BreezeMAX Series

Extreme CPE Manual

Extreme CPE
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Document History

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Electronic Emission Notices

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.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Radio Frequency Interference Statement

The Extreme CPE Access Unit has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules and to EN 301 489-1 rules.These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment notwithstanding use in commercial, business and industrial environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

FCC Radiation Hazard Warning

To comply with FCC RF exposure requirement, the antenna used for this equipment must be fixed-mounted on outdoor permanent structures with a separation distance of at least 62 centimeters (25 inches) from al persons.

R&TTE Compliance Statement

This equipment complies with the appropriate essential requirements of Article 3 of the R&TTE Directive 1999/5/EC.

This device is intended for use in the following European Community and EFTA countries:

Czech Česky	*Accton* tímto prohlašuje, že tento Radio LAN je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Estonian *Eesti*	Käesolevaga kinnitab Accton seadme Radio LAN vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, Accton, declares that this Radio LAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Finnish *Suomi*	Valmistaja Accton vakuuttaa täten että Radio LAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Dutch *Nederlands*	Hierbij verklaart Accton dat het toestel Radio LAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG Bij deze Accton dat deze Radio LAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.
French *Français*	Par la présente Accton déclare que l'appareil Radio LAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE
Swedish *Svenska*	Härmed intygar Accton att denna Radio LAN device står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Danish *Dansk*	Undertegnede Accton erklærer herved, at følgende udstyr Radio LAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF
German *Deutsch*	Hiermit erklärt Accton, dass sich dieser/diese/dieses Radio LAN device in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMWi) Hiermit erklärt Accton die Übereinstimmung des Gerätes Radio LAN device mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien)
Greek ελληνικά	Με την παρουσα Accton δηλωνει οτι radio LAN device συμμορφωνεται προσ τισ ουσιωδεισ απαιτησεισ και τισ λοιπεσ σΧετικεσ διαταξεισ τησ οδηγιασ 1999/5/εκ
Hungarian *Magyar*	Alulírott, Accton nyilatkozom, hogy a Radio LAN megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Italian *Italiano*	Con la presente Accton dichiara che questo Radio LAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latvian *Latviski*	Ar šo *Accton* deklarē, ka Radio LAN atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lithuanian Lietuvių	Šiuo *[manufacturer name]* deklaruoja, kad šis *[equipment type]* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Maltese *Malti*	Hawnhekk, *Accton*, jiddikjara li dan Radio LAN jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Spanish *Español*	Por medio de la presente Accton declara que el Radio LAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE
Polish *Polski*	Niniejszym Accton oświadcza, że Radio LAN jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Portuguese *Português*	Accton declara que este Radio LAN device está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Slovak *Slovensky*	Accton týmto vyhlasuje, že Radio LAN spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Slovenian *Slovensko*	Accton izjavlja, da je ta Radio LAN v skladu z bistvenimi zahtevami in ostalimi relevantnimi dolo?ili direktive 1999/5/ES.

Caution

To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

Line Voltage

Before connecting this instrument to the power line, make sure that the voltage of the power source matches the requirements of the instrument. The unit must be connected to an earthed (grounded) outlet to comply with international safety standards.

Radio

The instrument transmits radio energy during normal operation. To avoid possible harmful exposure to this energy, do not stand or work for extended periods of time in front of its antenna. The long-term characteristics or the possible physiological effects of Radio Frequency Electromagnetic fields have not been yet fully investigated.

Outdoor Unit and Antenna Installation and Grounding

Ensure that outdoor units, antennas and supporting structures are properly installed to eliminate any physical hazard to either people or property. Make sure that the installation of the outdoor unit, antenna and cables is performed in accordance with all relevant national and local building and safety codes. Even where grounding is not mandatory according to applicable regulation and national codes, it is highly recommended to ensure that the outdoor unit and the antenna mast (when using external antenna) are grounded and suitable lightning protection devices are used so as to provide protection against voltage surges and static charges. In any event, Alvarion is not liable for any injury, damage or regulation violations associated with or caused by installation, grounding or lightning protection.

Disposal of Electronic and Electrical Waste

Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

《电子信息产品污染控制管理办法》
(第39号)
(又名中国RoHS)

产品内含危害物质揭露表						
零部件名称	危害物质项目					
	铅	**镉**	**汞**	**六价铬**	PBB	PBDE
	(Pb)	(Cd)	(Hg)	(Cr^{6+})	(多溴联苯)	(多溴二苯乙醚)
含铜线材	×	○	○	○	○	○
连接器	×	○	○	○	○	○
变压器	×	○	○	○	○	○
陶瓷电容	×	○	○	○	○	○
高温锡材	×	○	○	○	○	○

○：表示此部件使用的所有同类材料中此种有毒或有害物质的含量均低于 SJ/T11363-2006 规定的限制要求。
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Management methods for Controlling Pollution by Electronic Information Products(No.39)
(also known as China RoHS)

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About This Manual

This manual describes the Extreme CPE and details how to install, operate and manage it.

This manual is intended for technicians responsible for installing, setting and operating the BreezeMAX Extreme CPE system, and for system administrators responsible for managing the system.

This manual contains the following chapters and appendices:

- **Chapter 1 - Product Description** - Describes the Extreme CPE unit and its functionality.
- **Chapter 2 - Installation** - Describes how to install the Extreme CPE and how to connect to subscriber's equipment.
- **Chapter 3 - Initial Configuration** - Describes how to initially configure the Extreme CPE in order to test basic link operation.
- **Chapter 4 - System Settings** - Describes general management functions for the Extreme CPE.
- **Chapter 5 - Unit Control** - Describes management functions for the operation of the Ethernet port, software version and configuration of password.
- **Chapter 6 - Registration** - Describes the manner in which the Extreme CPE can be described to identify itself on a network.
- **Chapter 7 - BS Scanning** - Describes the manner in which the access unit can interoperate with the base station.
- **Chapter 8 - ATPC -** Describes the functions of the adaptive transmission power control (ATPC) algorithm.
- **Chapter 9 - Performance Monitor** - Describes the performance statistics for all aspects of the Ethernet link and WiMAX connection.

- **Chapter 10 - Service** - Describes the configuration of VLANs and DSCP parameters.
- **Chapter 11 - Management** - Describes system management statistics.
- **Chapter 12 - Logout** - Describes logging out of the system.
- **Appendix A - GNU License**
- **Glossary** - Glossary of terms used in the Extreme CPE User Guide.

Contents

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Chapter 1 - Product Description

In This Chapter:

1.1 Introducing the Extreme CPE range

Extreme CPE is a set of outdoor (ODU) units with an indoor component (IDU), that are either 2.3 GHz, 2.5GHz, 3.5 GHz, or 5 GHz, high capacity gateways and WiMAX Wireless Broadband Access subscriber stations, for a home or small office. Which ODU set you use depends on the frequency band of your service provider's WiMAX service. Each system provides network connections that are always on, supporting immediate access to the Internet and other IP services at high data rates. The unit provides a gateway function between a WiMAX service provider and a local Ethernet LAN. The device enables a service provider to deliver last mile broadband wireless access as an alternative to wired DSL or cable modems.

Part of an extended and field-proven product portfolio, Extreme CPE is an integral part of the Extreme family, the latest most technologically advanced wireless solution for broadband deployment. With capacity of up to 20 Mbps download and 7 Mbps upload speed per unit, the Extreme CPE solution enables the delivery of powerful wireless broadband services to the subscriber. Extreme CPE is an out-of-the-box solution with immediate available local stock enabling virtually instant network expansion and simplified deployment. Extreme CPE provides a wireless solution for the subscriber to connect to the internet.

With a range of up to 5 Km and lower equipment and deployment costs, Extreme CPE enables service providers to wirelessly extend their services to customers in areas where the cost of cabling is prohibitive to deployment. Remote residential areas can now benefit from high-speed wireless Internet access, Web browsing and e-mail, and advanced applications such as multi-media services.

The Extreme CPE indoor unit (IDU) is a plug-and-play device that provides PoE power to the ODU and a network interface through an RJ-45 Ethernet switch port, as well as two RJ-11 Voice over IP (VoIP) phone ports for telecommunications.

1.1.1 The Extreme CPE range of products

The following table lists the available Extreme CPE models:

Table 1-1: Extreme CPE Range of Models

Frequency Band	Model Number	Description
2.3 GHz		■ 1 RJ-45 data port
		■ 1 RJ-45 data port and 2 RJ-11 VoIP ports
2.5 GHz		■ 1 RJ-45 data port
		■ 1 RJ-45 data port and 2 RJ-11 VoIP ports
3.5 GHz		■ 1 RJ-45 data port
		■ 1 RJ-45 data port and 2 RJ-11 VoIP ports
5 GHz		■ 1 RJ-45 data port
		■ 1 RJ-45 data port and 2 RJ-11 VoIP ports

The Extreme CPE offers a user-friendly web-based management interface for the configuration of all the unit's features. Any PC directly attached to the unit can access the management interface using a web browser, such as Internet Explorer (version 6.0 or above) or Firefox (version 1.5 or above).

The initial configuration steps can be made through the web browser interface using the Setup Wizard. It is recommended to make the initial changes by connecting a PC directly to one of the Extreme's LAN ports.

1.2 Specifications

1.2.1 WiMAX Radio

Table 1-2: WiMAX Radio Specifications

Item	Description
Radio Type	IEEE 802.16e WAVE 1 & WAVE 2
Frequency Band Range	■ 2305-2360 MHz, or ■ 2496-2690 MHz, or ■ 3400-3600 MHz, or ■ 4900-5950 MHz
Antenna Type (ODU)	■ Integrated Flat Panel Antenna, 17dBi, 24°AZ x 18°EL.
Channel Bandwidth	5.00, 7.00, 8.75, and 10.00 MHz
Maximum Throughput	5 Mbps Upload, 20 Mbps download
Radio Technology	Maximum-Ratio Combining (MRC)
Modulation Technique	■ Scaleable OFDMA employing Time-Division Duplex (TDD) mechanism ■ PRBS subcarrier randomization ■ Contains pilot, preamble, and ranging modulation
FEC Coding Rates	■ Down Link: QPSK, 16 QAM, 64 QAM ■ Up Link: QPSK, 16 QAM
Antenna Gain	Flat panel antenna: ■ 2.3 GHz: 13.5 dBi ■ 2.5 GHz: 13.5 dBi ■ 3.5 GHz: 15 dBi ■ 5 GHz: 17 dBi
TPL (Transmit Power Level)	+24 dBm maximum
Receive Sensitivity	-94 dBm maximum

1.2.2 VoIP Specifications

Table 1-3: VoIP Specifications

Item	Description
Voice Signalling Protocol	SIP v2 (RFC 3261)
Voice Codex	■ G.711 (a-law and u-law) ■ G.729ab ■ G.722 ■ G.722.1
Voice Quality	■ G.726 VAD (Voice Activity Detection) ■ G.723 CNG (Comfortable Noise Generation) ■ Echo cancellation (G.165/G.168) ■ Adaptive jitter buffer, up to 200 milliseconds ■ DTMF tone detection and generation ■ Configurable Cadence Rings
Call Features	■ Call transfer ■ Call waiting/hold/retrieve ■ 3-way conference call ■ Call blocking ■ T.38 fax relay ■ Dial plan (E.164 dialing plan) ■ Call forwarding: No Answer/Busy/All
REN (Ring Equivilent Number)	■ 3 REN total in system

1.2.3 Configuration and Management

Table 1-4: Configuration and Management

Item	Description
Management options	■ Web-based (HTTP/HTTPS) ■ SNMP ■ TR-069 ■ TFTP ■ Telnet
SNMP agent	V1 / V2c, supports 802.11 MIB, RFC-1213 MIB II and private MIB.
Management access	From Wired LAN, Wireless Link
Management access protection	Access Password
Encryption	WEP 152-bits
Allocation of IP parameters	Configurable or automatic (DHCP client)
Software upgrade	HTTP/FTP/TFTP
Configuration Upload/Download	HTTP

1.2.4 Mechanical IDU

Table 1-5: Mechanical Specifications

Item	Description
Dimensions	156mm (L) X 60mm (W) X 33mm (T)
Weight	0.32kg
Mounting	Desktop
Cabling	Category 5 cable connection

1.2.5 Mechanical ODU

Table 1-6: Mechanical Specifications

Item	Description
Dimensions	230mm (H) X 230mm (W) X 63 (T) mm
Weight	2kg
Mounting	Pole-mount
Cabling	Category 5 cable connection

1.2.6 Electrical

The Extreme CPE provides two types of power supply with charger and without charger capability. The charger provides optional battery backup features for areas that have no PSTN service but do need to comply with emergency laws for VoIP service. The backup battery supply is not available in this release.

Table 1-7: Electrical Specifications

Type	Details
AC Power Supply	Input: 100-240 VAC, 50-60 Hz, maximum power consumption 0.5A Output: 55 VDC, maximum power consumption 1A
MTBF	■ 200,000 hrs ■ Bellcore SR332

1.2.7 Environmental IDU

Table 1-8: Environmental Specifications

Item	Details
Operating Temperature	-5ºC to 45ºC
Storage Temperature	-40 to 75 °C
Humidity	Maximum 95%, non-condensing.

1.2.8 Environmental ODU

Table 1-9: Environmental Specifications

Item	Details
Operating Temperature	-40ºC to 55ºC
Storage Temperature	-40 to 70 °C
Humidity	Maximum 95%, non-condensing.
Rain	IEC 68-2-18 method 2.2
Random Vibration	IEC 68-2-64
Shock	IEC-68-2-29
Salt Fog	IEC-68-2-11
Ice Loading	25mm radial ice density 7kN/m3
Solar Radiation	IEC-68-2-5, MIL-STD-810D
Wind Speed	160Km/Hr required for antenna stability under operation

1.2.9 Standards Compliance

Table 1-10: Standards Compliance

Type	Standard
EMC	■ FCC Part 15B Class B ■ EN 55022 Class B ■ EN 61000-3-2 ■ EN 61000-3-3 ■ EN 301 489-1/4
Safety	■ UL 60950-1/-22 ■ IEC/EN 60950-1/-22
Immunity	■ EN 61000-4-2/3/4/6/11 ■ ITU-T K21
WiMAX Radio Signal Certification	■ EN 302 326, EN 302 326-1, EN 302 326-3, EN 301 893, EN 302 502 ■ FCCp15.407 , p15.247, p.27 ■ ETSI/EN-301753 V1.1.1
Standards	■ IEEE 802.16e-2005 WAVE 1 and WAVE 2 ■ IEEE 802.3-2005 10BASE-T and 100BASE-TX

2

Chapter 2 - Hardware Installation

In This Chapter:

2.1 Installation Requirements

This section describes how to install and connect the Extreme CPE WiMAX Residential Gateway.

2.1.1 Packings List

The BreezeMAX K2 CPE is split into four separate packages which include the following components:

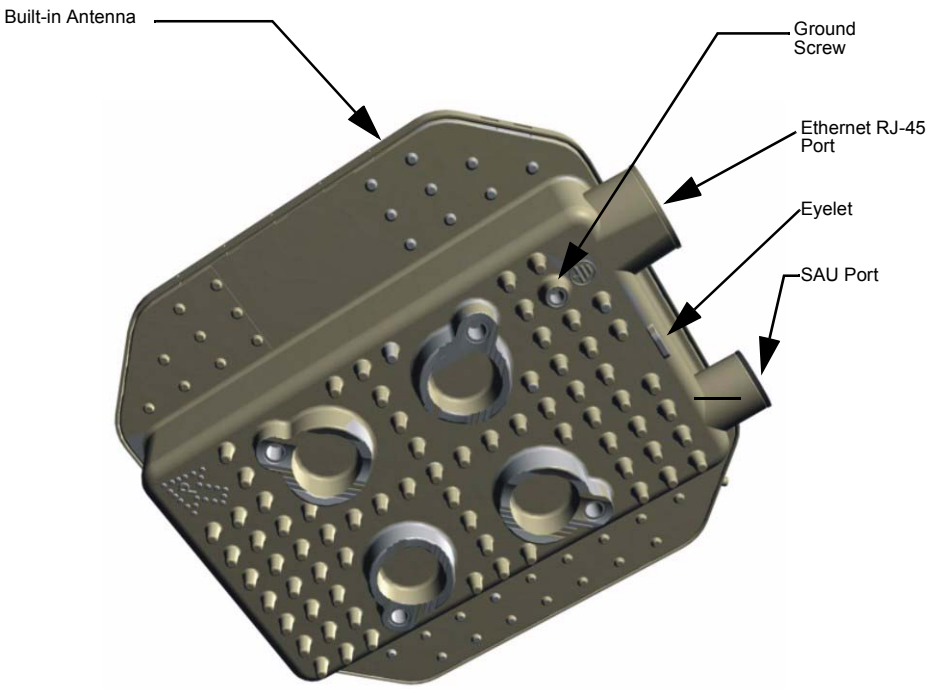
- BreezeMAX K2 CPE ODU unit with integrated antennas*
- Extreme CPE IDU unit, comprising of AC power adapter and internal gateway
- ODU pole mount bracket kit
- Propriety 10 PIN RJ-45 Category 5 network cable (90m)
- Software Utilities and User Guide CD

*For the bandwidth specifcation of your choice of model see “The Extreme CPE range of products” on page 3

Optional:

- Backup power supply.
- Tilt mount bracket.
- SAU

2.2 ODU Hardware Description



2.2.1 Built-in WiMAX Antenna

One high-gain internal antenna is built into the ODU for WiMAX communications. The antenna must be aligned towards the direction of the WiMAX service provider's base station.

2.2.2 Propriety Ethernet RJ-45 Port

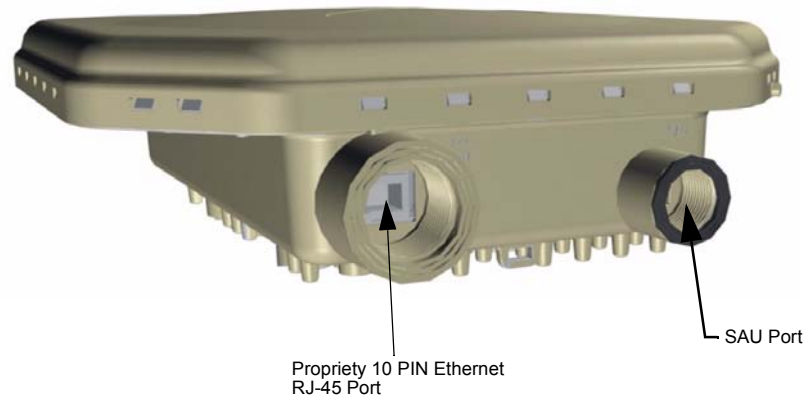
The ODU has one propriety 10 PIN RJ-45 PoE port that connects to the IDU using Ethernet cable. The Ethernet port connection provides power to the ODU as well as a data link to the IDU.

CAUTION

Do not connect a standard RJ-45 Category 5e cable to the ODU port or your unit will not function correctly. Use only the provided propriety 10 PIN Ethernet cable with 10 PIN plug adapters.

2.2.3 SAU Port

A Subscriber Unit Alignment Unit (SAU) port is included for connecting an optional SAU device that provides indicator status LEDs for antenna alignment.



2.2.4 Weatherproof Port Covers

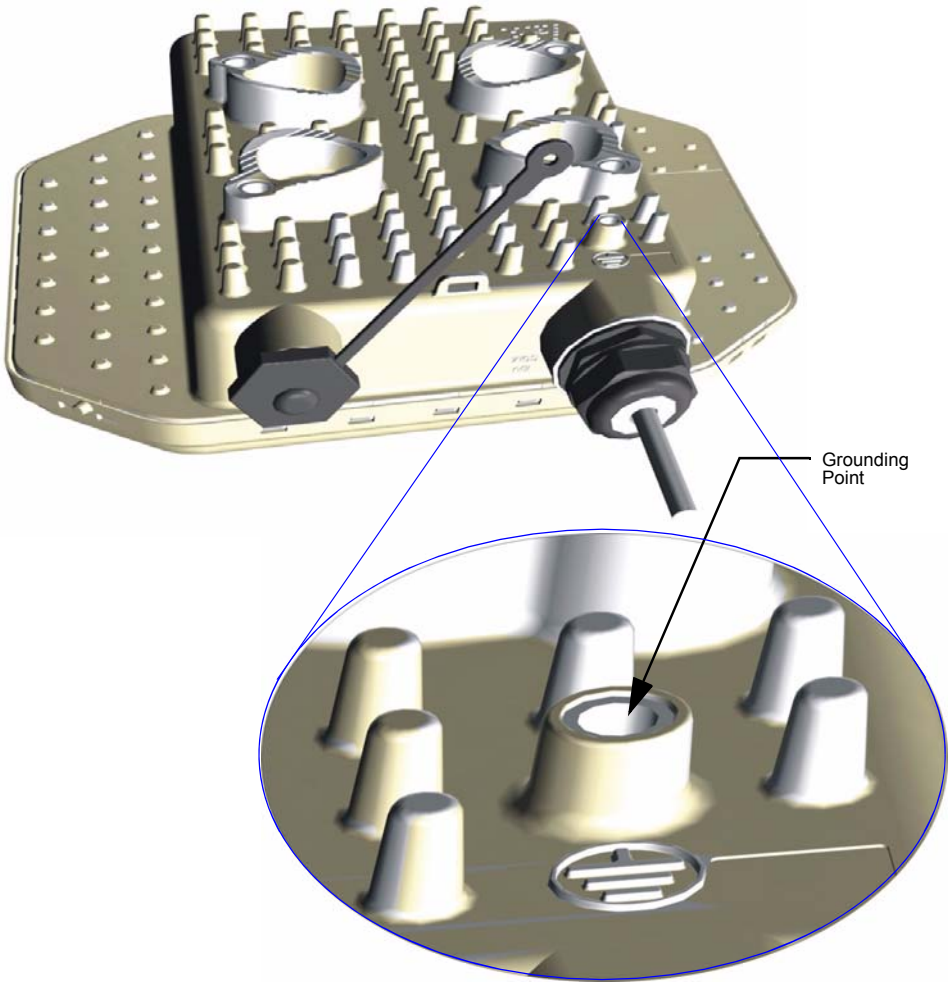
The ODU includes rubber weatherproof port covers for the RJ-45 and SAU ports. The RJ-45 port cover allows the Ethernet cable to be fed through and connected to the RJ-45 port. The SAU port cover protects the SAU port when it is not in use and its rubber chord should be threaded through the eyelet on the ODU to prevent loss of the cover when unscrewing and attaching an SAU.

2.2.5 Ground Screw

The ODU includes its own built-in lightning protection, it is important that the unit is properly connected to ground. A grounding screw is provided for attaching a ground wire to the unit.

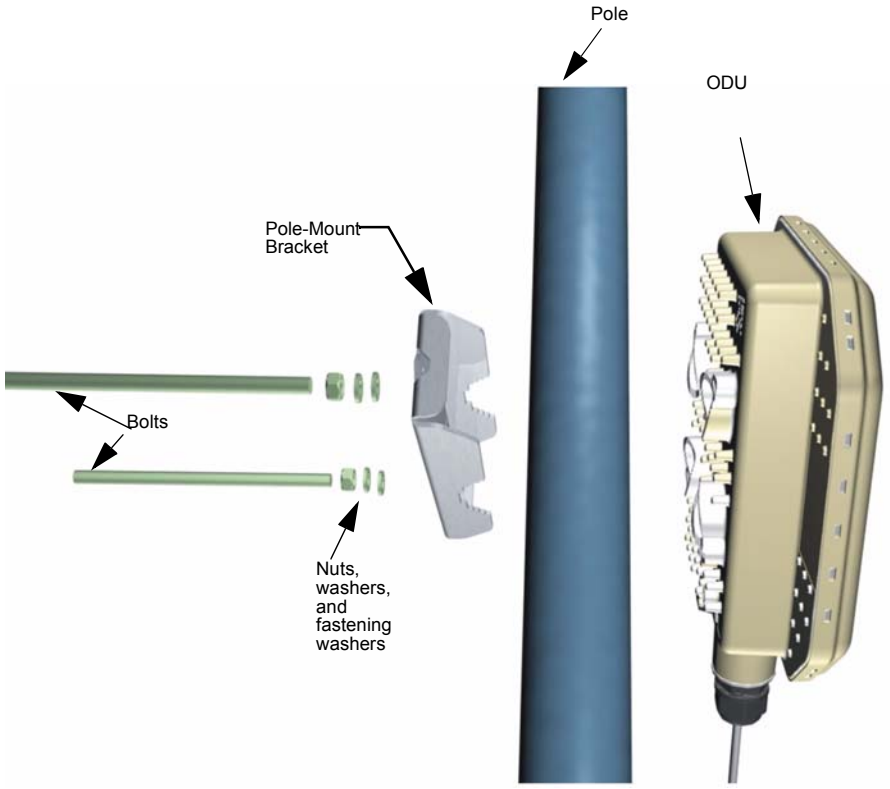
To ground the unit please follow the guidelines below:

- Be sure to use #14 AWG category cable to ground the unit.
- The unit can be grounded to the bracket or to the pole, alternatively you can ground the unit straight to earth.
- If grounding to the bracket or the pole make sure that you attach the grounding wire to a non-painted exposed part of either. Subsequently make sure that the pole is grounded to earth.



2.2.6 Pole-Mounting Bracket Kit

The ODU includes a bracket kit that is used to mount the unit to a pole, radio mast, or part of a tower structure.

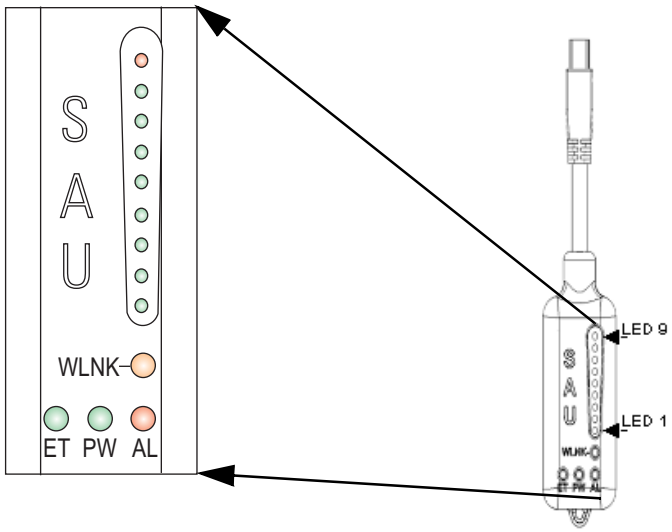


2.2.7 Tilt-Mount Bracket (Optional)

The ODU may be mounted to a pole with an optional tilt-mount bracket which provides greater scope and accuracy for adjusting the antenna direction of the ODU to the transmitting Access Unit (base-station).

2.2.8 SAU (Optional)

The SAU device can be connected to the ODU during installation to assist with antenna alignment and testing.



When connected to the ODU, the SAU provides status LED indications as described in the following table:

Table 2-11: SAU LED Indicators

LED	Status	Description
AL (Alarm)	Off	The diagnostic test has passed and the ODU is operating normally.
	On Red	An ODU failure has been detected.
PW (Power)	Off	The ODU is not receiving power or there is an internal 3.3 VDC failure.
	On Green	The SAU is receiving power from the ODU.
ET (Ethernet)	Off	There is no valid Ethernet link between the ODU and the IDU.
	On Green	There is a valid Ethernet link between the ODU and the IDU.

Table 2-11: SAU LED Indicators

LED	Status	Description
WLNK (Wireless link)	Off	The ODU is not connected to a base station.
	On Orange	The ODU is connected to and receives services from a base station (Network Entry completed). Link quality is indicated by LEDs 1-9, as described below.
	Blinking Orange	Authentication has failed due to one of the following reasons (indicated by the WiMAX Link LEDs): ■ If LEDs 7, 8 and 9 are on: Authentication has been rejected by the RADIUS server. ■ If LEDS 8 and 9 are on: Authentication has been rejected by the base station (due to a duplicate subscriber unit name in its database). ■ If LED 9 is on: Authentication has failed due to a timeout, or there was a re-authentication failure (connection to the RADIUS server was lost or a mismatched shared secret).
1	On Green	5dB ≤SNR < 10dB
1-2	On Green	10dB ≤SNR < 15dB
1-3	On Green	15dB ≤SNR < 20dB
1-4	On Green	20dB ≤SNR < 24dB
1-5	On Green	SNR ≥ 24dB and RSSI < -75dBm
1-6	On Green	SNR ≥ 24dB and RSSI ≥ -75dBm
1-7	On Green	SNR ≥ 24dB and RSSI ≥ -70dBm
1-8	On Green	SNR ≥ 24dB and RSSI ≥ -60dBm
1-9	1-8 On Green 9 On Red	RSSI ≥ -20dBm (saturation)
1-8 in sequence	Cycle On/Off Green	Indicates a full frequency scan in progress.
5, 4&6, 3&7, 2&8, 1 in sequence	Cycle On/Off Green	Selecting a detected base station with the strongest signal, or a short scan.

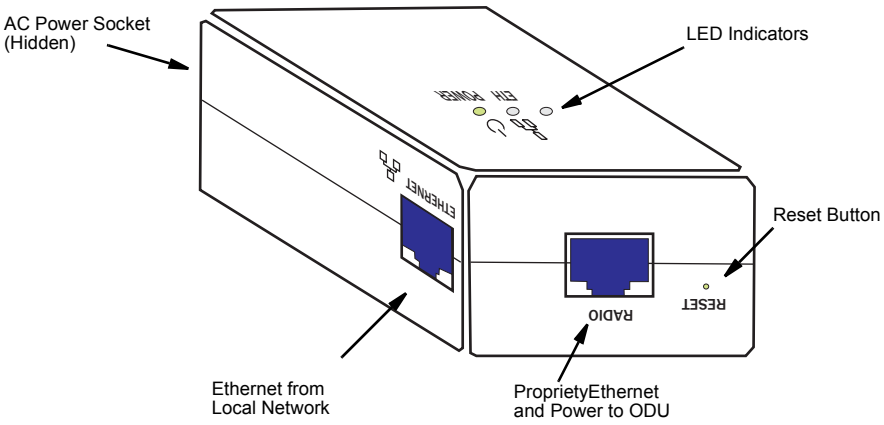
2.3 IDU Hardware Description

The Extreme CPE receives power through its network cable connection using power-over-Ethernet technology. A power injector IDU is included in the Extreme CPE package and provides two RJ-45 Ethernet ports, one for connecting to the ODU (Radio), and the other for connecting to a local LAN switch (Ethernet), as well as two RJ-11 phone ports for VoIP communications.

The Radio port is a propriety 10 PIN RJ-45 port that should not be confused with a regular RJ-45 connection. Use only the propriety cable provided in the package contents. To make sure you are using the right cable count the number of pins on the RJ-45 socket, which should number ten.

The Ethernet port uses an MDI (i.e., internal straight-through) pin configuration. You can therefore use straight-through twisted-pair cable to connect this port to most network interconnection devices such as a switch or router that provide MDI-X ports. However, when connecting the Extreme CPE to a workstation or other device that does not have MDI-X ports, you must use a crossover twisted-pair cable.

The following figures show the external components of the IDU:



The Extreme CPE does not have a power switch. It is powered on when its Ethernet port is connected to the power injector module, and the power injector module is connected to an AC power source.

The Power LED indicates whether AC power is applied.

The power injector module automatically adjusts to any AC voltage between 100-240 volts at 50 or 60 Hz. No voltage range settings are required.

WARNING

The power injector module is designed for indoor use only. Never mount the power injector outside with the Extreme CPE unit.

CAUTION

Do not connect a standard RJ-45 Category 5e cable to the ODU port or your unit will not function correctly. Use only the provided propriety 10 PIN Ethernet cable with 10 PIN plug adapters.

CAUTION

Due to the DC current the unit draws from its power socket, DO NOT connect a PC to the RJ-45 Data and Power port.

2.3.1 10BASE-T/100BASE-TX LAN Port

The IDU provides one 10BASE-T/100BASE-TX RJ-45 data port. This LAN port is standard RJ-45 Ethernet network ports that connect directly to PCs. They can also be connected to an Ethernet switch or hub to support more users.

The port supports automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. Each of these ports support auto-negotiation, so the optimum transmission mode (half or full duplex), and data rate (10 or 100 Mbps) is selected automatically.

2.3.2 ODU Port

The IDU includes one propriety 10 pin RJ-45 port that supports a Power-over-Ethernet (PoE) connection to the ODU.

NOTE

The Extreme CPE's propriety Ethernet port does not support Power over Ethernet (PoE) based on the IEEE 802.3af standard. Do not try to power the unit by connecting it directly to a network switch that provides IEEE 802.3af PoE. Always connect the unit to the included power injector module.

CAUTION

Due to the DC current the unit draws from its power socket, DO NOT connect a PC to the RJ-45 Data and Power port.

2.3.3 System Status LEDs

Both the propriety RJ-45 and RJ-45 data ports may be monitored through the LED indicators on the top of the IDU. The LED indicators are described in the following table.

Table 2-12: System Status LED Indicators

LED	Status	Description
ETH	On Green	Ethernet port has a valid link with an attached device.
	Flashing Green	The port is transmitting or receiving data.
	Off	Ethernet port has no link with another device.
POWER	On Green	Power is being supplied to the ODU.
	Off	The power supply is disconnected.

2.3.4 Power Adapter Socket

The power socket is located on the rear panel of the IDU. The power socket is for the AC power adapter connection.

The unit is powered on when connected to its AC power adapter, and the power adapter is connected to an AC power source between 100-240 volts at 50-60Hz.

CAUTION

Use ONLY the power adapter IDU supplied with the Extreme CPE. Otherwise, the product may be damaged.

2.3.5 Backup Battery Charger (Optional)

An optional backup battery charger can be used with the AC power adapter to provide redundant power in the event that the AC supply fails.

The backup battery charger holds 10 rechargable AA-type batteries. The batteries are charged while the AC power adapter is powering the Extreme CPE units. If the AC power fails, the batteries can power the Extreme CPE for up to five hours.

2.4 Installation Steps

CAUTION

Only the Extreme CPE ODU can be installed outdoors.

The BreezeMAX Extreme IDU power supply is an indoor unit and must not be installed outdoors.

ONLY experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor antennas.

Failure to abide may void the BreezeMAX Extreme CPE product warranty and may expose the end user or Service Provider to legal and financial liabilities. Alvarion and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of Outdoor antennas.

Before installing the BreezeMAX K2 CPE, verify that you have all the items listed in the package checklist above. If any of the items are missing or damaged, contact your local dealer. Also, be sure you have all the necessary tools and cabling before installing the Extreme CPE.

Hardware installation of the Extreme CPE involves these steps:

- Mount the ODU on a pole, mast, or tower using the mounting bracket.
- Install the IDU indoors.
- Connect the ODU-IDU Ethernet cable and a grounding wire to the ODU.
- Align the ODU antenna with the base station.

2.5 ODU Installation

The ODU includes its own bracket kit for mounting the unit to a 1 to 4 inch diameter steel pole or tube. The pole-mounting bracket allows the unit to be mounted to part of a radio mast or tower structure.

CAUTION

The planning and installation of the ODU requires professional personnel that are trained in the installation of radio transmitting equipment. The user is responsible for compliance with local regulations concerning items such as building safety codes, use of lightning arrestors, and grounding. Therefore, you must consult a professional contractor knowledgeable in local radio regulations prior to equipment installation.

2.5.1 ODU Location

The ODU should be installed outdoors, mounted to a pole using the included mounting bracket.

When selecting an suitable location for the unit, consider these points:

- The ODU should be installed where it can provide a direct, or near line of sight with the WiMAX base station. Normally, the higher the unit placement, the better the link quality.
- Make sure there are no other radio antennas within 2 m (6 ft) of the ODU.
- Place the ODU away from power and telephone lines.
- Avoid placing the ODU too close to any metallic, refective surfaces, such as roof-installed air-conditioning equipment, wire fences, or water pipes.

2.5.2 Mount the Unit

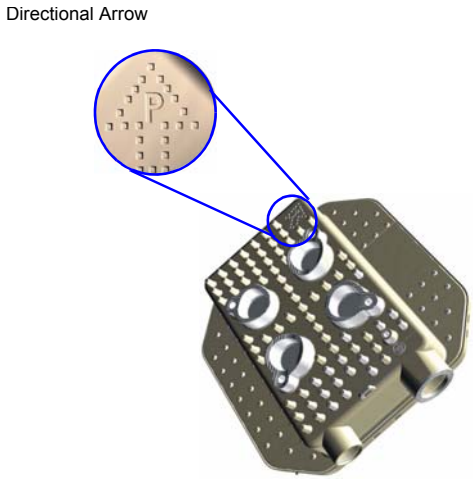
The ODU's pole-mounting bracket attaches directly to the ODU using two long threaded bolts. The bracket has V-shaped edges on one side that clamp the unit to a pole. The bracket allows the ODU's built-in antenna to be mounted to a pole in either a vertical or horizontal polarization direction.

Perform the following steps to mount the unit to a 1 to 4 inch diameter steel pole or tube using the mounting bracket:

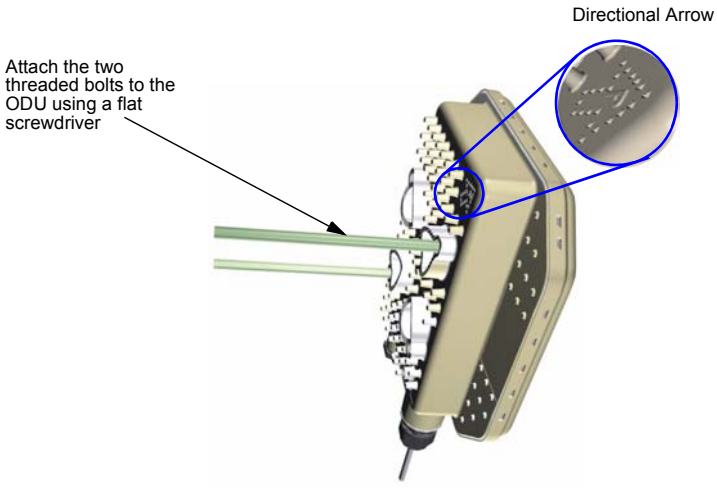
1 Attach the two threaded bolts to the back of the ODU using a flat screwdriver. Make sure you use the correct threaded holes for the required polarization.

NOTE

Antennas in a wireless link must be mounted in the same polarization direction.



Vertical Positioning



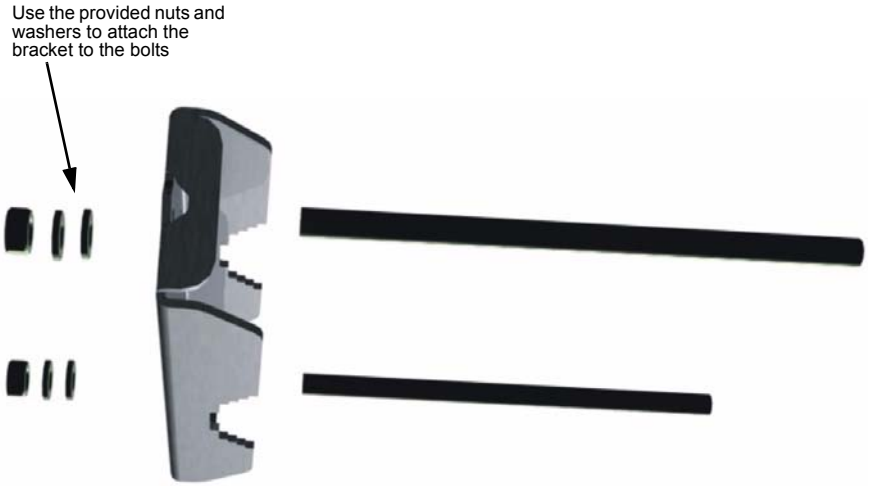
Horizontal Positioning

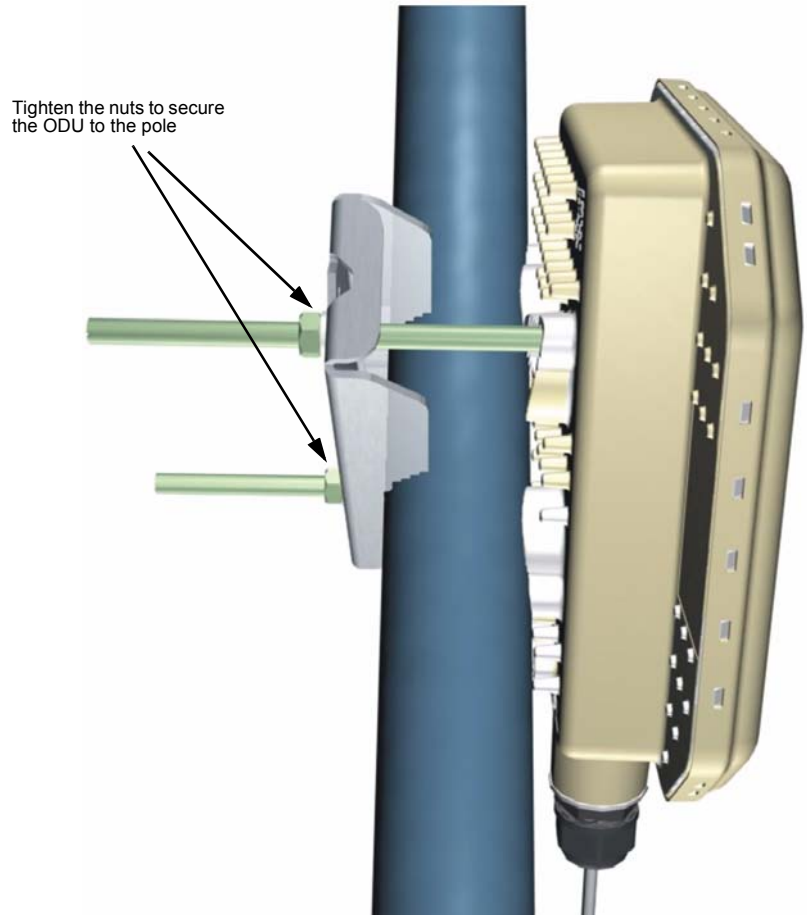
2 Place the ODU against one side of the pole and then fit the bracket onto the threaded bolts. The bracket's V-shaped edges should be against the pole.

NOTE

Make sure that the ODU connectors always face downward.

3 Use the included nuts and washers to secure the ODU to the pole. The securing nuts should be just tight enough to hold the ODU to the pole. (The bracket may need to be rotated around the pole during the antenna alignment process.)





2.6 IDU Installation

2.6.1 Select a location

The IDU can be installed indoors on any horizontal surface, such as a desktop or shelf. Be sure to select an suitable location for the device. Consider these points:

- Select a cool, dry place, which is out of direct sunlight.
- The device should have adequate space (approximately two inches) on all sides for proper air flow.
- The device must be near an AC power outlet that provides 100 to 240 V, 50 to 60 Hz.
- Be sure to attach the IDU ground wire to a nearby electrical earth point.
- The device should be accessible for network cabling and allow the status LED indicators to be clearly visible.

2.6.2 Installing the unit

The IDU is a plug-and-play device, so once it has been connected to your PC and powered up, it is fully operable.

To connect the Extreme CPE, follow these steps:

1 Power on the IDU by connecting the AC power adapter and plugging it into an AC power source.

CAUTION

Use ONLY the IDU power adapter supplied with the Extreme CPE. Otherwise, the CPE may be damaged.

CAUTION

Do not install the power injector outdoors. The unit is for indoor installation only.

CAUTION

Install lightning protection at the power injector end of the Ethernet cable, use a lightning arrestor immediately before the cable enters the building.

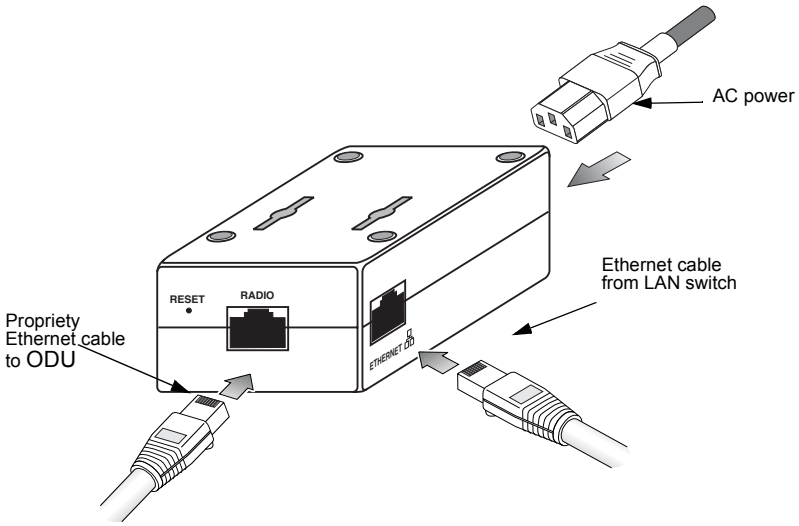
NOTE

The Extreme CPE's Ethernet port does not support Power over Ethernet (PoE) based on the IEEE 802.3af standard. Do not try to power the unit by connecting it directly to a network switch that provides IEEE 802.3af PoE. Always connect the unit to the included IDU power injector module.

2 Observe the Indicator LEDs. When you power on the IDU, verify that the Power LED turns on and that the other LED indicators start functioning.

3 Connect Category 5 or better Ethernet cables from the IDU's LAN ports to the network ports of your PCs. Alternatively, you can connect the LAN ports to an Ethernet switch or other devices. Make sure the length of each cable does not exceed 100 meters (328 ft).

If your PCs are powered on, the RJ-45 LAN port LEDs on the IDU should turn on to indicate valid links.



4 Use your PC's web browser to access the unit's management interface to make any configuration changes. For more information, see Chapter 3, "Initial Configuration."

NOTE

The Extreme CPE will search for a base station upon boot up, however if no base station is found the hardware will automatically reboot every ten minutes.

2.7 ODU Cable Connection

The ODU needs to be connected to the IDU using propriety Ethernet cable, and the ODU must be grounded by connecting a grounding wire.

2.7.1 ODU-IDU Propriety Ethernet Cable Connection

Use outdoor-rated 10 pin propriety Ethernet cable with RJ-45 connectors on each end. Before connecting the cable, first plan a cable route from the ODU outdoors to the IDU indoors. Consider these points:

- Make sure the cable length does not exceed 90 meters (295 ft).
- Determine a building entry point for the cable.
- Determine if conduits, bracing, or other structures are required for safety or protection of the cable.
- Be sure to ground the outdoor-rated 10 pin propriety Ethernet cable immediately before it enters the building.
- For additional lightning protection, it is recommended to use a lightning arrestor immediately before the Ethernet cable enters the building.

To connect the ODU-IDU Ethernet cable, follow these steps:

1. Remove the rubber sealing cover from the IDU COM port on the ODU.
2. Cut the Ethernet cable to the required length and feed it through the port cover. Then use a crimp tool to attach an RJ-45 connector to the Ethernet cable.

   Make sure the Ethernet twisted-pair wires are attached to the RJ-45 connector following standard pin assignments.
3. Connect the Ethernet cable to the IDU COM RJ-45 connector.
4. Screw the port cover back into the unit and tighten it to ensure protection against moisture.

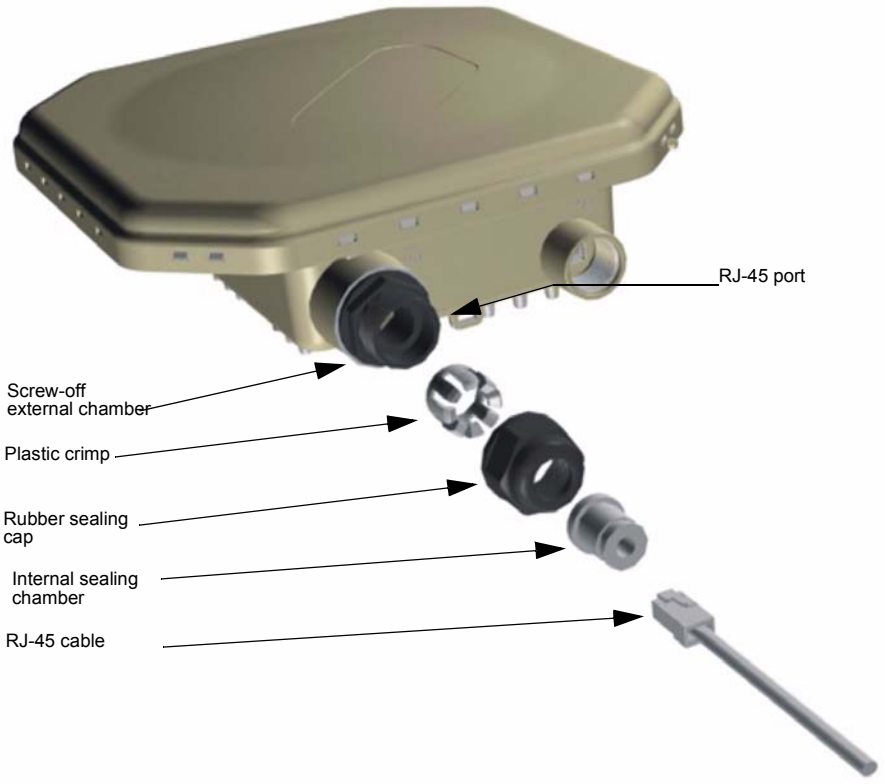
5 Seal the IDU COM connector using tar seal or weatherproof tape to protect against rain and moisture.

6 Route the Ethernet cable from the ODU to the IDU following your cable plan and connect it to the ODU port on the IDU. The RJ-45 port LED on the IDU should turn on to indicate a valid link.

NOTE

Connecting the propriety Ethernet cable to the IDU powers on the ODU.

The sequence of inserting the RJ-45 cable into the ODU and the supplied ODU components are described in the following diagram.



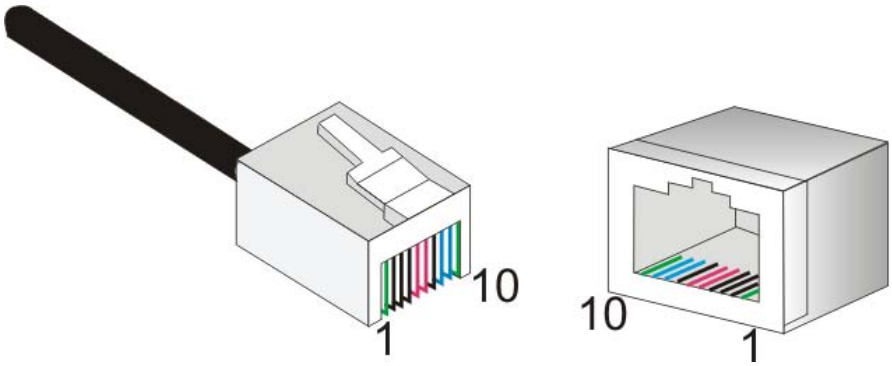
7 Insert the sealing cover into the port to ensure protection against moisture.

8 Seal the IDU COM connector using tar seal or weatherproof tape to protect against rain and moisture.

2.7.2 ODU 10 PIN Ethernet Port

The PoE ports on both the ODU and IDU use a non-standard propreity 10 PIN connection. You must use the cable provided with the unit. Attempting to insert a standard RJ-45 plug into either port simply won't fit and may damage the unit.

The following figure illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.



2.7.3 Propriety 10 Pin Assignments

The Extreme CPE cable provides pin-to-pin connection on both ends.

The following figure shows the required wire pair connections.

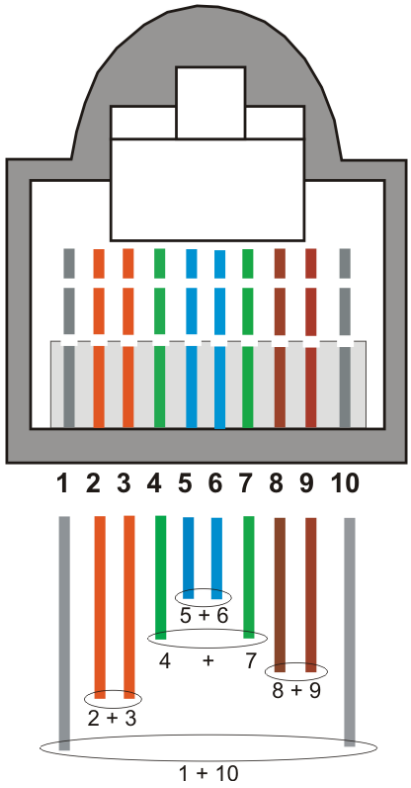

1 2 3 4 5 6 7 8 9 10
5 + 6
4 + 7
8 + 9
2 + 3
1 + 10

Table 2-13: Propriety Cable Color Codes

Wire color	Pin
Striped Grey	1
Orange	2
Striped Orange	3
Green	6
Striped Blue	4
Blue	5
Striped Green	7
Brown	8
Striped Brown	9
Grey	10

Table 2-14: Propriety MDI and MDI-X Port Pinouts

PIN	MDI-X Signal Name	MDI Signal Name
1	FXS Channel B TIP Line	
2	Receive Data plus (RD+)	Transmit Data plus (TD+)
3	Receive Data minus (RD-)	Transmit Data minus (TD-)
4	Transmit Data plus (TD+)	Receive Data plus (RD+)
5	Power over Ethernet (V+)	
6	Power over Ethernet (V-)	
7	Transmit Data minus (TD-)	Receive Data minus (RD-)
8	FXS Channel A TIP Line	
9	FXS Channel A RING Line	
10	FXS Channel B RING Line	
Note: The “+” and “-” signs represent the polarity of the wires that make up each wire pair.		

To comply with safety regulations, the shield of the ODU-IDU outdoor-rated Ethernet cable must be connected to protective ground (earth). The grounding point can be either inside the building, or immediately at the entry point to the building, depending on where a protective ground is available.

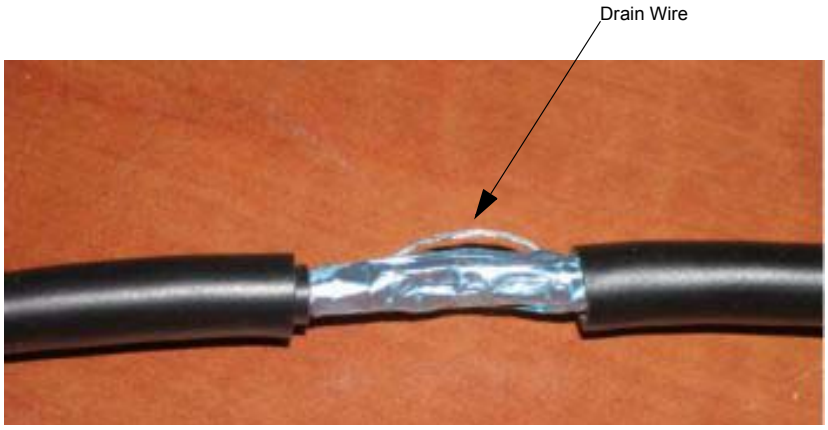
CAUTION

Grounding the ODU-IDU Ethernet cable must be performed by a professional installer in conformance with local safety regulations.

This document proposes one method for grounding the outdoor-rated Category 5E Ethernet cable through its drain wire. The actual connection method employed is left to the professional installer.

To ground the ODU-IDU Ethernet cable, follow these steps:

1 Strip back about a one inch (2.4 cm) section of the Ethernet cable jacket to expose the drain wire.



2 Attach a grounding cable to the drain wire and then connect it to protective earth.

3 Use weatherproof tape to cover and seal the attachment area on the Ethernet cable.

2.7.3.1 Ground Wire Connection

When connecting a ground wire to the ODU, use the grounding screw located on the base of the unit. Be sure to use #14 AWG or larger copper core ground wire.

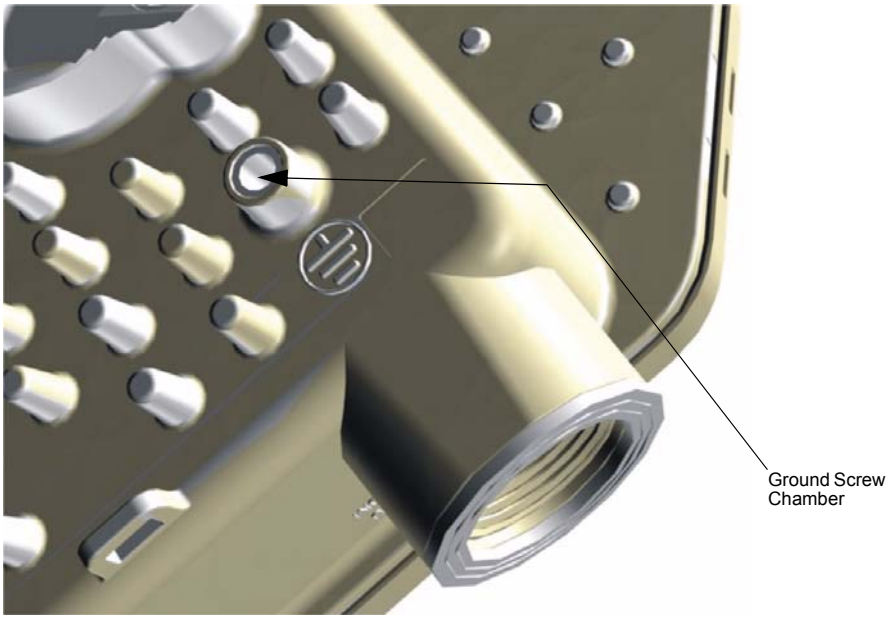
CAUTION

Be sure that grounding is available and that it meets local and national electrical codes. Grounding the ODU must be performed by a professional installer.

To connect a grounding wire to the ODU, follow these steps:

1 Crimp a ring lug onto the end of the ground wire before connecting it to the unit.

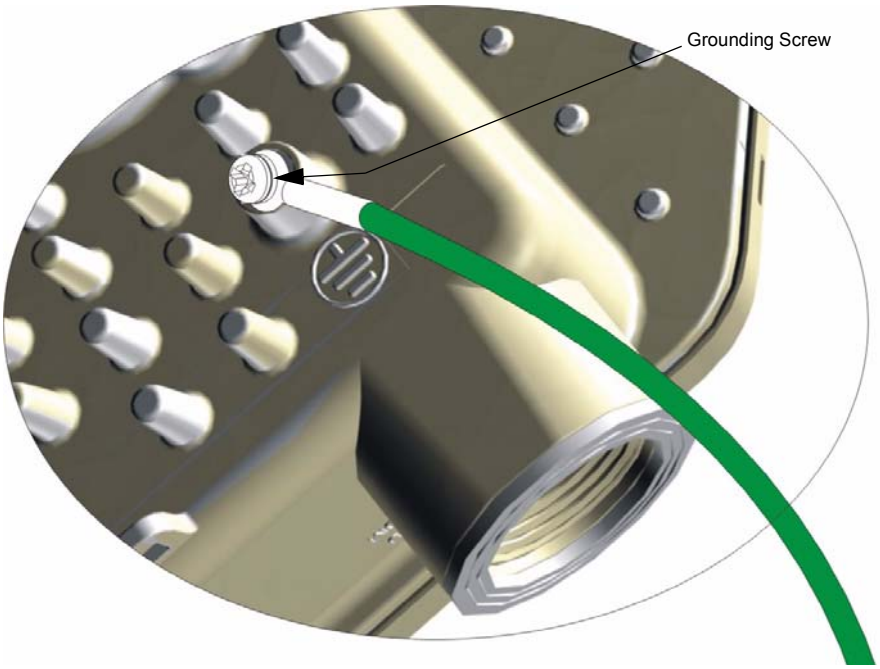
2 Place the ground wire lug on the grounding point and firmly tighten the screw.



3 Connect the other end of the grounding wire to a good ground (earth) connection.

NOTE

Use cable strips to secure all cables to the pole.


Grounding Screw

2.8 IDU Data Port

For standard category 5e or better, non-propreity Ethernet cables follow the guldelines below.

2.8.0.1 Preparing Ethernet Cables

Use a crimp tool for RJ-45 connectors to prepare the wires. Insert them into the appropriate pins and use the tool to crimp the connector. Make sure to do the following:

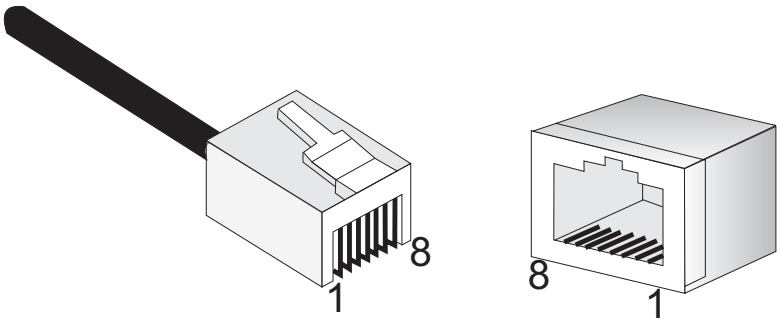
- Remove as small a length as possible of the external jacket. Verify that the external jacket is well inside the sealing cover when connected to the unit, to ensure good sealing.
- Pull back the shield drain wire before inserting the cable into the RJ-45 connector, to ensure a good connection with the connector's shield after crimping.
- For 10/100BASE-TX connections, a twisted-pair cable must have two pairs of wires. Each wire pair is identified by two different colors. For example, one wire might be green and the other, green with white stripes. Also, an RJ-45 connector must be attached to both ends of the cable.

CAUTION

Each wire pair must be attached to the RJ-45 connectors in a specific orientation.

DO NOT plug a phone jack connector into the RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

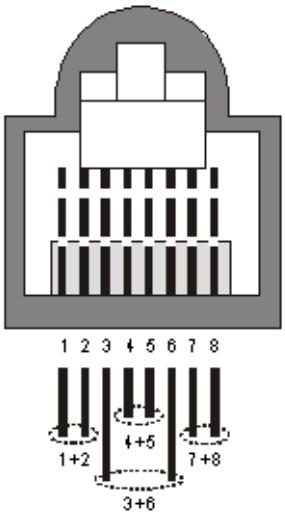
The following figure illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.



2.8.1 10/100BASE-TX Pin Assignments

The Extreme CPE cable provides pin-to-pin connection on both ends.

The following figure shows the required wire pair connections.



The color codes used in standard cables supplied by Alvarion are as listed in the following table:

Table 2-15: Cable Color Codes

Wire color	Pin
Blue	1
Blue/white	2
Orange	3
Orange/white	6
Brown	4
Brown/white	5
Green	7
Green/white	8

Table 2-16: 10/100BASE-TX MDI and MDI-X Port Pinouts

PIN	MDI-X Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)
4,5,7,8	Not used	Not used
Note: The “+” and “-” signs represent the polarity of the wires that make up each wire pair.		

2.8.2 Extreme CPE Cables

NOTE

The length of the Ethernet cable connecting the Extreme CPE to the data equipment, should not exceed 100 meters.

Use only Category 5E Ethernet cables from either Alvarion or any of the approved manufacturers, listed in Table 2-17. Consult with Alvarion's specialists on the suitability of other cables.

Table 2-17: Approved Category 5E Ethernet Cables

Manufacturer	Part Number
Superior Cables Ltd. www.superior-cables.com	612098

Table 2-17: Approved Category 5E Ethernet Cables

Manufacturer	Part Number
HES Cabling Systems www.hescs.com	H5E-00481
Teldor www.teldor.com	8393204101
Southbay Holdings Limited 11th Fl., 15, Lane 347, Jong Jeng Rd. Shin Juang City, Taipei County Taiwan, R.O.C. Attn: Eva Lin Tel. 886-2-2832 3339 Fax. 886-2-2206 0081 E-mail: eva@south-bay.com.tw	TSM2404A0D
GU-Tech., LLC . - A Member of OVIS GroupTel/Fax : 732 918 8221 Mobile: 718 909 4093 www.OVIS.COM.TW www.GU-TECH.COM	

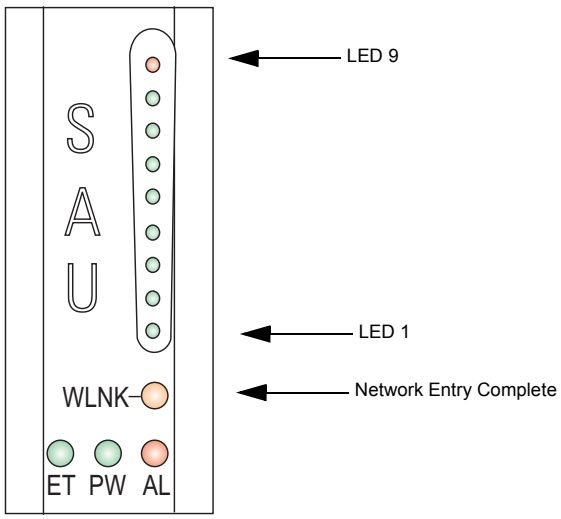
In case of missing information in the manufacturer's WEB site (product specifications, ordering issues, etc.), it is highly recommended to contact the manufacturer's sales representative directly.

2.9 ODU Antenna Alignment

The ODU will provide the best link quality when its antenna is aligned in the direction of the WiMAX base station. The optional SAU can be connected to the ODU to provide status LED indications and assist with antenna alignment.

To align the ODU antenna using the SAU, follow these steps:

1. Remove the rubber sealing cover from the SAU port on the ODU.
2. Connect the SAU device to the SAU port. The PW (power) LED should turn on to indicate that it is properly connected.
3. Point the ODU antenna in the general direction of the base station, then pan the ODU back and forth while watching the link quality LEDs (see "SAU LED Indicators" on page 18).



4. Find the point where the link quality is best and secure the ODU in that position. Verify that the SAU's WLNK LED is on, indicating that the unit is synchronized with the base station.

NOTE

If all the SAU link quality LEDs are on, including LED 9 (red), the received signal strength is too high. Move the ODU's position so that only LEDs 1 to 8 are on.

5. Remove the SAU connection and replace the rubber sealing cover on the port.

6 Seal the SAU connector using tar seal or weatherproof tape to protect against rain and moisture.

2.9.1 Align the WiMAX Antenna

After the Extreme CPE unit has been mounted, connected, and its radio is operating, the antenna must be accurately aligned to ensure optimum performance on the wireless link. This alignment process is particularly important for long-range links.

To start the alignment process, you can just point the antenna in the general direction of the Access Unit's (base station) antenna using binoculars or a compass. For accurate alignment, you must monitor the signal strength LEDs as the antenna moves horizontally.

The signal strength LEDs indicate the received radio signal strength for the link. The more LEDs that turn on, the stronger the signal.

When you move the antenna during alignment, the radio signal from the remote antenna can be seen to have a strong central main lobe and smaller side lobes. The object of the alignment process is to set the antenna so that it is receiving the strongest signal from the central main lobe.

To align the antennas in the link, monitor the signal strength LEDs. For details see Table 2-11. Perform the following procedure:

1 Pan the ODU horizontally back and forth while checking the LEDs, preferrably with an SAU.

2 Find the point where the signal is strongest (refer to Table 2-11) and leave in that position.

NOTE

Sometimes there may not be a central lobe peak because vertical alignment is too far off; only two similar peaks for the side lobes are detected.

3

Chapter 3 - Initial Configuration

In This Chapter:

3.1 Introduction

The Extreme CPE offers a user-friendly web-based management interface for the configuration of all the unit's features. Any PC directly attached to the unit can access the management interface using a web browser, such as Internet Explorer (version 6.0 or above).

The initial configuration steps can be made through the web-browser interface using the default IP address.

3.1.1 Accessing the Web Management Interface

The Extreme CPE has the default IP address of 192.168.254.251 and the subnet mask 255.255.255.0. Be sure to first check if your PC's IP address is set on the same subnet as the Extreme CPE and that the PC's IP address is 192.168.254.250.

NOTE

The Extreme CPE does not support DHCP. Your PC must be set to the same subnet as the unit, ie. 192.168.254.x, and be set to the specific IP address 192.168.254.250.

In the web browser's address bar, type the default IP address: http://192.168.254.251.

The web browser displays the Extreme CPE's login page.

NOTE

The Extreme CPE will scan for a base station upon boot up, however if no base station is found the unit will automatically reboot every ten minutes causing a temporary loss of connection to the web interface. To overcome this problem reload the web page.

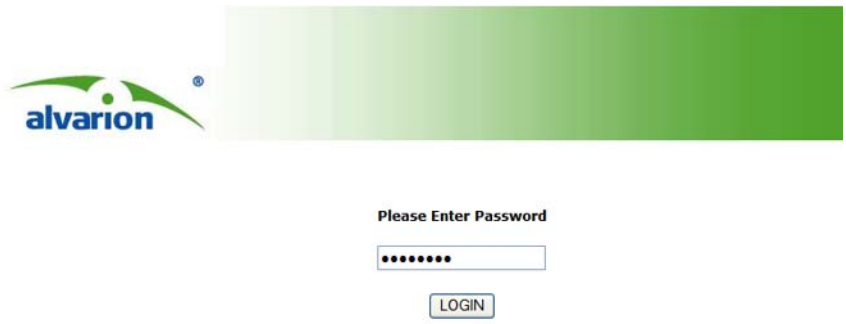


Figure 3-1: Login Window

To log in, enter the user password **installer**, and click Login. The homepage displays.

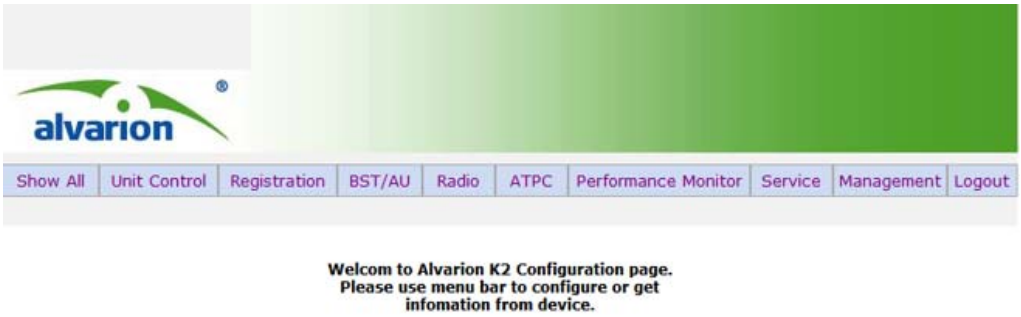


Figure 3-2: Main Window

NOTE

It is strongly recommended that you configure your own password. If a password is not configured, the management interface is not protected and anyone who can connects to the Extreme CPE may be able to compromise your network security.

4

Chapter 4 - System Settings

In This Chapter:

4.1 Introduction

The Extreme CPE's System menu allows you to perform general management functions for the unit, including setting the system time, configuring an access password, and upgrading the system software.

Through an easy to use web management interface the Extreme CPE can be configured to be a powerful wireless connection to any telecommunications network.

NOTE

You can use the web browser interface to access IP addressing only if the Extreme CPE already has an IP address that is reachable through your network.

The default IP address of the Extreme CPE is 192.168.254.251. You should set your PC network card to be on the same subnet, with a network mask of 255.255.255.0 and an IP address of 192.168.254.250. This can be set through the Network Connections menu on your PC.

Figure 4-3: Show Settings Menu

4.2 System Status

The Show All page is a display-only menu of non-configurable parameters for Unit Control, Registration, Base Station Identification (BSID), Radio, Multi rate, Adaptative Transmission Power Control (ATPC) and Service. To configure the parameters associated with each show menu item refer to the sections listed in the main menu.

Figure 4-4: Show All - Unit Control

UNIT CONTROL – The Show All - Unit Control menu provides information on the default system configuration and radio type.

- **SU Type** – Describes the service unit (SU) type.
- **CPE Family** – Describes the primary chipset of the Extreme CPE.
- **Serial Number** – Describes the serial number of the Extreme CPE unit. This number can be used to determine the identity of the subscriber unit by the base station operator.
- **MAC Address** – Describes the physical layer address of the LAN port. The WAN port MAC address can be determined by adding "1" to the LAN port MAC address.
- **MAC Address Control Number** – Displays the MAC address control number.
- **Radio Band** – Describes the radio band in use. The radio band for the Extreme CPE is 5.x.
- **Hardware version** – Describes the revision of hardware in use.
- **Hardware configuration** – Describes the identity of the current hardware configuration by serial number.
- **RF version** – Describes the radio frequency (RF) or rate of oscillation of the electrical circuit.
- **SU Interface Type** – Describes the number of ports available on the interface. "D" refers to data ports, "V" refers to VoIP ports, with a prefix number in use as a quantifier.
- **Radio Type** – Describes the receive (Rx) and transmit (Tx) capacity of the radio.
- **Antenna Type** – Describes the antenna type employed by the Extreme CPE.
- **Ethernet Port Auto Negotiation** – Describes the Ethernet port auto negotiation enable/disable state.
- **Ethernet Port Speed & Duplex** – Describes the speed and duplex capabilities to which the Ethernet port has been set to.

- **Operation Mode** – Describes the operation mode of the Extreme CPE, either IPCS or ETHCS where IPCS refers to transparent delivery of IPv4 packets and ETHCS refers to transparent delivery of tagged 802.3 packets over Ethernet.

- **Unit Status** – Describes the connectivity status of the Extreme CPE to the base station.

- **SW Boot Version** – Describes the current software boot version file.

- **Main SW File Name** – Describes the name of the current firmware.

- **Main SW Version** – Describes the version of the current firmware.

- **Shadow SW File Name** – Describes the name of the secondary, or shadow, firmware file.

- **Shadow SW Version** – Describes the version of the shadow firmware file.

- **Running From** – Describes the firmware file being used by the Extreme CPE as a running configuration. (Options: Main, or Shadow)

- **TFTP Server IP address(for SW download)** – Describes the TFTP server IP address that is being used for firmware download.

- **SW File Name** – Describes the name of the download firmware file from the TFTP server.

- **Configuration File Upload Name** – Describes the name of the uploaded configuration file.

- **Configuration File Download Name** – Describes the name of the current configuration file.

- **List of TM&PM Files Gathered** – Describes the TM (Traffic Monitoring) and PM (Performance Monitoring) files that the unit has detected.

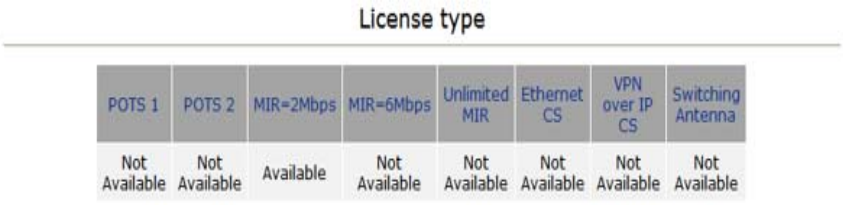


Figure 4-5: Show All - License Type

LICENSE TYPE – Describes the availability of VoIP ports, operator preset maximum information rates (MIR), Ethernet status, virtual private networks (VPN) status and switching antenna status.

- **POTS1/2** – Describes the availability status of the VoIP plain old telephone service (POTS) ports. 'Available' indicates that the specified VoIP port is open for use.
- **MIR=2Mbps** – Describes the operator preset maximum information rate (MIR) state per subscriber at 2Mbps upload/download.
- **MIR=6Mbps** – Describes the operator preset maximum information rate (MIR) state per subscriber at 6Mbps upload/download.
- **Unlimited MIR** – Describes if the operator preset maximum information rate (MIR) is unlimited in upload/download bandwidth, or unavailable to the subscriber.
- **Ethernet CS** – Describes the Ethernet convergence sublayer (CS) status.
- **VPN over IP CS** – Describes the status of the virtual private network (VPN) over internet protocol (IP) convergence sublayer.
- **Switching Antenna** – Describes the status of the switching antenna.

Figure 4-6: Show All - Best BSID

BEST BSID – The Show All - Best BSID page displays information on the base station identity (BSID), as well as signal strength indication, noise ratio and bandwidth of the WiMAX connection.

- **Configured Best BS ID** – Describes the configured base station identity, in the form xx.xx.xx.xx.xx.xx.
- **Current Best BS ID** – Describes the identity of the best base station, in the form xx.xx.xx.xx.xx.xx.
- **Current Best BS RSSI (dBm)** – Describes the receive signal strength indicator of the WiMAX link, in decibels per milliwatt.
- **Current Best BS SNR (dB)** – Describes the signal to noise ratio of the WiMAX link, in decibels.
- **Current Bandwidth** – Describes the bandwidth of the WiMAX link.

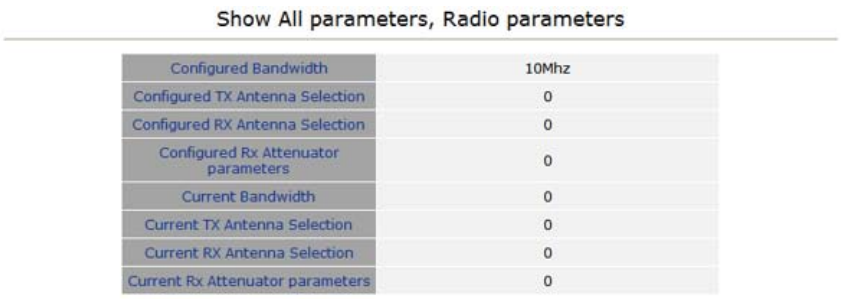


Figure 4-7: Show All - Radio Parameters

RADIO PARAMETERS – The Show All - Radio Parameters page displays information on the bandwidth and antenna selection of the Extreme CPE.

- **Configured Bandwidth** – Describes the configured bandwidth in megahertz.
- **Configured Tx Antenna Selection** – Describes the configured tranmission antenna selection.
- **Configured Rx Antenna Selection** – Describes the configured receive antenna selection.
- **Configured Rx Attenuator Parameters** – Describes the configured receive signal after attenuation.
- **Current Bandwidth** – Describes the current bandwidth of the WiMAX link.

- **Current Tx Antenna Selection** – Describes the current transmission antenna selection.
- **Current Rx Antenna Selection** – Describes the current receive antenna selection.
- **Current Rx Attentuator Parameters** – Describes the current receive attenuator parameters.

Figure 4-8: Show All - Registration Parameters

REGISTRATION PARAMETERS – The Show All - Registration Parameters page displays information on the authentication parameters required to support provisioning on the unit.

- **Configure User Name** – Describes the configured user name for the unit.
- **Actual User Name** – Describes the current name being used to identify the user of the unit.
- **Organization** – Describes the WiMAX subscriber name.
- **Address** – Describes the contact information for the WiMAX subscriber.
- **Country** – Describes the country of operation.
- **Authentication** – Describes the method of authentication being used to secure the WiMAX connection.

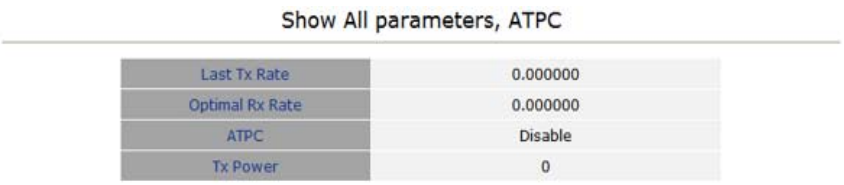


Figure 4-9: Show All - ATPC

ATPC – The Show All - ATPC (Automatic Transmitter Power Control) page displays information on the transmitted signal.

- **Last Tx Rate** – Describes the last detected tranmission rate.
- **Optimal Rx Rate** – Describes the transmission rate best suited to the connection.
- **ATPC** – Describes the level of automatic transmitter power control.
- **Tx Power** – Describes the transmission power level.

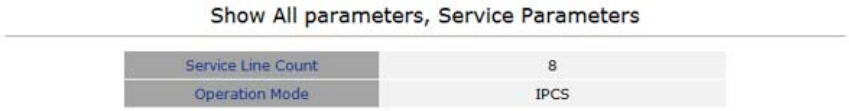


Figure 4-10: Show All - Service Parameters

SERVICE PARAMETERS – The Show All - Service Parameters page displays information on WiMAX service related capabilities.

- **Service Line Count** – Describes the service line count.
- **Operation Mode** – Describes the operation mode of the Extreme CPE.

5

Chapter 5 - Unit Control

In This Chapter:

5.1 Introduction

The Unit Control menu enables resetting the unit, reverting to the default configuration, changing the password, configuring the operation mode of the Ethernet port, and selecting the running software version. It also enables you to download a new software version.

Figure 5-11: Unit Control Menu

5.2 Show Unit Control

The Show All page displays the show parameters for Unit Control, Registration, Base Station ID (BSID), Radio, Multi rate, ATPC and Service.

Figure 5-12: Unit Control - Show

UNIT CONTROL – The Show All - Unit Control menu provides information on the default system configuration and radio type.

- **SU Type** – Describes the service unit (SU) type.
- **CPE Family** – Describes the primary chipset of the Extreme CPE.

- **Serial Number** – Describes the serial number of the Extreme CPE unit. This number can be used to determine the identity of the subscriber unit by the base station operator.

- **MAC Address** – Describes the physical layer address of the LAN port. The WAN port MAC address can be determined by adding "1" to the LAN port MAC address.

- **MAC Address Control Number** – Displays the MAC address control number.

- **Radio Band** – Describes the radio band in use. The radio band for the Extreme CPE is 5.x.

- **Hardware version** – Describes the revision of hardware in use.

- **Hardware configuration** – Describes the identity of the current hardware configuration by serial number.

- **RF version** – Describes the radio frequency (RF) or rate of oscillation of the electrical circuit.

- **SU Interface Type** – Describes the number of ports available on the interface. "D" refers to data ports, "V" refers to VoIP ports, with a prefix number in use as a quantifier.

- **Radio Type** – Describes the receive (Rx) and transmit (Tx) capacity of the radio.

- **Antenna Type** – Describes the antenna type employed by the Extreme CPE.

- **Ethernet Port Auto Negotiation** – Describes the Ethernet port auto negotiation enable/disable state.

- **Ethernet Port Speed & Duplex** – Describes the speed and duplex capabilities to which the Ethernet port has been set to.

- **Operation Mode** – Describes the operation mode of the Extreme CPE, either IPCS or ETHCS where IPCS refers to transparent delivery of IPv4 packets and ETHCS refers to transparent delivery of tagged 802.3 packets over Ethernet.

- **Unit Status** – Describes the connectivity status of the Extreme CPE to the base station.

- **SW Boot Version** – Describes the current software boot version file.
- **Main SW File Name** – Describes the name of the current firmware.
- **Main SW Version** – Describes the version of the current firmware.
- **Shadow SW File Name** – Describes the name of the secondary, or shadow, firmware file.
- **Shadow SW Version** – Describes the version of the shadow firmware file.
- **Running From** – Describes the firmware file being used by the Extreme CPE as a running configuration. (Options: Main, or Shadow)
- **TFTP Server IP address(for SW download)** – Describes the TFTP server IP address that is being used for firmware download.
- **SW File Name** – Describes the name of the download firmware file from the TFTP server.
- **Configuration File Upload Name** – Describes the name of the uploaded configuration file.
- **Configuration File Download Name** – Describes the name of the current configuration file.
- **List of TM&PM Files Gathered** – Describes the TM (Traffic Monitoring) and PM (Performance Monitoring) files that the unit has detected.

License Type

POTS 1	POTS 2	MIR=2Mbps	MIR=6Mbps	Unlimited MIR	Ethernet CS	VPN over IP CS	Switching Antenna
Not Available	Not Available	Available	Not Available	Not Available	Not Available	Not Available	Not Available

LICENSE TYPE – Describes the availability of VoIP ports, operator preset maximum information rates (MIR), Ethernet status, virtual private networks (VPN) status and switching antenna status.

- **POTS1/2** – Describes the availability status of the VoIP plain old telephone service (POTS) ports. 'Available' indicates that the specified VoIP port is open for use.
- **MIR=2Mbps** – Describes the operator preset maximum information rate (MIR) state per subscriber at 2Mbps upload/download.
- **MIR=6Mbps** – Describes the operator preset maximum information rate (MIR) state per subscriber at 6Mbps upload/download.
- **Unlimited MIR** – Describes if the operator preset maximum information rate (MIR) is unlimited in upload/download bandwidth, or unavailable to the subscriber.
- **Ethernet CS** – Describes the Ethernet convergence sublayer (CS) status.
- **VPN over IP CS** – Describes the status of the virtual private network (VPN) over internet protocol (IP) convergence sublayer.
- **Switching Antenna** – Describes the status of the switching antenna.

5.3 Reset

The Reset page allows you to reset the Extreme CPE for configuration changes to take effect.

NOTE

Reseting the unit does not restore factory defaults.

Figure 5-13: Unit Control - Reset Unit

RESET UNIT – Reseting the unit reboots the device.

- **Reset Unit** – Click 'Reset Unit' to reboot the Extreme CPE.

5.4 Change Password

The Change Password page enables you to create a new password for access to the Extreme CPE. It is advisable to change the factory default password upon receipt of your Extreme CPE device.

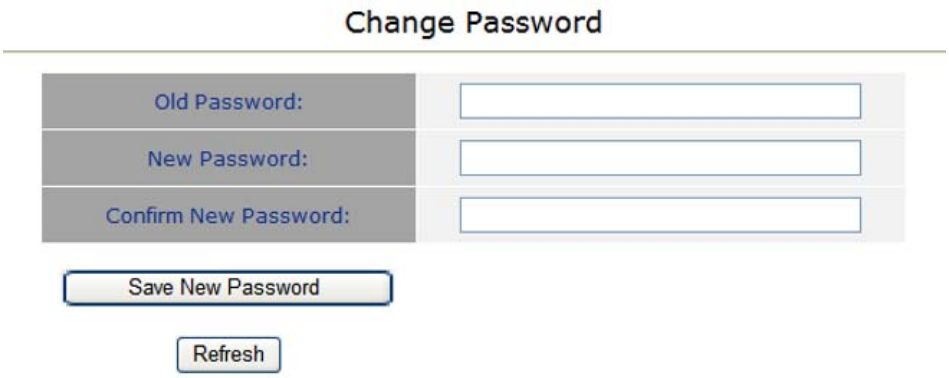


Figure 5-14: Unit Control - Change Password

CHANGE PASSWORD – Allows changing of the current user password for security purposes.

- **Old Password** – Prompts you to enter your current password.
- **New Password** – Prompts you to enter a new password. (Length: 1-20 characters, cannot include the characters '<>?:;,."'{[}]/\|,' and is case sentivitive.
- **Confirm New Password** – Prompts you to re-enter the new password.
- **Save New Password** – Clicking 'Save New Password' saves the new password and deletes the old password.
- **Refresh** – Clicking 'Refresh' clears all information boxes.

5.5 Software Version Control

The Software Version Control page allows you to download new runtime software for the Extreme CPE, run a backup runtime image (or shadow), reset the device and select the current running configuration file.

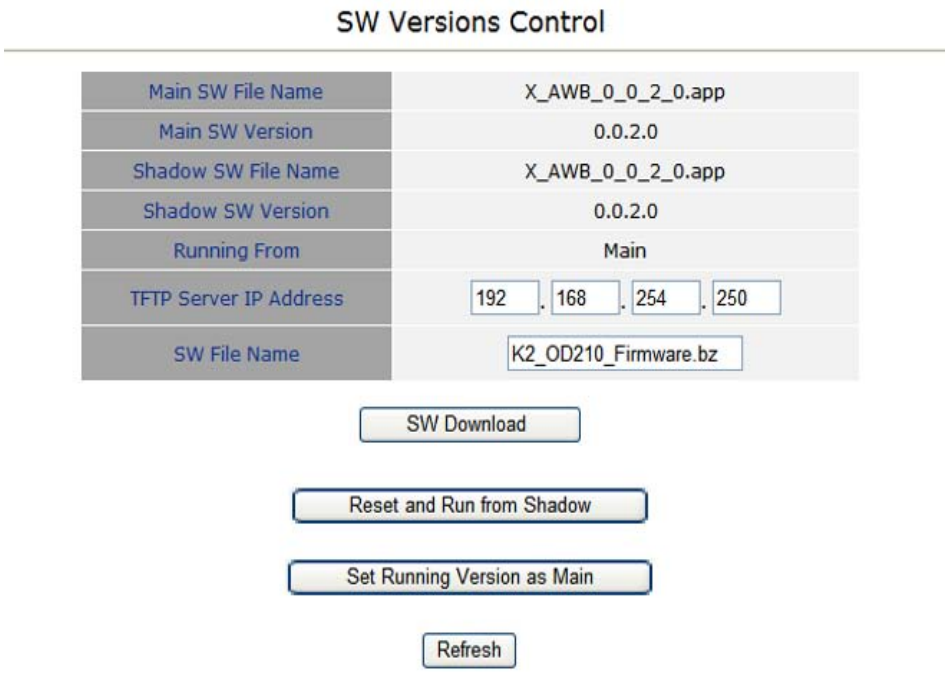


Figure 5-15: Unit Control - Software Version Control

SW VERSIONS CONTROL – Enables uploading and setting of main and shadow software versions.

- **Main SW File Name** – Describes the file name of the currently loaded software.
- **Main SW Version** – Describes the version of software currently in use.
- **Shadow SW File Name** – Describes the shadow or backup software loaded into memory for failover measures.
- **Shadow SW Version** – Describes the shadow software version.
- **Running From** – Describes if the unit is running Main or Shadow software on bootup.

- **TFTP Server IP Address** – Allows the user to enter the IP address of the TFTP server from which to download code to the unit.

- **SW File Name** – Allows the user to enter the file name of the software file to be downloaded to the unit.

- **SW Download** – Click 'SW Download' to download user specified software to the unit from the TFTP IP address. The image downloaded will overwrite the current shadow image.

- **Reset and Run from Shadow** – Click 'Reset and Run from Shadow' to reboot the unit and run from the shadow image.

- **Set Running Version as Main** – Click 'Set Running Version as Main' to make the currently running software configuration the main image.

- **Refresh** – Click 'Refresh' to reload the current page and parameters associated with it.

5.6 Configuration Control

The Configuration Control page allows you to specify an IP address from which to upload or download a running configuration file. It also allows you to restore the factory default TFTP server address.

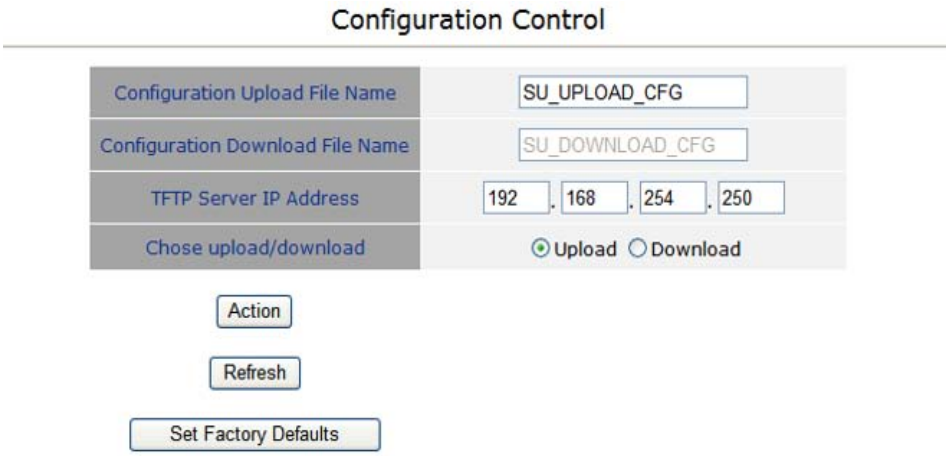


Figure 5-16: Unit Control - Configuration Control

CONFIGURATION CONTROL – Use the configuration control page to transfer running configuration files.

- **Configuration Upload File Name** – Allows the user to specify the configuration upload file name for copying to the TFTP server.
- **Configuration Download File Name** – Allows the user to specify the configuration download file name for downloading from the TFTP server.
- **TFTP Server IP Address** – Specifies a TFTP server IP address for upload/download.
- **Chose upload/download** – Selects to either upload to, or download from the specified TFTP server.
- **Action** – Performs the selected upload or download procedure.
- **Refresh** – Reloads the page and the parameters associated with it.
- **Set Factory Defaults** – Resets the factory default configuration file path settings from the TFTP server to the Extreme CPE.

NOTE

Selecting this option does not perform a factory reset. It simply makes available the TFTP IP path of the default factory configuration file settings to the unit. Selecting ‘Action’ will implement the file settings.

5.7 TM and PM File Upload Control

The TM (Traffic Monitoring) & PM (Performance Monitoring) File Upload Control page enables the user to define parameters related to uploading the TM & PM files where link quality data is stored, to the TFTP server directory and to initiate the upload operation.

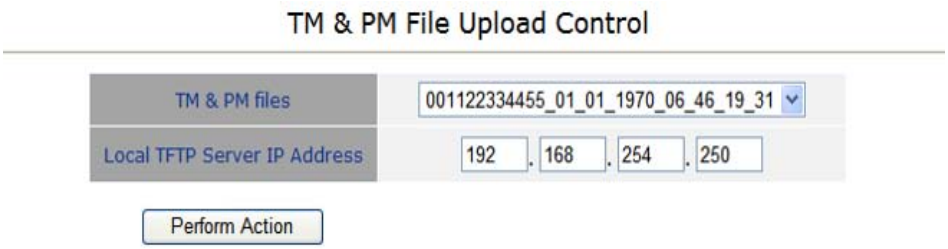


Figure 5-17: Unit Control - TM & PM File Upload Control

TM & PM FILE UPLOAD CONTROL – Traffic and performance monitoring allow for a variety of statistical data to be collected about the Extreme CPE and its WiMAX link.

- **TM & PM Files** – Specifies the available TM and PM files from the drop down menu for uploading to the TFTP server.
- **Local TFTP Server IP Address** – Specifies a local TFTP server IP address from which to upload the TM and PM files.
- **Perform Action** – Clicking 'Perform Action' initiates the upload procedure.

5.8 Ethernet Operation Mode

The Ethernet Op Mode page enables configuration of the Ethernet connection.

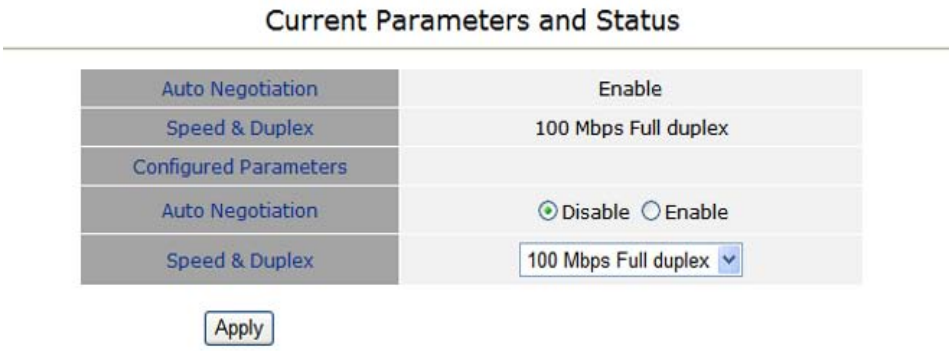


Figure 5-18: Unit Control - Ethernet Op Mode

CURRENT PARAMETERS AND STATUS – Specifies the current Ethernet port settings.

- **Auto Negotiation** – Describes the auto negotiation status of the Ethernet port.
- **Speed & Duplex** – Describes the speed and duplex capabilities set for the Ethernet port.
- **Configured Parameters** –
- **Auto Negotiation** – Select to enable or disable auto-negoatiation on the Ethernet port.
- **Speed & Duplex** – If auto-negotiation is disabled, select from the drop down menu the speed and duplex setting for the Ethernet port.
- **Apply** – Click 'Apply' to save and apply settings to the port.

6

Chapter 6 - Registration

In This Chapter:

6.1 Introduction

The Registration menu enables the user to enter station information about for the Extreme CPE, such as user name, password, country of operation and organisation. It also enables the user to select the authentication method used to authenticate the Extreme CPE with the base station.

Figure 6-19: Registration Menu

6.2 Show Registration Parameters

The Show Registration Parameters page displays the show registration parameters such as configured user name and the country of operation of the Extreme CPE.

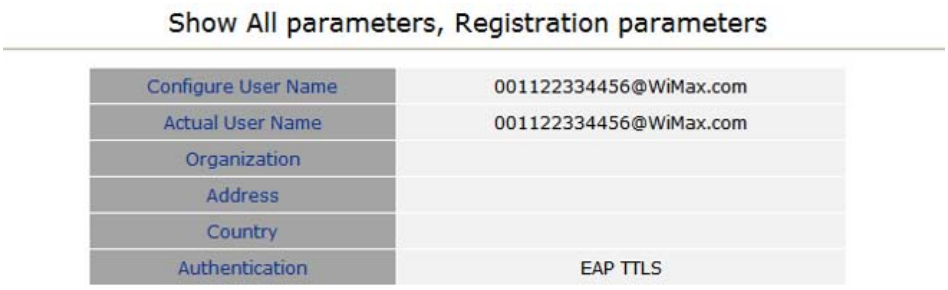


Figure 6-20: Registration - Show

REGISTRATION PARAMETERS – The Show All - Registration Parameters page displays information on the authentication parameters required to support provisioning on the unit.

- **Configure User Name** – Describes the configured user name for the unit.
- **Actual User Name** – Describes the name being used to identify the actual user of the unit.
- **Organization** – Describes the WiMAX subscriber name.
- **Address** – Describes the contact information for the WiMAX subscriber.
- **Country** – Describes the country of operation.
- **Authentication** – Describes the method of authentication being used to secure the WiMAX connection.

6.3 Registration Configuration

The User Registration page allows the user to define registration parameters such as configured user name, password, organisation and the country of operation of the Extreme CPE. It also allows the user to select the authentication method.

Figure 6-21: Registration - User Registration Configuration

USER REGISTRATION – Allows the user to enter information on the authentication parameters required to support provisioning on the unit.

- **User Name** – Allows the user to enter a user name for the unit, in the form someone@WiMAX.com.
- **Password** – Allows the user to set a password for registration purposes.
- **Password Confirm** – Prompts the user to re-enter the password.
- **Organization** – Enter the WiMAX subscriber name.
- **Address** – Enter the contact information for the WiMAX subscriber.
- **Country** – Enter the country of operation.
- **Authentication** – Allows the user to describe the method of authentication being used to secure the WiMAX connection. (Options: none; EAP TTLS; EAP TLS)

7

Chapter 7 - Base Station Scanning

In This Chapter:

7.1 Introduction

The base station/access unit (BST/AU) page displays base station (BST) and access unit (AU) information for the the base station that the Extreme CPE connects to. It also enables configuration of BST/AU identification, network masks, and WiMAX mobility mode.

Figure 7-22: BS Scanning Menu

7.2 BS Scanning

The BS AU scanning page allows the user to scan for a nearby base station, specify a frequency, a preferred bandwidth, and frame duration.

The table will display all base stations that match the criteria entered.

NOTE

The access unit will search for the preferred base station first, but the displayed best base station might not be that which is specified as preferred if it the preferred base station unavailable.

Best BST/AU Parameters and Best BST/AU Table

Configured Best BS ID	00.00.00.00.00.00
Current Best BS ID	00.00.00.00.00.00
Current Best BS RSSI(dBm)	0
Current Best BS SNR(dB)	0
Current Bandwidth	0

Figure 7-23: BST/AU - Best BST/AU

BEST BS/AU – The Best BS/AU page displays information on the base station identity (BSID), as well as signal strength indication, noise ratio and bandwidth of the WiMAX connection.

- **Configured Best BS ID** – Describes the configured base station identity, in the form xx.xx.xx.xx.xx.xx.
- **Current Best BS ID** – Describes the identity of the best base station, in the form xx.xx.xx.xx.xx.xx.
- **Current Best BS RSSI (dBm)** – Describes the receive signal strength indicator of the optimal WiMAX link, in decibels per milliwatt.
- **Current Best BS SNR (dB)** – Describes the signal to noise ratio of the optimal WiMAX link, in decibels.
- **Current Bandwidth** – Describes the bandwidth of the optimal WiMAX link.

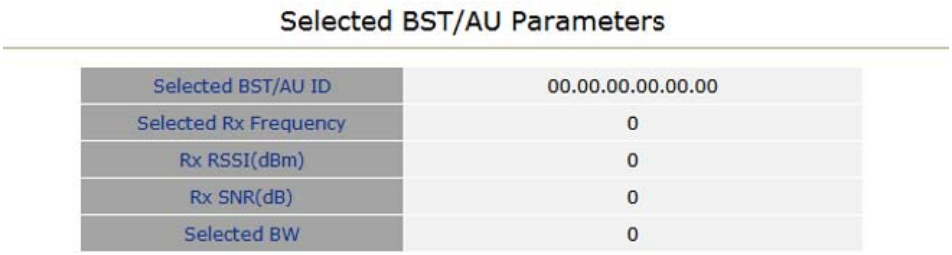


Figure 7-24: BST/AU - Selected BST/AU Parameters

SELECTED BST/AU PARAMETERS – The Selected BST/AU Parameters page describes the BSID, frequency, signal strength, noise ratio and identity of the selected base station.

- **Selected BST/AU ID** – Describes the configured base station identity, in the form xx.xx.xx.xx.xx.xx.
- **Frequency** – Describes the selected receive signal frequency.
- **Rx RSSI (dBm)** – Describes the receive signal strength indicator of the WiMAX link, in decibels per milliwatt.
- **Rx SNR (dB)** – Describes the signal to noise ratio of the WiMAX link, in decibels.
- **Selected Bandwidth** – Describes the bandwidth of the WiMAX link.

Figure 7-25: BST/AU - Best BST/AU Table

BEST BST/AU TABLE – The Best BST/AU Table describes the optimal base station identity, frequency, signal to noise ratio and bandwidth of the selected base station.

- **BS ID** – Describes the optimal base station identity (BSID).
- **Rx Frequency (MHz)** – Describes the optimal base station receive frequency for the WiMAX link, in megahertz.
- **SNR(dB)** – Describes the optimal signal to noise ratio of the WiMAX link, in decibels.

- **Bandwidth** – Describes the optimal bandwidth of the WiMAX link.

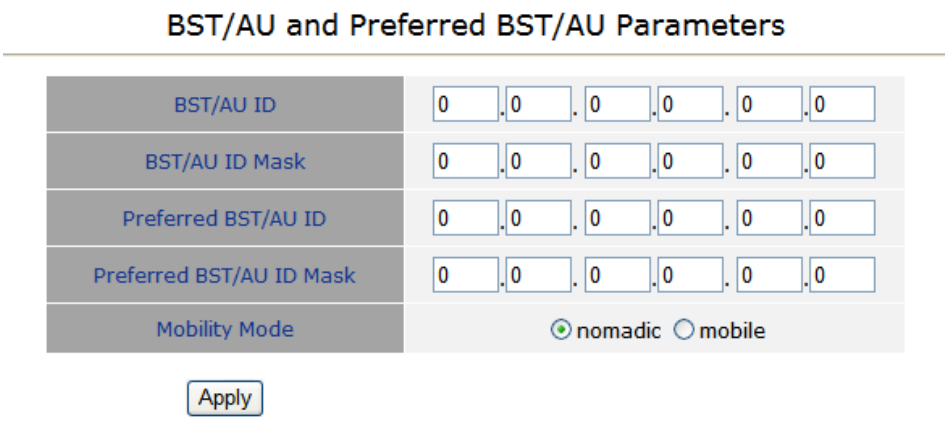


Figure 7-26: BST/AU - BST/AU and Preferred BST/AU Parameters

BEST BST/AU TABLE – The BST/AU and Preferred BST/AU Parameters page describes the user configured base station identity, mask, perferred base station identity and mask, as well as the mobility mode.

- **BST/AU ID** – Allows the user to configure the base station identity.
- **BEST/AU ID MASK** – Alllows the user to configure the base station mask.
- **Preferred BST/AU ID** – Allows the user to configure the preferred base station identity.
- **Preferred BST/AU ID Mask** – Allows the user to configure the preferred base station mask.
- **Mobility Mode** – Selects the mobility mode of the WiMAX radio. (Options: nomadic and mobile)
- **Apply** – Applies the specified changes.

8

Chapter 8 - Radio Parameters

In This Chapter:

8.1 Introduction

The radio page allows you to configure frequency scanning parameters for the Extreme CPE, view the scanning table and antenna selection.

Figure 8-27: Radio Menu

8.2 Radio Parameters

The Show Radio Parameters page displays the parameters of the radio settings.

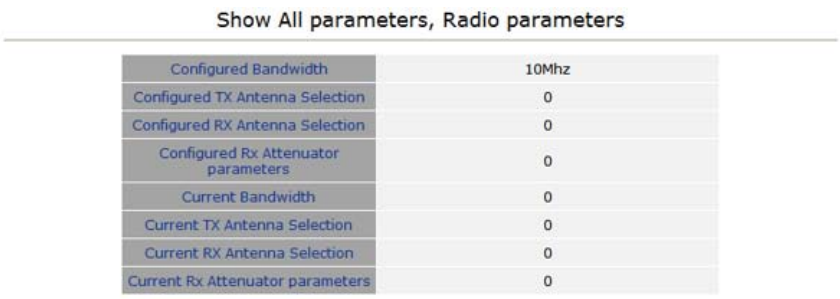


Figure 8-28: Show All - Radio Parameters

RADIO PARAMETERS – The Show All - Radio Parameters page displays information on the bandwidth and antenna selection of the Extreme CPE.

- **Configured Bandwidth** – Describes the configured bandwidth in megahertz.
- **Configured Tx Antenna Selection** – Describes the configured tranmission antenna selection.
- **Configured Rx Antenna Selection** – Describes the configured receive antenna selection.
- **Configured Rx Attenuator Parameters** – Describes the configured receive signal after attenuation.
- **Current Bandwidth** – Describes the current bandwidth of the WiMAX link.
- **Current Tx Antenna Selection** – Describes the current transmission antenna selection.
- **Current Rx Antenna Selection** – Describes the current receive antenna selection.
- **Current Rx Attentuator Parameters** – Describes the current receive attenuator parameters.

8.3 Frequency Scanning

Frequency Scanning allows the user to enter frequencies with which to scan for nearby base stations.

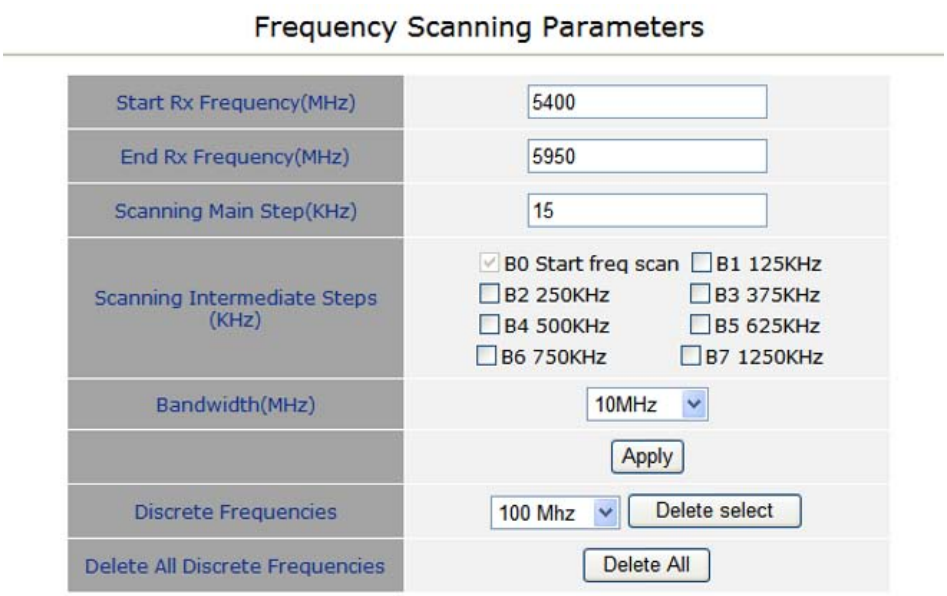


Figure 8-29: Radio - Frequency Scanning Parameters

FREQUENCY SCANNING PARAMETERS – The Frequency Scanning Parameters page specifies the frequency, scanning steps and bandwidth for purposes of scanning for nearby base stations.

- **Start Rx Frequency(MHz)** – Specifies the frequency at which to start scanning, in megahertz.
- **End Rx Frequency(MHz)** – Specifies the frequency at which to stop scanning, in megahertz.
- **Scanning Main Step(KHz)** – Specifies the main step in the frequency scanning process using the formula F(N) = Start Frequency + N*Main Step, for N = 0,1,2..
- **Scanning Intermediate Steps(KHz)** – Specifies the intermediate step in the scanning process using the formula F(N) = Start Frequency + N*(Main Step), Start Frequency + N*(Main Step + Intermediate Step), for N= 0,1, 2,..
- **Bandwidth(MHz)** – Specifies the bandwidth for the scanning process.

- **Apply** – Saves the specified bandwidth.
- **Discrete Frequencies** – Delete a selected discrete frequency.
- **Delete All Discrete Frequencies** – Deletes all discrete frequencies.

Figure 8-30: Radio - Discrete Scanning

DISCRETE SCANNING FREQUENCIES – Allows the user to enter up to 10 discrete frequencies to scan for a base station with. The frequecneis must comply with the the supported hardware bands.

- **Update Discrete Frequencies** – Enter up to 10 discrete frequencies, separated by commas. The resolution used is 125KHz.
- **Update** – Adds the frequencies and replaces any previous discrete frequency.
- **Add One Discrete Frequency** – Adds one discrete frequecny to the list.

Figure 8-31: Radio - Scanning Table

SCANNING TABLE – The Scanning Table displays all frequencies and bandwidths scanned by the Extreme CPE.

- **Rx Frequency(MHz)** – Describes the receive frequency scanned.
- **Bandwidth** – Describes the receive bandwidth scanned.

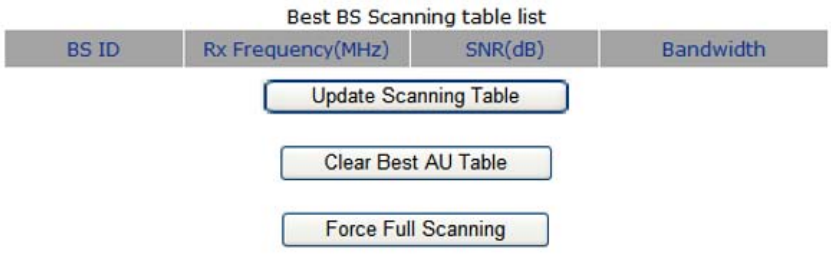


Figure 8-32: Radio - Best BS Scanning Table List

SCANNING TABLE – The Scanning Table displays all frequencies and bandwidths scanned by the Extreme CPE.

- **BS ID** –

- **Rx Frequency(MHz)** –
- **SNR(dB)** –
- **Bandwidth** –
- **Update Scanning Table** –
- **Clear Best AU Table** –
- **Force Full Scanning** –

8.4 Antenna Selection

Antenna Selection displays the current antenna deployed by the Extreme CPE.

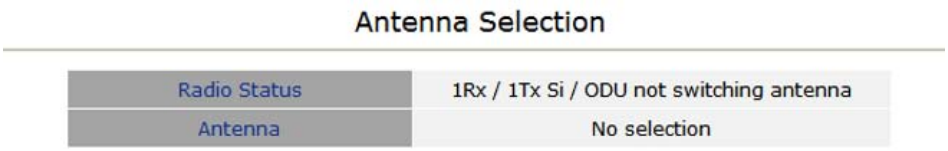


Figure 8-33: Radio - Antenna Selection

ANTENNA SELECTION – The Antenna Selection page displays information on the antenna in use by the Extreme CPE.

- **Radio Status** – Describes the status of the WiMAX radio.
- **Antenna** – Describes the selection of antenna.

9

Chapter 9 - ATPC

In This Chapter:

9.1 Introduction

The Adaptive Transmission Power Control (ATPC) page displays the WiMAX transmit signal levels and allows configuration of the ATPC algorithm or disabling of the feature.

ATPC provides system designers with the ability to dynamically control the transmission power, and offers a register to specify the transmission power level during runtime. It is desirable to specify the minimum transmission power level that achieves the required communication reliability for the sake of saving power and increasing the system lifetime.

Figure 9-34: ATPC Menu

9.2 ATPC Parameters

The Show All Parameters, ATPC page displays the transmit and receive data levels.

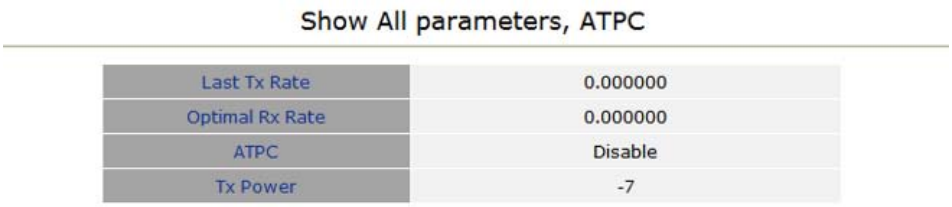


Figure 9-35: ATPC - Show Parameters

ATPC – The Show All - ATPC (Automatic Transmitter Power Control) page displays information on the transmitted signal.

- **Last Tx Rate** – Describes the last detected tranmission rate.
- **Optimal Rx Rate** – Describes the transmission rate best suited to the connection.
- **ATPC** – Describes the level of automatic transmitter power control.
- **Tx Power** – Describes the transmission power level.

9.3 ATPC Configuration

The Multi rate and ATPC Parameters page enables the user to view the transmission (Tx) and reception (Rx) power levels, their optimum levels, radio band, and allows enabling or disabling of the ATPC feature, as well as setting of the the transmission power level.

Once enabled the ATPC feature implements a power control algorithm for the WiMAX network. The result of applying ATPC is that every node knows the proper transmission power level to use for each of its neighbours, and every node maintains good link qualities with its neighbours by dynamically adjusting the transmission power through on-demand feedback packets.

Uniquely, ATPC adopts a feedback-based and pairwise transmission power control. By collecting the link quality history, ATPC builds a model for each neighbor of the node. This model represents an in-situ correlation between transmission power levels and link qualities. With such a model, ATPC tunes the transmission power according to monitored link quality changes. The changes of transmission power level reflect changes in the surrounding environment.

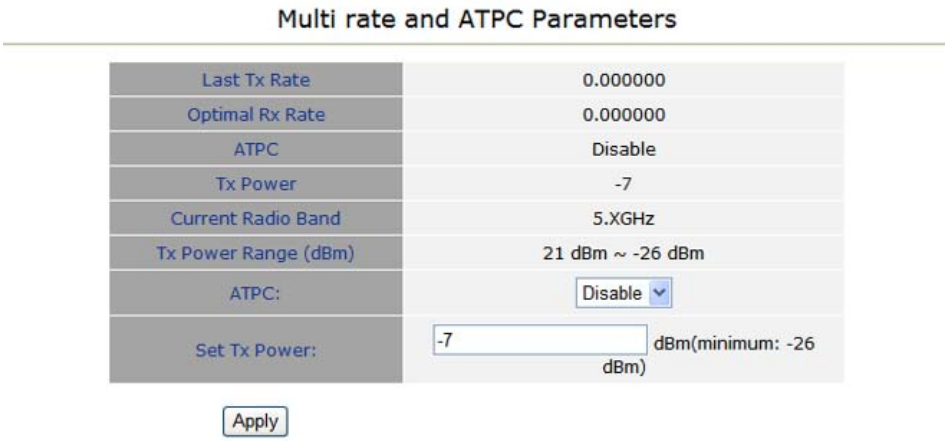


Figure 9-36: ATPC - Configuration

MULTI RATE / ATPC – The Multi rate and ATPC Parameters page displays information on the transmitted and received signals, allows enabling of the ATPC algorithm and setting of the transmission power level.

- **Last Tx Rate** – Describes the last transmission power rate.
- **Optimal Rx Rate** – Describes the optimal receive signal stregth.

- **ATPC** – Describes the status of the ATPC algorithm.
- **Tx Power** – Describes the mean transmission power rate.
- **Current Radio Band** – Describes the current radio band in GHz.
- **Tx Power Range (dBm)** – Describes the transmission power range in dBm.
- **ATPC** – Allows the user to enable or disable the ATPC algorithm.
- **Set Tx Power** – Allows the user to set the transmission power rate.
- **Apply** – Applies all modified parameters.

10

Chapter 10 - Performance Monitor

In This Chapter:

10.1 Introduction

The Performance Monitor Page displays performance monitoring of link quality, Ethernet counters, link history, Ethernet history, integration times and spectrum analyser for fault management. The Extreme CPE collects data on a regular basis and is able to deliver the data to the Access Control Server NMS (Network Management Station) upon request.

Figure 10-37: Performance Monitor Menu

10.2 Link Quality Counters

The Link Quality On-Line Display page displays the SNR (signal to noise ratio), RSSI (receive signal strength indication), and Tx/Rx data levels.

Figure 10-38: Performance Monitor - Link Quality

ONLINE LINK QUALITY – The Link Quality On-Line Display displays information related to the quality of the link between the Extreme CPE and the base station.

- **DL Median SNR (dB)** – Displays the median level of the downlink (DL) Signal-to-Noise (SNR) ratio, measured over a duration of two seconds. The figure will refresh every two seconds.

- **DL Median RSSI (dBm)** – Displays the median level of the downlink Receive Signal Strength Indicator (RSSI), measured over a duration of two seconds. The figure will refresh every two seconds.

- **Median Rx Rate** – Displays the current average data rate of the WiMAX link in Megabits per second, measured over a duration of two seconds. The figure will refresh every two seconds.

- **Last Rx Rate** – Displays the strength of the received signal in Megabits per second, measured over a duration of two seconds. The figure will refresh every two seconds.

- **Maximum Rx Rate** – Displays the upper maximum of the received signal strength detected over a duration of two seconds. The figure will refresh every two seconds.

- **Minimum Rx Rate** – Displays the lowest received signal strength detected over a duration of two seconds. The figure will refresh every two seconds.

- **UL SNR (dB)** – Displays the median uplink (UL) Signal-to-Noise Ratio received by the base station, measured over a duration of two seconds. The figure will refresh every two seconds.

- **UL RSSI (dBm)** – Displays the median uplink Receive Signal Strength Indicator received by the base station, measured over a duration of two seconds. The figure will refresh every two seconds.

- **Median Tx Rate** – Displays the median transmit data rate of the Extreme CPE in Megabits per second, measured over a duration of two seconds. The figure will refresh every two seconds.

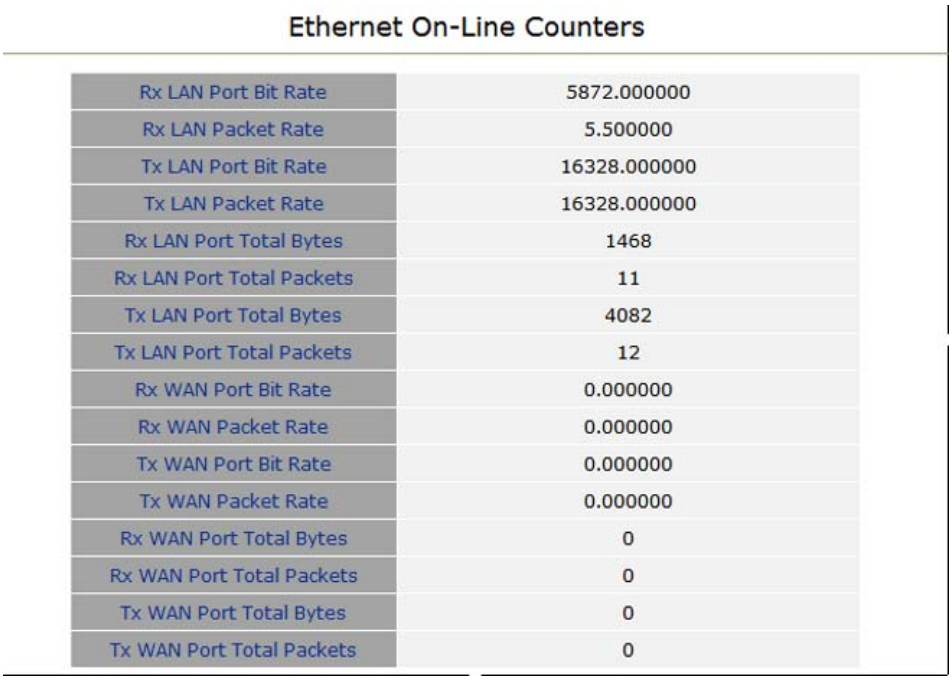
- **Last Tx Rate** – Displays the most recent transmit data rate of the Extreme CPE in Megabits per second, measured over the last two seconds. The figure will refresh every two seconds.

- **Maximum Rx Rate** – Displays the maximum receive data rate of the Extreme CPE in Megabits per second, measured over a duration of two seconds. The figure will refresh every two seconds.

- **Minimum Rx Rate** – Displays the mimimum receive data rate of the Extreme CPE in Megabits per second, measured over a duration of two seconds. The figure will refresh every two seconds.

10.3 Ethernet Counters

The Ethernet On-Line Counters page displays RX and Tx levels for the Ethernet connection.



Ethernet On-Line Counters

Rx LAN Port Bit Rate	5872.000000
Rx LAN Packet Rate	5.500000
Tx LAN Port Bit Rate	16328.000000
Tx LAN Packet Rate	16328.000000
Rx LAN Port Total Bytes	1468
Rx LAN Port Total Packets	11
Tx LAN Port Total Bytes	4082
Tx LAN Port Total Packets	12
Rx WAN Port Bit Rate	0.000000
Rx WAN Packet Rate	0.000000
Tx WAN Port Bit Rate	0.000000
Tx WAN Packet Rate	0.000000
Rx WAN Port Total Bytes	0
Rx WAN Port Total Packets	0
Tx WAN Port Total Bytes	0
Tx WAN Port Total Packets	0

Figure 10-39: Performance Monitor - Online Counters

ETHERNET ON-LINE COUNTERS – The Ethernet On-Line Counters page describes the incremental statistical values of the LAN and WAN ports.

- **Rx LAN Port Bit Rate** – Displays the received bit rate of the Ethernet LAN port. The figure will refresh every two seconds.
- **Rx LAN Packet Rate** – Displays the received packet rate of the Ethernet LAN port. The figure will refresh every two seconds.
- **Tx LAN Port Bit Rate** – Displays the transmitted bit rate of the Ethernet LAN port. The figure will refresh every two seconds.
- **Tx LAN Packet Rate** – Displays the transmitted packet rate of the Ethernet LAN port. The figure will refresh every two seconds.
- **Rx LAN Port Total Bytes** – Displays the received byte rate of the Ethernet LAN port. The figure will refresh every two seconds.

- **Rx LAN Port Total Packets** – Displays the total received packets of the Ethernet LAN port. The figure will refresh every two seconds.

- **Tx LAN Port Total Bytes** – Displays the transmitted byte rate of the Ethernet LAN port. The figure will refresh every two seconds.

- **Tx LAN Port Total Packets** – Displays the total number of packets transmitted by the Ethernet LAN port. The figure will refresh every two seconds.

- **Rx WAN Port Bit Rate** – Displays the received bit rate of the WiMAX WAN port. The figure will refresh every two seconds.

- **Rx WAN Packet Rate** – Displays the received packet rate of the WiMAX WAN port. The figure will refresh every two seconds.

- **Tx WAN Port Bit Rate** – Displays the transmitted bit rate of the WiMAX WAN port. The figure will refresh every two seconds.

- **Tx WAN Packet Rate** – Displays the transmitted packet rate of the WiMAX WAN port. The figure will refresh every two seconds.

- **Rx WAN Port Total Bytes** – Displays the total bytes received on the WiMAX WAN port. The figure will refresh every two seconds.

- **Rx WAN Port Total Packets** – Displays the total packets received on the WiMAX WAN port. The figure will refresh every two seconds.

- **Tx WAN Port Total Bytes** – Displays the total bytes transmitted by the WiMAX WAN port. The figure will refresh every two seconds.

- **Tx WAN Port Total Packets** – Displays the total number of packets transmitted by the WiMAX WAN port. The figure will refresh every two seconds.

10.4 Link Historical

The Link Quality Historical Counters page allows you to set a start/stop time and date for monitoring WiMAX link quality statisitics.

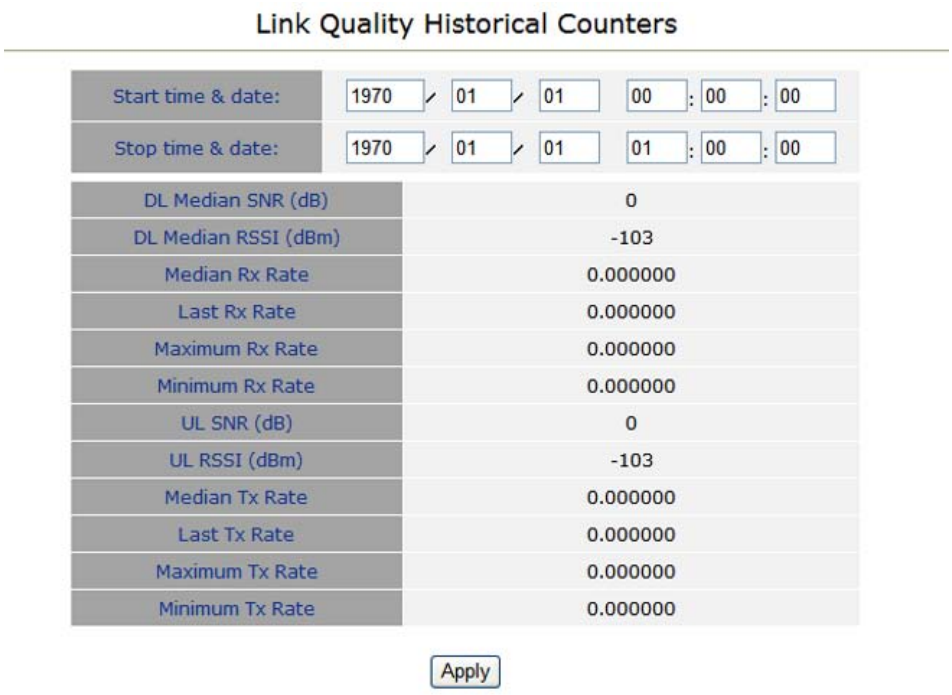


Figure 10-40: Performance Monitor - Link Historical

LINK QUALITY HISTORICAL COUNTERS – The Link Quality Historical Counters page allows the user to modify the time over which to monitor the WiMAX link and to display WiMAX receive/transmit link statistics. The user may configure up to 96 Historical Counters, the amalgamation of which will be displayed as averages in the display-only parameters below. Between the dates chosen a frequency of monitoring for information can be set on the Integration Time page.

- **Start Time & Date** – Allows the user to enter the year, month, day, hour, minute and second on which to start monitoring the WiMAX link.

- **Stop time & date** – Allows the user to enter the year, month, day, hour, minute and second on which to stop monitoring the WiMAX link.

- **DL Median SNR (dB)** – Displays the median downlink (DL) Signal-to-Noise Ratio for the selected time period.

- **DL Median RSSI (dBm)** – Displays the downlink Receive Signal Strength Indicator for the selected time period.
- **Median Rx Rate** – Displays the average number of received data packets in Megabits per second for the selected time period.
- **Last Rx Rate** – Displays the last 1 or 15 minutes of received data, depending on the configuiration of the Integration Time settings, in Megabits per second for the selected time period.
- **Maximum Rx Rate** – Displays the maximum received data rate in Megabits per second, for the selected time period.
- **Minimum Rx Rate** – Displays the minimum received data rate in Megabits per second, for the selected time period.
- **UL SNR (dB)** – Displays the median level of Signal-to-Noise Ratio received by the base station from the Extreme CPE, for the selected time period.
- **UL RSSI (dBm)** – Displays the median level of Receive Signal Strength Indication that the base station detects from the Extreme CPE, for the selected time period.
- **Median Tx Rate** – Displays the average number of data packets transmitted in Megabits per second, for the selected time period.
- **Last Tx Rate** – Displays the last 1 or 15 minutes of data packets transmitted in Megabits per second. The frequency for this parameter can be set on the Integration Time page.
- **Maximum Tx Rate** – Displays the maximum rate of data transfer for the selected time period.
- **Minimum Tx Rate** – Displays the minimum rate of data transfer for the selected time period.
- **Apply** – Applies the Ethernet Historical Counter setting and saves it.

10.5 Ethernet Historical

The Link Quality Historical Counters page allows you to set a start/stop time and date for monitoring Ethernet link quality statisitics.

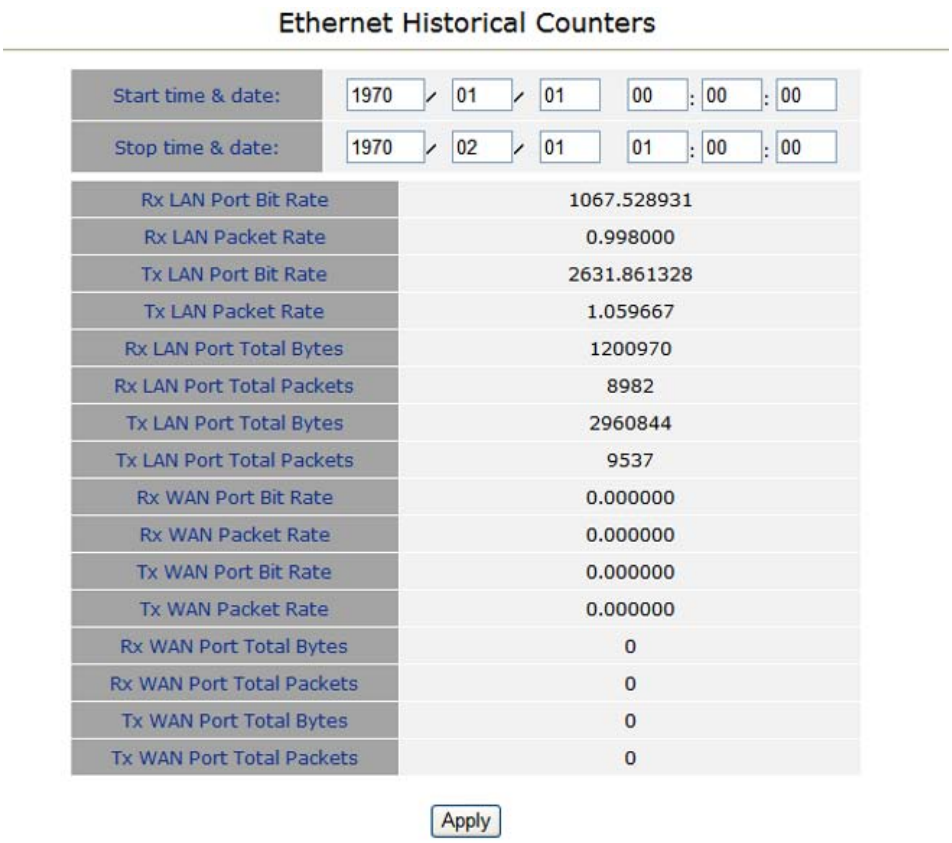


Figure 10-41: Performance Monitor - Ethernet Historical

ETHERNET HISTORICAL COUNTERS – The Ethernet Historical Counters page allows the user to modify the time over which to monitor the Ethernet link and to display Ethernet receive/transmit link statistics.

- **Start Time & Date** – Allows the user to enter the year, month, day, hour, minute and second on which to start monitoring the Ethernet link.

- **Stop time & date** – Allows the user to enter the year, month, day, hour, minute and second on which to stop monitoring the Ethernet link.

- **Rx LAN Port Bit Rate** – Displays the received bit rate of the Ethernet LAN port, for the selected time period.

- **Rx LAN Port Packet Rate** – Displays the received packet rate of the Ethernet LAN port, for the selected time period.
- **Tx LAN Port Bit Rate** – Displays the transmitted bit rate of the Ethernet LAN port, for the selected time period.
- **Tx LAN Port Packet Rate** – Displays the transmitted packet rate of the Ethernet LAN port, for the selected time period.
- **Rx LAN Port Total Bytes** – Displays the total bytes received by the Ethernet LAN port, for the selected time period.
- **Rx LAN Port Total Packets** – Displays the total number of packets received by the Ethernet LAN port, for the selected time period.
- **Tx LAN Port Total Bytes** – Displays the total bytes transmitted by the Ethernet LAN port, for the selected time period.
- **Tx LAN Port Total Packets** – Displays the total number of packets transmitted by the Ethernet LAN port, for the selected time period.
- **Rx WAN Port Bit Rate** – Displays the received bit rate of the WiMAX WAN port, for the selected time period.
- **Rx WAN Packet Rate** – Displays the received packet rate of the WiMAX WAN port, for the selected time period.
- **Tx WAN Port Bit Rate** – Displays the transmitted bit rate of the WiMAX WAN port, for the selected time period.
- **Tx WAN Packet Rate** – Displays the transmitted packet rate of the WiMAX WAN port, for the selected time period.
- **Rx WAN Port Total Bytes** – Diplays the total number of bytes received by the WiMAX WAN port, for the selected time period.
- **Rx WAN Port Total Packets** – Displays the total number of packets received by the WiMAX WAN port, for the selected time period.
- **Tx WAN Port Total Bytes** – Displays the total number of bytes transmitted by the WiMAX WAN port, for the selected time period.

- **Tx WAN Port Total Packets** – Displays the total number of packets transmitted by the WiMAX WAN port, for the selected time period.

10.6 Integration Time

The Integration Time page allows you to set the frequency with which the Extreme CPE will monitor traffic statistics on both the WiMAX link and Ethernet link.

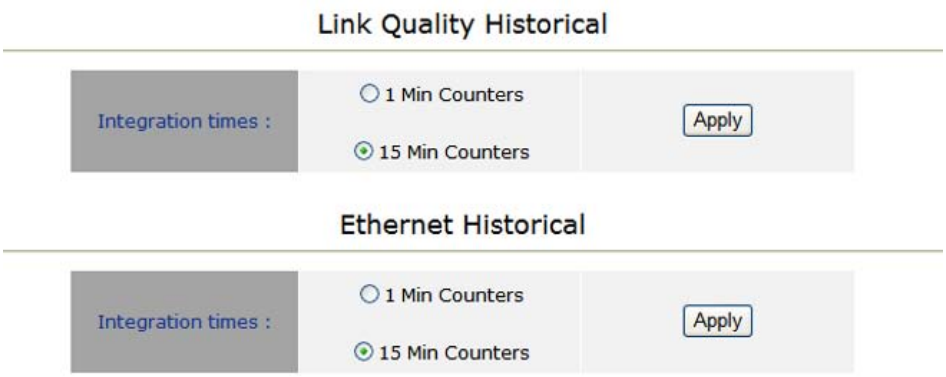


Figure 10-42: Performance Monitor - Integration Time

LINK QUALITY HISTORICAL – The Link Quality Historical page allows the user to define a time period for monitoring the WiMAX WAN port link.

- **1 Min Counters** – Sets the counter to a duration of one minute.
- **15 Min Counters** – Sets the counter to a duration of fifteen minutes.
- **Apply** – Applies the chosen setting.

ETHERNET HISTORICAL – The Ethernet Historical page allows the user to define a time period for monitoring the Ethernet LAN port link.

- **1 Min Counters** – Sets the counter to a duration of one minute.
- **15 Min Counters** – Sets the counter to a duration of fifteen minutes.
- **Apply** – Applies the chosen setting.

10.7 Spectrum Analyzer

The Spectrum Analyzer page allows the Extreme CPE to provide off line Spectrum analyzing for walk test / drive test site surveying. The Spectrum analyzer runs an off line frequency scanning from the WEB interface.

A spectrum analysis identifies, classifies, and finds sources of RF interferences that impact the performance of WiMAX networks.

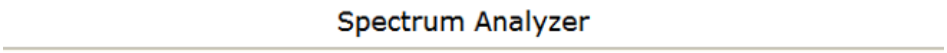


Figure 10-43: Performance Monitor - Spectrum Analyzer

11

Chapter 11 - Service

In This Chapter:

11.1 Introduction

The Service page allows configuration of VLANs and DSCP parameters.

Figure 11-44: Service Menu

11.2 Show Service

The Show All parameters, Service Parameters page displays the service line count and the operation mode.

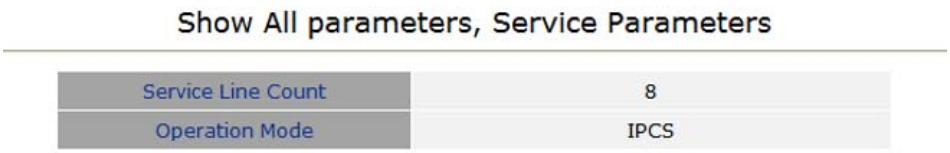


Figure 11-45: Service - Show Service Parameters

11.3 Service Parameters

The Ethernet On-Line Counters page displays RX and Tx levels for the Ethernet connection.

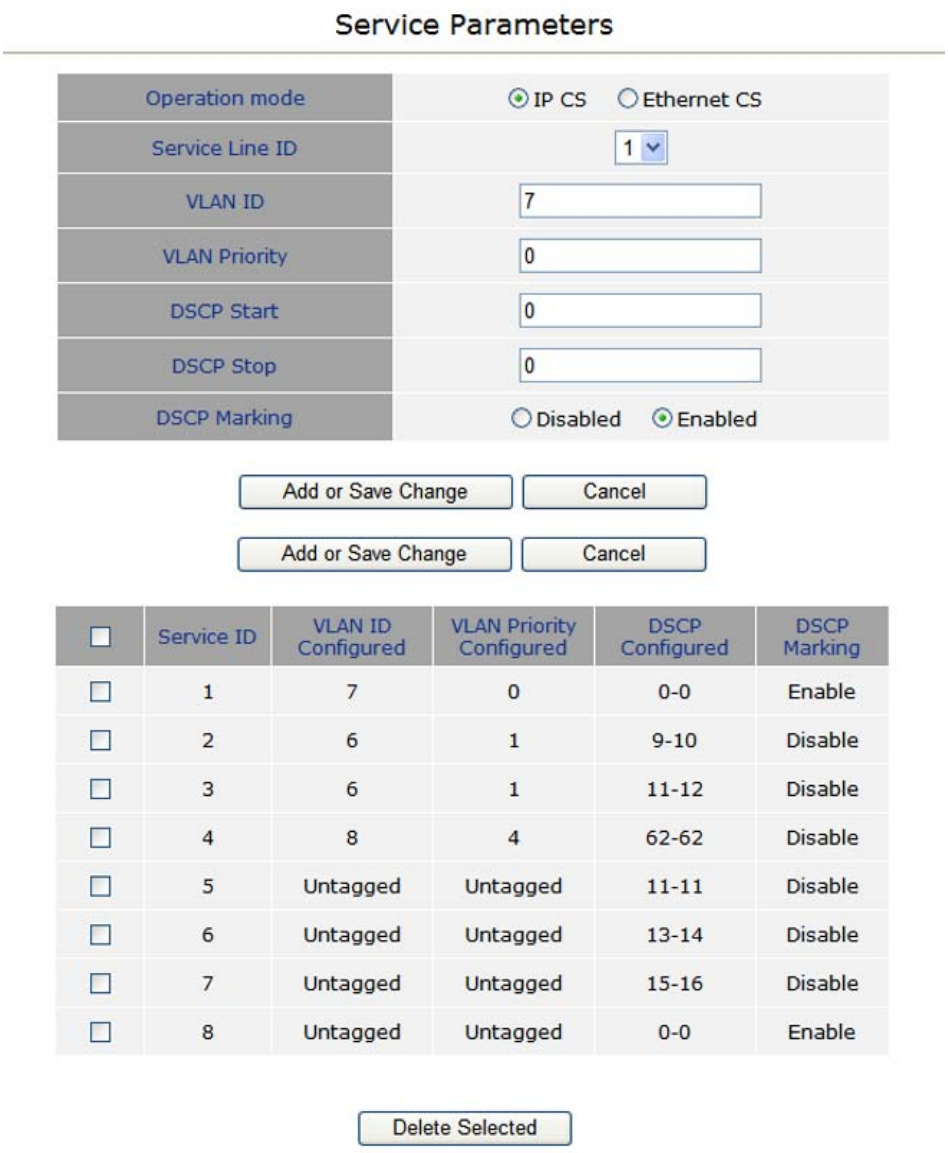


Figure 11-46: Service - Service Parameters

12

Chapter 12 - Management

In This Chapter:

12.1 Introduction

The Management page displays system management statisitics.

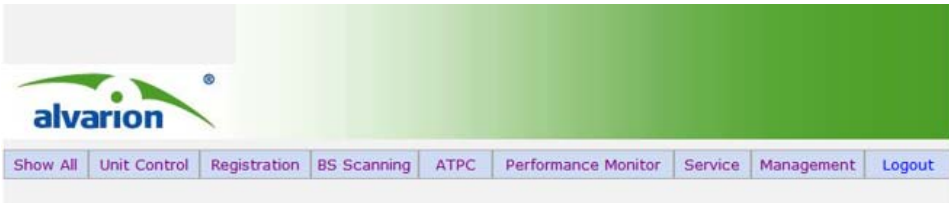


Figure 12-47: Management Menu

12.2 Management Parameters

The Management Parameters page displays non-configurable DSCP and IP related statistics.

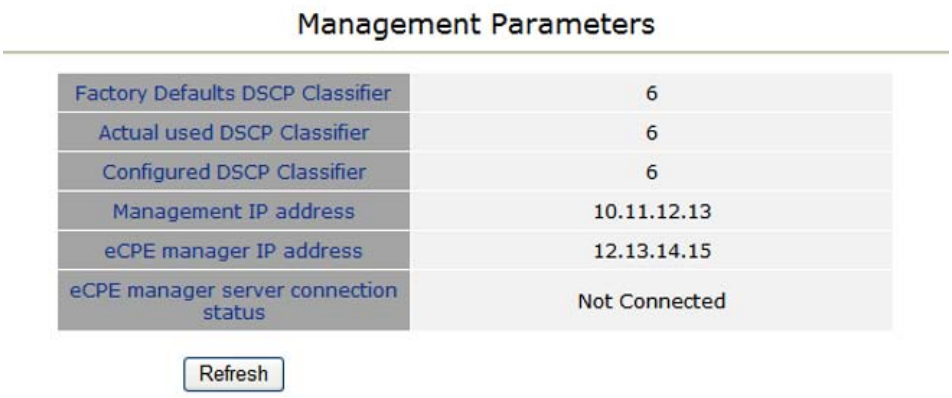


Figure 12-48: Management - Management Parameters

13

Chapter 13 - Logout

In This Chapter:

13.1 Logout

The Logout page enables you to log out of the web interface and terminate your session. Logging out is proceeded by a prompt to log in again.

Figure 13-49: Logout

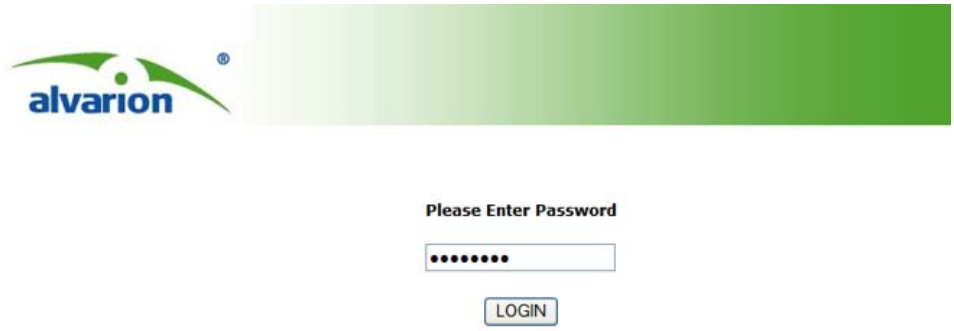


Figure 13-50: Login

A

Appendix A - Troubleshooting

In This Chapter:

This appendix provides a lists of things to check in case of problems before contacting local Technical Support.

Check the following before you contact local Technical Support.

1. If you cannot access the Internet from the PC, check the following:
   - If you cannot access the Internet, be sure your WIndows system is correctly configured for TCP/IP. The IP settings should be set to “obtain an IP address automatically.”
   - The WAN Type settings for the service provider may not be configured correctly. Use the web interface to check that the WAN settings match those provided by the service provider.
   - You may be out of the service area of the WiMAX base station. Check with the WiMAX service provider for service coverage information.
   - If you cannot resolve the problem, check the System Status page of the web interface and contact your WiMAX service provider.
2. If the management interface cannot be accessed using a web browser:
   - Be sure the management station is correctly configured for TCP/IP. The IP settings should be set to “obtain an IP address automatically.”
   - Try a Ping command from the management station to the unit’s IP address to verify that the entire network path between the two devices is functioning correctly.
   - Check that the management station has a valid network connection and that the Ethernet port that you are using has not been disabled.
   - Check the network cabling between the management station and the unit. If the problem is not resolved, try using a different port or a different cable.
3. Forgot or Lost the Password
   - Set the unit to its default configuration by pressing the reset button on the back panel for 5 seconds or more. Then use the default password “admin” to access the management interface.
4. If all other recovery measures fail and the unit is still not functioning properly, take either of these steps:
   - Reset the unit using the web interface, or through a power reset.

Table A-1: Troubleshooting Chart

Ports	Description
■ POWER LED is Off	◇AC power adapter may be disconnected. Check connections between the unit, the AC power adapter, and the wall outlet.
	◇The unit has detected a system error. Reboot the unit to try and clear the condition. ◇If the condition does not clear, contact your local dealer for assistance.
■ ETH link LED is Off	◇Verify that the unit and attached device are powered on. ◇Be sure the cable is plugged into both the unit and corresponding device. ◇Verify that the proper cable type is used and its length does not exceed specified limits. ◇Check the cable connections for possible defects. Replace the defective cable if necessary.

B

Appendix B - GNU License

In This Chapter:

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END OF TERMS AND CONDITIONS

Glossary

100BASE-TX	IEEE 802.3u specification for 100 Mbps Fast Ethernet over two pairs of Category 5 or better UTP cable.
10BASE-T	IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3 or better UTP cable
Advanced Encryption Standard (AES)	An strong encryption algorithm that implements symmetric key cryptography.
Authentication	The process to verify the identity of a client requesting network access. IEEE 802.11 specifies two forms of authentication: open system and shared key.
Auto-negotiation	Signalling method allowing each node to select its optimum operational mode (speed and duplex mode) based on the capabilities of the node to which it is connected.
Base Station	A WIMAX service provider's equipment that is installed at a fixed location to provide network connectivity for subscriber stations within a defined service area.
Broadcast Key	Broadcast keys are sent to stations using 802.1X dynamic keying. Dynamic broadcast key rotation is often used to allow the access point to generate a random group key and periodically update all key-management capable wireless clients.
Customer Premise Equipment (CPE)	Customer Premise Equipment: Communications equipment that resides on the customer's premises.
Domain Name System (DNS)	A system used for translating host names for network nodes into IP addresses.
Dynamic Host Control Protocol (DHCP)	Dynamic Host Configuration Protocol: Provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.
Ethernet	A popular local area data communications network, which accepts transmission from computers and terminals.

Encryption	Data passing between the SU-A-EZ and clients can use encryption to protect from interception and evesdropping.
Extended Service Set (ESS)	Extended Service Set: More than one wireless cell can be configured with the same Service Set Identifier to allow mobile users can roam between different cells with the Extended Service Set.
Extensible Authentication Protocol (EAP)	An authentication protocol used to authenticate network clients. EAP is combined with IEEE 802.1X port authentication and a RADIUS authentication server to provide “mutual authentication” between a client, the access point, and the a RADIUS server
File Transfer Protocol (FTP)	File Transfer Protocol: A TCP/IP protocol used for file transfer.
Hypertext Transfer Protocol (HTTP)	Hypertext Transfer Protocol: HTTP is a standard used to transmit and receive all data over the World Wide Web.
IEEE 802.16e	A standard that provides mobile broadband wireless access using Scalable Orthogonal Frequency Division Multiple Access (SOFDMA).
Local Area Network (LAN)	Local Area Network: A group of interconnected computer and support devices.
MAC	Media Access Control: The lower of the two sub-layers of the data link layer defined by the IEEE. The MAC sub-layer handles access to shared media, such as whether token passing or contention will be used.
MAC Address	Standardized data link layer address that is required for every port or device that connects to a LAN. Other devices in the network use these addresses to locate specific ports in the network and to create and update routing tables and data structures. MAC addresses are 6bytes long and are controlled by the IEEE.
Network Time Protocol (NTP)	NTP provides the mechanisms to synchronize time across the network. The time servers operate in a hierarchical-master-slave configuration in order to synchronize local clocks within the subnet and to national time standards via wire or radio.

Orthogonal Frequency Division Multiplexing (OFDM)	Orthogonal Frequency Division Multiplexing: OFDM allows multiple users to transmit in an allocated band by dividing the bandwidth into many narrow bandwidth carriers.
Power Over Ethernet (PoE)	Power over Ethernet: A specification for providing both power and data to low-power network devices using a single Category 5 Ethernet cable. PoE provides greater flexibility in the locating of Wi²s and network devices, and significantly decreased installation costs.
RTS Threshold	Transmitters contending for the medium may not be aware of each other. RTS/CTS mechanism can solve this "Hidden Node Problem." If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.
Service Set Identifier (SSID)	An identifier that is attached to packets sent over the wireless LAN and functions as a password for joining a particular radio cell; i.e., Basic Service Set (BSS).
Session Key	Session keys are unique to each client, and are used to authenticate a client connection, and correlate traffic passing between a specific client and the AU-EZ.
Shared Key	A shared key can be used to authenticate each client attached to a wireless network. Shared Key authentication must be used along with the 802.11 Wireless Equivalent Privacy algorithm.
Simple Network Management Protocol (SNMP)	Simple Network Management Protocol: The application protocol in the Internet suite of protocols which offers network management services.
Simple Network Time Protocol (SNTP)	SNTP allows a device to set its internal clock based on periodic updates from a Network Time Protocol (NTP) server. Updates can be requested from a specific NTP server, or can be received via broadcasts sent by NTP servers.
Subscriber Station	A general term for a customer's WIMAX terminal equipment that provides connectivity with a base station.
Subscriber Unit Alignment Unit (SAU)	An optional device that provides additional assistance in aligning the ODU antenna.
Trivial File Transfer Protocol (TFTP)	Trivial File Transfer Protocol: A TCP/IP protocol commonly used for software downloads.
UTP	Unshielded twisted-pair cable.

Wired Equivalent Privacy (WEP)	Wired Equivalent Privacy: WEP is based on the use of security keys and the popular RC4 encryption algorithm. Wireless devices without a valid WEP key will be excluded from network traffic.

Numerics

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