VistaMAX OBR3650HP
Outdoor Base Station Transceiver

Installation and Operation Guide

vecima networks

Document: **OBR3650HP_ml_r01_sd**
Approved: **C.W.**

Contents

Preface

Warnings and Advisories

CAUTION

Before installing and operating this equipment, read all safety, installation and operating sections. Retain this manual for future reference. Follow all instructions - failure to do so may result in damage to the unit or severe personal injury.

CAUTION

Servicing should not be attempted by the user. There are no user serviceable parts inside. Refer all servicing to factory qualified personnel.

Regulatory Notices

FCC Compliance

This equipment has been tested and found to comply with the limits for 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 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 or more 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

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

For safety reasons, people should not work in a situation where RF exposure limits could be exceeded. To prevent this situation, the users should consider the following rules:

- Install the antenna so that there is a minimum of 25 cm of distance between the antenna and people.
- Do not turn on power to the device while installing the antenna.
- Do not connect the antenna while the device is in operation.
- Do not collocate or operate the antenna used with the device in conjunction with any other antenna or transmitter.
- In order to ensure compliance with local regulations, the installer MUST enter the antenna gain at the time of installation.

Any changes or modifications not expressly approved by Vecima Networks Ltd. could void the user's warranty.

The Vecima OBR3650HP base station unit must be installed by a trained professional, value added reseller, or systems integrator who is familiar with regulatory EIRP limits, RF cell planning issues and the regulatory limits defined by the FCC.

WARNING

See "3.5.1 Setting the VistaMAX OBR3650HP Transmit Power for FCC Limits" on page 3-7 for professional installation instructions regarding safe EIRP limits.

Industry Canada Compliance

Operation of this device is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

The users should not modify or change this device without written approval from Vecima Networks. Modification will void warranty and authority to use the device.

Getting Support

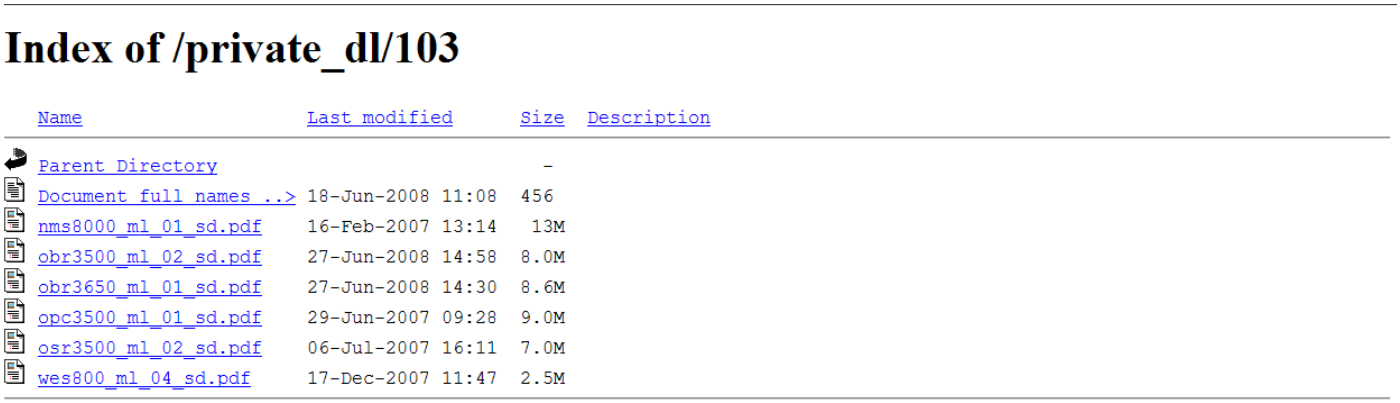
Finding Related Documentation

The user manuals for the VistaMAX series of products may be downloaded from our FTP site as follows:

Step 1 Using a web browser, visit **https://files.vecima.com**

Step 2 Select 103 from the 'Jump to Download Area' drop menu and click on 'Go!'

Step 3 Enter the Username as **vistamax** and the Password as **vistamax**



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Step 4 Download the required file(s)

Document Conventions

This manual uses the following special formats to emphasize key information. Be aware of all warnings and cautions before you begin to install the OBR3650HP.

WARNING

Whenever you see this icon and heading, the associated text addresses or discusses a critical safety or regulatory issue.

CAUTION

Whenever you see this icon and heading, the associated text discusses an issue, which, if not followed, could result in damage to, or improper use of, the equipment or software.

NOTE

Whenever you see this icon and heading, the associated text provides some important information not directly related to the topic.

TIP

Whenever you see this icon and heading, the associated text provides a tip for facilitating the installation, testing, or operation of the equipment or software

Technical Support

Visit the Vecima Networks Web page at www.vecima.com.

- Get the latest announcements from Vecima Networks.
- Download product related software, manuals, application notes, or other information about Vecima products.

For technical support:

Contact technical support by telephone or email.

- Email: support@vecima.com
- Telephone: +1 306 955 7075, press "2" for technical support.

Be prepared to provide your model number and phone number.

Warranty and Service Policies

Warranty Statement

Vecima Networks warrants its products to be free from defects in workmanship or materials for a period of two years. The warranty begins on the date of the original shipment from Vecima Networks to its customer. No claim may be allowed for expenses incurred in installation or use. No other expressed or implied warranties shall apply to the goods sold. Vecima Networks is not responsible for delayed shipments, other loss beyond Vecima Networks' control, or consequential damages of any kind arising in connection with the use of its products. This warranty is a return-to-factory warranty only. During the warranty period Vecima Networks will at its option, replace, repair or refund the price paid for any item which is returned for service. This warranty does not apply to units that have been misused physically or used in an inappropriate environment.

Service Policies

Return Material Authorization

Before returning any item for service, you must obtain a Returned Material Authorization (RMA) number from Vecima Networks. Vecima Networks will assign a unique RMA number for each item returned.

How to Return an Item for Service

Step 1 Contact Vecima Networks to obtain an RMA number. Before contacting Vecima Networks, record the model number, Vecima serial number, original invoice number, purchase order number, and a description of the fault. Vecima will request this information before providing an RMA.

Email: support@vecima.com

Telephone: +1 306 955 7075, press "2" for technical support.

Step 2 Refer to the RMA number in all correspondence and clearly mark all applicable RMA numbers on the outside of each package returned.

Step 3 The repair center will provide you with shipping instructions when they send the RMA number to you.

Step 4 Ship each product to Vecima Networks in its original shipping container (or equivalent) via prepaid carrier, with appropriate insurance and customs documentation (where required). Vecima Networks will not accept collect shipments, damaged shipments or shipments unaccompanied by an RMA number.

Step 5 Vecima Networks will replace or repair items and return them to you as follows:

For items still under warranty—Vecima Networks Inc. will return items via prepaid ground carrier. The customer is responsible for any additional costs incurred, including customs clearance and duties. The customer will be responsible for any additional charges incurred from alternative shipping methods.

For items no longer under warranty—Vecima Networks will return items via prepaid ground carrier at the customer's expense. The customer is responsible for any additional costs incurred, including customs clearance and duties. The customer will be responsible for any additional charges incurred from alternative shipping methods.

Repair Charges and Warranty Exemptions

Items returned beyond the warranty period or items that do not qualify for warranty service are subject to additional out-of-warranty repair charges. Descriptions of these charges and warranty exemptions are listed below:

(1) Repair turnaround time is typically 5-14 business days after receipt of the item at Vecima Networks. A flat rate repair charge will apply to all out-of-warranty items. Flat rate repair charges are subject to change without notice.

(2) Any faults due to customer error (i.e. - incorrect set-up or configuration settings) are subject to the current test fee and will be exempt from warranty.

(3) Items returned with inadequate fault descriptions are subject to the current test fee and are exempt from warranty.

(4) In the event that no fault is found, the item is subject to the current test fee and will be exempt from warranty.

(5) Any product exhibiting external damage (either from shipping, improper handling or use) will be subject to inspection. If said damages are determined to be the cause of failure, the item will be exempt from warranty. All repairs to correct the external damage are subject to time & materials charges (parts and labor at current rates).

(6) Items with damage caused by unauthorized repairs or by external devices are subject to current out-of-warranty flat rate repair charges and are exempt from warranty.

(7) All products returned for factory optioning are subject to the applicable current option charge plus test fee. Factory-optioned products carry the balance of the original warranty or a 90 day warranty, whichever is greater.

NOTE

The customer must approve all out-of-warranty repairs in writing. Vecima will not start any repairs until they receive the customer's purchase order or out-of-warranty repair authorization.

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1.0 Introduction

1.1 OBR3650HP Overview

The VistaMAX Outdoor Base Station 3650 (OBR3650HP) is a WiMAX compliant low power transceiver contained in a weatherproof sealed housing. The OBR3650HP offers a single out-of-box solution for WiMAX applications – the only equipment required inside the base station premises is Power over Ethernet switch. The OBR3650HP is part of the WiMAX compliant VistaMAX family of base stations, subscriber units, and network equipment available from Vecima Networks.

The OBR3650HP operates in the 3650 to 3675 MHz band. It requires an additional indoor Power over Ethernet switch such as the VPN100002. The WiMAX Ethernet Switch 800 (WES800) can also serve as the Ethernet switch to provide power to sectors using the units and serve as the network connection point.

Figure 1-1 VistaMAX OBR3650HP

1.2 Specifications

RF

Item	Specification
RF Frequency	3650 to 3675 MHz
RF Frequency Step Size	250 KHz
Duplexing Mode	TDD
Channel Bandwidth	3.5 MHz or 7 MHz (software selectable)
Modulation Types	IEEE 802.16-2004, OFDM256, burst by burst adaptive BPSK-1/2 QPSK-1/2, QPSK-3/4 16QAM-1/2, 16QAM-3/4 64QAM-2/3, 64QAM-3/4
Maximum Rated Power	+27dBm at the external antenna connector
Output Power	+17 dBm to +27 dBm
Output Power Control Range	FCC Part 90
Spectral Mask Compliance	-94 dBm
Minimum Sensitivity	-91 dBm
Integrated Antenna Options	N female

Network

Item	Specification
LAN Interface	10/100BaseT 802.3 Ethernet
Management/Monitoring Interfaces	SNMP (WiMAX Forum MIBs + Vecima Networks extensions) Built-in HTTPS web server Telnet/SSH CLI Syslog

Operation Parameters

Item	Specification
Lightning Protection	Multi-strike protection built-in
Power Supply	36 to 56 VDC Power over Ethernet
Power Consumption	45 W maximum

Mechanical

Item	Specification
Operating Temperature	-45°C to +55°C
Physical	20" x 8" x 5" (50.8cm x 20cm x12.7cm) maximum
Mounting	Pole mount (2.5" to 4.5" diameter pole)
Weight	20 lbs. (9 kg) maximum
Weatherproofing	NEMA 4X/IP66

2.0 Installation

2.1 Unpacking the Unit

Carefully remove the equipment form the packing material and set it on a solid surface, such as a table or desk. If it appears damaged in any way, notify the carrier and keep all packing materials for inspection by the carrier's agent.

2.2 Mounting the OBR3650HP

The following hardware is included in the box for mounting the OBR3650HP to the pole:

- Qty. 1 x Chassis Bracket
- Qty. 1 x Elevation Adjustment Bracket
- Qty. 1 x Pole Catch Bracket
- Qty. 4 x 6 inch Carriage Bolts
- Qty. 8 x Nuts
- Qty. 4 x Split Lock Washer
- Qty. 4 x Bolts
- Qty. 4 x Flat Washer
- Qty. 4 x Nylon Washer

The Chassis Bracket and Elevation Adjustment Bracket come pre-installed on the OBR3650HP chassis.

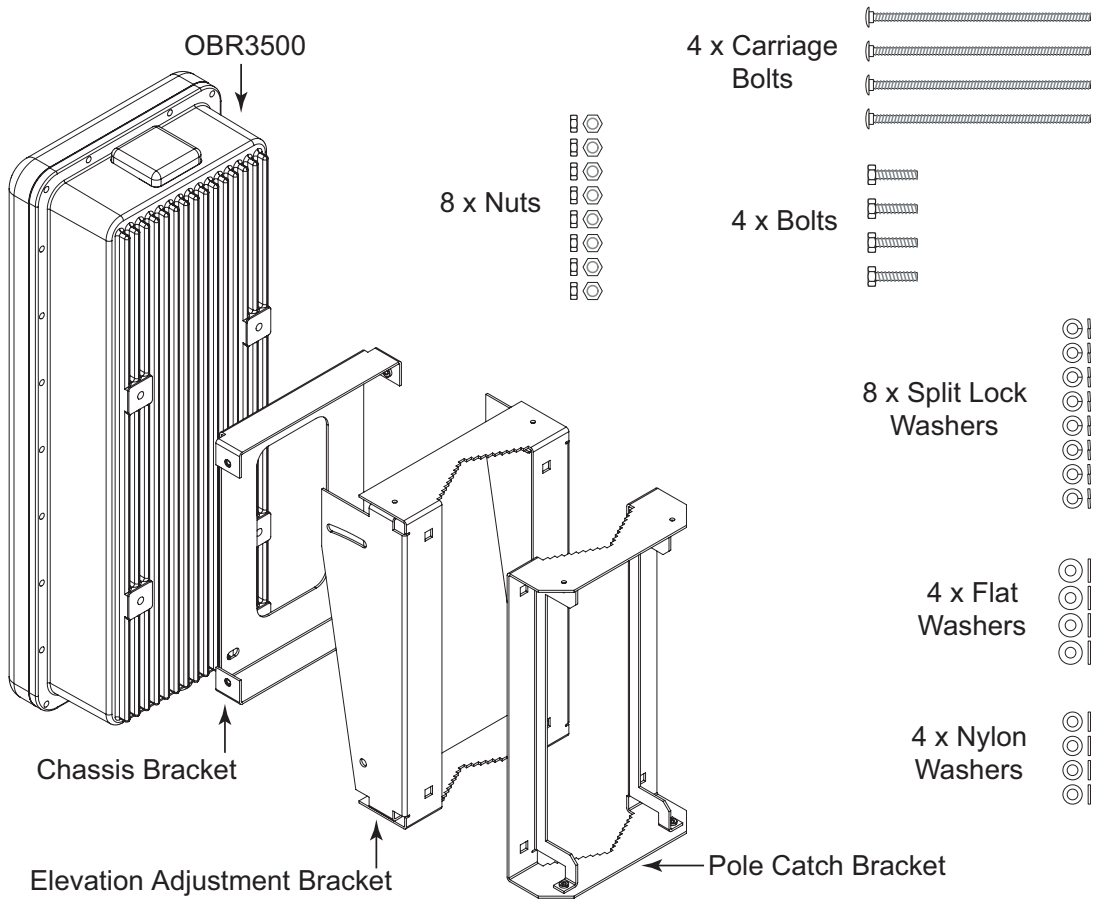
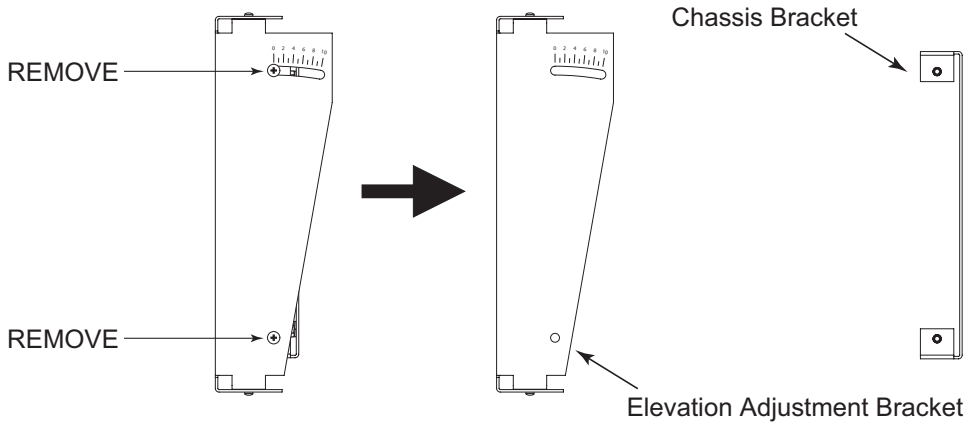


Figure 2-1 OBR3650HP Pole Mounting Hardware

Figure 2-2 & 2-3 describe the steps necessary to prepare the OBR3650HP for pole mounting.

1 Remove the Elevevation Adjusment Bracket from the Chassis Bracket by removing the four screws (2 on each side) .



2 Attach the Chassis Bracket to the OBR3650 using four bolts and assorted washers as shown below. Take care to place the nylon washers between the Chassis Bracket and the OBR3650 to prevent damage to the paint.

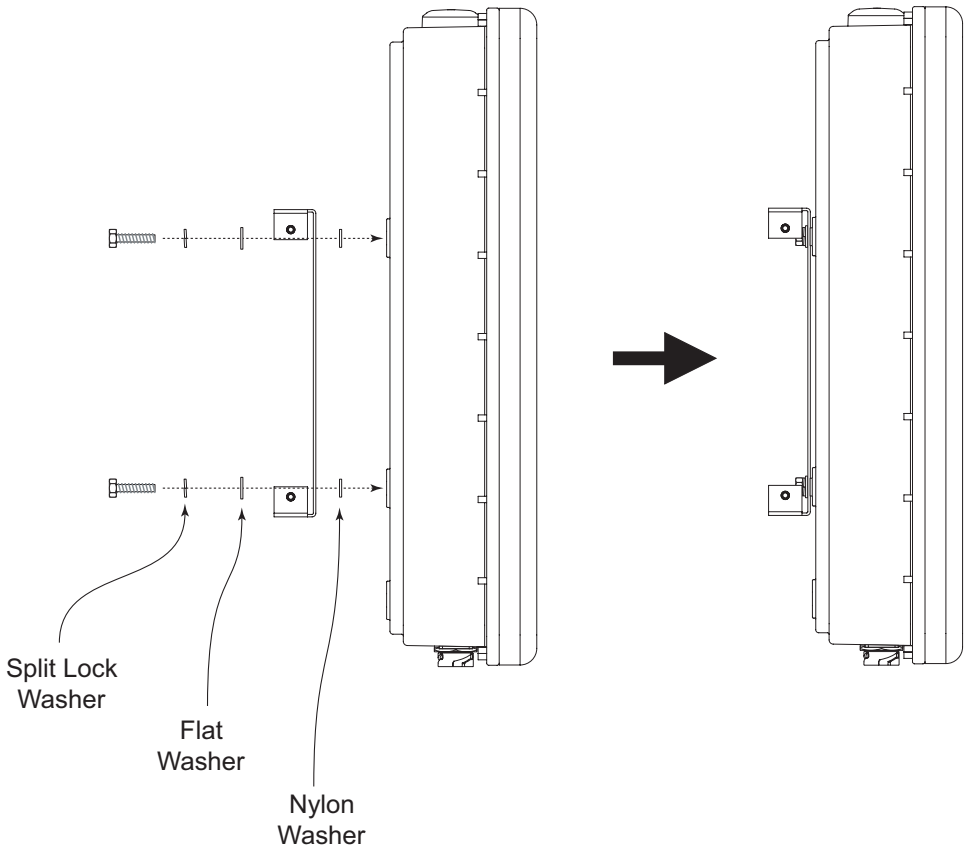
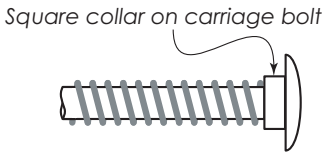
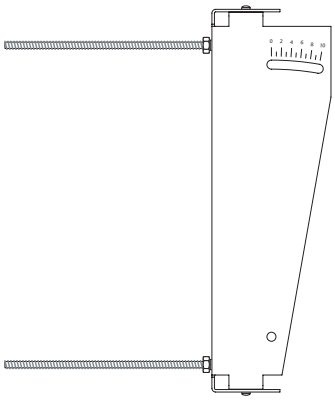


Figure 2-2 Preparing the OBR3650HP for Pole Mounting (Part 1)

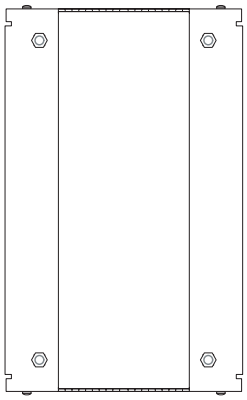
3 Insert the four carriage bolts into the four square holes in the Elevation Adjustment bracket as shown

*To prevent the square collar near the head of the carriage bolts from slipping back through the square holes, fasten a nut onto each carriage bolt as shown -- **NOTE:** do not use any washers; the nuts will not fasten flush to the surface. The nuts will prevent the square collars on the carriage bolts from slipping out of the notches when fastened down.*

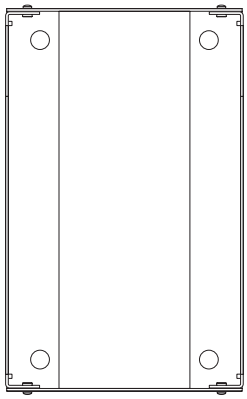




Elevation Adjustment bracket with Carriage bolts installed (viewed from the side)



Elevation Adjustment bracket with Carriage bolts installed (viewed from the "face" that will mount against the pole)



Elevation Adjustment bracket with Carriage bolts installed (viewed from the "face" that will mount towards the OBR3650)

4 After inserting the carriage bolt into the Elevevation Adjusment bracket, re-attach the bracket to the OBR3650 by replacing the four screws (2 on each side) as shown.

The OBR3650 is now ready to be mounted to a pole.

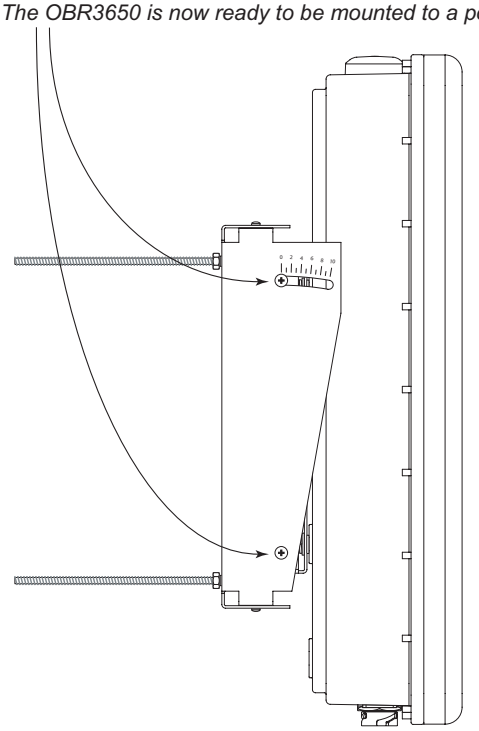
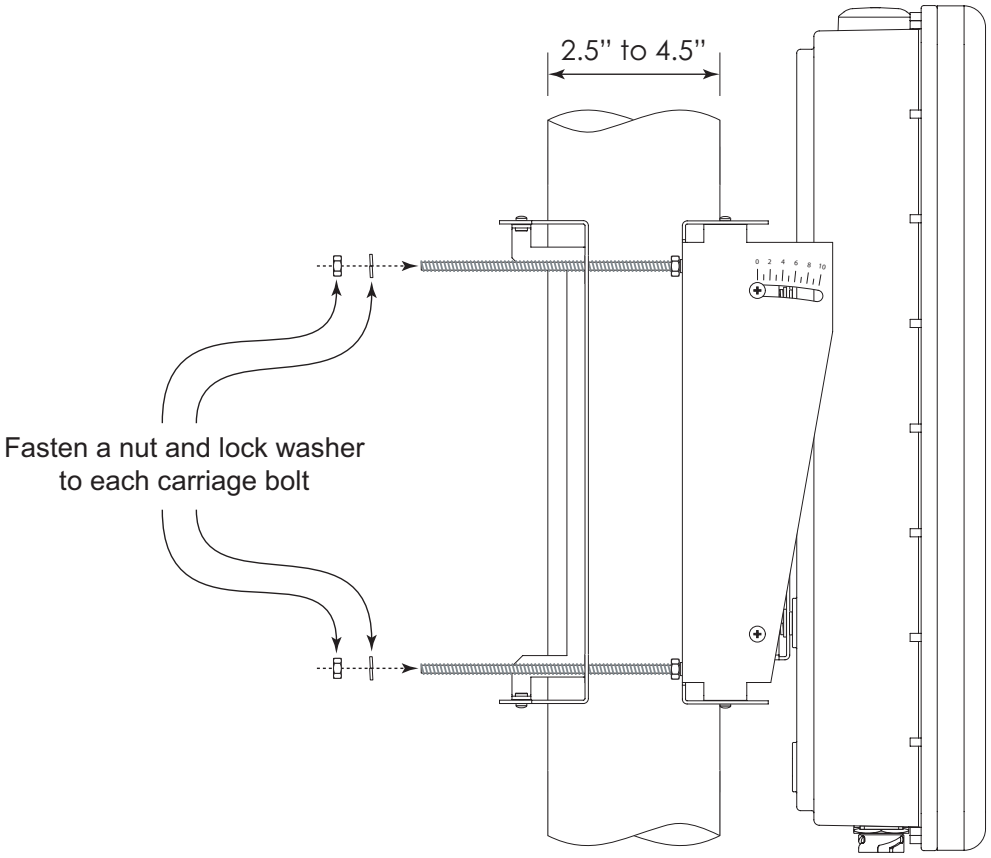
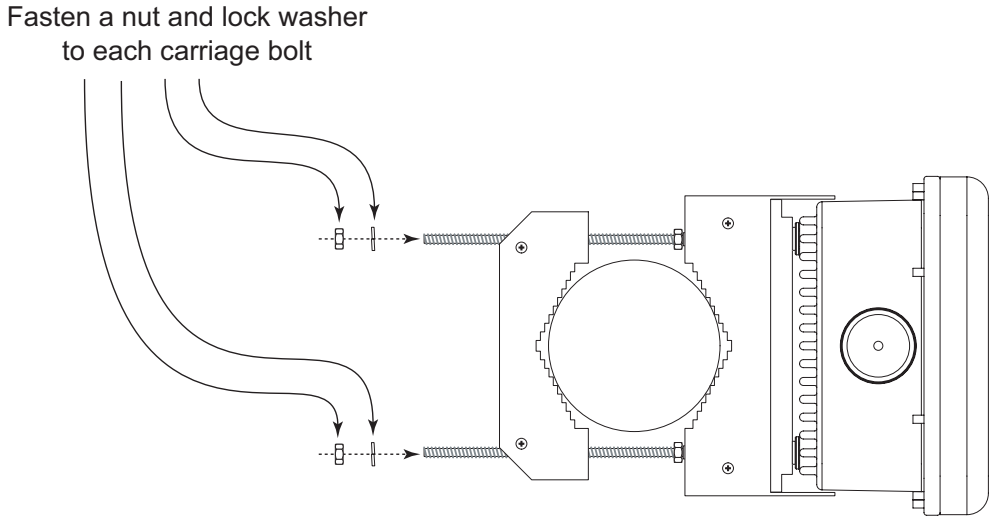


Figure 2-3 Preparing the OBR3650HP for Pole Mounting (Part 2)

After preparing the OBR3650HP for pole mounting, hold the OBR3650HP against the pole at the desired height then place the Pole Catch Bracket onto the opposite side as shown in Figure 2-4. Fasten a lock washer and nut onto all four carriage bolts and tighten until the OBR3650HP is suitably secured in place.



Pole Mounting - Side View



Pole Mounting - Top View

Figure 2-4 Attaching the OBR3650HP to the Pole

Once the OBR3650HP is mounted to the pole, the Elevation Angle may be adjusted as necessary and the unit may be connected to the network via a CAT5E cable with a standard RJ45 connector on one end and a special Molex® backshell with RJ45 connector on the other end.

NOTE

If not using a pre-made cable assembly (such as a CAT5CABLE/OD/25, CAT5CABLE/OD/50, CAT5CABLE/OD/75 or CAT5CABLE/OD/10 from Vecima Networks), then a cable assembly will have to made using the Molex® backshell included with the OBR3650HP. Please see Appendix 1 for details on how to install the Molex® backshell.

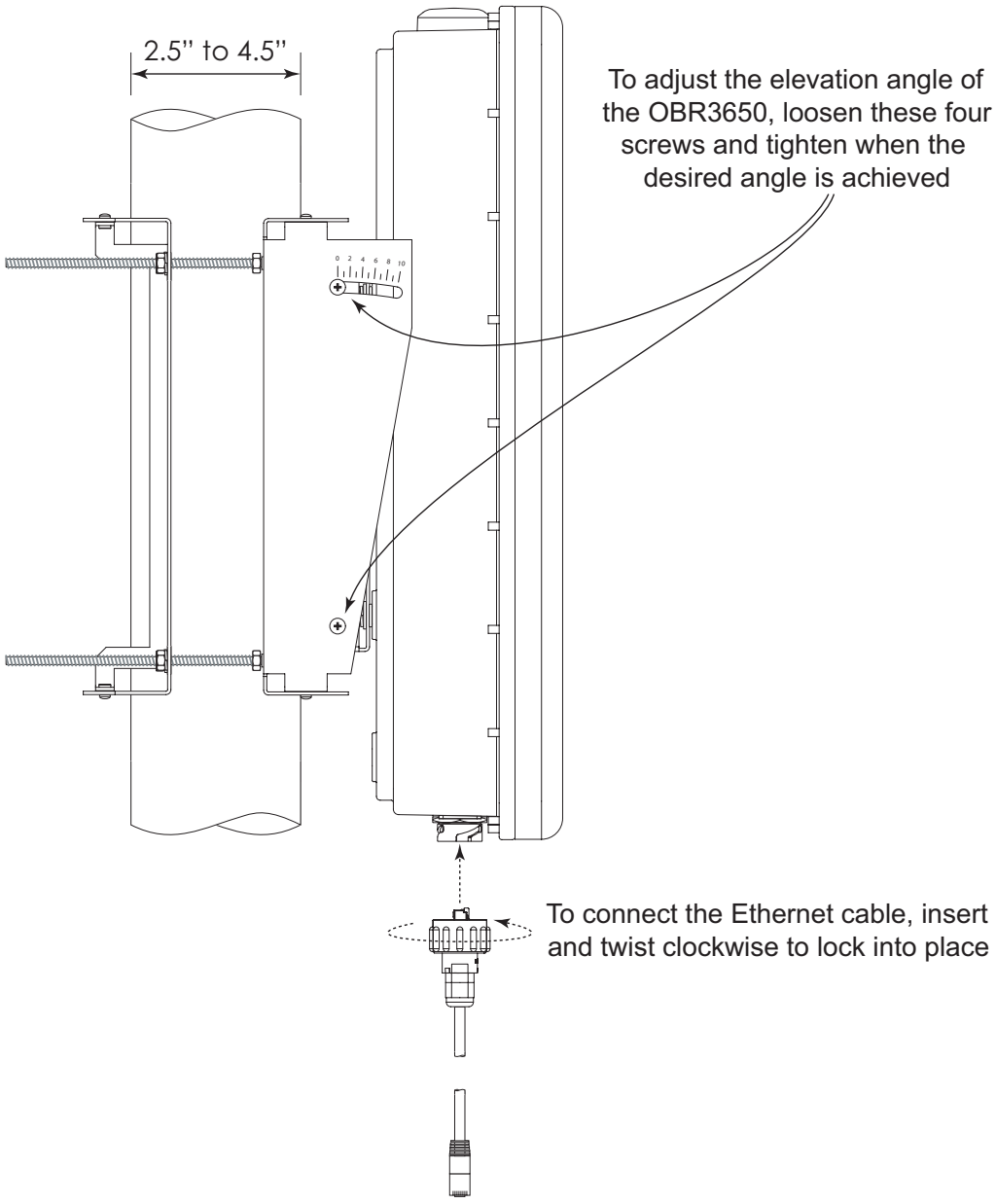


Figure 2-5 Connecting the OBR3650HP to the Network

2.2.1 Water Proof the Connection

Wrapping the antenna connection with sealing tape keeps the connection tight and protects against moisture.

To water proof the connection follow these steps:

Step 1 Use a section of rubber sealing tape. Starting at the OBR3650HP end, stretch the tape and wrap it around the connector as close as possible to the body of the OBR3650HP. Overlap the tape by approximately one-half of its width so that it can form a seal with itself. Extend the wrapping to approximately one-inch past the end of the connector.

Figure 2-6 Apply Rubber Sealing Tape

Step 2 Cover the sealing tape with electrical tape. Start approximately one inch further down the cable, and stretch the tape, overlapping by one-half. Wrap to the OBR3650HP end, then without breaking the tape, wrap back down to the cable end.

Figure 2-7 Water Proofed Connection

2.3 Installing the Grounding Apparatus

Install the grounding apparatus to protect the OBR3650HP from lightning strikes and power surges. Ground the base station to the earth ground to protect from lightning strikes. Use the surge suppressor to shunt to ground any over-voltage [>60 V] transients that may be induced on the CAT5E cablefeed via lightning or other high voltages.

2.3.1 Lightning Protection

The OBR3650HP has a built in lightning surge suppression mechanism to protect it against damage from lightning strikes.

Assembling the OBR3650HP Base Station Grounding

Attach the earth ground to the grounding lug located on the base station.

Provided parts:

- 1 x 5/8 inch washer
- 1 x 1/4 inch grounding lug

Required parts:

- 1 x #6 AWG grounding wire assembly of sufficient length to connect the OBR to the tower's earth ground bus
- 1 Size 11 Wrench (11mm or 7/16 inch)

To assemble and attach the ground lug:

1. Locate the grounding point on the OBR3650HP. This is at the bottom of the OBR, to the right of the Vecima sticker.
2. On the grounding lug, assemble the grounding combination in the following order:
   Lug > Washer > Grounding Assembly > Washer.
3. Screw the combination into the OBR at the grounding point.
4. Attach the assembly to the lightning grid or the antenna.

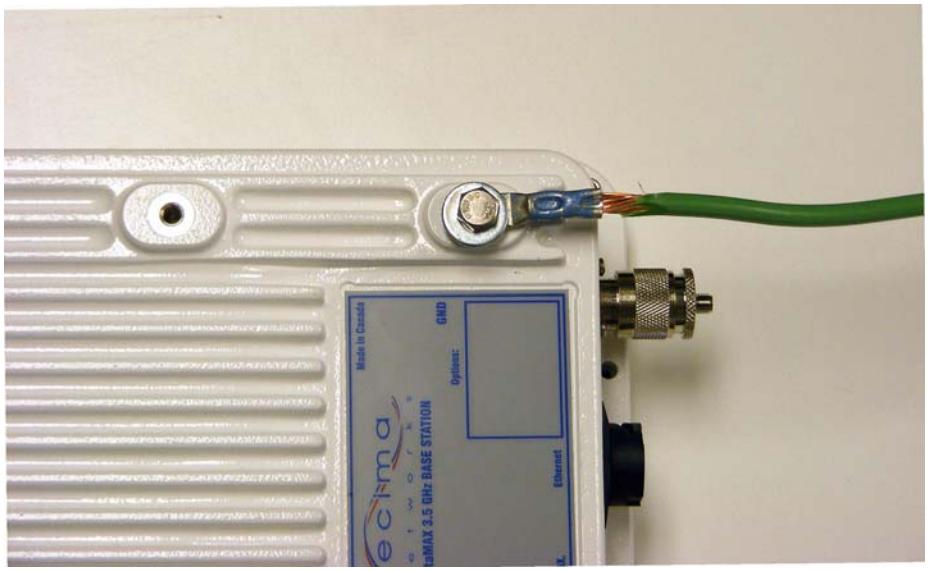


Figure 2-8 Assembled Ground Lug

Grounding the Base Station

Vecima Networks requires that the OBR3650HP be connected to the tower grounding system as shown in Figure 2-11.

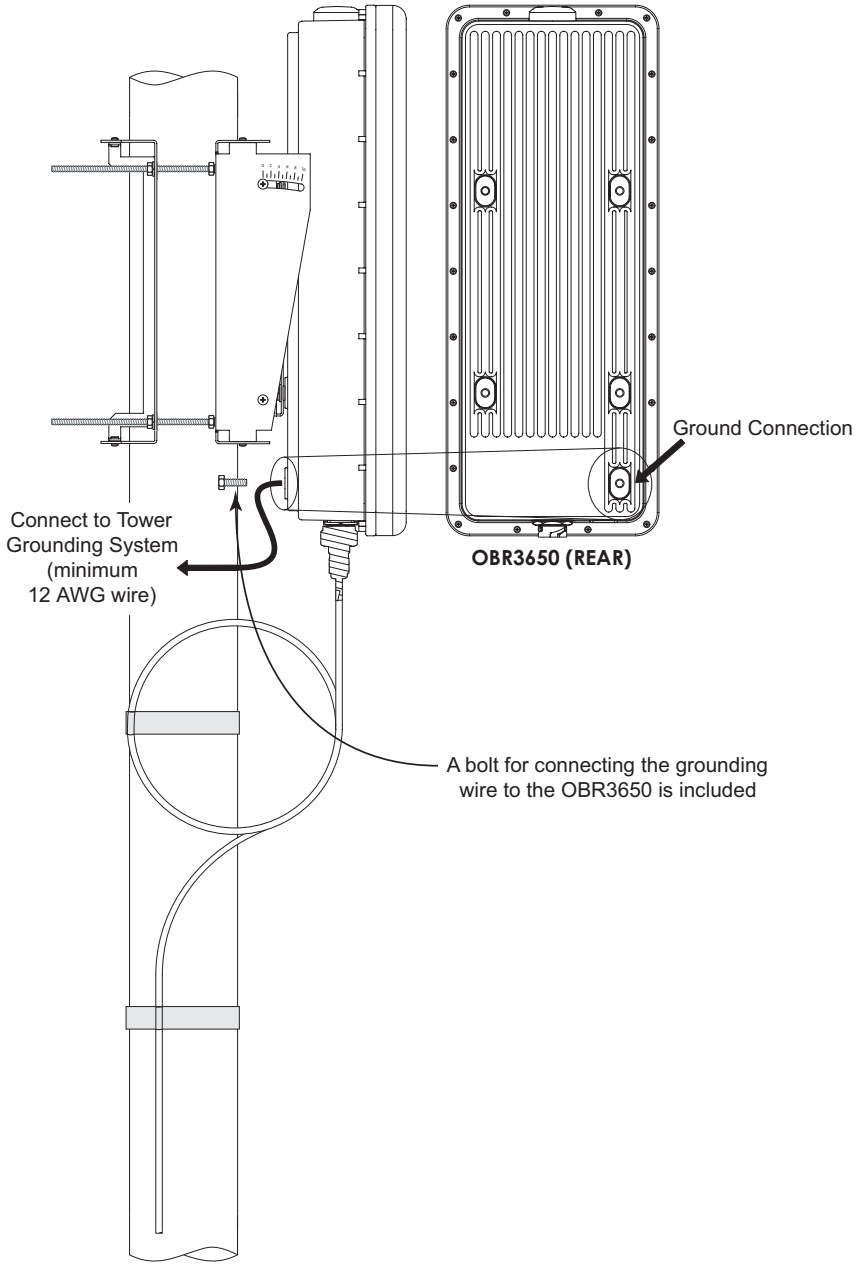


Figure 2-9 Grounding the OBR3650HP

CAUTION

Vecima Networks requires that the CAT5E cable to the OBR3650HP is connected to a lightning surge protector at the entrance to the building, prior to connection to the WES800 Ethernet Switch as shown in Figure 2-10.

2.3.2 Power Surge Protection

Use the surge suppressor to protect your equipment and secure your data from power surges.

To connect the Cablefeed Shield to the Surge Suppressor Ground Lug

1. Remove the suppressor unit cover.
2. Thread the Ethernet cable through the right side opening to the suppressor.
3. Measure five (5) inches from the end of the cable that you threaded through the right side opening.
4. Lightly score the cable at the five inch mark.
5. Carefully slice the edge of the insulation.

   Note: Do NOT cut the metal shield that surrounds the wires.
6. Slowly snip or slice the insulation down to the five (5) inch scoring.
7. Remove the insulation from the cable.
8. Gently twist the metal shield to form metal ground strip.
9. Make a straight-through cable with the wires.

   Remember: be careful not to damage the metal ground strip.
10. Undo the grounding bolt on the right side of the suppressor.
11. Wrap the grounding strip onto the grounding bolt.
12. Screw the grounding bolt back into the side of the suppressor.
13. Thread the cable that connects to the Power over Ethernet through the left opening on the suppressor.
14. Strip the wires and make it a straight-through cable.
15. Connect the cables to their perspective ports.
16. Replace the cover of the suppressor.
17. Finish connecting the network. See “2.3.3 Grounding the Base Station”

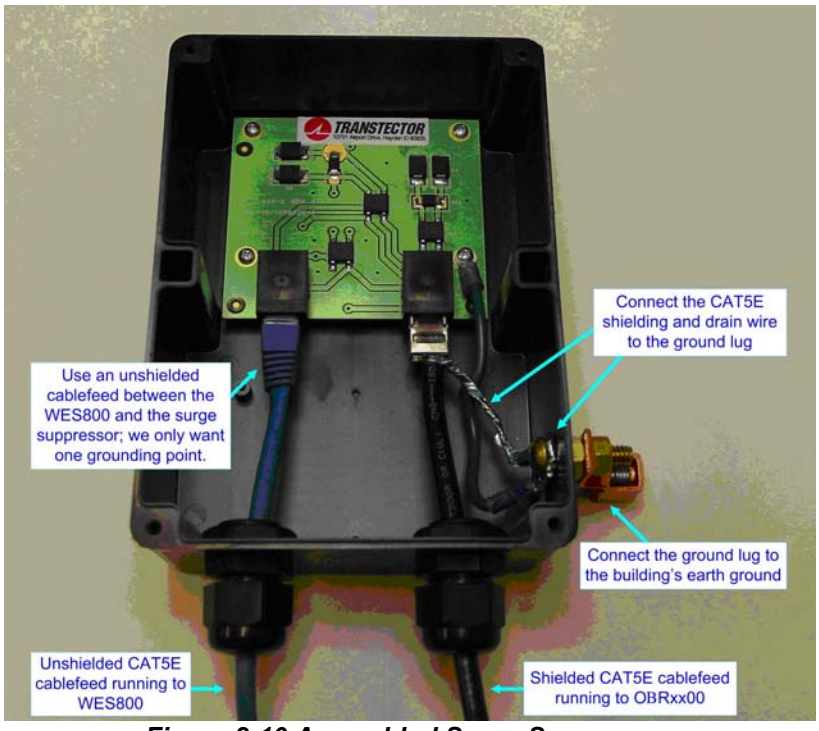


Figure 2-10 Assembled Surge Suppressor

2.3.3 Grounding the Base Station

Vecima recommends grounding the base station using one of the following procedures depending on your configuration. If you are unsure which procedure to use, use procedure B.

Procedure A: Grounding the base station so that the building and the tower share the same earth ground:

1. Connect the chassis of the OBR3650HP to the tower via the grounding lug on the back of the unit. See "2.3.3 Grounding the Base Station".
2. Use a shielded CAT5 cablefeed to connect the OBR base station to the surge suppressor.
3. Use an inline surge suppressor for all OBR3650HP cablefeed installations. Connect the shield of the cablefeed to the ground lug of the surge suppressor. The purpose of the surge suppressor is to shunt to ground any over voltage [>60] transients that may be induced on the CAT5E cablefeed via lightning or other high voltages.

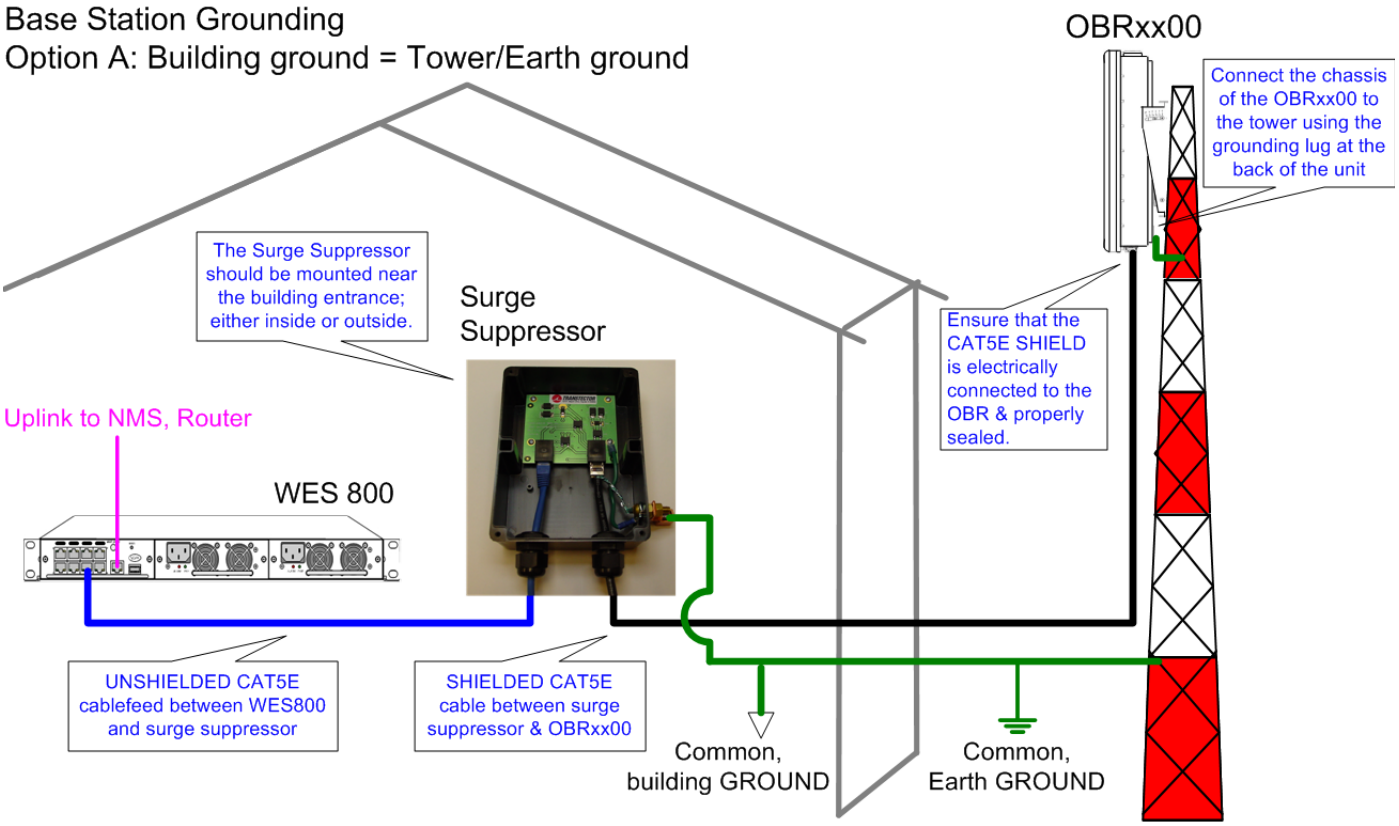


Figure 2-11 Base Station Grounding - building ground is same as tower ground

Procedure B: Grounding the base station so that the building and the tower use different earth grounds:

1. Connect the chassis of the OBR3650HP to the tower via the grounding lug on the back of the unit. See "2.3.3 Grounding the Base Station".
2. Use a shielded CAT5 cablefeed to connect the OBR base station to the surge suppressor.
3. Use two inline surge suppressors, one for all OBR3650HP cablefeed installations at the base of the tower and another for the first surge suppressor and the WES800. Connect the shield of the cablefeed to the ground lug of the surge suppressor. The purpose of the surge suppressor is to shunt to ground any over voltage [>60 V] transients that may be induced on the CAT5E cablefeed via lightning or other high voltages.

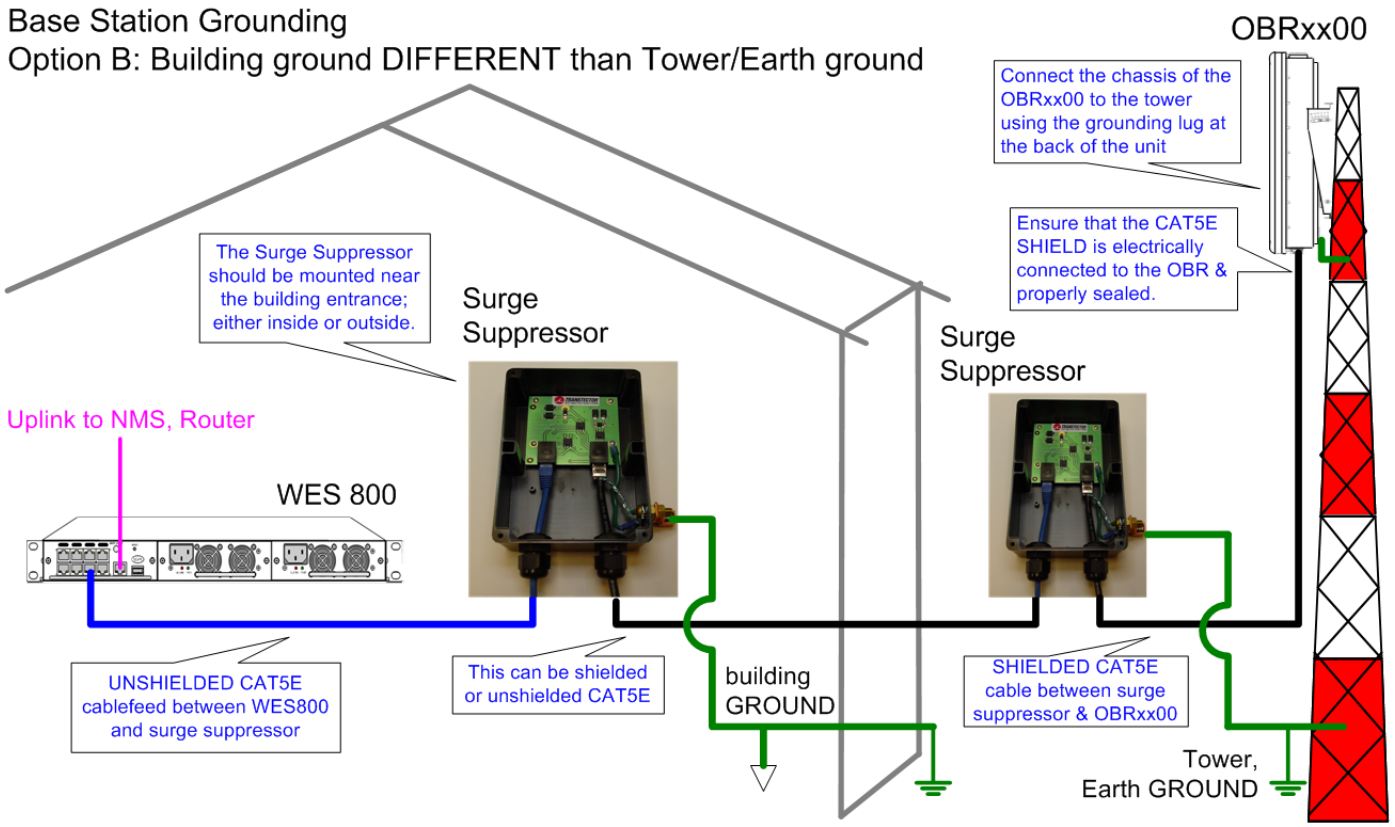


Figure 2-12 Base Station Grounding - building ground different than tower ground

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3.0 Getting Started with OBR3650HP

3.1 Before You Begin

The OBR3650HP provides the base station component of the Vecima VistaMAX system. To set up and configure the base station, you require the following:

- One VistaMAX OBR3650HP base station with a stand-alone Power over Ethernet (PoE) or WES800 Ethernet Switch
- One VistaMAX outdoor subscriber station or indoor subscriber station such as the OSR3500C or ISR3510.
- One of the following components to provide the DHCP and TFTP server:
  - Vecima's Network Management 8000
  - A third-party DHCP and TFTP server as per the WiMAX standard. This setup is not covered in this manual.

Setting up the system using NMS8000

Using the NMS8000 as the provisioning tool for all OSR subscriber stations and hosts on the VistaMAX system is the most common scenario. The platinum, gold, silver, or bronze VistaMAX starter kits available from Vecima Networks includes an NMS8000.

NOTE

If you wish to connect Internet-accessible hosts to the VistaMAX system, you will need to provide a router with a public IP address and a valid DNS server. When you are connecting to Internet-accessible host and using the NMS8000, Vecima recommends connecting one of the NMS8000 Ethernet interfaces on a public routeable IP address.

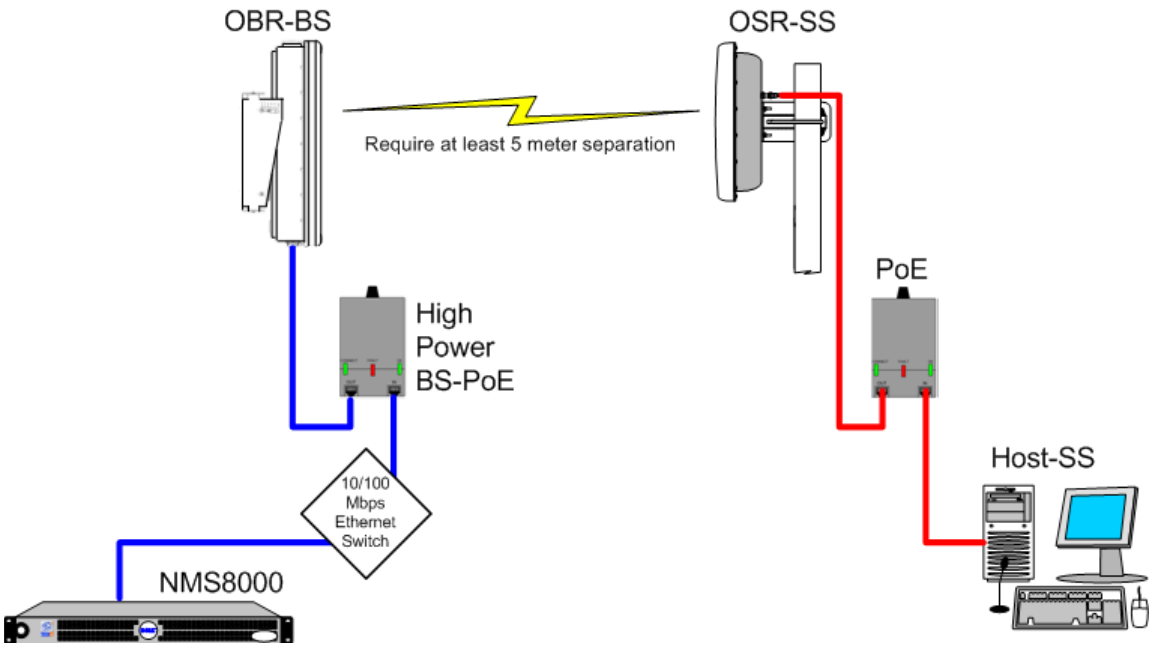


Figure 3-1 Using NMS8000 to Provision VistaMAX System

3.2 Overview of Configuration

The following steps outline the process for configuring a VistaMAX system. This process assumes that you are using an NMS8000.

Step 1 Use CAT5 straight-through Ethernet cables to connect the physical components as shown in **Using NMS8000 to Provision VistaMAX System**.

Step 2 Use the Web-based interface to configure the IP addresses for the base station and subscriber station(s). If necessary, configure the IP addresses for the NMS8000.

Step 3 Use the Web-based interface to configure the radio parameters for the base station and subscriber station(s).

Step 4 If necessary, use the Web-based interface for the NMS8000 to add the subscriber stations on the NMS8000.

Step 5 Establish the link between the base stations and subscriber stations and verify that the subscriber stations are online.

The steps that pertain to the base station are described in more detail below. For more information, refer to the *NMS8000 & NMS8000/SSP Network Management Server Installation and Operation Guide* or related information listed under Finding Related Documentation on page iii.

3.3 Using the Web Based Interface

The Web interface of the OBR3650HP system may be viewed with a standard web browser such as Mozilla™ or Internet Explorer™, no additional add-ins are required.

NOTE

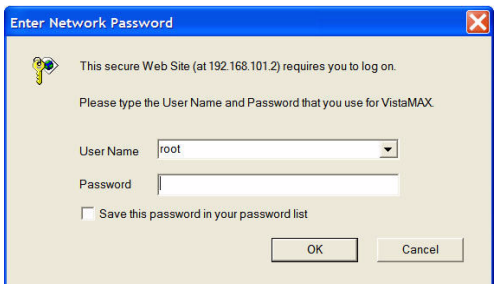
If your Web certificate is invalid or expired, you will be prompted to continue without the certificate or add an exemption to the certificate.

The following are the default log on settings for the Base station Web-based interface:

- Web-based interface access — `https://192.168.101.2`
- subnetwork mask — `255.255.255.0`
- username — `root`
- password — `vistamax`

To log on to the Web-based interface:

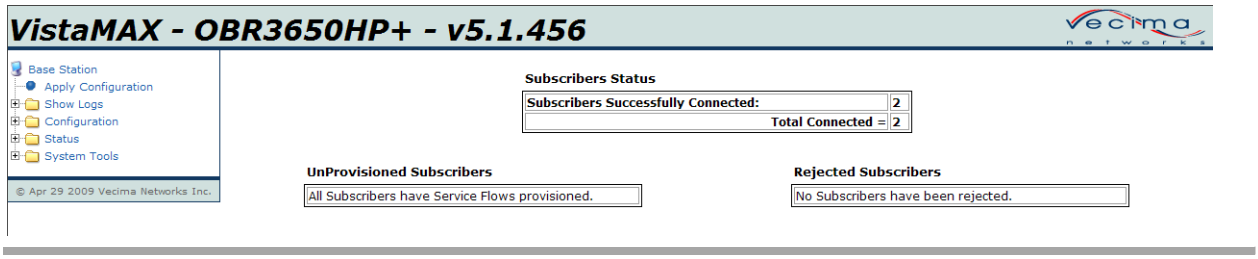
Step 1 Open a Web browser and open the Web-based interface by typing `https://192.168.101.2` in the address bar. The Network Password page opens:



NOTE

`192.168.101.2` is the default IP address that comes preconfigured from Vecima, but your IP address might be different. If you are not using the default address, contact your system administrator for the IP address.

Step 2 Type the username `root` and the password `vistamax` to access the web GUI. The log on screen displays:



3.4 Configuring the Network

You will need to configure your network to establish communication between the network elements. Figure 3-2 shows an example of a properly configured network. The example shows a network configuration using default values. If you purchased a WiMAX starter kit, these value will already be set.

The VistaMAX Base Station is shipped with a default IP address. However, depending upon your network configuration, you may want to change the IP address of your Base Station.

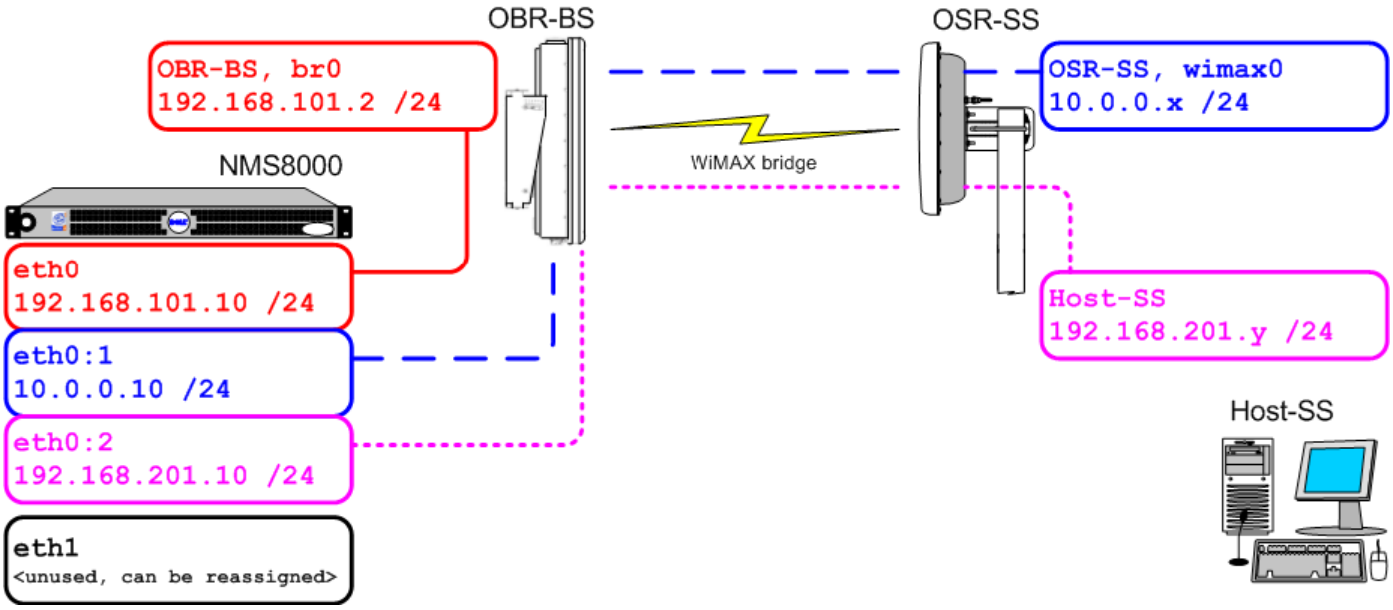


Figure 3-2 Network Diagram

As per the WiMAX standard, the subscriber station requires an IP address and TFTP offered to it during network entry. To fulfill this requirement, both a DHCP and TFTP server must be present. It is possible to use a third-party customer-supplied DHCP and TFTP server, but Vecima recommends using the Network Management Server 8000 (NMS8000). Most Vecima starter kits come with an NMS as part of the solution.

NOTE

Customers who purchased the basic starter kit or who do not have an NMS must use the WiMAX-out-of-the-box (WOOTB) procedure. For more information about WOOTB, contact the Application Engineering Support at Vecima Networks.

To configure a network using NMS8000:

Step 1 Open the base station graphical user interface (GUI) and click **Configuration > Network Configuration**. The Current Interfaces screen opens displaying the name, IP address, and netmask of the base station's primary interface. The default value is `192.168.101.2`. To modify this value, click **br0** to open the BR0 configuration screen and type the new value in the appropriate field. See "**To change the base station IP address**" below for a detailed description of this Step.

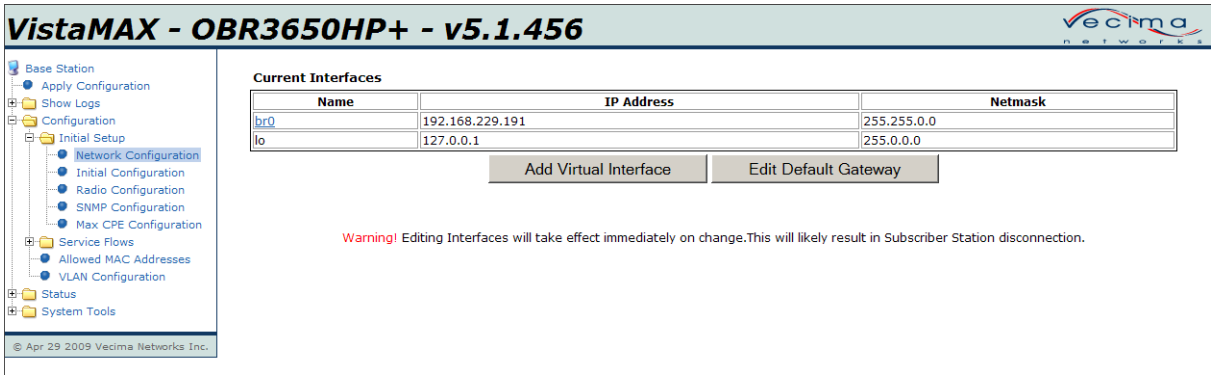
Step 2 Using the NMS GUI, set up and enable DHCP on the NMS, then configure the subscriber stations and host computers as required.

NOTE

For more information see the *NMS8000 & NMS8000/SSP Network Management Server Installation and Operation Guide*.

To change the base station IP address:

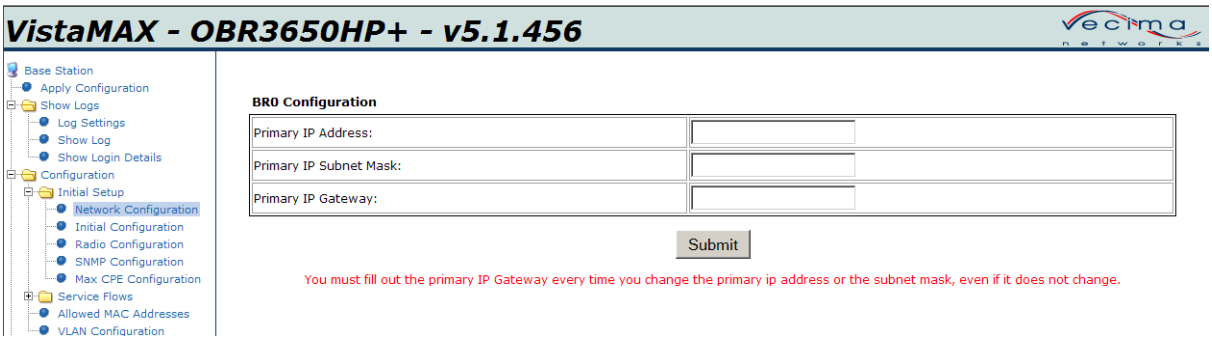
Step 1 Log on to the Web-based interface and click **Configuration > Network Configuration**. The Current Interfaces table displays showing the primary (**br0**) IP address and virtual addresses (**br0:1 br0:2**, etc.) for your base station.



From this page, you can set the following parameters:

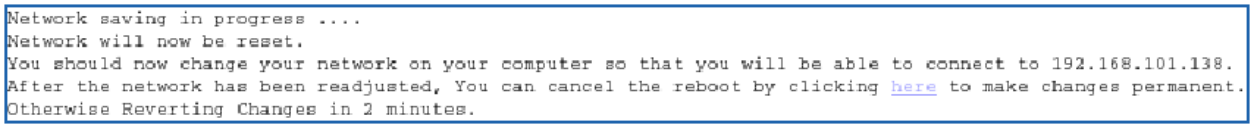
Parameter	Description	Default
br0 and Virtual Interfaces	This is where the primary interface (**br0**) and any virtual interfaces (br0:1, br0:2, etc.) will be configured for remote access. The primary interface is the IP address for the Base Station.	Dependent on your network design.
Gateway	This is where the default gateway will be specified for the **br0**.	Dependent on your network design.

Step 2 Click the **br0** link under Name field in the Current Interfaces table. The window will change to this.



- In the **Primary IP Address** field, enter the new IP for the Base Station: `192.168.101.138`
- In the **Primary IP Subnet Mask** field, enter the subnet mask for the Base Station. `255.255.255.0`
- In the **Primary IP Gateway** field, enter the gateway address for your network `192.168.101.3`

Step 3 Click the **Submit** button. The following message appears:

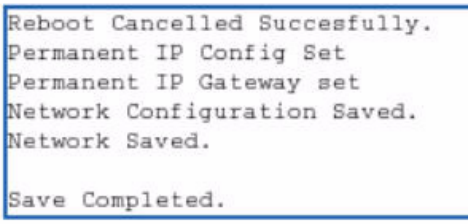


Step 4 Click the **here** link to make the change permanent.

NOTE

At this point, you may need to change the IP configuration of the computer which you are using to access the base station.If you have completely changed the domain for the Base Station (*was* `192.168.101.1`, *now* `172.200.26.1`), please ensure the IP of the computer is capable of communicating with the new IP address of the BS. If not, adjust the network configuration of the computer accordingly before moving on to the next step.

The following information displays on the page to indicate the changed IP address:



The address on the browser also changes to reflect the new IP address:

`https://192.168.101.138/cgi-bin/index.cgi`

NOTE

If you were not able to reconnect and click the **here** link to confirm the IP address of the Base Station within 2 minutes, the Base Station will revert to the old IP address and reboot automatically. Please restart the IP address change process by going back to step 1.

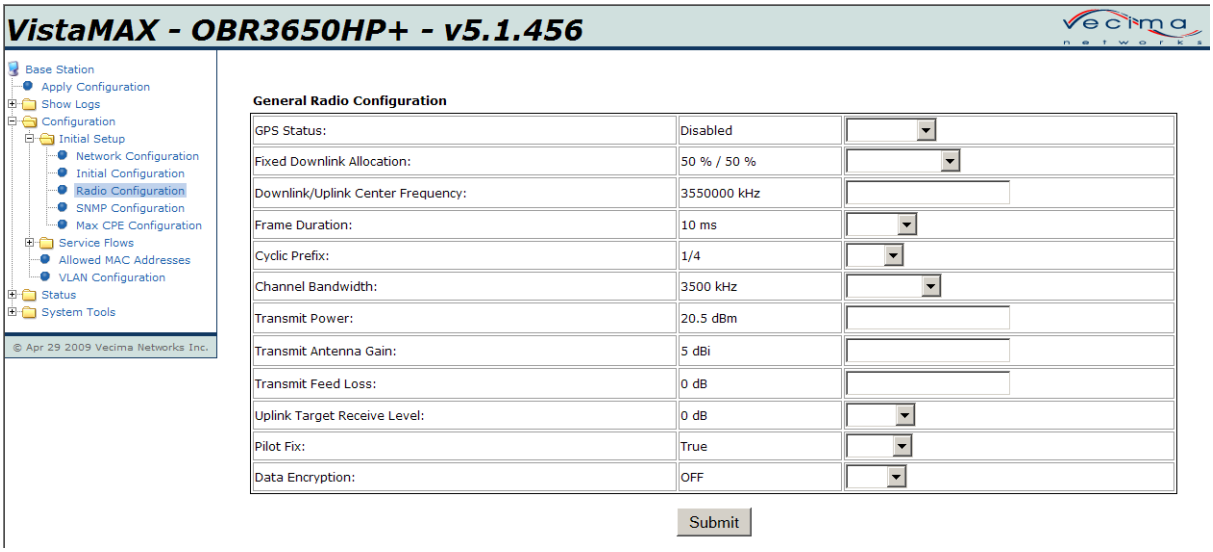
Step 5 Once you have made the correct configuration settings, click the **Submit** button at the bottom of the window.

Step 6 To apply the Radio Configuration, click **Apply Configuration** from the menu options. The configuration area displays a list of changes made. Click **Yes** to apply the changes.

3.5 Configuring the Radio

To configure the radio

Step 1 Log on to the Web-based interface and click **Configuration > Radio Configuration**. The following page displays:



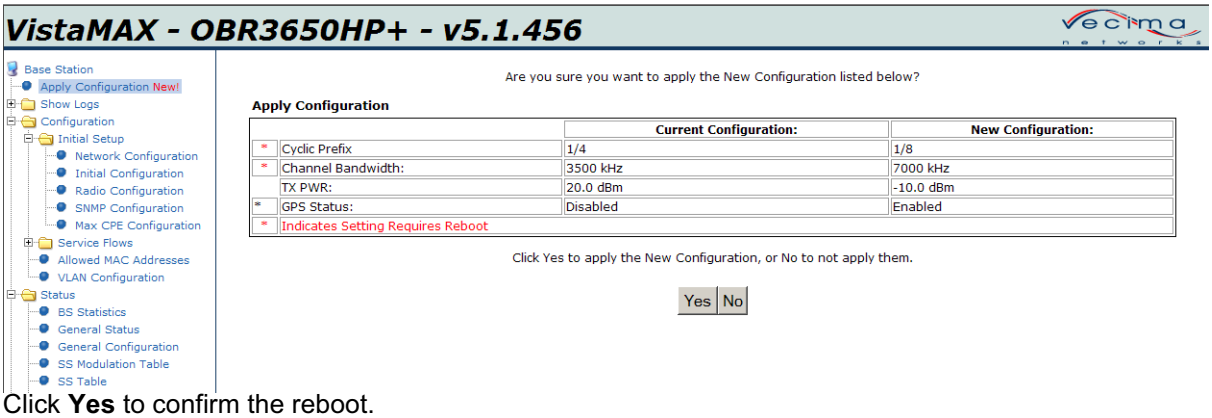
You can set the following parameters for the base station radio from this page:

Parameter	Description	Procedure	Default
Downlink/Uplink center frequency	This is the channel center frequency in KHz	Enter the value into the blank field.	Customer specific
Transmit power	The output power level of the Downlink in dBm	Enter the value into the blank field	28.0 dBm
Channel Bandwidth	The available options are 3500 and 7500 kHz	Click the drop-down menu arrow and select the bandwidth	7000000 kHz
Frame Duration	The combined Downlink and Uplink frame length in milliseconds	Click the drop-down menu arrow and select the duration	10.0 ms
Cyclic Prefix	The redundant symbol percentage used to counteract inter-symbol interference	Click the drop-down menu arrow and select the prefix	1/4
Uplink Target Receive Level	This is the Uplink Rx level which all Subscriber Stations will strive to meet in dB	Enter the value into the blank field	0 dB
Downlink Allocation	This is the percentage of the TDD frame that is dedicated to Downlink data	Click the drop down arrow for the Fixed Downlink Allocation and select the value for the location	50%
Downlink/Uplink Modulation	This is the modulation scheme used for the DL and UL	Click the drop-down arrow and select the value for the modulation	Adaptive
RF Output Enable	This enables or disables the transmitter	Click the drop-down arrow and select the output	Enabled

Step 2 Once you have made the correct configuration settings, click the **Submit** button at the bottom of the window.

Step 3 To apply the Radio Configuration, click **Apply Configuration** from the menu options. The configuration area displays a list of changes made. Click **Yes** to apply the changes.

Step 4 To save configuration changes to the radio, click **Reboot** from the menu options. The configuration screen displays the following:



Click **Yes** to confirm the reboot.

3.5.1 Setting the VistaMAX OBR3650HP Transmit Power for FCC Limits

CAUTION

The VistaMAX OBR3650 radio and antenna should be installed only by experienced installation professionals who are familiar with FCC EIRP limits, local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void Vecima's product warranty and may expose the end user or the service provider to legal and financial liabilities. Vecima and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.

CAUTION

The device cannot be sold as a retail item to the general public or by mail order. It must only be sold to dealers.

FCC EIRP Limits

- The allowed EIRP for 3.5MHz bandwidth is 3.5watts or 35.44dBm
- The allowed EIRP for 7.0MHz bandwidth is 7.0watts or 38.45dBm

NOTE

Vecima has provided head room in the OBR transmitter to allow the professional installer to use different RF cable types and lengths.

Installation Scenarios

The following procedures describe how an installer would set the transmit power level for a 3.65 MHz OBR base station using either a 12 dBi 120-deg Sector or an 11dBi Omni antenna.

Required equipment for installation:

- One VistaMax 3.65 OBR base station, mounting accessories, and PoE surge suppressors
- One 5-ft Huber + Suhner - Sucofeed ½" cable or equivalent.
- Five OSR3500C subscriber stations
- One 12dBi 120-deg Sector or 11dBi Omni antenna – optional at time of purchase.

Setting Transmit Power When Using a 12dBi 120-deg Sector Antenna

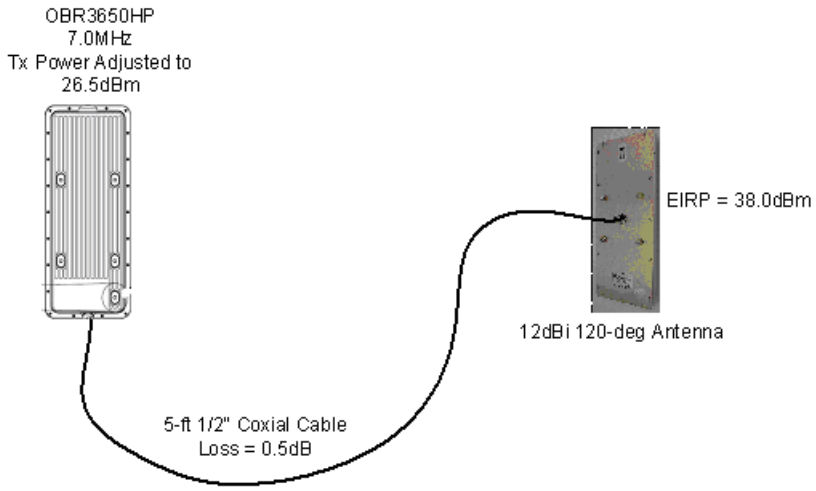


Figure 3-3 Gains and losses in the RF chain for the calculated EIRP of 38.0dBm

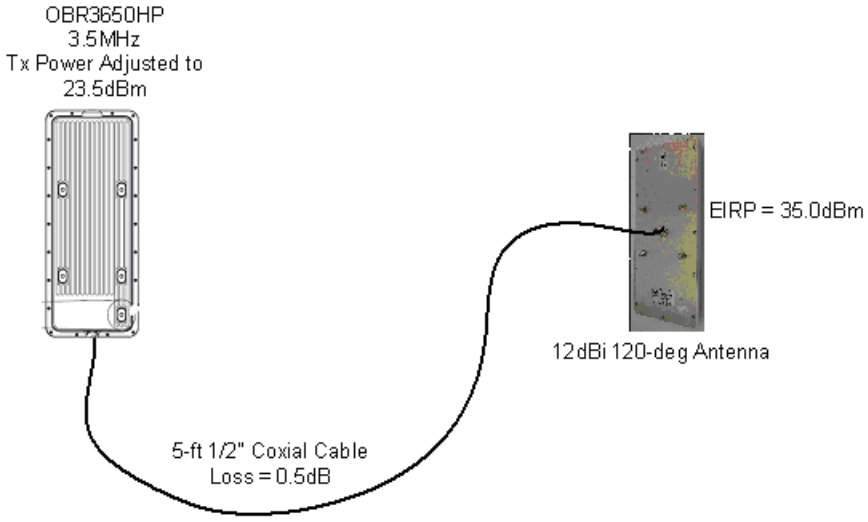
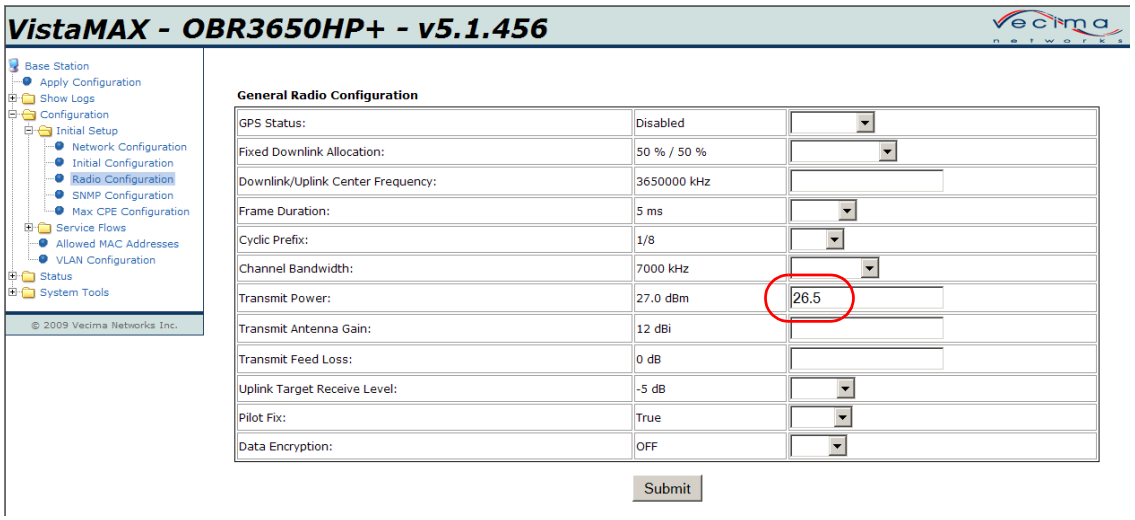


Figure 3-4 Gains and losses in the RF chain for the calculated EIRP of 35.0dBm

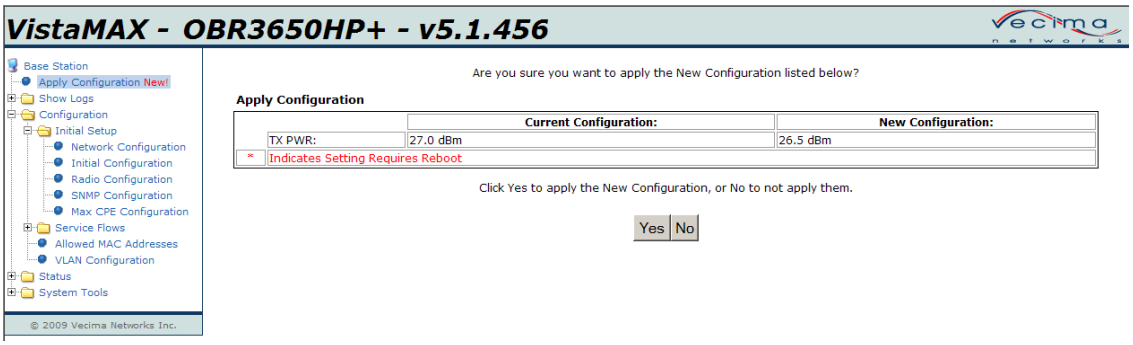
To adjust the power for 7.0MHz bandwidth:

1. Enter the new power setting in the field to the right of **Transmit Power**. In this scenario, 26.5dBm will result in the correct transmit power.

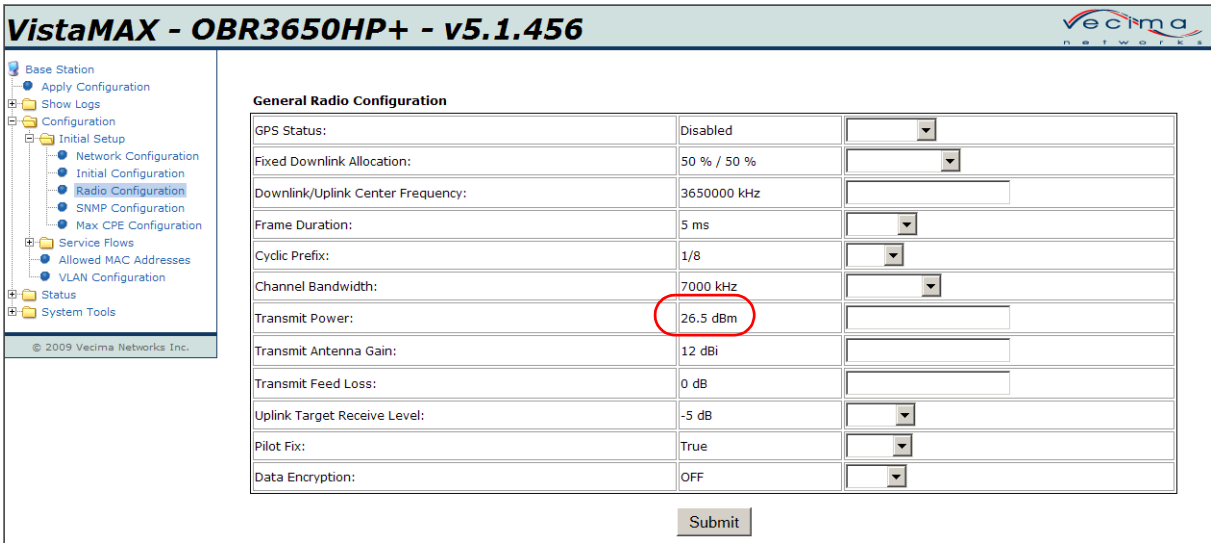
   Note: The transmit power can be adjusted by 0.5dB increments.



2. Click **Submit**. The main menu changes to indicate that a new configuration is ready to be applied.
3. Click **Apply Configuration** and click **Yes** to apply the changes to the configuration. The window changes to offer a reboot option.



4. Click **Reboot**. The OBR3650 will reboot and restart with the new configuration.
5. Confirm the new transmit power by clicking **Configuration>Initial Setup>Radio Configuration**.

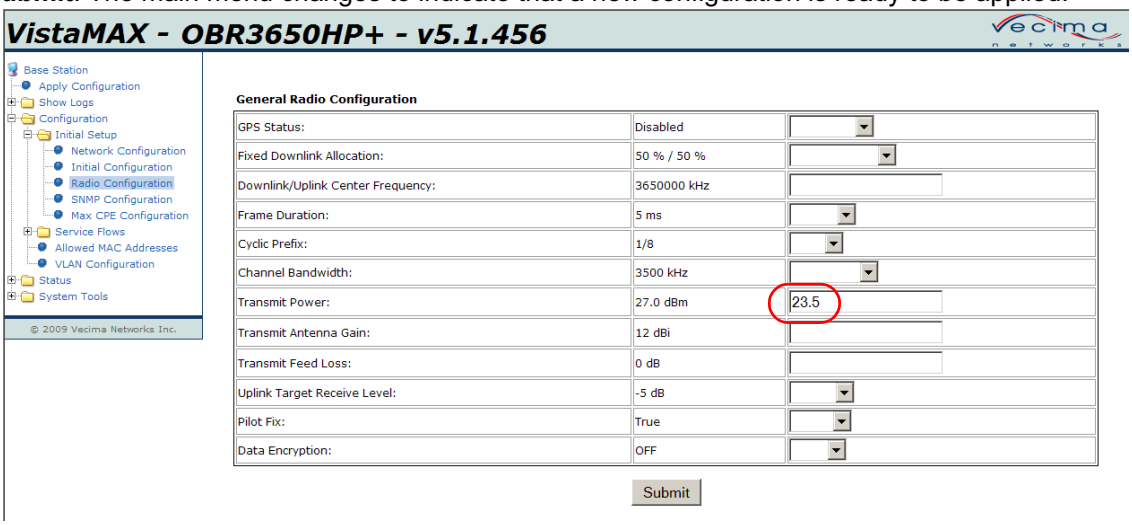


To adjust the power for 3.5MHz bandwidth:

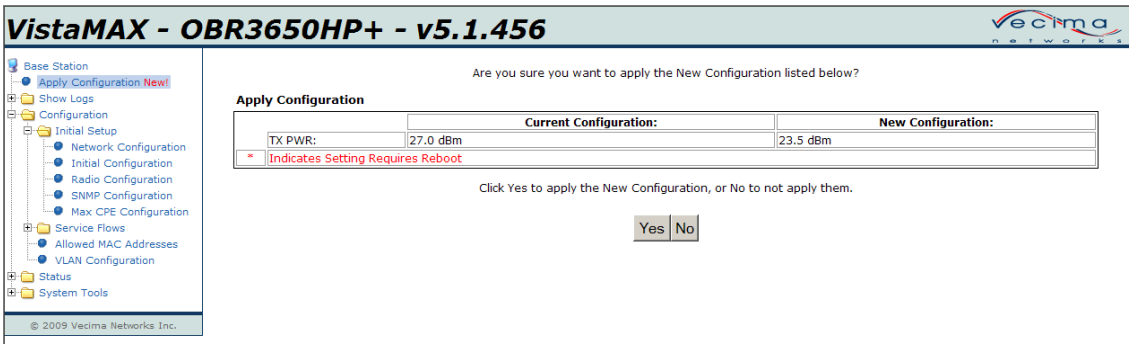
1. Enter the new power setting in the field to the right of **Transmit Power**. In this scenario, 23.5dBm will result in the correct transmit power.

   Note: The transmit power can be adjusted by 0.5dB increments.

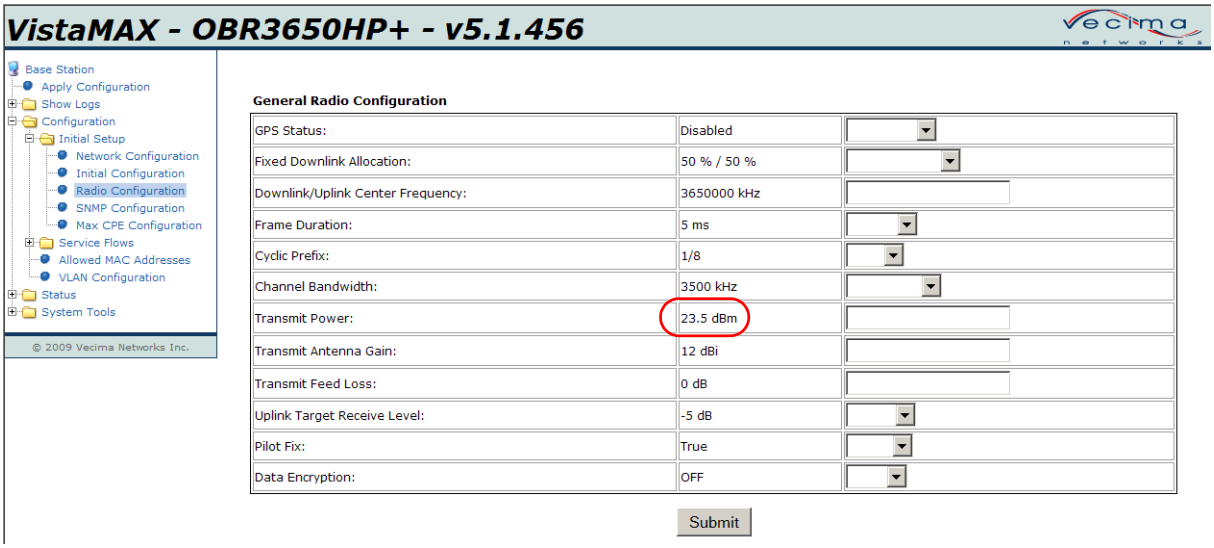
2. Click **Submit**. The main menu changes to indicate that a new configuration is ready to be applied.



3. Click **Apply Configuration** and click **Yes** to apply the changes to the configuration. The window changes to offer a reboot option.



4. Click **Reboot**. The OBR3650 will reboot and restart with the new configuration.
5. Confirm the new transmit power by clicking **Configuration>Initial Setup>Radio Configuration**.



Setting Transmit Power When Using an 11dBi Omni Antenna:

Since the Omni antenna is 1dB lower in gain, the transmit power of the OBR can increased by 1dB.

The maximum transmit power of the OBR can be used when using the 11dBi Omni antenna. If a shorter RF cable is used, then the transmit power will need to be adjusted down.

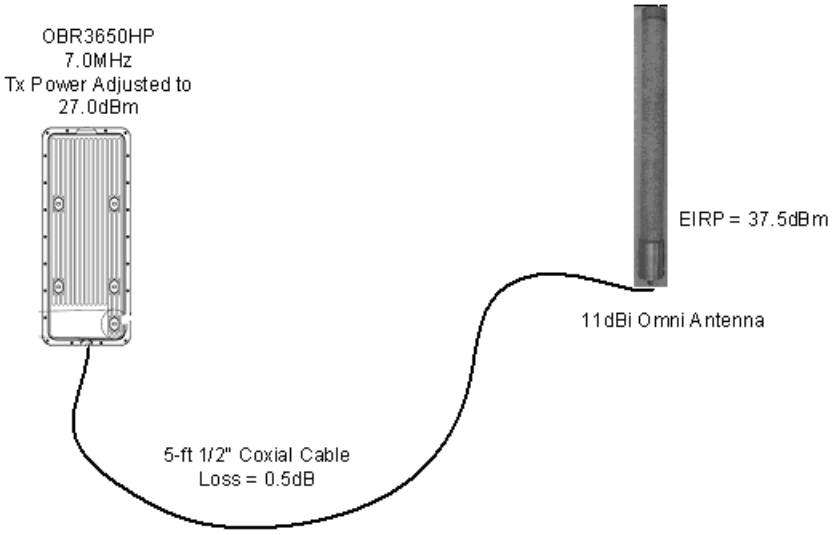


Figure 3-5 Gains and losses in the RF chain for the calculated EIRP of 37.5dBm

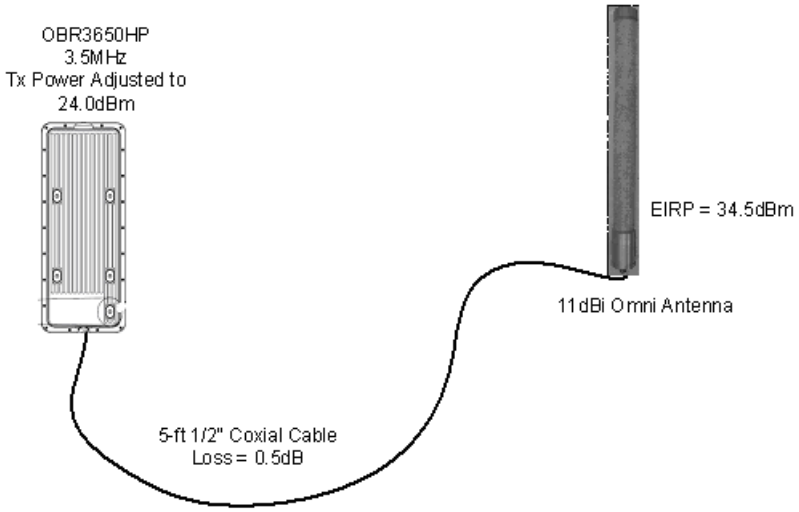
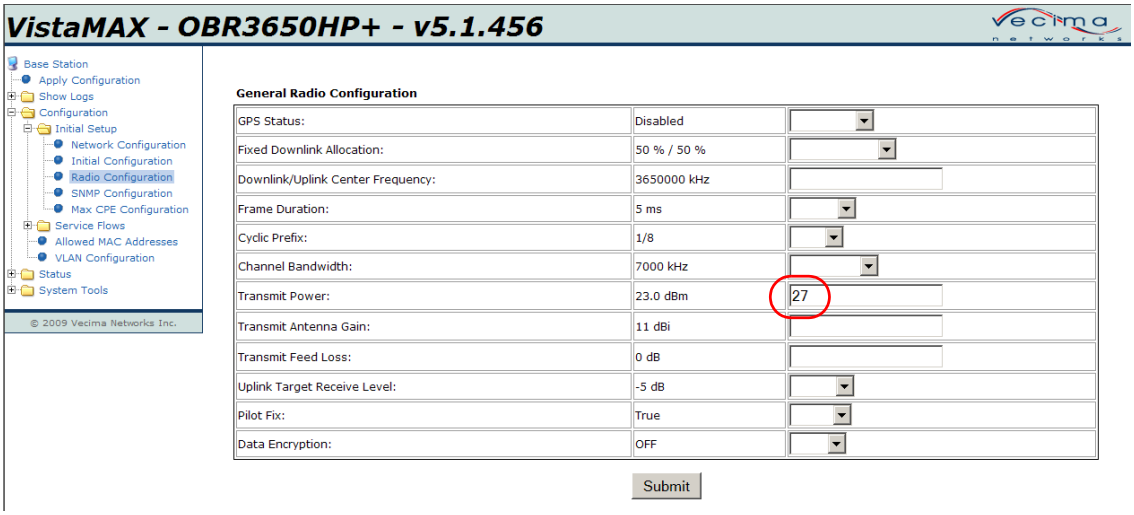


Figure 3-6 Gains and losses in the RF chain for the calculated EIRP of 34.5dBm

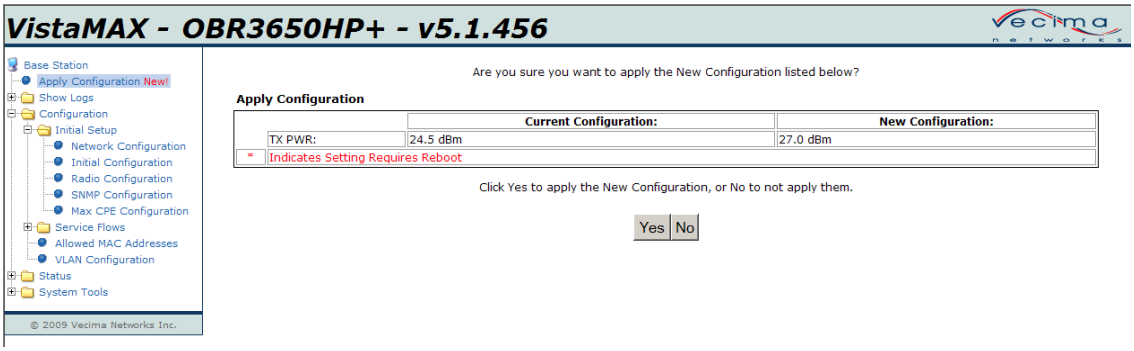
To adjust the power for 7.0MHz bandwidth:

1. Enter the new power setting in the field to the right of **Transmit Power**. In this scenario, 27dBm will result in the correct transmit power.

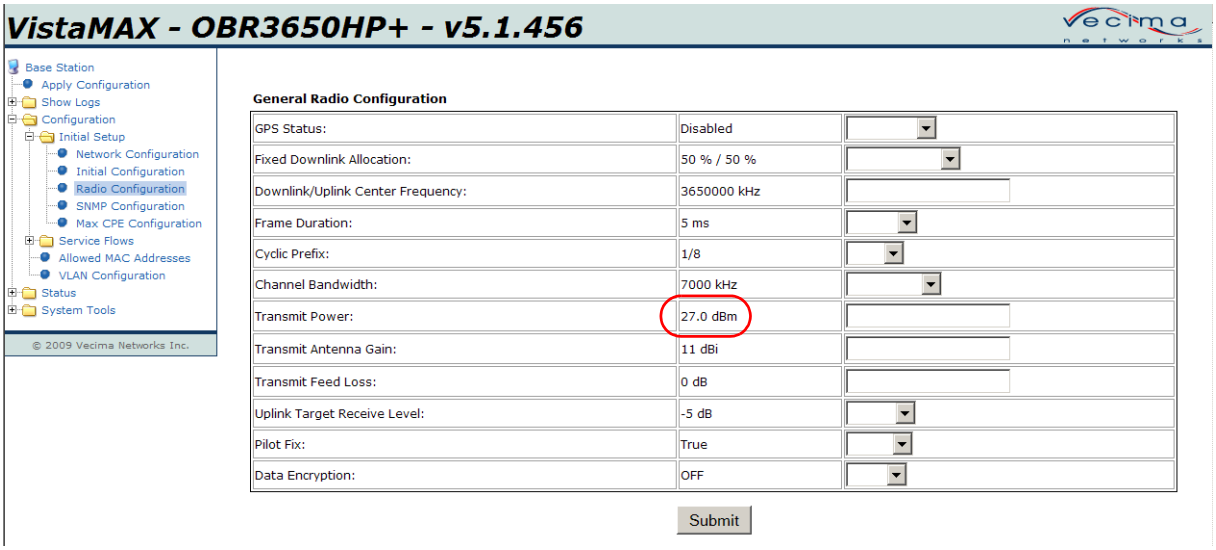
   Note: The transmit power can be adjusted by 0.5dB increments.



2. Click **Submit**. The main menu changes to indicate that a new configuration is ready to be applied.
3. Click **Apply Configuration** and click **Yes** to apply the changes to the configuration. The window changes to offer a reboot option.



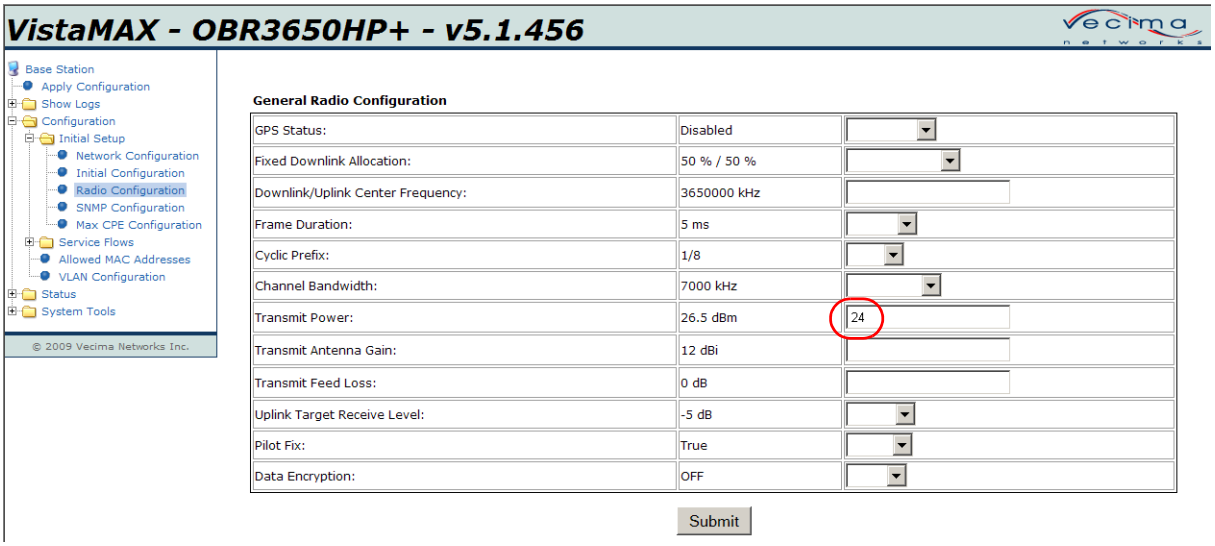
4. Click **Reboot**. The OBR3650 will reboot and restart with the new configuration.
5. Confirm the new transmit power by clicking **Configuration>Initial Setup>Radio Configuration**.



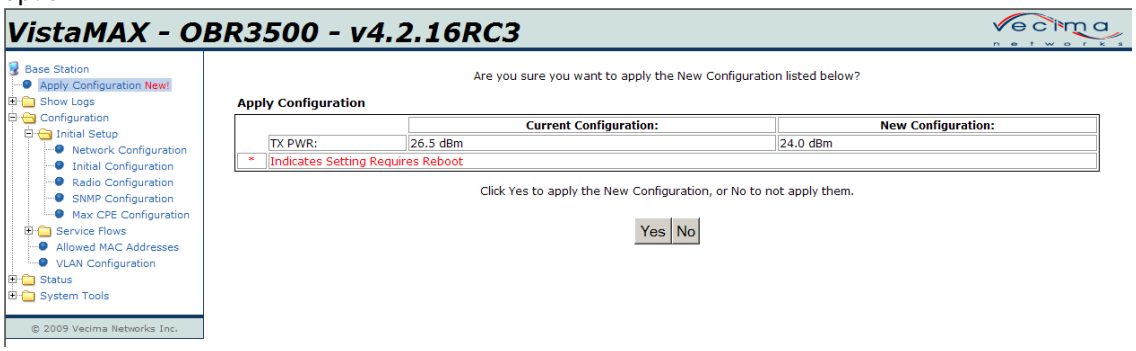
To adjust the power for 3.5MHz bandwidth:

1. Enter the new power setting in the field to the right of **Transmit Power**. In this scenario, 24dBm will result in the correct transmit power.

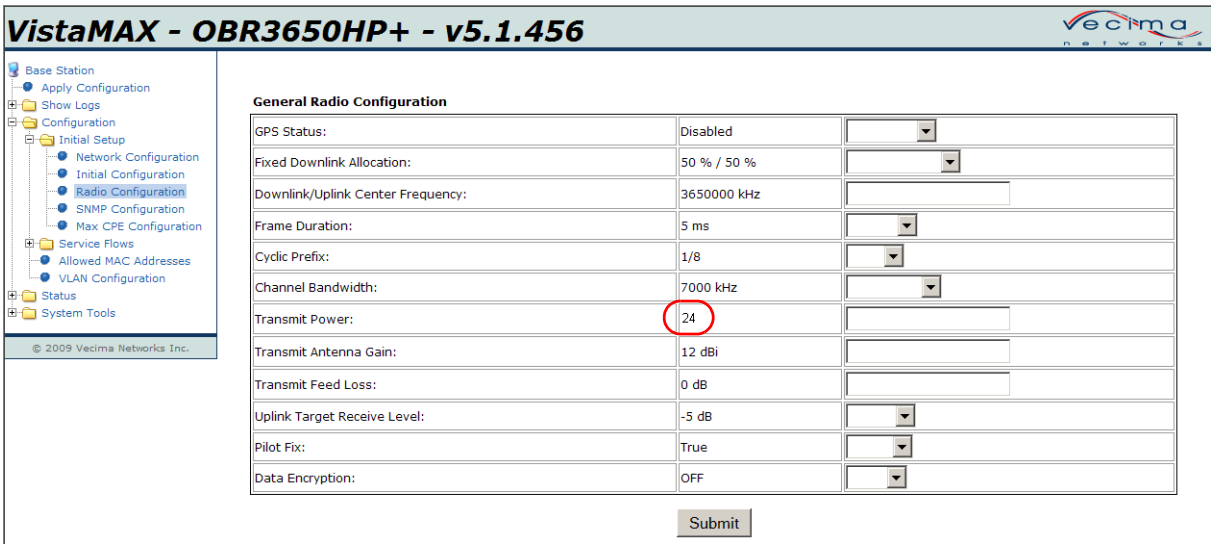
   Note: The transmit power can be adjusted by 0.5dB increments.



2. Click **Submit**. The main menu changes to indicate that a new configuration is ready to be applied.
3. Click **Apply Configuration** and click **Yes** to apply the changes to the configuration. The window changes to offer a reboot option.



4. Click **Reboot**. The OBR3650 will reboot and restart with the new configuration.
5. Confirm the new transmit power by clicking **Configuration>Initial Setup>Radio Configuration**.



3.6 Establishing a Link

Before you can establish the link between the base station and the subscriber station(s), ensure that the equipment is set up as follows.

- The NMS, base station, subscriber station, and one or more host computers are physically connected and powered up as shown in Figure 3-1.
- If you are using an outdoor base station with an integrated antenna, ensure that the base station is vertically aligned in comparison to its mounting. If you are using a non-integrated antenna, connect an external antenna.
- The base station network and radio have been configured as described in this manual.
- The subscriber station is powered up and connected to the host computers and the Downlink/Uplink frequency is set to the same frequency as the base station transmit frequency.
- Host computers should be assigned static IP addresses.

NOTE

For more information about how to set up and configure VistaMAX components, see the Finding Related Documentation on page iii section in the Preface. Documentation is available for download from the FTP site or by contacting Vecima Networks.

To establish the link between the base station and subscriber station:

Step 1 Set up and configure your VistaMAX system.

Step 2 Power up all the units.

Step 3 The subscriber station should complete network entry and establish a link to the base station in 1-2 minutes.

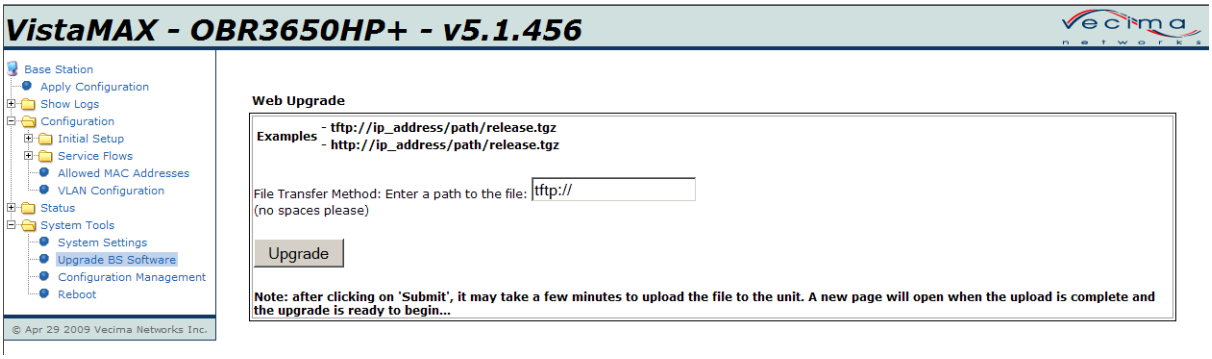
3.7 Other Administrative Tasks

3.7.1 Upgrading the Base Station

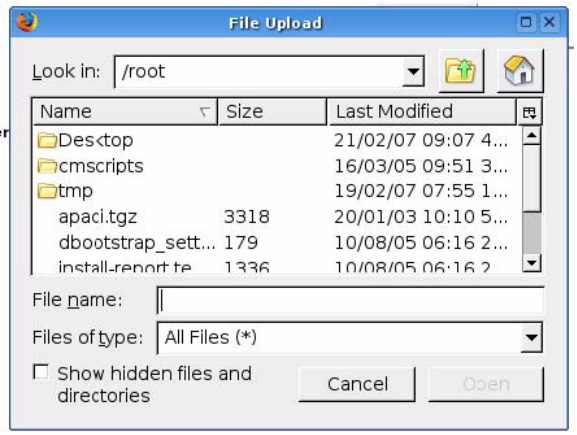
In order to make sure that the Base Station is able to function properly, upgrades may need to be made to the system.

To upgrade the base station through the Web GUI:

Step 1 From the **System Tools** menu, click **Upgrade BS Software**. The following page displays:



Step 2 Choose one of the following methods to upgrade your base station.

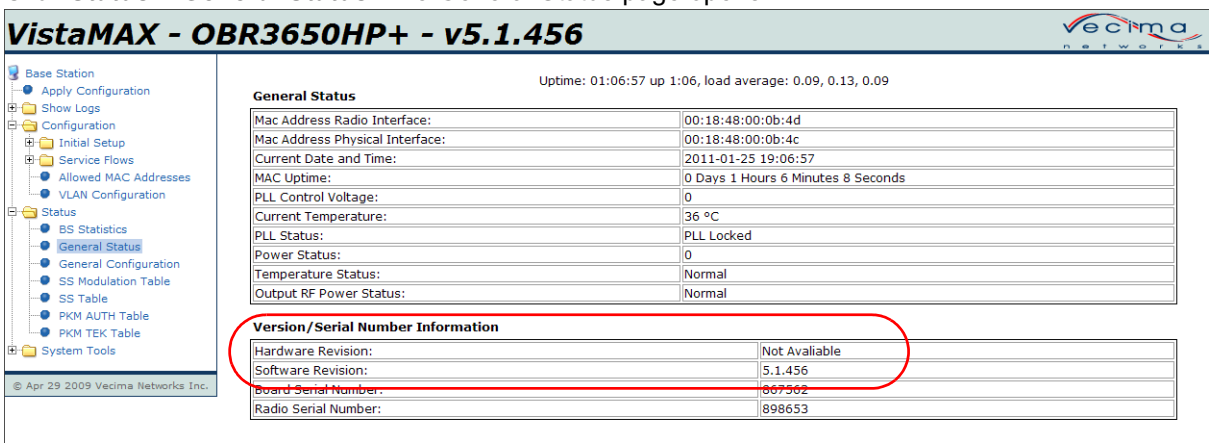
If	Then
The upgrade file is located on a web server	**1)** Enter the address of the web server plus the path to the file in the upgrade line. **1)** Click **Upgrade**.
The upgrade file is located on the tftp server in the tftproot folder.	**1)** Type the URL and path for the certificate. For example: `tftp://<ip of NMS>/<version>/<file>` **2)** Click **Upgrade**.
The upgrade file has been downloaded to your computer	**1)** Click the Browse button at the end of the Enter Path Select the file that will be used for the upgrade.  **3)** Click the Open button. **4)** Click **Upgrade**.

NOTE

The Base Station upgrade might take about five minutes to complete.

To verify the upgrade:

Step 1 Click **Status > General Status**. The General Status page opens:



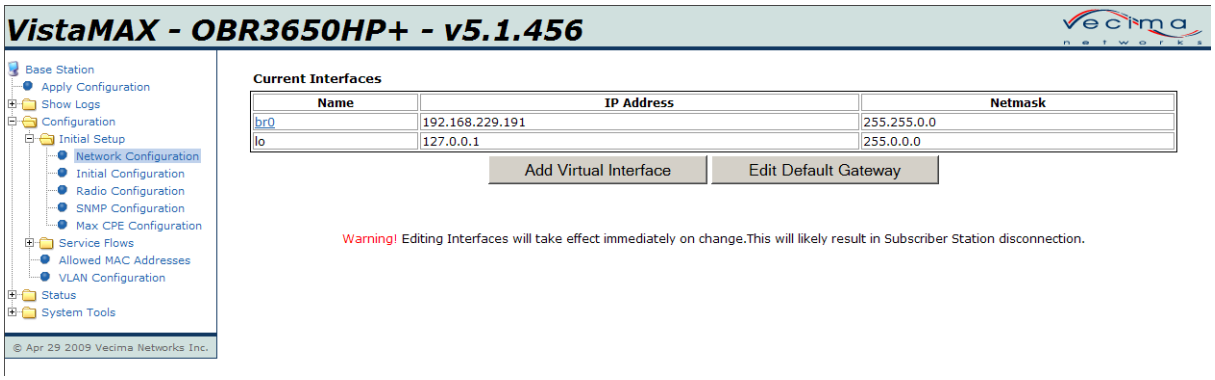
Step 2 Read the **Versions/Serial Number Information** to ensure the proper version is running.

3.7.2 Adding a Virtual IP Address

The ability to define virtual addresses on the Base Station will allow you to access the Base Station from more than one domain. Set up a virtual address by adding a new IP addresses into the Base Station through the Network Configuration menu.

To add a Virtual IP Address:

Step 1 Log on to the Web-based interface and click **Configuration > Network Configuration**. The Current Interfaces table displays showing the primary (**br0**) IP address and virtual addresses (**br0:1 br0:2**, etc.) for your base station.



Step 2 Click **Add Virtual Interface**. The Add Virtual Interface page appears.

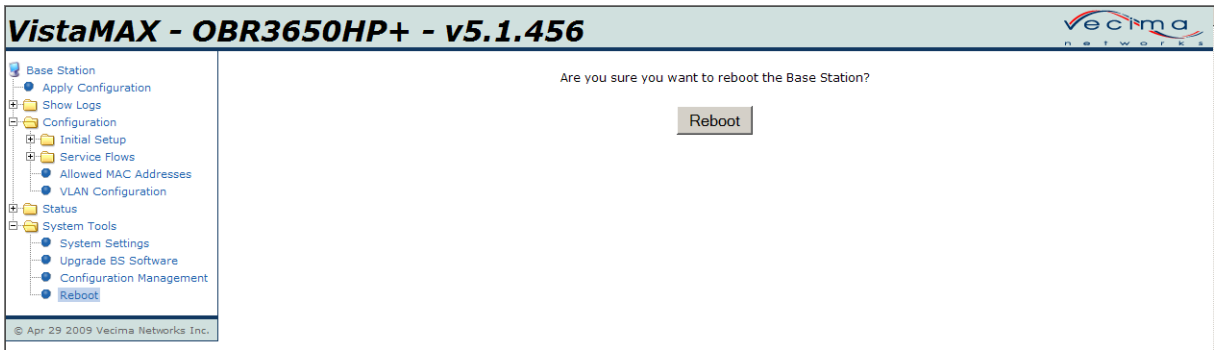
Step 3 Type the name for the new virtual interface in the **Virtual Interface Name** field. Enter an IP address for the new domain that you wish to add in the **IP Address** field and the subnet address in the **Subnet Mask** field.

Step 4 Click **Add**.

Step 5 Repeat steps 2 to 4 until you have added all the virtual addresses that you need.

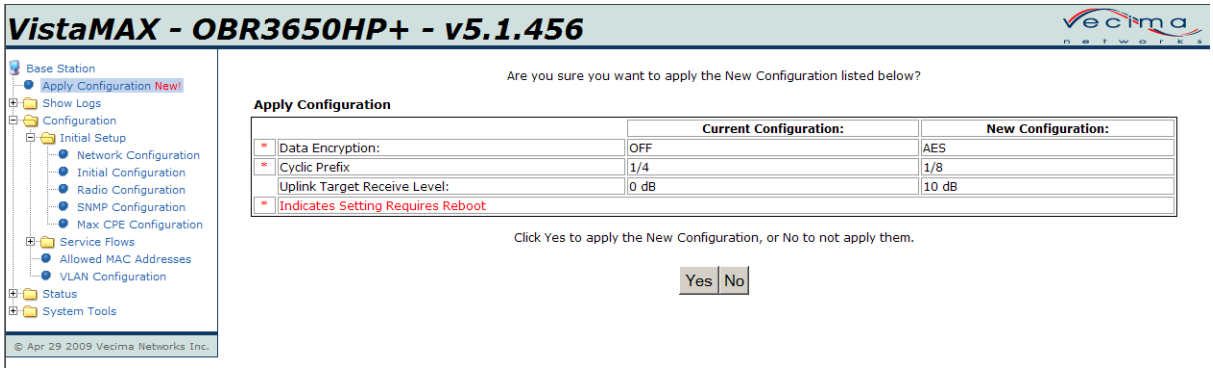
3.7.3 Rebooting the system

Select **Reboot** and click **Yes** to restart the system. If you have made configuration changes, they will be in use after the system restarts.



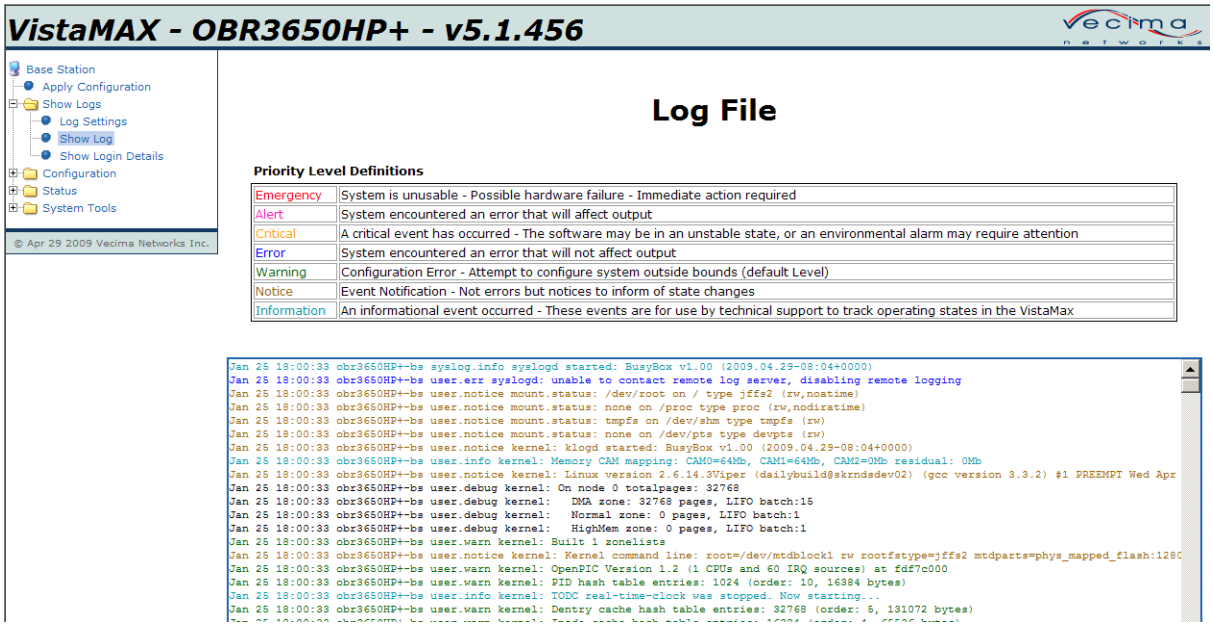
3.7.4 Applying Configuration

Select **Apply Configuration** and click **Yes** to confirm the configuration changes.



3.7.6 Checking Base Station Logs

Select **Show Log** to display the log activity for the base station.



3.7.7 Setting Service Flow Information

The service flow is part of the Quality of Service (QoS) feature of the base station. Service flows provide the following functions:

- Service flows specify a multitude of QoS parameters including: traffic priority, sustained and reserved data rates, jitter, maximum latency, and specify security profiles.
- Service flows are setup individually for both uplink and downlink data flows.
- Service flows classify traffic based on Layer 2, 3 or 4 (Ethernet, IP, TCP/UDP/RTP) header information including items such as source and destination addresses, port numbers, 802.1Q VLAN IDs, and Ethernet or IP traffic priority levels.

Before each frame, OBR3650HP examines all of the incoming requests and grants a time to transmit for the subscriber station based on all of the active service flow parameters to guarantee QoS where required. Individual subscriber stations receive aggregate bandwidth grants from the OBR3650HP and must individually manage their own uplink bandwidth usage.

Setting up a Quality of Service framework:

Step 1 Define a service class and set up its parameters.

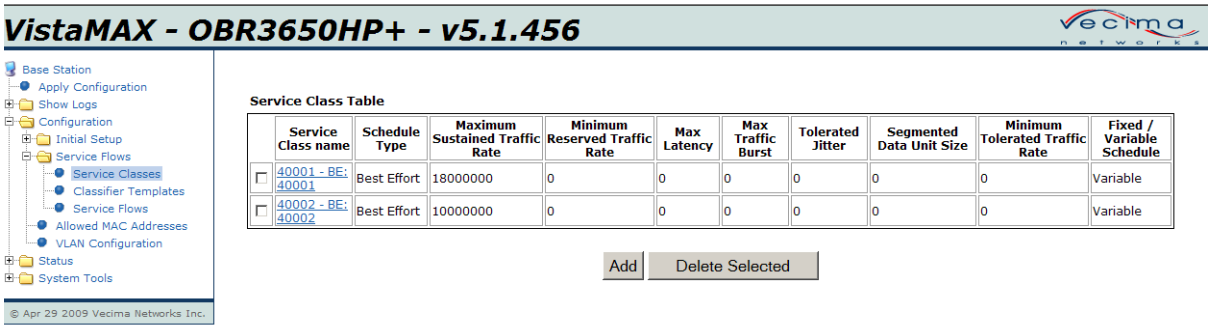
Step 2 Define a classifier template and set up its rules.

Step 3 Create service flows and associate them with service classes and classifier templates.

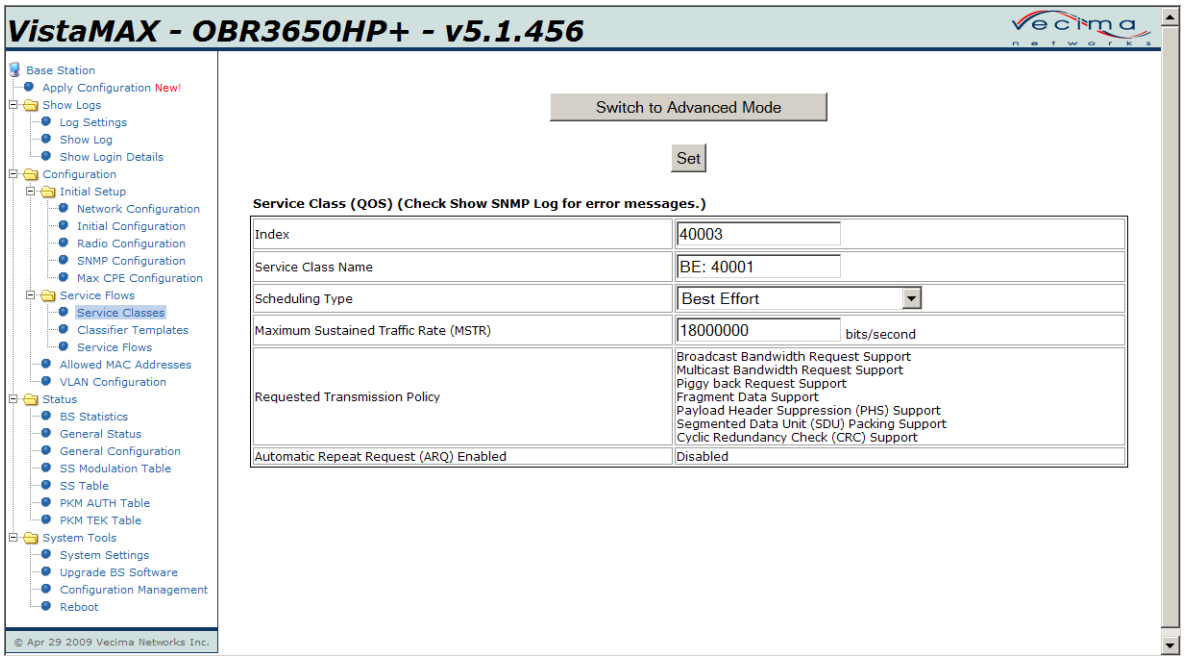
Step 4 Provision subscriber stations with service flows.

To define a service class and set up its parameters:

1) Click **Configuration > Service Flows > Service Class Table** to open the Service Class Table page. This page lists all the default and user defined Service Classes and shows the parameters for each one.



2) Click **Add** to open a page displaying the Service Class (QoS). Use this page to define the service class parameters.

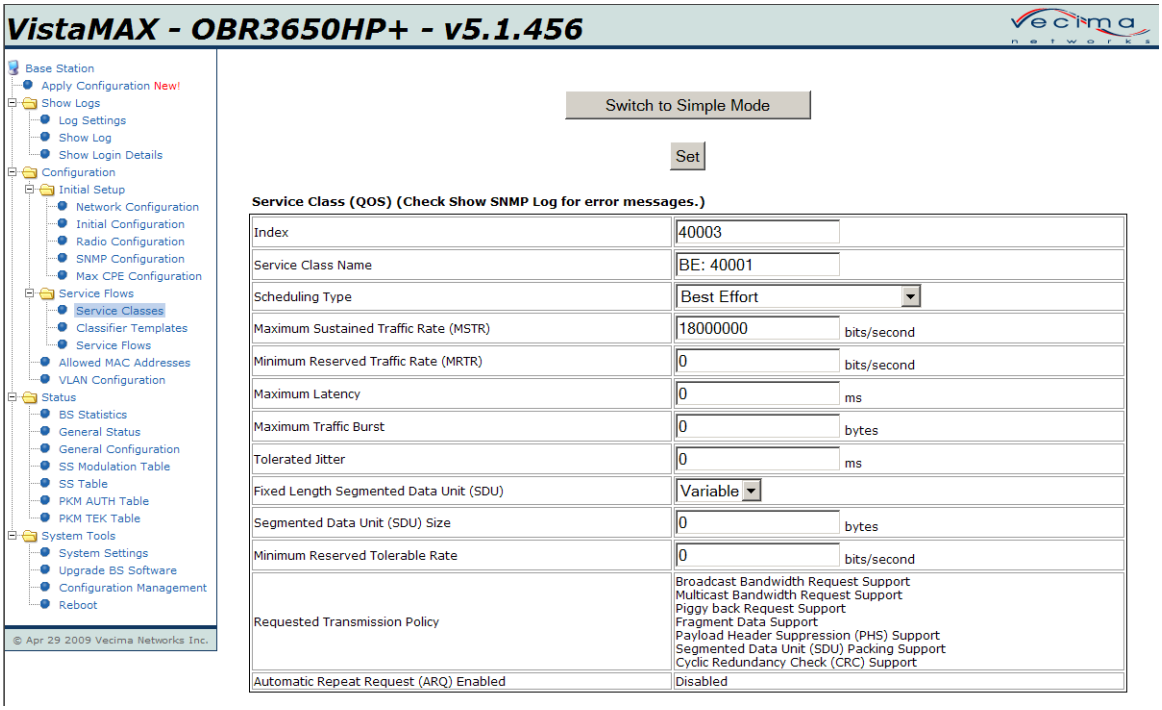


3) Enter values in the fields and click **Set** to save the changes and return to the Service Class Table page.

Required fields:

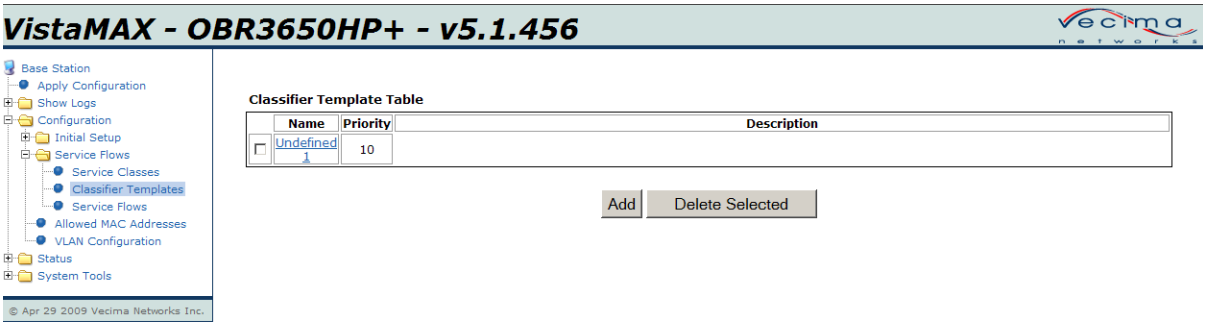
- Index
- Service Class Name
- Maximum Sustained Traffic Rate

4) Click **Switch to Advanced Mode** to open another page where you can set more parameters.

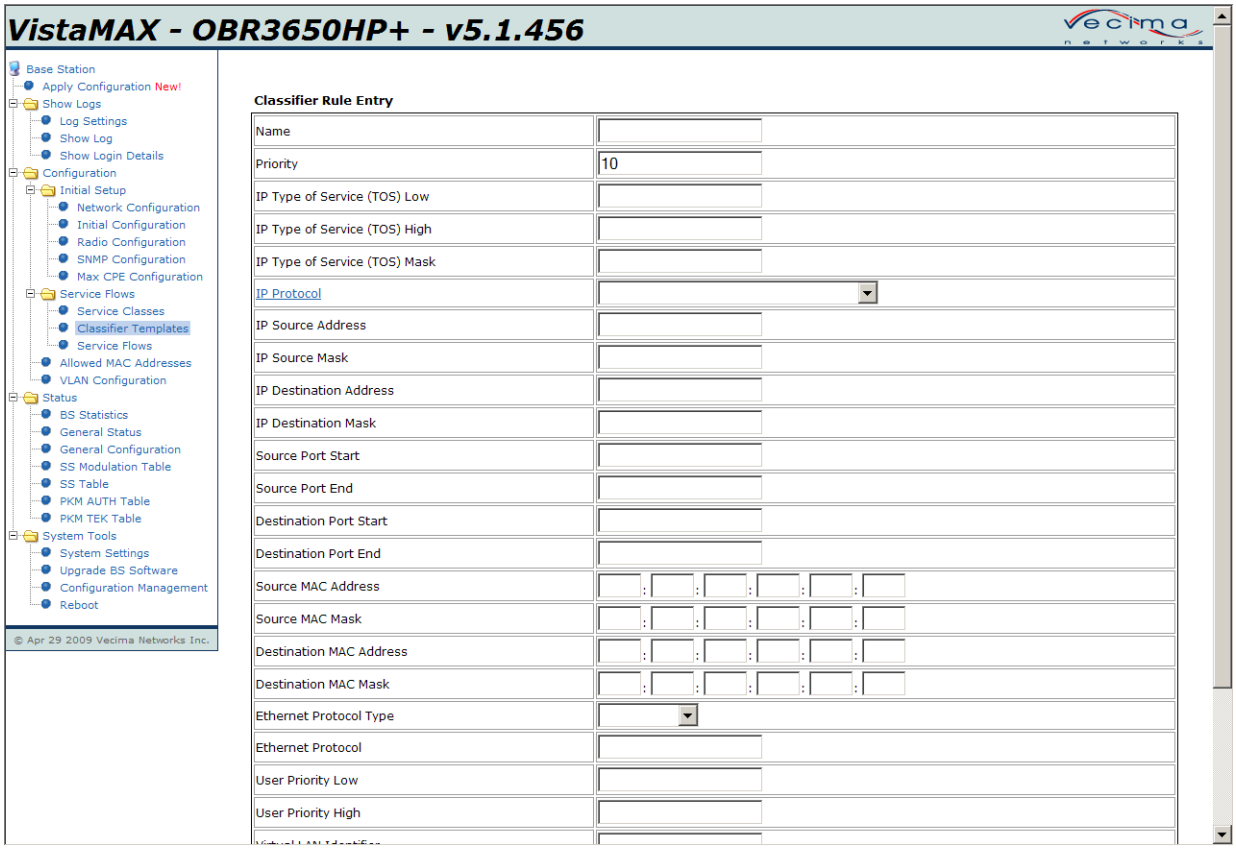


To define a classifier template and set up its rules.

1) Click **Configuration > Service Flows > Classifier Templates** to open the Classifier Template Table page. Use this page to define the classifier templates.



2) Click **Add** to open the Classifier Rule Entry page and set up classifier templates for later use.



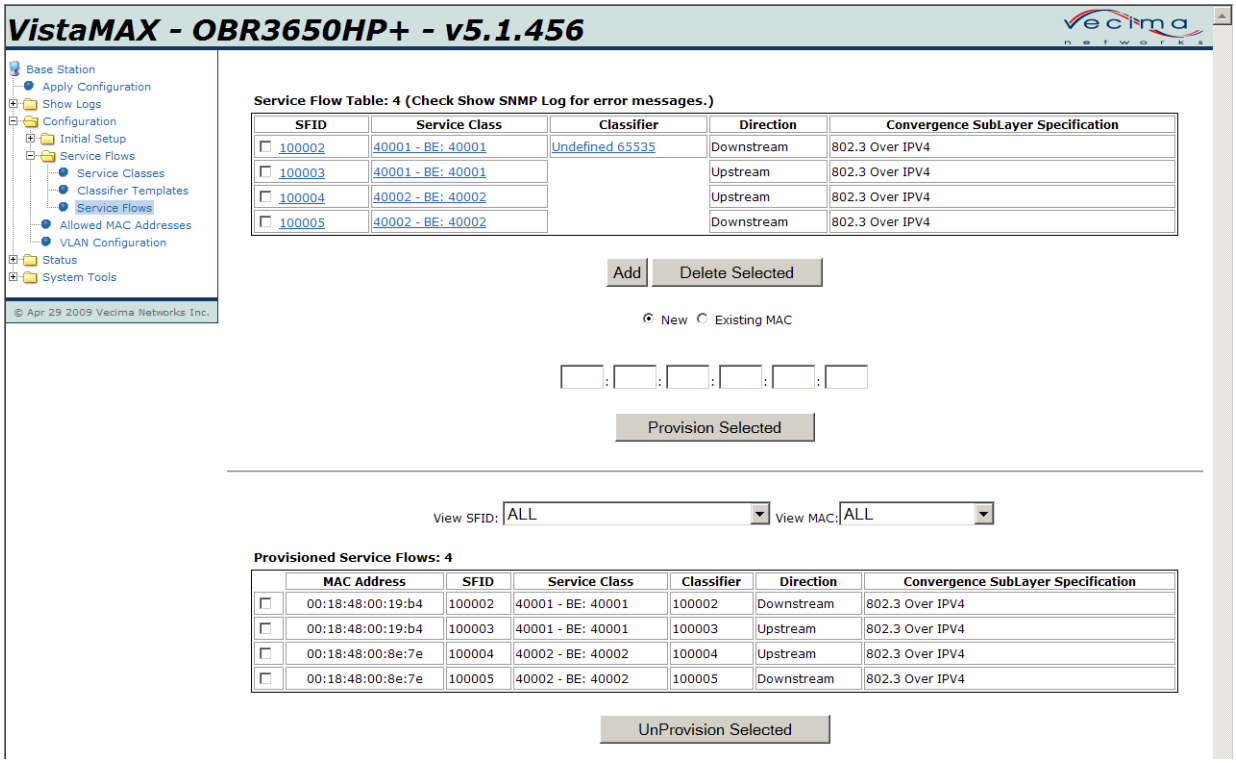
3) Enter values in the fields and click **Set** to save the changes.

Required fields:

- Priority
- Destination Port Start
- Destination Port End

To create service flows and associate them with service classes and classifier templates.

1) Click **Configuration > Service Flows > Service Flows** to open a page displaying the predefined service flows. Use this page to provision subscriber stations with service flows according to their MAC addresses.



2) Click **Add**. A new page opens displaying the Add Service Flow table. Use this page to set up the service flow parameters.
3) Type a number in the **SFID** field to identify the service flow.
4) Select **UpStream** or **DownStream** from the **Direction** drop list to indicate the direction of the data to which the service flow will apply.
5) Select a specification from the **Convergence SubLayer Specification** drop list to indicate the protocol that the service flow uses. The default is IPv4 over Ethernet.
6) Select the State of the service flow: **Authorized**, **Admitted**, or **Active**.
7) Select a service class to include with the service flow.
8) Select a classifier template to include with the service flow.
9) Click **Add**. This saves the service flow and returns you to the Service Flow Table page where the new service flow is displayed. You can then use this service flow to provision subscriber stations.

To provision a subscriber station:

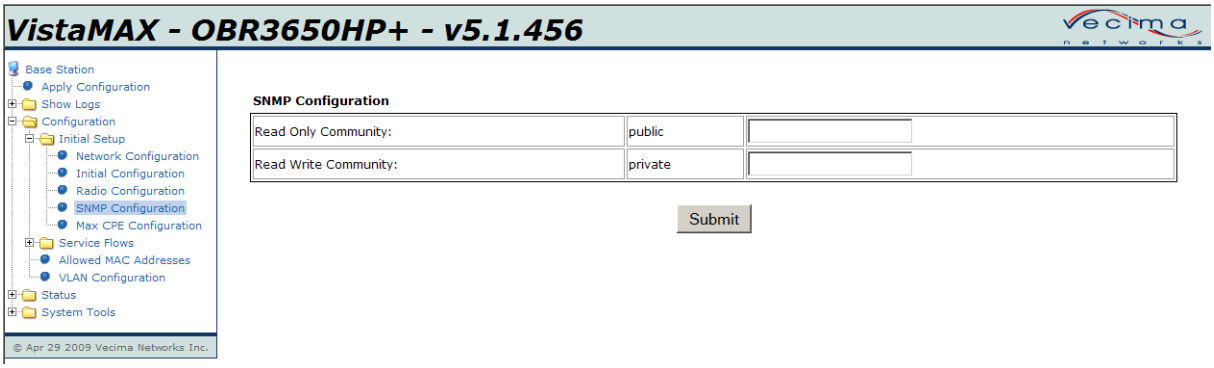
1) Type a MAC address in the field provided or select one from the list of that appears when you select **Existing MAC**.
2) Choose the service flows that you want to assign to the selected MAC address by clicking the **SFID** check boxes that correspond to the predefined service flows.
3) Click **Provision Selected**. The new MAC address appears in the Provisioned Service Flows table with the associated service flow.

To remove the service flow from a subscriber station:

1) Select a MAC Address from the Provisioned Service Flows table by selecting the corresponding check box.
2) Click **UnProvision Selected** to remove the provisioned service flow from the subscriber station.

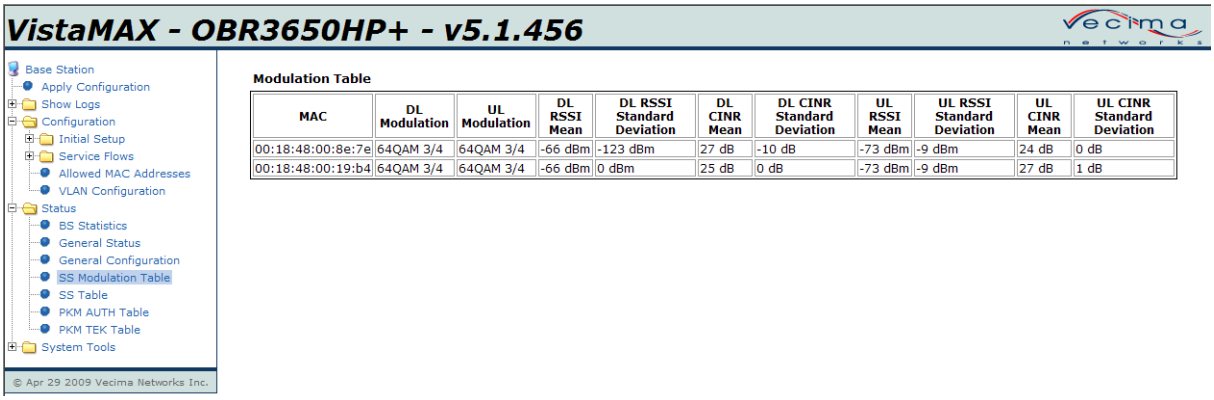
3.7.8 SNMP Configuration

Select **SNMP Configurations** to define the SNMP community strings. Currently, setting the SNMP is the only way that the base station can communicate.



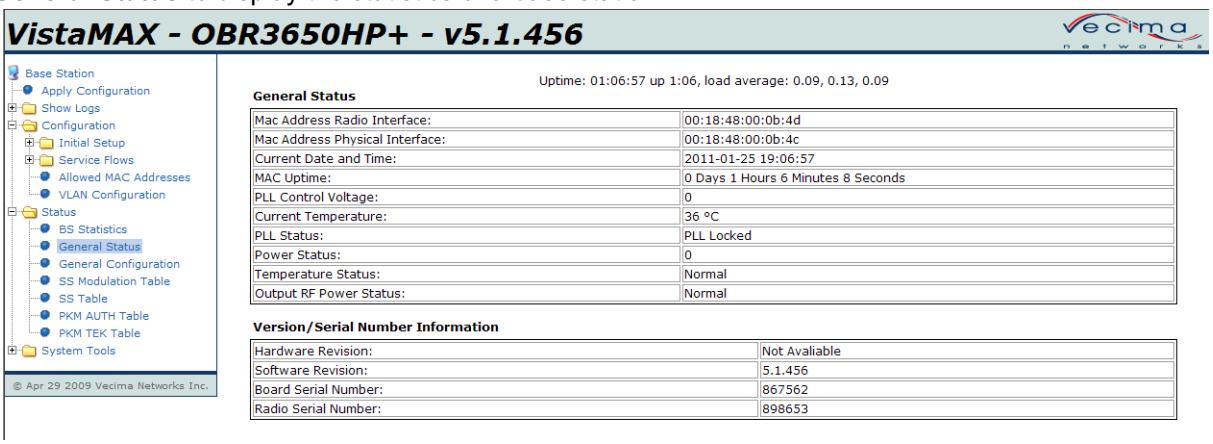
3.7.9 Subscriber Station Modulation Table

Select **SS Modulation Table** to show the current downlink and uplink modulations for all registered SS.



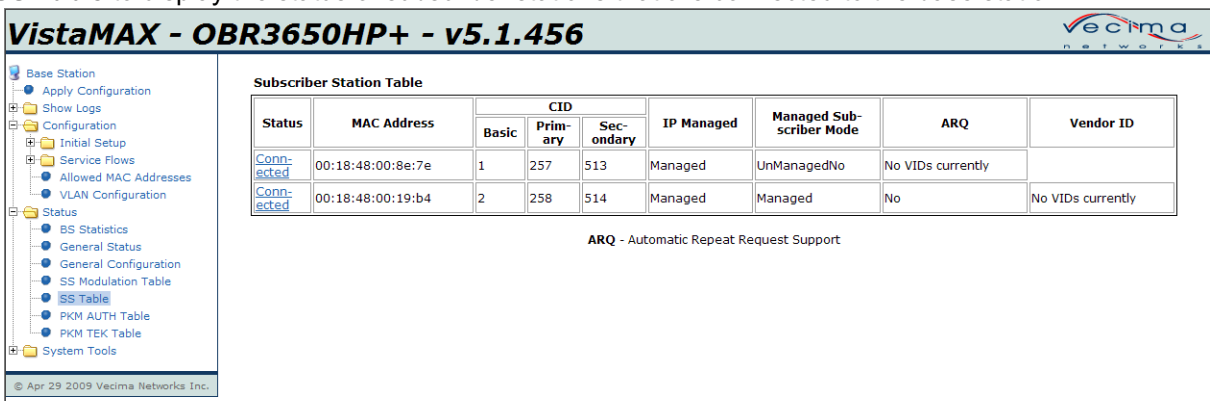
3.7.10 Checking Base Station Status

Select **General Status** to display the statistics of a base station.



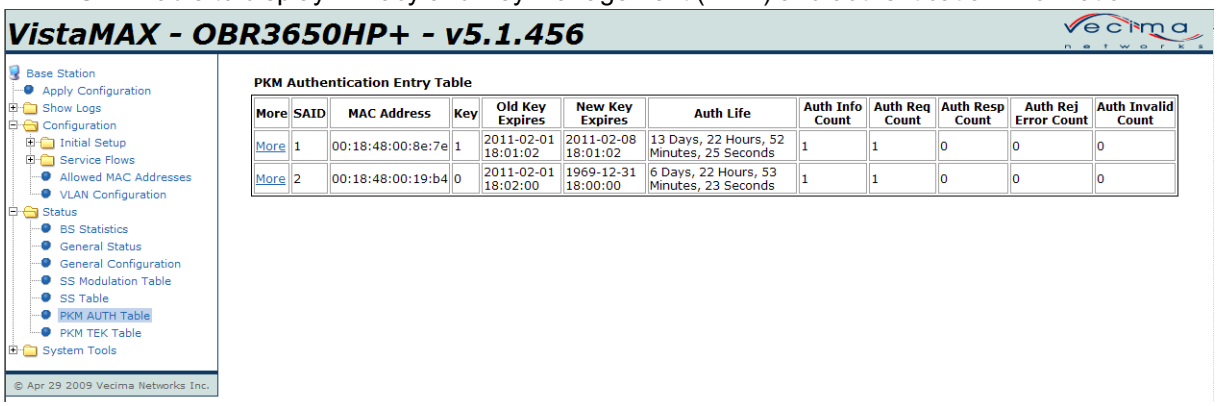
3.7.11 SS Table

Select **SS Table** to display the status of subscriber stations that are connected to the base station.



3.7.12 PKM AUTH Table

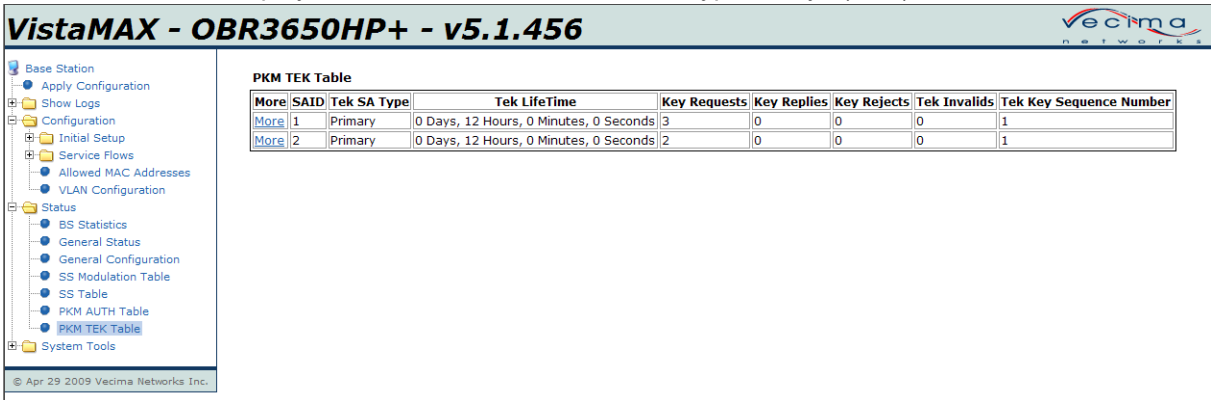
Select PKM AUTH Table to display Privacy and Key Management (PKM) and authentication information.



This page shows the Security Association ID (SAID) number for MAC Addresses and displays Private Key information for those MAC addresses.

3.7.13 PKM TEK Table

Select **PKM TEK Table** to display information about the traffic-encryption keys (TEK).



This page shows the Security Association ID (SAID) number and the traffic-encryption keys (TEK) information.

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A1 Molex® Backshell Installation

A defect was detected with the Ethernet terminating end of the Molex®backshell packaged with the OBR3650HP. The terminating modular plug allowed the shielding wire to be improperly grounded, thus making the cable susceptible to radiated interference. Without proper grounding, the presence of interfering radiation can cause the loss of data packets between the OBR base station and the WES800.

To fix this problem, Vecima recommends reworking the termination of the Ethernet cable using the JMRJ45S-15 modular plug and properly grounding the cablefeed. The cable termination can be repaired in the field at the tower site. Once the Ethernet cable termination is repaired, the cable feed will no longer be susceptible to interfering radiation and the data will be secured.

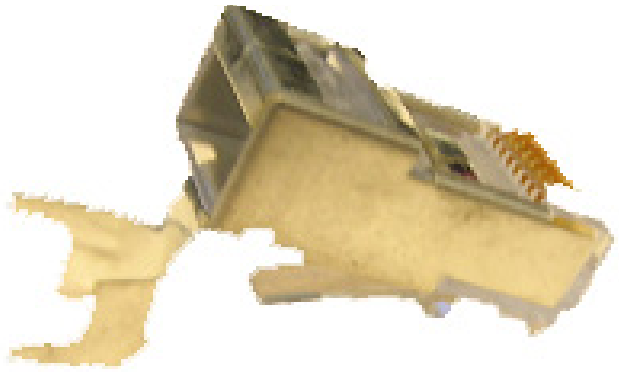


Figure A-1 JMRJ45S-15 Modular Plug

NOTE

Other than the risk of data loss due to interfering radiation, there is no safety issues concerning the connector that came with the OBR3650HP. Where loss of data due to the radiating interference is not a concern, reworking the terminating end with the JMRJ45S-15 is only necessary as a precaution.

If using a pre-made cable assembly (such as a CAT5CABLE/OD/25, CAT5CABLE/OD/50, CAT5CABLE/OD/75 or CAT5CABLE/OD/100 from Vecima Networks), then the process described in this document is not necessary

CAUTION

Before attaching the backshell, it is highly recommended that the user read through this entire appendix to become familiar with all of the steps involved to ensure that none are missed.

A1.1 Molex® Backshell Components

Figure A-2 shows the items that make up the Molex® backshell included with the OBR3650HP. The Ethernet modular plug shown is the JMRJ45S-15 that must be substituted for the plug that comes with the package.

Figure A-2 Molex® Backshell Elements

Molex® backshell component parts:

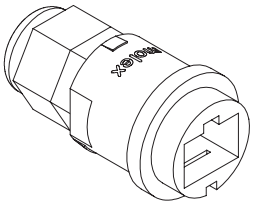
1. Coupling ring
2. Cable seal assembly – might already be threaded to into part 3
3. Plug holder
4. Basket seal
5. JMRJ45S-15 modular plug
6. Loading sleeve
7. Retainer wedge

NOTE

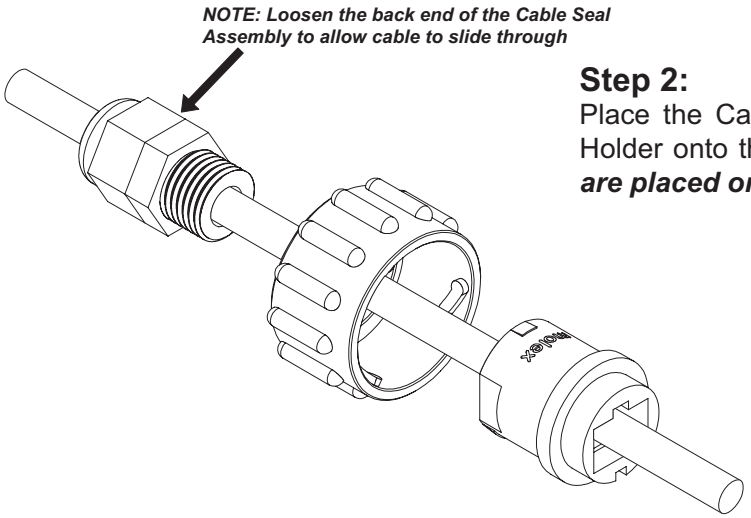
The CAT5E cable is not included with the OBR3650HP. Vecima Networks strongly recommends using CAT5E, outdoor rated cable with stranded conductors (Example: CommScope ICAT5E 2002).

A1.2 Initial Placement of the Backshell

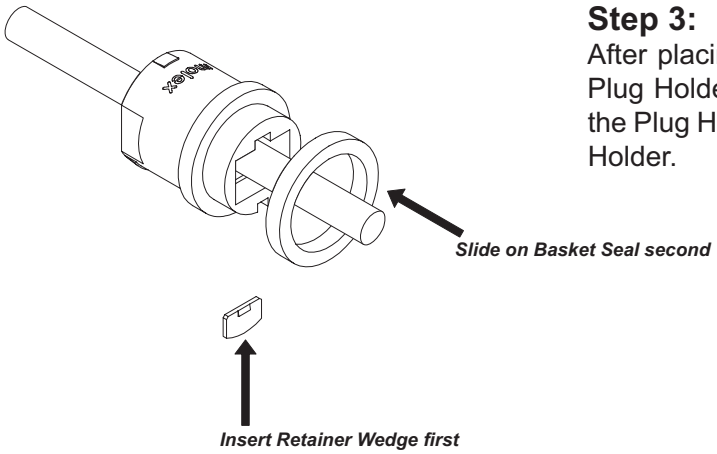
shows the steps necessary to initially place the backshell on the cable.



Step 1:
Separate the Cable Seal Assembly from the Coupling Ring (if they came threaded together in the package)



Step 2:
Place the Cable Seal Assembly, Coupling Ring and Plug Holder onto the cable as shown. ***It is vital that the items are placed on the cable in the correct order.***



Step 3:
After placing the Cable Seal Assembly, Coupling Ring and Plug Holder onto the cable, insert the Retainer Wedge into the Plug Holder and then slide the Basket Seal onto the Plug Holder.

Figure A-3 Placing the Molex Backshell on

A1.3 Attaching the RJ45 Connector

Assembling the JMRM45S-15 Ethernet Terminating End

Step 1 Carefully cut about 1.5 inches (approximately 4 cm) of the jacket. Be careful not to cut the foil that encases the wires. Vecima recommends that you use an exacta knife to score the length of jacket that you are removing, then use your needle-nose pliers to carefully split the jacket. If you happen to take off all the foil, simply remove more of the jacket. When complete, 0.65 inches (or 1.7 cm) of intact foil should be exposed and the wires should extend another 0.85 inches (or 2.2 cm) beyond that. See Figure Figure A-4.

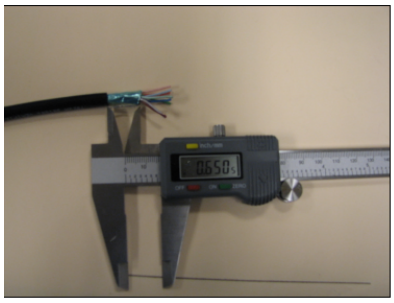


Figure A-4 Stripped jacket

Step 2 Untwist the wire pairs and separate them. Fold the stranded wire back over the foil. See Figure A-5 below for a picture of wires prepared for insertion into the connector sleeve.

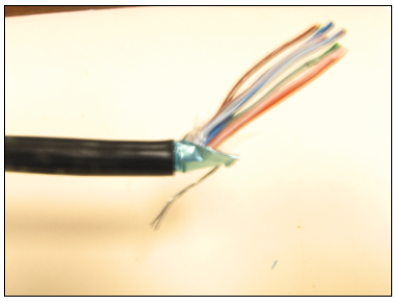
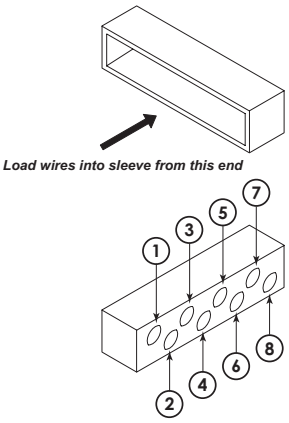


Figure A-5 Preparing the wires for insertion in connector sleeve

Step 3 Insert each wire through the loading sleeve in the precise order shown in Figure A-6. Ensure that the foil is closed around the wires and that the loading sleeve is pushed as far back on the cable as possible so that it is close to the foil. Be sure to insert the wires into the open end of the loading sleeve. Trim the wires so that the they extend from the foil by 0.4 inches (1 cm). Figure Figure A-7 shows the completed assembly before crimping.



1. White/Orange (Pair 2, TX Data +)
2. Orange (Pair 2, TX Data)
3. White/Green (Pair 3, RX Data +)
4. Blue (Pair 1, +48VDC)
5. White/Blue (Pair 1, +48VDC)
6. Green (Pair 3, RX Data -)
7. White/Brown (Pair 4, DC Return)
8. Brown (Pair 4, DC Return)

Color Coding shown is EIA/TIA 568B

Figure A-6 Inserting wires in loading sleeve

Figure A-7 Cable ready for crimping

Step 4 Before installing into the connector bend back the metal strain relief along the cable length. The metal strain relief should fit just after the jacket and cover the foil.

Check the following before crimping:

1) The wires are in the correct order. See Figure A-6
2) You can see the copper ends of the wires. If the wires are not snug against the connector end, the connection will be intermittent.

After ensuring that the cable is prepared correctly, crimp the cable using a WT1144 or WT1145 crimping tool as shown in Figure A-8. The crimped cable is shown in Figure A-9.

NOTE

If no crimping tool is available, use a pair of pliers to crimp the shield to the cable. Ensure that the shield is securely attached to the cable.

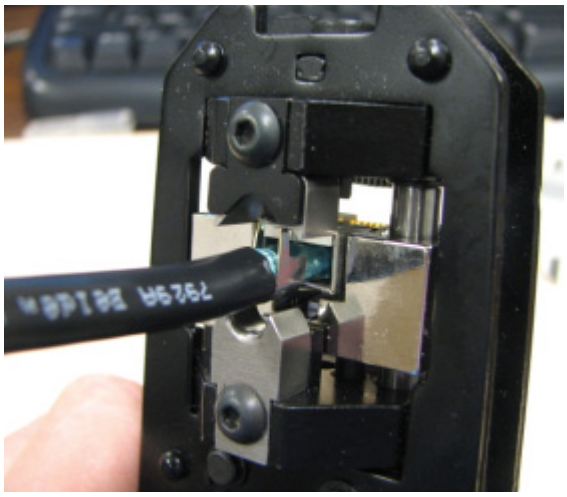


Figure A-8 Crimping the cable

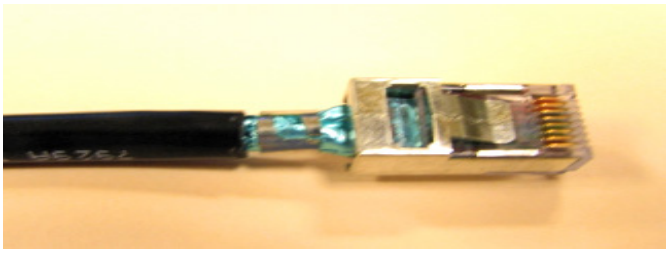


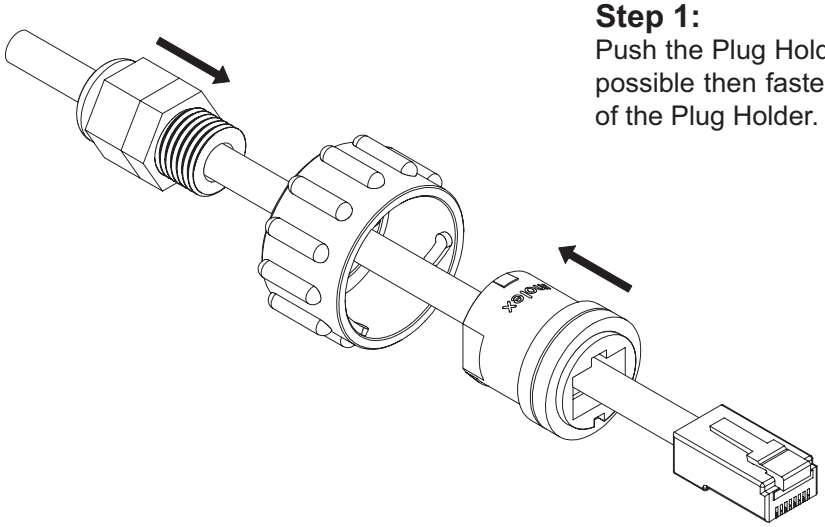
Figure A-9 Assembled cable terminating end

Step 5 After crimping the cable, cut a two inch piece of ZTHS.50-01 heat-shrunk protective sheath and place it over the connector and a leading piece of cable. See Figure A-10.

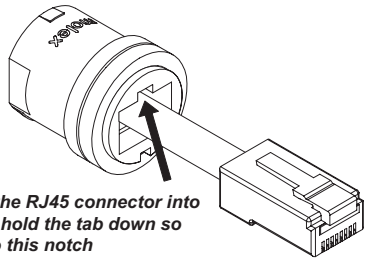
Figure A-10 Connector wrapped in ZHTHS.50-01 sheath

A1.4 Completing the Backshell Installation

Figure A-11 shows the steps necessary to compete the installation of the backshell on the cable.



Step 1:
Push the Plug Holder as far back into the Coupling Ring as possible then fasten the Cable Seal Assembly into the rear of the Plug Holder.

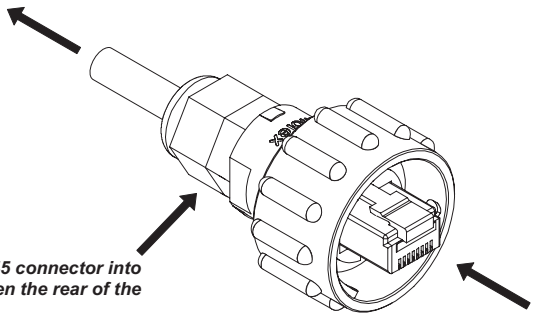


When inserting the RJ45 connector into the Plug Holder, hold the tab down so that it slides into this notch

Step 2:
Push the RJ45 connector into the Plug Holder until it is snug against the Reatainer Wedge and then tighten the rear of the Cable Seal Assembly to hold the cable in place.

When pushing the RJ45 connector into the Plug Holder, be sure to hold the tab down so that it slides into the slot as indicated.

This prevents the RJ45 connector tab from locking since there is no access to push down the tab once it is inside the Coupling Ring. The Coupling Ring takes care of locking the RJ45 connector in place via its bayonet locking mechanism.



After pushing the RJ45 connector into the Plug Holder, tighten the rear of the Cable Seal Assembly

Figure A-11 Attaching the RJ45 Connector

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B1 Installing the Antenna - Points to Consider

Improperly installed antennas will add cost, time, and frustration to your operation. Taking some time to plan a proper installation will have long term benefits.

B1.1 Planning the Installation

Consider the following points when planning an installation:

- The antenna should support proper grounding and lightning protection.

  It is usually far easier to bring the coax into the building where the AC power enters the building; because this is the easiest and cheapest way to properly bond the cable entrance to the AC ground (coax is easier and cheaper to work with than #6 AWG copper). Any lightning energy coming in on the coax will be also shared and spread over to the AC ground system, and there will be no voltage differential between the two ground systems.

- The antenna should be able to send and receive a strong signal.

  The simplest method is to presurvey the proposed location with an antenna and transceiver that are connected via a temporary string of coaxial cable to a power inserter. The assembly can be mounted to any pole and hand–held to determine the presence of signal using the integrated beeper.

- The antenna should support your plan for cableruns.

  Cableruns that are too long might decrease the efficiency of signal transmission. Cableruns should be able to support proper grounding and surge protection. Make sure that you have determined the entire wiring route & needs before drilling holes in the structure and attaching mounting hardware.

CAUTION

To comply with RF exposure requirements, the integrated antenna or any external antenna which is connected to an OBR3650HP requires a minimum distance of 1.5 meters between it and all persons.

B1.2 Safety Considerations

Before you begin your installation, read all critical safety warnings.

- Do not put the antenna under a power line. The power line can cause interference, and also exposes the Installation to unnecessary site hazards.
- All Installations must meet building and electrical codes. Note that some municipalities have restrictions or community covenants regarding towers and antenna structures. Check first.
- Do not install the antenna in high winds or in stormy weather, particularly if lightning is present.
- Remember to assemble the antenna hardware at a safe location before climbing up to the antenna mount.
- Depending on your location, you may need two or more people to install the antenna and mount.

B1.3 Evaluating the Mounting Location

You can mount the antenna to a variety of surfaces.

- The antenna should have a clear line-of-sight to the subscriber station. Do not put the antenna where it will be blocked by people, animals or vehicles.

  Consider how time and the season will affect the line-of-sight. For example, will foliage from growing trees interfere with the line-of-sight? Will wind or ice add strain to the mounting assembly?

- The simple arm supplied with the integrated antenna assembly can be mounted to the side of the house if you can locate the structural studding.

  The simple arm can also be attached to brick or cinder blocks. If mounting to brick, be sure to put the anchors in the brick only, as anchors will not hold in joint mortar. If mounting to cinder blocks, use toggle bolts that go into the hollow space in the block.
- The rooftop will often be another spot to fasten to. This usually is the best location for obstruction clearance. Locating underlying truss structure can be done with stud finders, looking for nail fasteners through the fascia board, standard sounding techniques, or from the underside of the roof. To prevent the roof from leaking, you should caulk the holes with silicone sealant around the holes and at the bottom of the antenna foot where it contacts the surface. Apply the sealant before you bolt the foot down tight. Be sure to caulk all holes to prevent leaks.
- An independent radio tower can also be used, but the Installation of these towers is beyond the scope of this document, usually involving professional structural engineering. Metal towers can provide some of the best lightning protection since the large metallic structural elements will best carry lightning energy straight to ground.
- Wooden poles are NOT recommended, because the insulating properties of the wooden pole mean that a large percentage of a lightning stroke will follow the coax towards the terminal end, even when substantial grounding conductors are used. Also, wooden poles will sway in the wind putting the antenna beam in and out of alignment in high wind conditions. By the time the pole is re-guyed to minimize the sway; a properly engineered metal tower could have been installed.
- Wind considerations. The integrated antenna has been engineered to operate in 160 Km (100MPH) winds, and survive in 220 Km (135 MPH) winds, but these forces will generate several hundred Kg. of load to the supporting mast. At this point, the mounting structure needs to be very secure.
- The Installation should be accessible year round. Ice might build up in the winter or early spring time.

TIP

When the primary coaxial cable is placed, leave approximately 24” of coaxial cable with a 4” to 6” diameter loop where the antenna will be installed. This will allow for the required flexibility for adjustment and future servicing.