Broadband Wireless Connectivity Solution

ALINK-PW5 Pre-WiMAX

Revision 1.0

User Guide

Revision History

Version	Date	Notes
1.0	Aug. 24, 2009	Initial Version

The Wireless Technology

Broadband Wireless Connectivity Solution

The Product line are adopting Wireless TDMA concept to provide an affordable and reliable rural connectivity platform. All of products are high performance outdoor deployable wireless bridge that provides wireless connectivity between multiple network locations. With the high throughput and long distance transmission, it is the appropriate backhaul solution for Network Carriers, Internet Service Providers, System Integrators and Enterprises.

About this manual

The purpose to use this manual is for install the Pre-WiMAX capacity Wireless TDMA Backhaul. This user manual is including disposing course and method and helping the customer to solve the unpredictable problem. The following typographical conventions are used in this purpose:

Planning Your Wireless Network

Network Topology

A wireless network is a group of computers, each equipped with one wireless adapter. Computers in a wireless network must be configured to share the same radio channel. Several PCs equipped with wireless cards or adapters can communicate with one another to form an ad-hoc network. The wireless adapters also provide users access to a wired network when using an access point or wireless router. An integrated wireless and wired network is called an infrastructure network. Each wireless PC in an infrastructure network can talk to any computer in a wired network infrastructure via the access point or wireless router. An infrastructure configuration extends the accessibility of a wireless PC to a wired network, and may double the effective wireless transmission range for two wireless adapter PCs. Since an access point is able to forward data within a network, the effective transmission range in an infrastructure network may be doubled.

Network Layout

The Wireless Bridge has been designed for use with proprietary 5 GHz based on IEEE 802.11a standard products, products using these standards can communicate with each other. When you wish to connect your wired network with your wireless network, the Wireless Bridge's network port can be used to connect to any of switches or routers.

Installation Considerations

The AP lets you access your network, using a wireless connection, from virtually anywhere within its operating range. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

- Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.
- Keep the number of walls and ceilings between the AP and other network devices to a minimum - each wall or ceiling can reduce your AP's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.
- Be aware of the direct line between network devices. A wall that is 1.5 feet thick(.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.
- Building materials can impede the wireless signal - a solid metal door or aluminum studs may have a negative effect on range. Try to position wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

Applications

The wireless LAN products are easy to install and highly efficient. The following list describes some of the many applications made possible through the power and flexibility of wireless LANs:

- **Difficult-to-wire environments**

  There are many situations where wires cannot be laid easily. Historic buildings, older buildings, open areas and across busy streets make the installation of LANs either impossible or very expensive.

- **Temporary workgroups**

  Consider situations in parks, athletic arenas, exhibition centers, disaster-recovery, temporary offices and construction sites where one wants a temporary WLAN established and removed.

- **The ability to access real-time information**

  Doctors/nurses, point-of-sale employees, and warehouse workers can access real-time information while dealing with patients, serving customers and processing information.

- **Frequently changed environments**

  Show rooms, meeting rooms, retail stores, and manufacturing sites where

frequently rearrange the workplace.

- **Wireless extensions to Ethernet networks**

  Network managers in dynamic environments can minimize the overhead caused by moves, extensions to networks, and other changes with wireless LANs.

- **Wired LAN backup**

  Network managers implement wireless LANs to provide backup for mission-critical applications running on wired networks.

Network Topology – Wireless Bridge (PEER-TO-PEER) Point

Broadband Wireless Connectivity

Pre WiMAX
(Master)

Pre WiMAX
(Slave)

Internet

Switch Hub

16 Ports Switch Hub

Surveillance (IP Camera x 8)

. . . .

PC or NB x 8

. . . .
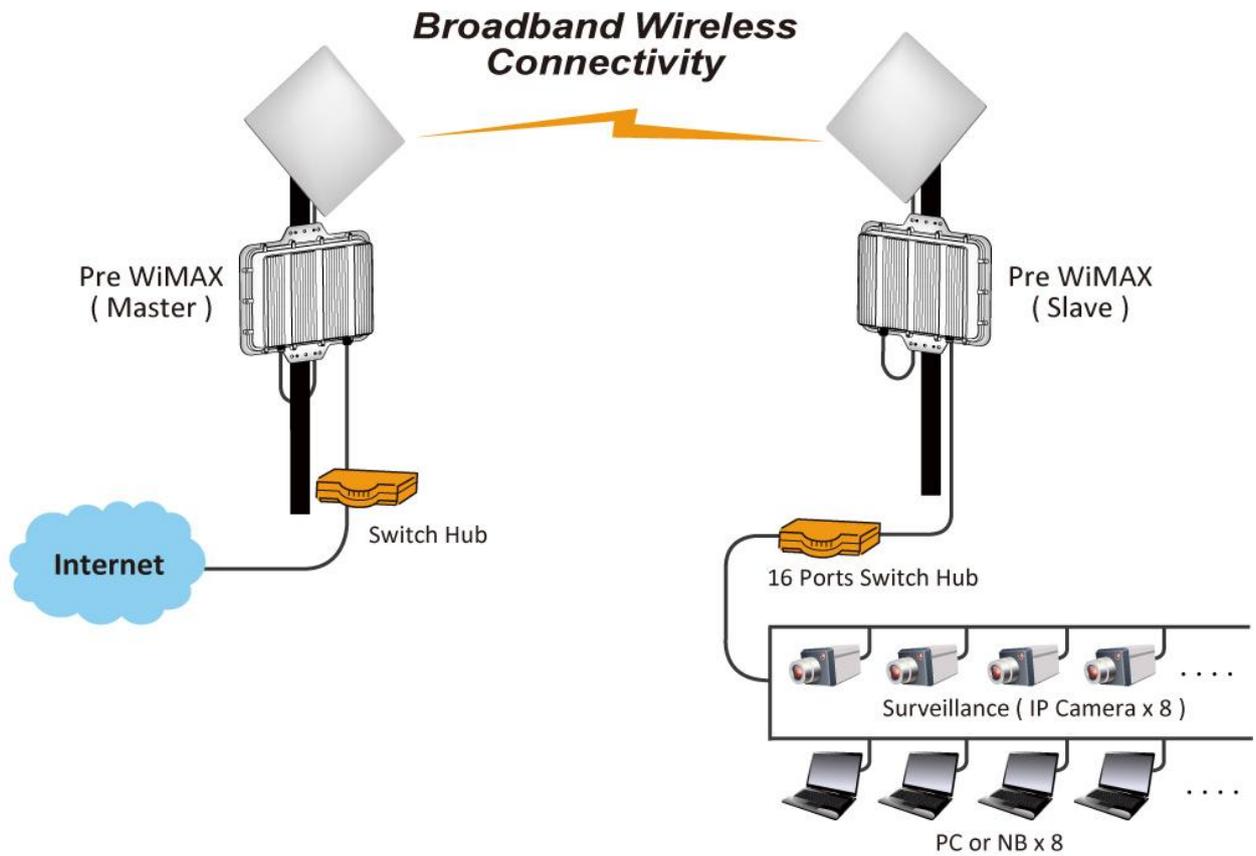
Installation Diagram
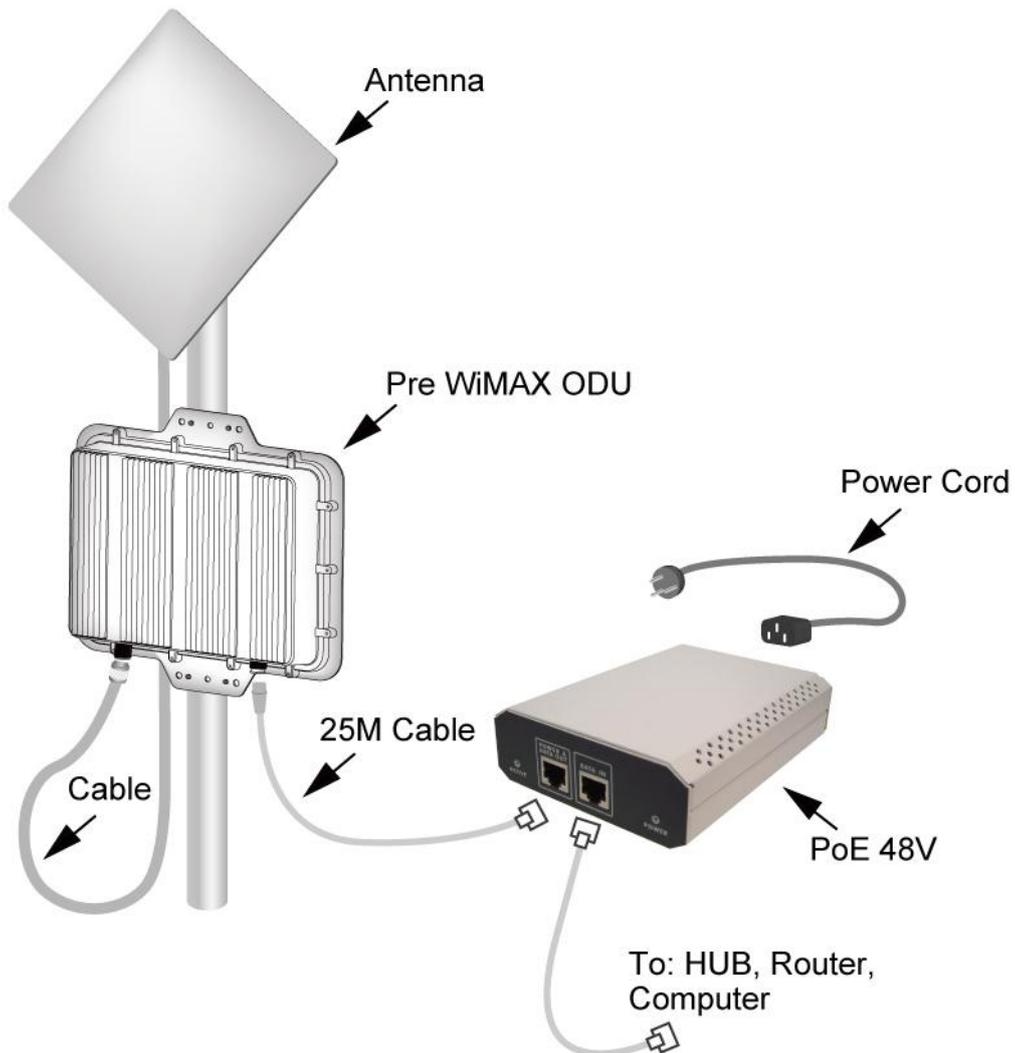
Attention:

● The cable distance between the Router and PC/hub/Switch
should not exceed 100 meters.

● Make sure the wiring is correct. In 10Mbps operation, Category
3/4/5 cable can be used for connection. To reliably operate your
network at 100Mbps, you must use Category 5 cable, or better
Data Grade.

Wireless Bridge Configuration Using Web User Interface

Before Setup…
❖ **Verify the IP address setting**

You need to configure your PC's network settings to obtain an IP address. Computer use IP addresses to communicate with each other across a network, such as the Internet.

1. From the taskbar, click the **Start** button, select **Settings** > **Control Panel**. From there, double-click **the Network connections** icon.

2. Right click the **Local Area Connection** icon **Properties**; select the **TCP/IP** line for the applicable Ethernet adapter. Then, click the **Properties** button.

3. Click the **IP Address** tab page, select **USE the following IP address**, type **192.168.1.254** (but, **192.168.x.x** for the device use) in the **IP Address** field and **255.255.0.0** in the **Subnet Mask** field, then click **OK** button.

Start Setup by Browser...

1. After getting the correct connection, start the web browser (make sure you disable the proxy) and type **192.168.x.x (x is outdoor unit IP Address)** in the

   Address field. Press **Enter**. http://192.168.1.1
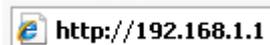
   You will see a popup menu below:
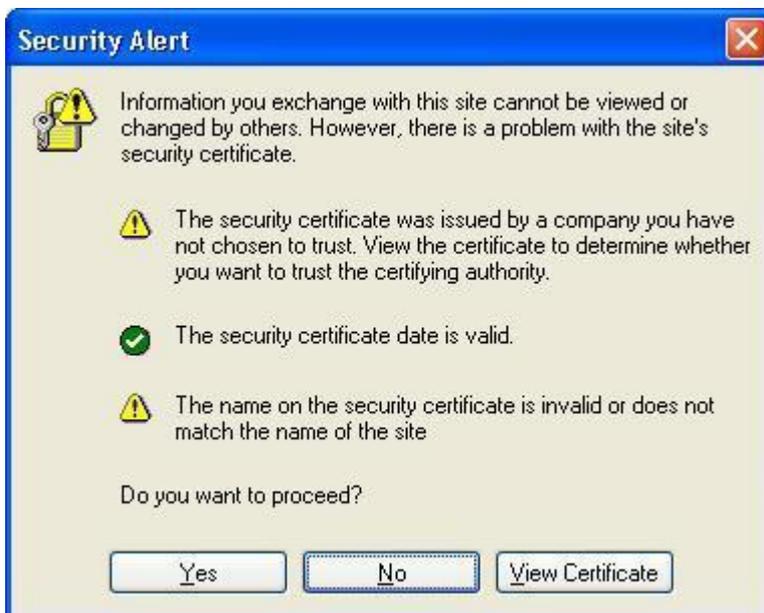
Clicking "Yes" ushers you into login.

2. Enter the factory default **User name** and **Password** fields:

   User Name: **admin**

   Password: **password**

   then click **Login** button.

8

3. You will enter the Utility homepage.

Device Information

The first page appears in main page will show "**Device Information**" automatically, you can find the Device Name, MAC address, Firmware version.

Basic Setup

● **Device Name –** You'll see the Device Name. You may assign any device name to this CPE. This name is only used by the CPE administrator for identification purposes. Unique, memorable names are helpful, especially if you are employing multiple access points on the same network. This name is composed of 15 characters with 0-9, A-Z, a-z or "-".

● **Ethernet Data Rate –** 10/100 Mbps Base-T

IP Address –

IP Address – Default is **"Manual"** or set to DHCP

IP Subnet Mask –

Default Gateway –

Primary DNS Server –

Secondary DNS Server –

- **Spanning Tree Protocol (STP) –**Spanning-Tree Protocol is a link management protocol that provides path redundancy while preventing undesirable loops in the network.

Wireless Setup

- Radio Frequency (RF) **–** Default is "Enable"

- Remote MAC Address **–**Wireless Bridge (Peer-to-Peer) can allow Bridge point to point network architecture, In order to establish the wireless link between bridge radios, the MAC address of remotes bridge(s) need to be registered in the address table. Type the MAC address with format xx:xx:xx:xx:xx:xx (x is the hexadecimal digit)

- Security **–**
  Cipher **–** Default is "NONE", WEP and AES
  Cipher Phrase **–**

- **Radio**
  - RF Bandwidth **–**Optimize the network and increase its bandwidth, the options are 5,10, 20 and 40MHz, default is 20MHz
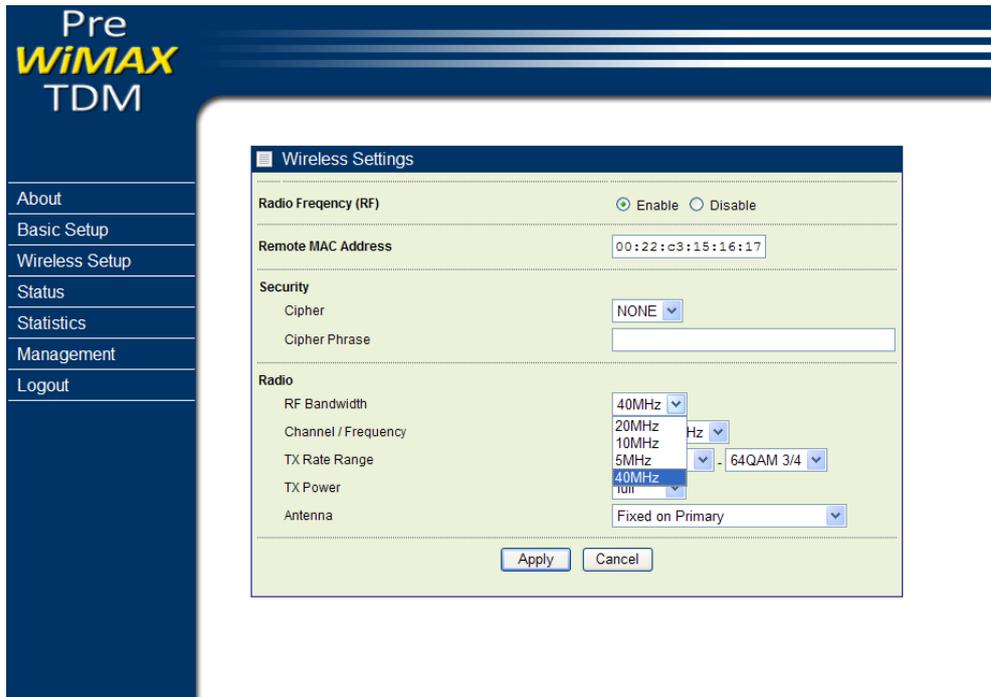
  - Channel/Frequency **–**The channels available are based on select the appropriate channel from the list provided to correspond with your network settings.
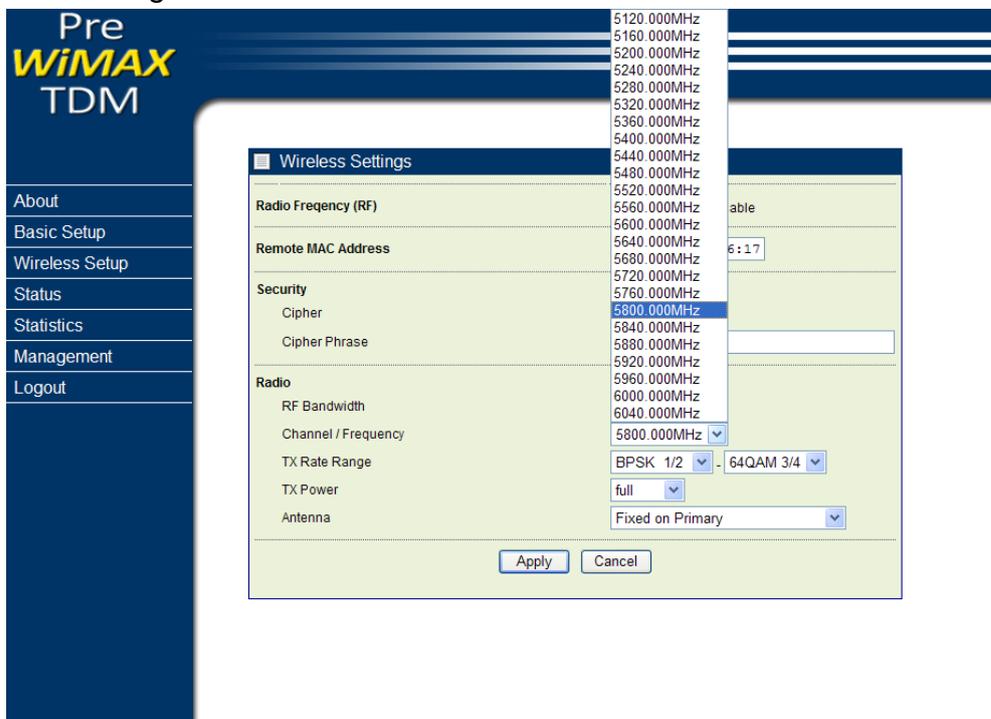
- TX Rate Range – In data rate column you can select all bit rate supported in current operation mode. Default value is "**BPSK 1/2 to 64QAM 3/4**" means the system will adjust the connection speed dynamically according to your current link status.
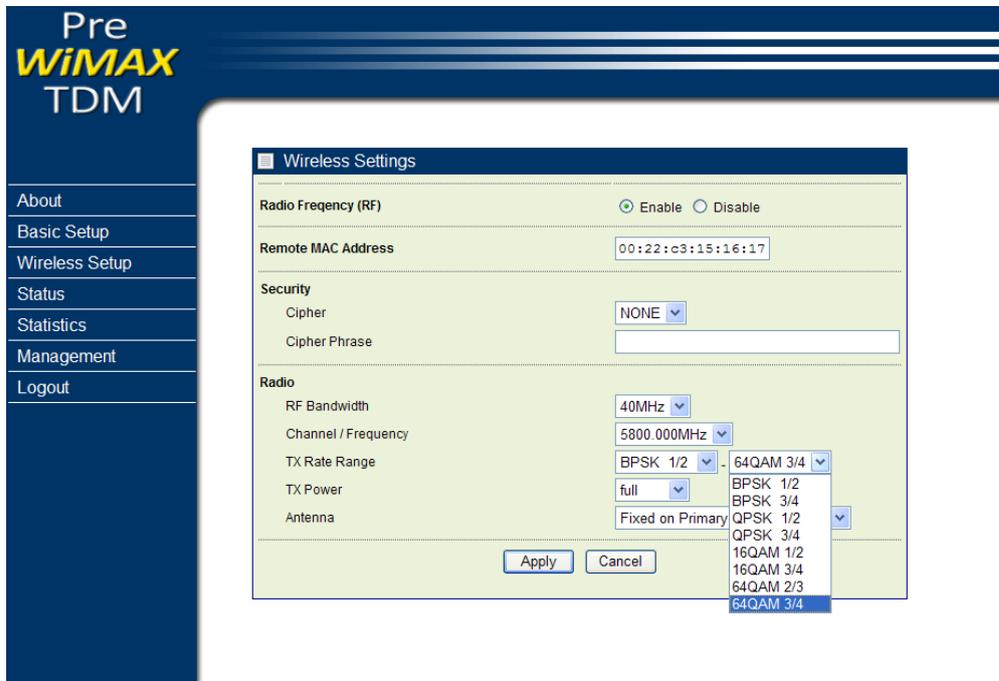
- TX Power – Default is "full", you can reduce RF output power by selecting adjustable transmit power full, half, quarter, eighth and min. To change transmit power may decrease your wireless signal coverage. This feature can be helpful in restricting the coverage area of the wireless network.

13
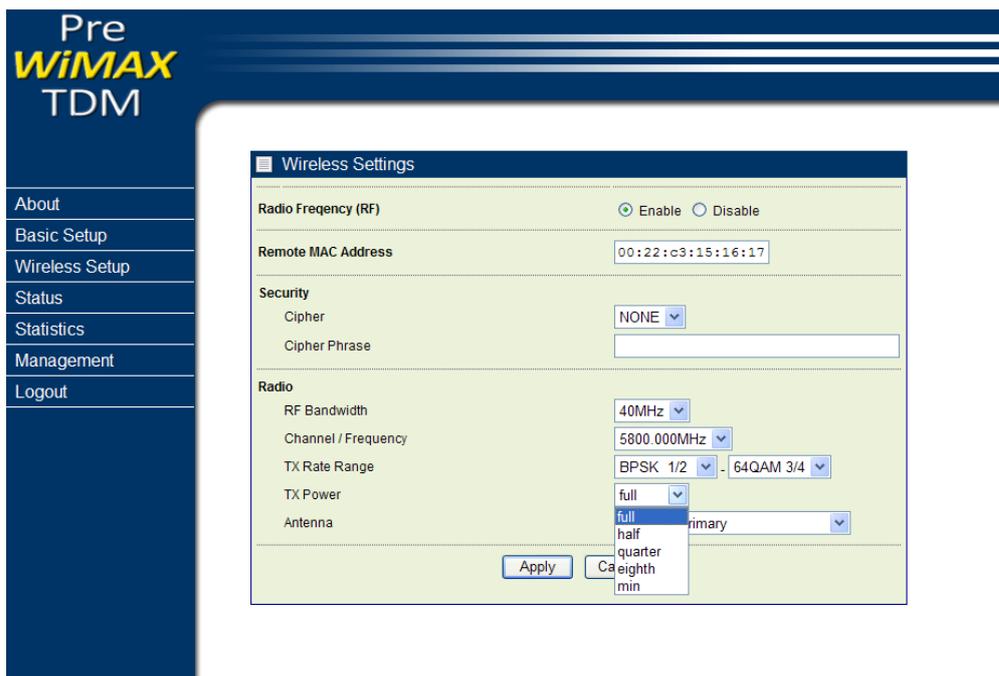
- Antenna **–** Default setting is "**Fixed on Primary**", if you need "**Tx on Primary; Rx on Secondary**" option for customization and contact to our sales window for special deliver.

Status

Peer-to-Peer link show the Bridge ID of neighborhood, Time, MAC address, IP Address, Channel Info. ,Rx/Tx rate, RSSI (dBm), Remote RSSI, Best Remote RSSI (dBm) and Status

Statistics –

Management

Change Password –In the "Change Password" page, you can modify "**Password**". Changing the sign-on password is as easy as typing the string you wish in the column. Then, type the password into second column to confirm. This option allows you to create a password for the device. By default, this device is configured with a password is "**password**". For security reasons it is highly recommended that you create a new password.

Click **"Apply"** to finish the procedure. Be sure you noted the modification before apply all changes.

Remote Management –

Remote Console is recommended that Putty is your right option to access this device's management.

- Open putty.exe by double clicking Putty
  1. Enter 192.168.1.1 in the "Host Name" field, port number is 22 and "Protocol".
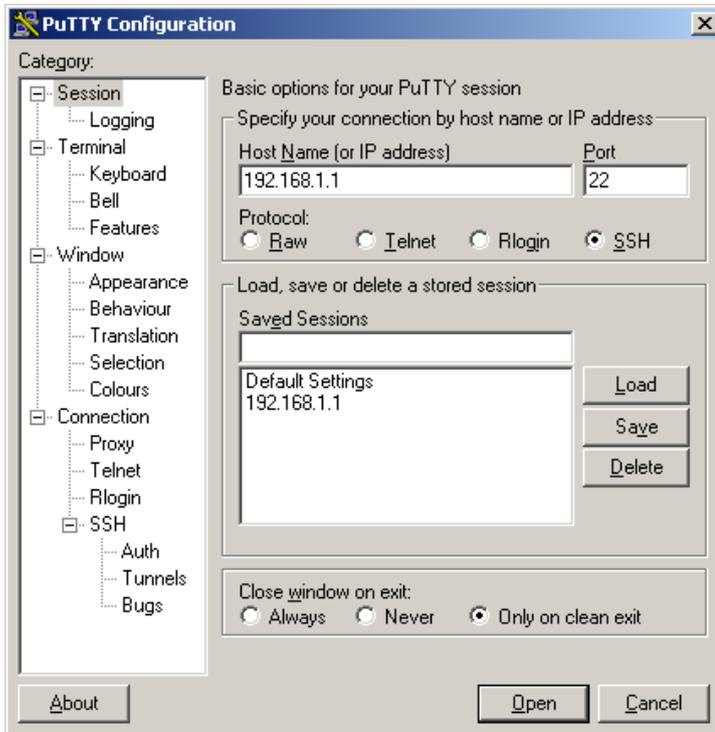
  2. From the "Connection", select "SSH"; from the "Preferred SSH protocol version", select"2"; from the "Encryption cipher selection policy", make"3DES"the top position.
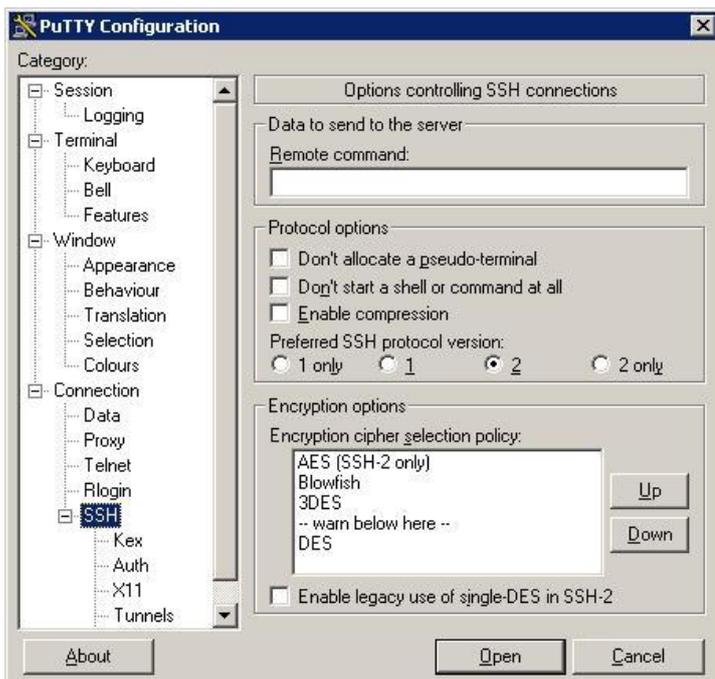
3. Click Open and a page will open like below:
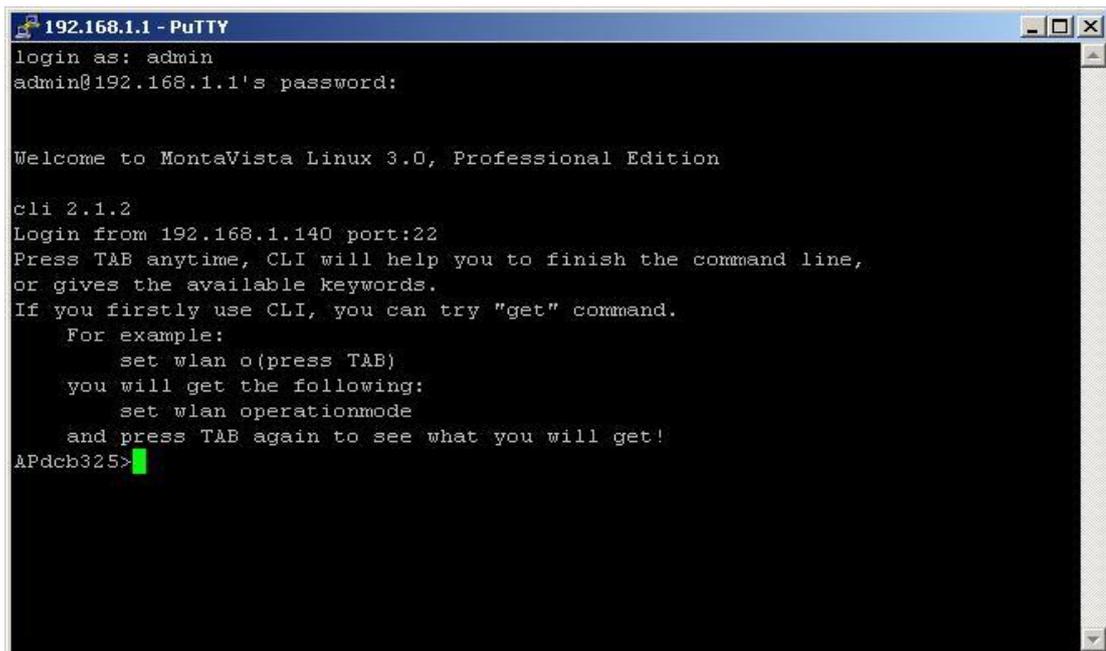
```
192.168.1.1 - PuTTY                                              _ □ ×
login as: admin
admin@192.168.1.1's password:


Welcome to MontaVista Linux 3.0, Professional Edition

cli 2.1.2
Login from 192.168.1.140 port:22
Press TAB anytime, CLI will help you to finish the command line,
or gives the available keywords.
If you firstly use CLI, you can try "get" command.
    For example:
        set wlan o(press TAB)
    you will get the following:
        set wlan operationmode
    and press TAB again to see what you will get!
APdcb325>
```

4. Enter username: **admin** and password: **password** in the separate field
5. For Help information, enter "help" command.

Under System Management, click **SNMP** to display and change settings for the Simple Network Management Protocol.

To communicate with the access point, the **SNMP** agent must first be enabled and the Network Management Station must submit a valid community string for authentication. Select **SNMP** Enable and enter data into the fields as described below. When you are finished, click **"Apply"**

Setting	Description
SNMP	Enables or disables SNMP.
Contact Location	Sets the location string that describes the system location. Maximum length is 255 characters.
Community Name (Read Only)	Specifies a community string with read-only access. Authorized management stations are able to retrieve MIB objects. Maximum length is 32 characters. Default is "**public**"
Community Name (Read Write)	Specifies a community string with read-write access. Authorized management stations are able to both retrieve and modify MIB objects. Maximum length is 32 characters. Default is "**private**"
Trap Destination IP Address	Enter the IP address of the trap manager that will receive these messages.
Trap Destination Community Name	Enter the community name of the trap manager that will receive these messages. Default is "**public**"

Upgrade Firmware –

Enter the location of the firmware upgrade file in the file path field, or click the **"Browse"** button to find the firmware upgrade file. Then click on the **"Upgrade"** button, and follow the on-screen instructions. The whole firmware upgrade process will take around 60 seconds. Before upgrade, make sure you are using correct version. Please check with your technical support service if new firmware available.
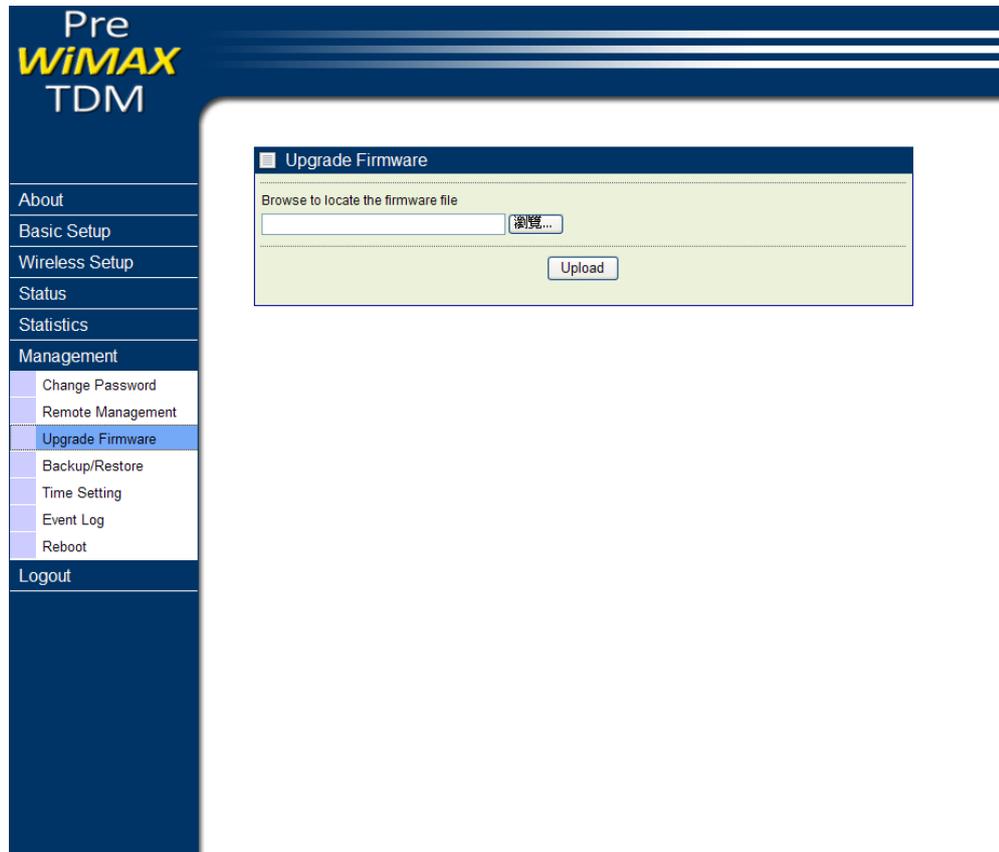
Backup/Restore Settings –

In Management section, you can **Backup/Retrieve Setting** and **Restore to Factory Default Settings** the system in following pages.

- **Backup the current settings to a file –** Click on the "Backup" button, system will prompt you where to save the backup file. You can choose the directory to save your configuration file.
- **Retrieve backed up settings from a file –** Here you can restore the configuration file from where you previous saved.
- **Restore to factory default settings –** Be very carefully before restore system back to default since you will lose all current settings immediately.
  If you act the function, the IP address will restore the establishing value situation. **192.168.1.1** in the **IP Address** field and **255.255.255.0** in the **Subnet Mask** field,

Time Setting –

Time Server –This allows you to configure the time on the device. You may do this automatically by connecting to a NTP server. Select the time zone from the drop down list and then specify the IP address of the NTP server.

From the"**Time Server**"， enter the correct time server. The following provides the time server website.

time.windows.com

time-a.nist.gov

time.nist.gov

- **Time Server Port – 123**
- **Time Zone –** From the" **Time Server** "pop-menu, select your time zone.
- From the"**Adjust for Daylight Saving Time**"， you have the option of daylight saving time or not.

Event Log –The **Log** page displays a list of events that are triggered on the Ethernet and Wireless interface. This log can be referred when an unknown error occurs on the system or when a report needs to be sent to the technical support department for debugging purposes.
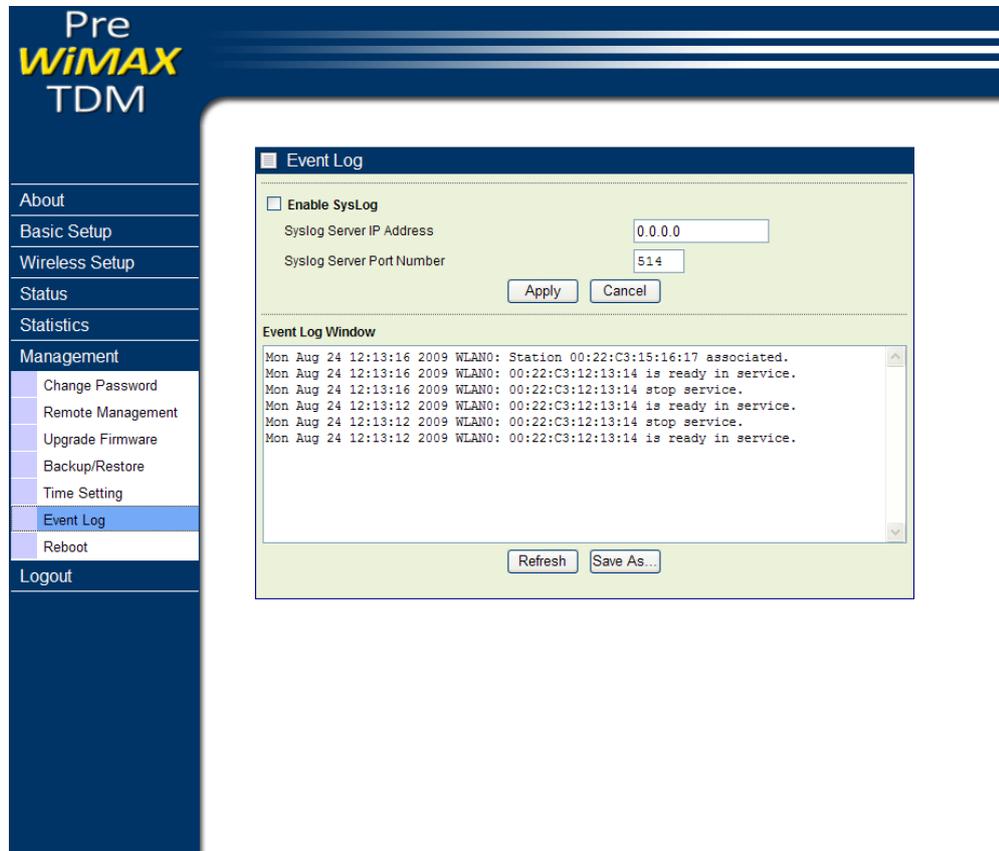
Reboot –Click on **"Yes"** button to restart Bridge and wait 30 seconds for system rebooting.
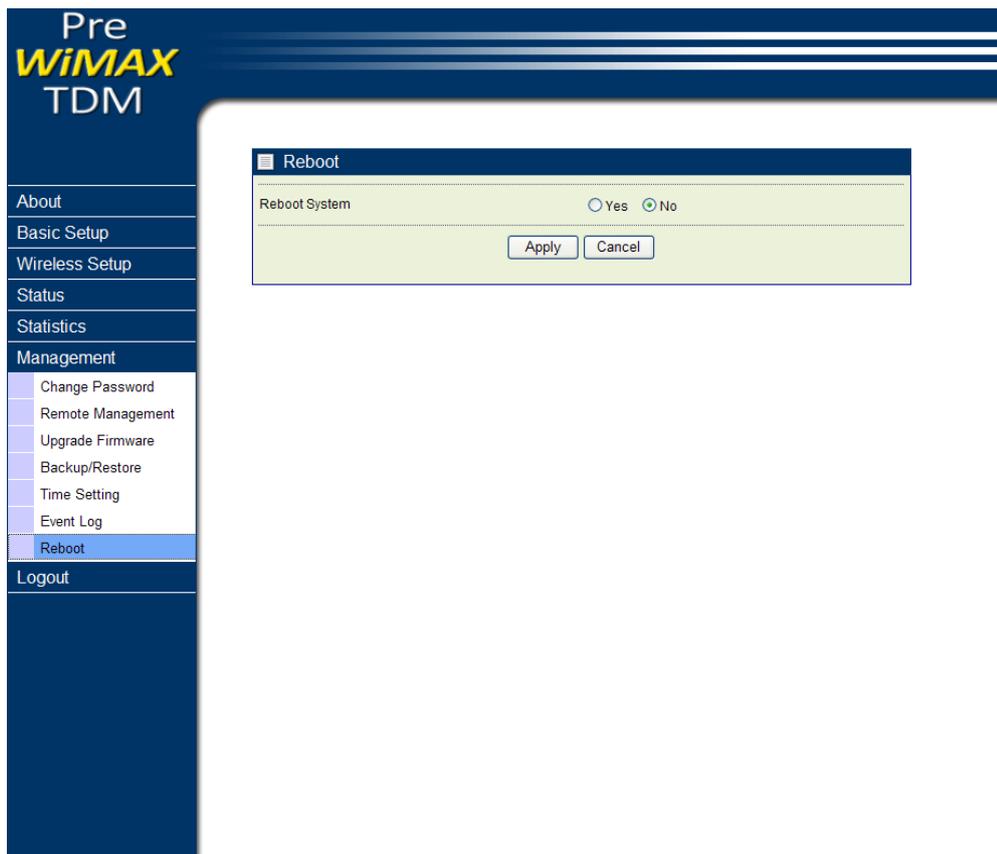
Logout–
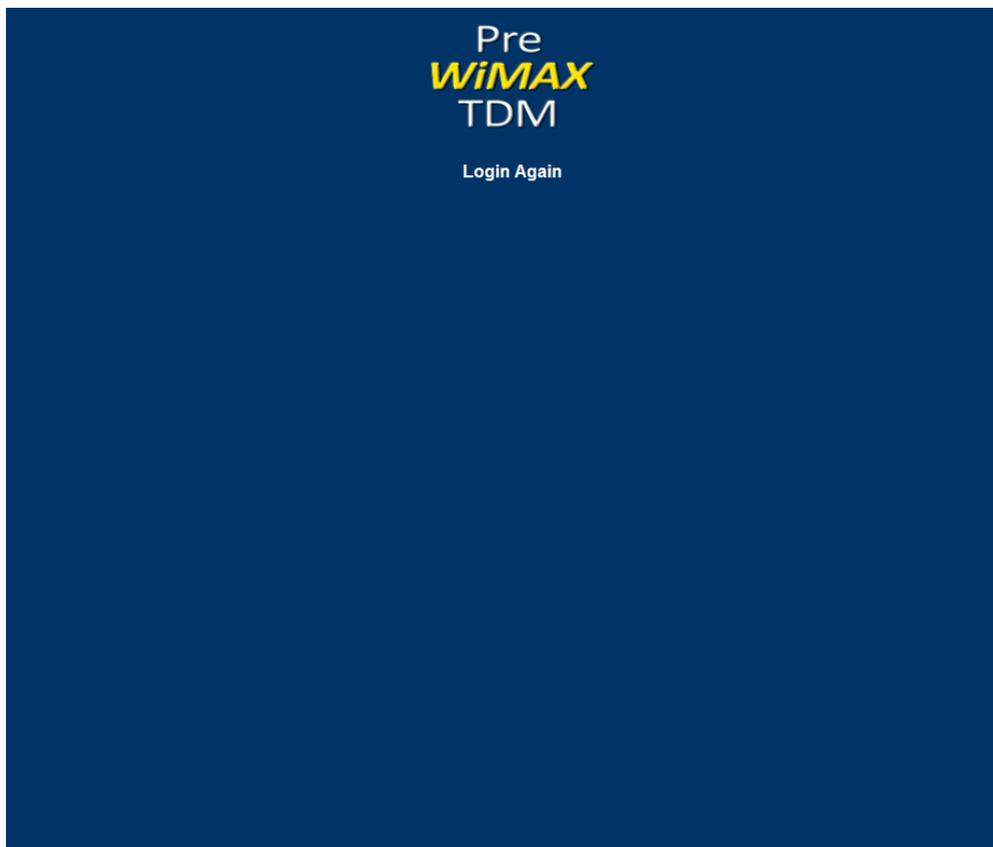
Appendix A: Specification

Standards Compliance	IEEE 802.11 silicon to non-standard; IEEE 802.3; IEEE 802.3u; IEEE802.3af(option)
SDRAM	64 M Byte
Flash	16M Byte
Radio Frequency Type	Proprietary 5GHz based on 802.11a OFDM
Modulation	64QAM 3/4, 64QAM 2/3, 16QAM 3/4, 16QAM 1/2, QPSK 3/4, QPSK 1/2, BPSK 3/4, BPSK 1/2
Frequency Band	5120~6060MHz
Transmission Power	300mW (Adjustable output power)
Data Rate	Up to 40Mbps over 50Km connection
Access Point Interfaces	Auto sensing MDI/MDI-X Ethernet 10/100Base-TX: RJ-45
Sensitivity	-92dBm @ 6Mbps; -72dBm @ 54Mbps, PER < 10%
Antenna Type	N-type external high gain antenna
Security Systems	WEP/ AES encryption;
Wireless Setting	Operation Mode –Wireless PtP Bridge Channel Bandwidth adjustable 5/10/20/40 MHz Adjustable transmit power
Software/Firmware	DFS Spanning Tree settings Reset to default by WebUI Web-based configuration via popular browser (MS IE, Netscape…) Firmware upgrade and configuration Backup/Restore via Web 802.1Q VLAN pass-through Signal strength LED indicator (5 LEDs) EventLog Remote Log Server SNMP v1/v2c MIB support: MIB I, MIB II (RFC-1213) and Private MIB Support Time settings Hardware Watch dog
Operating Environment	Operating Temperature: -30 ~ +70°C
Power	DC 48 Volt ±5%; 1A (Max.)AC adapter AC 100V ~ 240V
Network Management System OS Support	Windows 2000/XP/Vista Home BASIC
Warranty	One year limited

Appendix B: Notice

Please refer to the following system grounding diagram for your installation reference.

When in doubt, refer to the NEC code to determine proper grounding techniques.

For detailed information regarding grounding the outdoor wireless system.
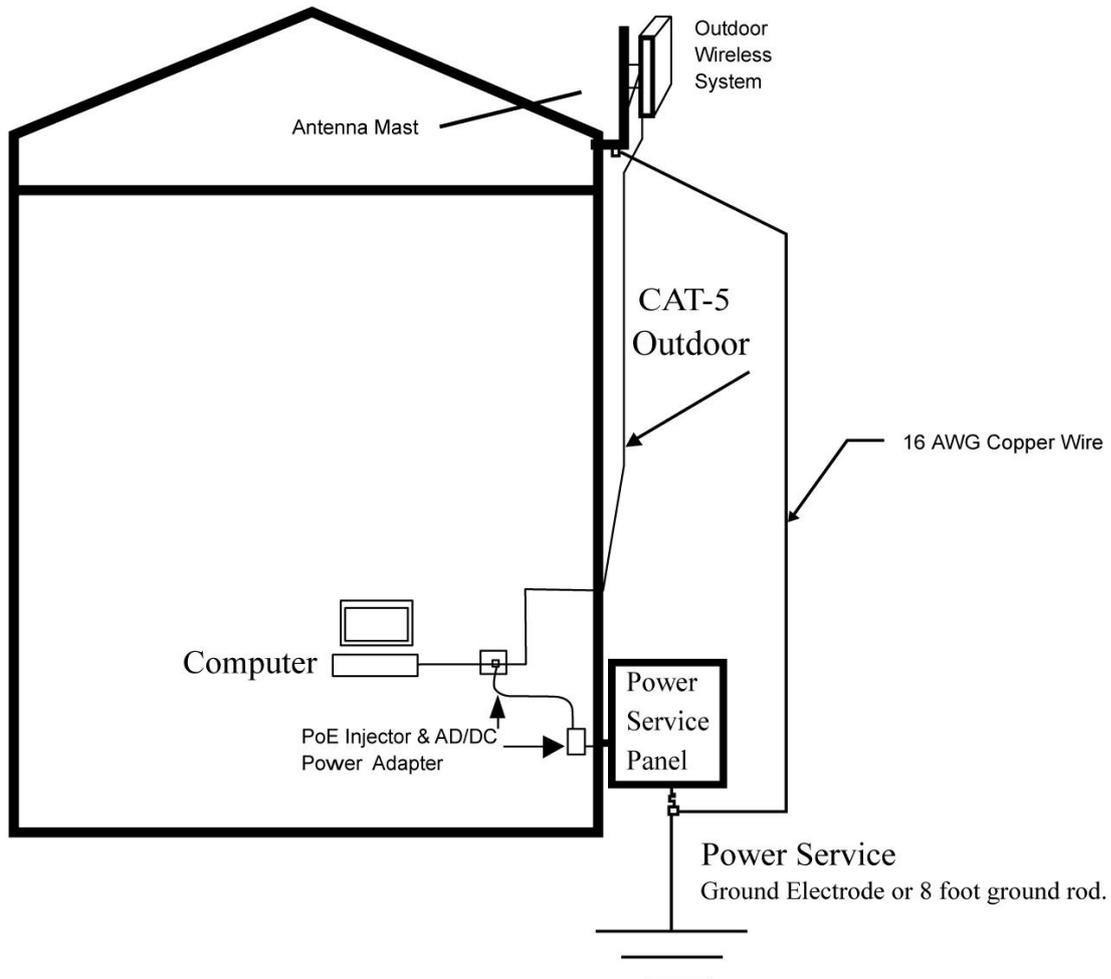
Appendix C: SSH settings List

get	set	del	keyword				descriptions
√	√		system				--- system setting
√			version				--- system firmware version
√	√		apname				--- system name
√			macaddress				--- system MAC address
√	√		country				--- country/region
√	√		routemode				--- system route mode
√	√		anyiponroute				---system any ip on route mode
√	√		bridge				--- system bridge port
√	√			iptype			--- system dhcp client
√	√			ipaddr			--- system IP address
√	√			netmask			--- system network mask
√	√			gateway			--- system gateway
√	√			dns primary			--- system primary DNS
√	√			dns secondary			--- system secondary DNS
√	√		ethernet				--- system ethernet port
√	√			iptype			--- system dhcp client
√	√			ipaddr			--- system IP address
√	√			netmask			--- system network mask
√	√			gateway			--- system gateway
√	√			dns primary			--- system primary DNS
√	√			dns secondary			--- system secondary DNS

√	√			IP start			--- IP range start
√	√			IP End			--- IP range end
√	√			IP Range Netmask			--- IP range netmask
√	√		wireless				--- system wireless port
√	√			iptype			--- system dhcp client
√	√			ipaddr			--- system IP address
√	√			netmask			--- system network mask
√	√			gateway			--- system gateway
√	√			dns primary			--- system primary DNS
√	√			dns secondary			--- system secondary DNS
√	√			IP start			--- IP range start
√	√			IP End			--- IP range end
√	√			IPRange Netmask			--- IP range netmask
√	√		stp				--- enable spanning tree protocol
√			ethstats				--- ethernet statistics
√	√		radius				---radius setting
√	√			auth			---authentication radius setting
√	√				primary		---primary
√	√					ipaddr	---radius IP address
√	√					port	---radius port number
√	√					secret	---radius secret string

√	√				secondary		
√	√					ipaddr	---radius IP address
√	√					port	---radius port number
√	√					secret	---radius secret string
√	√			account			
√	√				primary		---primary
√	√					ipaddr	---radius IP address
√	√					port	---radius port number
√	√					secret	---radius secret string
√	√				secondary		
√	√					ipaddr	---radius IP address
√	√					port	---radius port number
√	√					secret	---radius secret string
√	√		ssh				--- enable remote SSH access
√	√		snmp				--- SNMP setting
√	√			server			--- enable SNMP agent
√	√			trap server			--- SNMP TrapServer IP address
√	√			read community			--- SNMP Readcommunity
√	√			write community			--- SNMP Writecommunity
√	√			description			--- SNMP System Description
√	√	√	wlan				--- wireless setting
√	√			radio			--- enable wireless radio

√	√			wirelessmode				--- wireless mode
√	√			channel				--- wireless channel(depends on country and wireless mode)
√	√			rate				--- wireless transmission data rate
√	√			ssid				--- wireless network name(1-32chars)
√	√			power				--- wireless transmit power
√	√			fragmentationthreshold				--- wireless fragmentation threshold (even only)
√	√			rtsthreshold				--- wireless RTS/CTS threshold
√	√			super				--- enable Super-A/G mode
√	√			beaconinterval				--- wireless beacon period in TU(1024us)
√	√			dtim				--- wireless DTIM period in beacon interval
√	√			preamble				--- wireless preamble(only effect on 802.11b rates)
√	√			wirelessisolate				--- wireless isolate communication between clients
√	√			oprationmode				--- wireless operation mode

√	√	√		remoteap			--- wireless remote AP(s) (depends on oprationmode)
√	√	√			p2p(+ap)		--- remote ap address for p2p mode
√	√	√			p2mp(+ap)		--- remote ap address for p2mp mode
√	√	√				1	--- 1st remote ap address for p2mp mode
√	√	√				2	--- 2nd remote ap address for p2mp mode
√	√	√				3	--- 3rd remote ap address for p2mp mode
√	√	√				4	--- 4th remote ap address for p2mp mode
√	√	√				5	--- 5th remote ap address for p2mp mode
√	√	√				6	--- 6th remote ap address for p2mp mode
√	√	√				7	--- 7th remote ap address for p2mp mode
√	√	√				8	--- 8th remote ap address for p2mp mode
√	√	√	acl				--- wireless access control
√	√			mode			--- enable wireless access control (ACL)
√	√	√		list			---

		√				all		--- (delete only) all local ACL address
√	√	√				null		--- edit local ACL address
√			association					--- list of associated wireless clients
√			wlanstats					--- wlan statistics
√	√		authentication					--- wireless authentication type
√	√		encryption					--- wireless data encryption
√	√	√	key					--- wireless wep key setting
√	√			type				--- wireless wep key type
√	√			default				--- wireless wep default key index
√	√	√		passphrase				--- wireless wep passphrase key
√	√	√		1				--- wireless wep key 1
√	√	√		2				--- wireless wep key 2
√	√	√		3				--- wireless wep key 3
√	√	√		4				--- wireless wep key 4
√	√	√	wpa					--- wireless WPA setting
√	√	√		psk				--- wireless pre-shared key (PSK) for WPA-PSK
√	√			reauthtime				--- wireless WPA re-auth period (in seconds)
√	√			keyupdate				--- enable wireless WPA

								global key update
√	√				mode			--- wireless WPA global key update condition
√	√				interval			--- wireless WPA global key update interval
√	√					sec		--- wireless WPA global key update interval (in seconds)
√	√					pkt		--- wireless WPA global key update interval (in packets)
√	√		SmartWDS					--- SmartWDS settings
√	√			ID				--- Auto WDS ID
√				remotes				--- Auto WDS remote AP list
√				status				--- Auto WDS status
√	√		spaceinmeter					--- wireless space in meter
√	√		maxrssi					--- wireless max rssi
√	√		downflowwidth					--- wireless down flow width
√	√		RFlinewaste					--- RF line waste
√	√		localplus					--- local plus
√	√		remoteplus					--- remote plus
√	√		testremotemac					--- remote test mac

√	√		linkrx				--- MIB_WLAN_LINK_RX
√	√		linktx				--- MIB_WLAN_LINK_TX
√	√		linktime				--- MIB_WLAN_LINK_TIME
√	√		linkpktsize				--- MIB_WLAN_LINK_PKT_S IZE
√	√		linkpktinter val				--- MIB_WLAN_LINK_TEST_ INTERVAL
√	√		linklocalrssi				--- MIB_WLAN_LINK_LOCA L_RSSI
√	√		linkremoters si				--- MIB_WLAN_LINK_REMO TE_RSSI
√	√		linkaction				--- MIB_WLAN_LINK_ACTIO N
	√		password				--- system password
	√		reboot				--- reboot system
	√		exit				--- logout from CLI
	√		quit				--- quit CLI