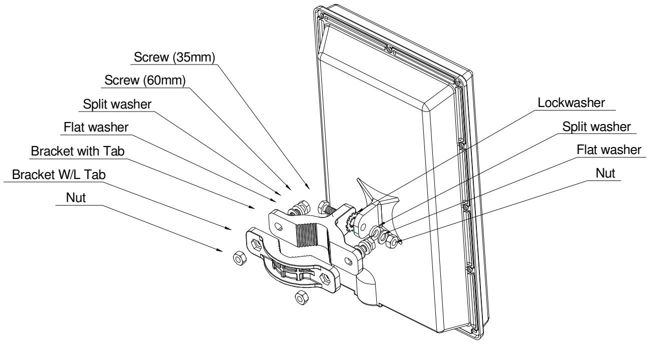


Figure 61 Pole-Mount the Outdoor CPE Device

Wall-Mounting the Outdoor CPE Device

In the following steps, it introduces how to wall-mounting the Outdoor CPE Device.

1. Install the Bracket with tab on a wall by using two mounting screws appropriate for the wall's construction material. The appropriate mounting hardware should be purchased directly from a local supplier.
2. Connect the Arm Bracket to Outdoor CPE Device with the 35mm length Screw, Lockwasher, Split washer, Flat washer, and Nut orderly as shown in Figure 62. Ensure the Lockwasher is located between the Bracket's tab and the Outdoor CPE Device's tab. Do not over-tighten before finishing the Outdoor CPE Device alignment.
3. Secure the other side of Arm Bracket along with Lockwasher to the Bracket's tab mounted on wall. Ensure that the bolt head is positioned in the socket of the Bracket. Do not over-tighten before finishing the Outdoor CPE Device alignment.
4. Adjust the azimuth and elevation of the Outdoor CPE Device toward the direction of WiMAX Base Station location.
5. Tighten the screws to secure the Outdoor CPE Device tightly.

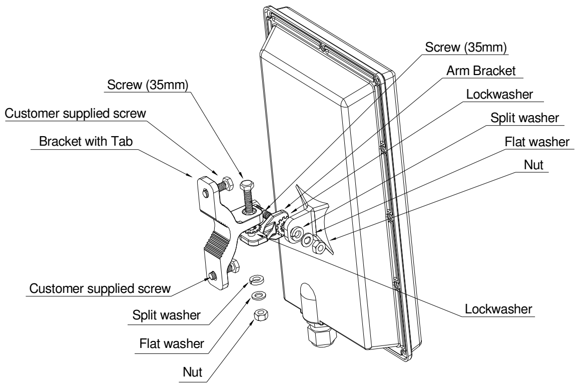


Figure 62 Wall-Mount the Outdoor CPE Device

Grounding the Outdoor CPE Device

Grounding the Outdoor CPE Device is essential to avoid serious injury to service personnel and damage to the Outdoor CPE Device. Please be noted that minimum #16 AWG wire with the color combination green-and-yellow should be used for the grounding. The following steps introduce how to ground the Outdoor CPE Device.

1. Remove the ground screw installed on the side of the Outdoor CPE Device, as shown in
2. Cut the required length of the grounFigure 63.d wire, and then strip the insulation from the ground wire by using either a wire cutter/stripper or utility knife.
3. Crimp the ground wire to the copper cable lug, and then connect the cable lug to the grounding connection on the side of the Outdoor CPE Device. Please be noted that the thickness of the cable lug should be less than 0.85mm.
4. Tighten the screw by using the appropriate size and type of screw driver to secure the copper cable lug to the Outdoor CPE Device.
5. Strip the other end of the ground wire and connect to the main ground

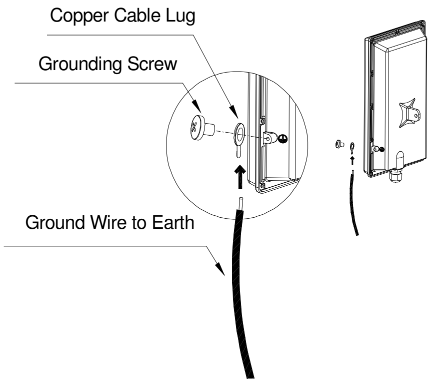


Figure 63 Connect the ground wire