3.4 MP-8160-CPE-A100

This section provides the hardware overview and installation method for MP-8160-CPE.

3.4.1 Hardware Overview

Figure 3-34 MP-8160-CPE

A detailed description about the various components of the device are explained in the following sections.

3.4.1.1 Ethernet Port (PoE IN and Data)

The device comes with auto-sensing 10/100 BASE-T Ethernet port with configurable Tx Modes and Speeds.

The Ethernet port of the device allows the user to connect to the LAN by using Cat5/Cat5e or better Ethernet cable, and also power ON the device by using the Power over Ethernet (PoE) Injector supplied with the product package.

- The device receives 48 VDC via a standard Cat5/Cat5e or better cable connected to the Ethernet port.
- Maximum power supplied to the device is 19.2 Watts. The device typically draws 5 Watts.

Recommended Ethernet Cable Specifications	
Type	Cat5/5e or better, STP, 24 AWG, UL rated, UV-shielded and outdoor-rated
Impedance	100 ohms
Cable Length	330 feet / 100 meters *: The total length of cabling between the Personal Computer and the device cannot exceed 100 meters (includes cable from the Personal Computer to the PoE, and the cable from the PoE to the device. Due to DC power requirements, the maximum cable length between the PoE Injector and the device is 75 meters.*

: Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.

3.4.1.2 Grounding Point

To protect the device against lighting or ESD events, you must ground the device properly. To ensure proper grounding, use the grounding point situated at the bottom corner of the device and the grounding screw (M4 thread size) provided to attach a ground wire of at least 12 AWG stranded to the device.

3.4.2 Product Package

Each shipment includes the items listed in the following table. Please verify that you have received all the parts in the shipment prior to installation.

What's in the Kit	Image
MP-8160-CPE	
PoE Injector and Power Cord *WD - EU power cord*	
Connector Weather Proofing Kit	
Pole Mounting Kit	
Grounding Kit	
Quick Installation Guide	

3.4.3 Installation Procedure

This section describes the steps to install and mount the device.

: The device must be installed by a trained professional who is familiar with radio frequency planning and regulatory limits.

Perform the following steps to install and mount the device.

Step 1: Plan for Installation

There are several planning factors to be considered before installing the device. In addition to selecting the installation site, you should do the following:

Calculate:

- Required RSL and fade margin to achieve link availability objectives. For more details on how to calculate RSL and fade margin, please refer to the *'Antenna Installation Guide'* and *'Proxim Link Calculator'* that are available on the support site at http://my.proxim.com.
- Required path availability
- Anticipated multi-path reflection points

Determine:

- System Frequency Plan
- Required transmission line types (like cable, waveguides) and lengths

Plan for:

- Device's continuous power consumption needs
- Lightning protection and system grounding
- Hardware mounting
- Cable installation including egress
- Pre-testing equipment (back-to-back test procedure)

Step 2: Choose a Location

To make optimal use of the device, you must find a suitable location to install the hardware. Proxim recommends you do a site survey, observing the following requirements, before mounting the hardware.

- The location must allow easy disconnection of power to the radio, if necessary.
- Ensure free flow of air around the hardware.
- The radio device must be kept away from vibration and excessive heat.
- The installation must conform to local regulations at all times.

Step 3: Gather Required Tools

You should have the following tools available before installing the device:

- Cross-tip screwdrivers
- Large blade standard screwdriver
- Spanner 13
- Wire crimpers (if using connectors that are not pre-made)

Step 4: Unpack the Product Package

- Unpack the device and its accessories from the shipping box.
- Please make a note of the Ethernet addresses, MAC addresses and the serial number. These addresses may be used when configuring the device. Note that the serial number helps you to seek support from the Proxim's Customer support team.

Step 5: Pole Mount the Device

1. To pole-mount the device to a 1 inch diameter pole, place the mounting bracket with its small V-Groove facing the pole.
2. To pole-mount the device to a 2.5 inch diameter pole, place the mounting bracket with its large V-Groove facing the pole.
3. Place the device with its rear side facing the pole, and screw the M8x80mm long screws along with the spring and plain washers through the mounting bracket into the mounting holes of the device and tighten it to torque of 11 N.m/100 in-lbs.
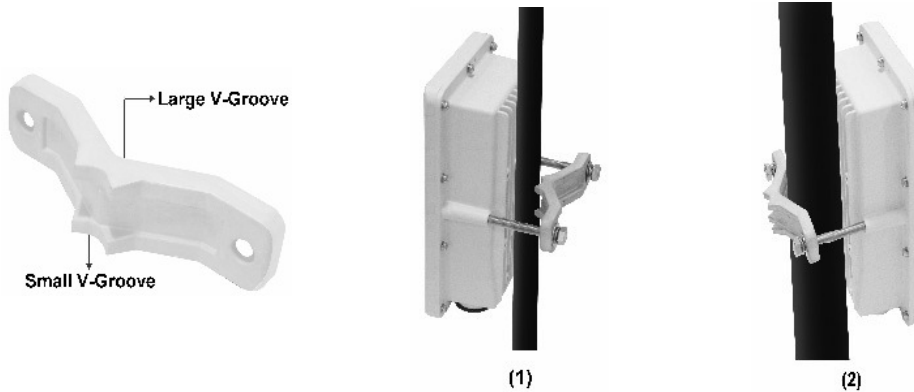
Figure 3-35 Pole-Mounting

Step 6: Weatherproof RJ45 Connectors

The following steps explain how to weatherproof the RJ45 connector:

1. Use a straight-through cable (Cat5/5e or better) with one end bare.
2. Connect the crimped RJ45 connector end of the cable into the RJ45 Ethernet port inside the enclosure. The cable connector should latch into the Ethernet port.
3. Slide the Flat Washer (A) into the Connector Body (B) to make it waterproof and onto the bare end of the cable. Next, fasten the Connector Body into the Ethernet connector hole on the device.
4. Slide the tube-shaped Compression Washer (C) into the Compression Ring (D) and onto the cable from the bare end, and insert into the fixed Connector Body.
5. Slide the Sealing Nut (E) over the bare end of the cable and fasten it on the fixed Connector Body.
6. Crimp the bare end of the cable with RJ45 connector and connect it to the **LAN+DC** port on the PoE Injector.
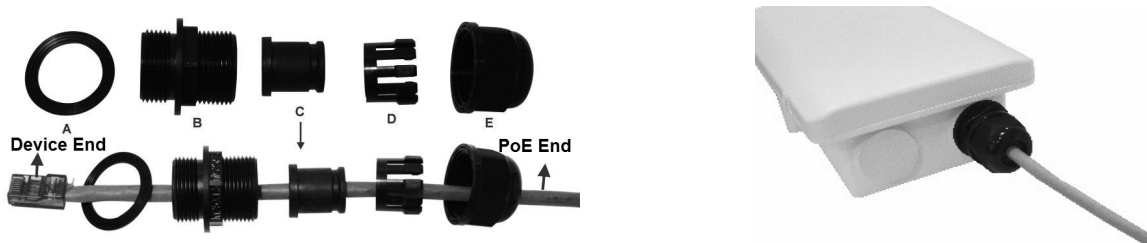

Figure 3-36 Weatherproofing RJ45 Connectors

Additional Weatherproofing Steps

To add an additional layer of protection to the connectors against the environment, see Appendix - Additional Weatherproofing Steps.

Step 7: Plug in the Cables

 : Unscrew the sealing cap for installation of the cable.

1. Plug one end of the Cat5/5e cable into the Ethernet port of the device by following the Weatherproofing steps as explained in Step 5. Connect the other end of the Cat5/5e or better cable to the **LAN +DC** port on the PoE Injector.

: Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.

Figure 3-37 Cables Plugged In

2. To connect the device through a hub or a switch to a Personal Computer, connect an Ethernet cable between the network interface card in the Personal Computer and the hub/switch, and between the hub/switch and the RJ45 **LAN** port on the PoE Injector.

3. To connect the device directly to a Personal Computer, connect an ***Ethernet cable*** between the network interface card in the Personal Computer and the RJ45 **LAN** port on the PoE Injector.

Step 8: Install Surge Protector

Proxim recommends two approved lightning surge protectors to be installed, one near to the device and the other at the building ingress point.

: To buy a suitable Surge Protector, place an order separately with your distributor.

Perform the following steps to ensure proper surge protection:

1. Mount the surge protector near the outdoor device and use 10 AWG or larger wire to connect the protector's ground lug to the appropriate mounting ground point. The outdoor device and co-located surge protector should have a common grounding point using the shortest possible grounding cable.

2. Mount a second surge protector near the building ingress and use 10 AWG or larger wire to connect the surge protector's ground lug to earth ground as shown in the following figure.
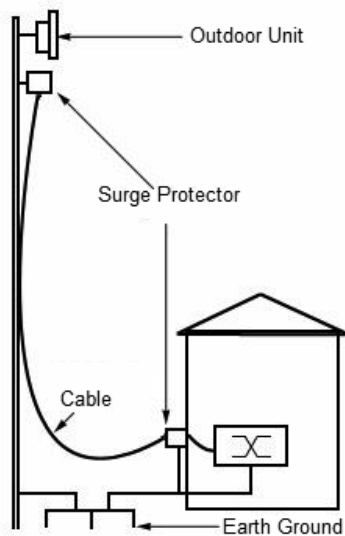

Figure 3-38 Surge Protector

: Use Outdoor-rated, UV protected, shielded Cat5/Cat5e cable for the following.

3. Connect an RJ45 terminated cable between the indoor equipment and to the port on the surge protector at the building ingress.
4. Connect a short RJ45 terminated cable between the outdoor equipment and the port on the co-located surge protector.
5. Connect an RJ45 terminated cable between the two surge protectors on their remaining ports.

: Ensure to loop the cable before entering the premise to prevent water ingress.

Step 9: Ground the Device

To ensure proper grounding, use the grounding point situated at the bottom corner of the device and the grounding screw provided to attach a ground wire of at least 12 AWG stranded to the device. It is important that the following grounding guidelines are followed to protect the device against lighting or ESD events:

1. Connect one end of the grounding cable to the device and the other end to the closest earthing system point at the installation.
2. Cut any extra ground wire length when finished connecting it to the single point earth ground.
3. Avoid sharp bends and never loop or coil up the ground wire, always connect it straight to ground.
4. A good earth ground impedance is less than 1.0 ohm.
5. Make sure all connections are fastened securely and are tight.
6. Never install during a storm and always follow your local safety codes.

Connect the grounding wire, which is supplied with the product package, to the grounding lug:

Figure 3-39 Ground the Device

Step 10: Power ON the Device

Plug in the power cord into a power outlet after having connected the PoE Injector and the device using Cat5/5e cable. There is no ON/OFF switch on the device. To disconnect power, unplug the RJ45 connector from the **LAN+DC** port on the PoE injector.

Step 11: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the device's operational state. The LEDs are available at the device's Ethernet connector inside the enclosure. You can see the LED through the Ethernet connector. The LEDs will not be visible if the RJ45 connector is weatherproofed.
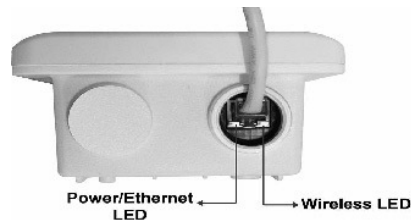
Figure 3-40 LED Indicators

The following table describes the status of LED:

LED State	Ethernet Interface	
	Power/Ethernet LED	**Wireless LED**
Off	No Power	Radio is not present or failed to detect
Amber	No Application Image detected (ScanTool mode)	Power is ON and device detects Reload signal
Blinking Green	Power is ON and the Ethernet link is DOWN	Radio is detected but wireless link has not been established yet
Solid Green	Power is ON and the Ethernet link is UP	Radio is detected and wireless link has been established

3.5 MP-8150-SUR-100 / QB-8150-LNK-100

This section provides the hardware overview and installation method for the following product(s):

- MP-8150-SUR-100
- QB-8150-LNK-100
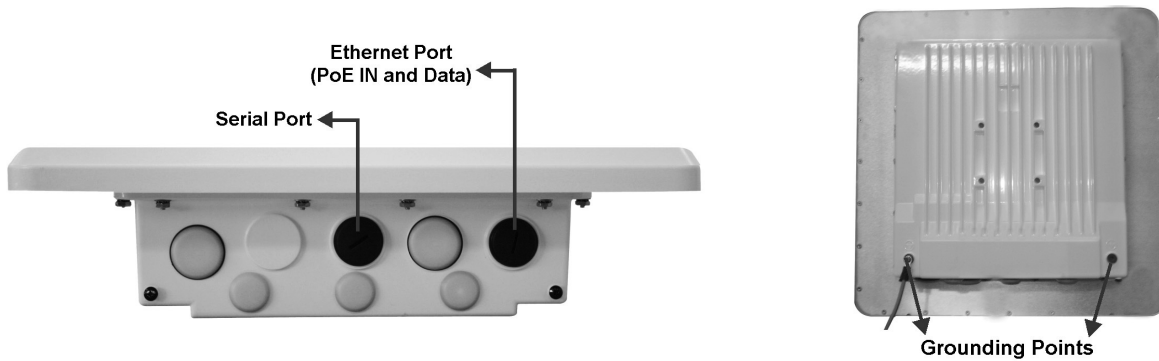
3.5.1 Hardware Overview

Figure 3-41 MP-8150-SUR-100 / QB-8150-EPR-100

A detailed description about the various components of the device are explained in the following sections.

3.5.1.1 Gigabit Ethernet Port

The device comes with one auto-sensing 10/100/1000 BASE-T Ethernet port with configurable Tx Modes and speeds.

The Gigabit Ethernet port (PoE IN and Data) of the device allows the user to connect to the LAN by using Cat5e/Cat6 Ethernet cable, and also power ON the device by using the Power over Ethernet (PoE) Injector supplied with the product package.

- The device receives 48 VDC via a a standard Cat5e/Cat6 cable connected between the PoE and the device.
- Maximum power supplied to the device is 32 Watts and the device typically draws 6 Watts.

Above 0° Celsius internal temperature, the device does not regulate its temperature, so the power drawn is generally lower in this temperature range. When the internal temperature gets close to the limits, the device starts to heat itself and the power draw increases. Powering the device when it is cold, triggers a special self-heat mode where the device is inoperable until the internal temperature is above -20° Celsius. This is signaled by a solid yellow LED on the Ethernet connector. Once the internal temperature is above -20° Celsius, the device boots normally.

Recommended Ethernet Cable Specifications	
Type	Cat5e/Cat6, STP, 24 AWG, UL rated, UV-shielded and outdoor-rated
Impedance	100 ohms
Cable Length	330 feet / 100 meters 📝 : *The total length of cabling between the Personal Computer and the device cannot exceed 100 meters (includes cable from the Personal Computer to the PoE, and the cable from the PoE to the device). Due to DC power requirements, the maximum cable length between the PoE Injector and the device is 75 meters.*

📝 : *Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.*

3.5.1.2 Serial Port

The Serial Port is used for debugging and management, and Audible Antenna Alignment through Command Line Interface (CLI).

The serial connection is established with an RJ11 to DB9 connector (also referred to as a "dongle") by connecting the RJ11 end of the dongle connector to the device and the other end to your Personal Computer.
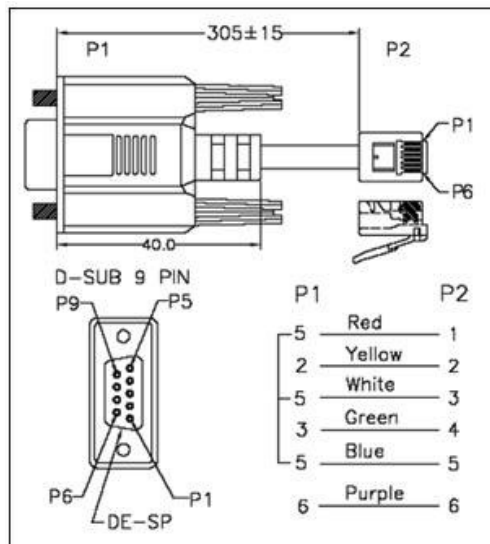

Figure 3-42 Serial Components

The pin assignments for DB9 connector are as follows:

D-Shell	RJ11
1	NC
2	2
3	4
4	NC
5	1 + 3 + 5
6	6
7	NC
8	NC
9	NC

: The pin6 on RJ11 connector is used as input for 12V DC IN for diagnostic purpose. Supplying power on this pin, when the device is powered by POE injector, might damage the device.
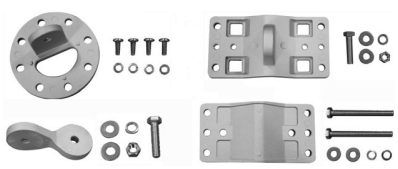
3.5.1.3 Grounding Point

To protect the device against lighting or ESD events, you must ground the device properly. To ensure proper grounding, use either of the ground points that are situated at the bottom corner of the device and the grounding screw (#8-32 thread size) provided to attach a ground wire of at least 10 AWG stranded to the device.

3.5.2 Product Package

Each shipment includes the items listed in the following table. Please verify that you have received all the parts in the shipment, prior to installation.

What's in the Kit	Image
MP-8150-SUR-100/ QB-8150-EPR-100	
PoE Injector with Country specific Power Cord *WD - US, UK and EU power cords* *US - US power cord* *EU - UK and EU power cords*	
RJ11 to DB9 Serial Connector	
Connector Weather Proofing Kit	
EMI Toroid	
Grounding Kit	
Quick Installation Guide	

What's in the Kit	Image
Mounting Kit and Hardware	 The mounting kit includes the following: • Mounting clamp for wall/pole • Extension arm • Mounting plate to enclosure • Mounting clamp for pole mounting The following table lists the items included with the mounting kit: See table below.

Quantity	Description	Image
6 each	Plain washer #5/16	
2 each	Hex Cap Screw NC 5/16-18 x 35	
2 each	Nut NC 5/16-18	
4 each	Helical Spring Lock Washer #1/4	
4 each	Helical Spring Lock Washer #5/16	
2 each	Hex Cap Screw NC 5/16-18 x 80	
4 each	68764, Screw, Machine, Pan, Philips, 1/4"-20, 5/8"L	

: QB-8150-LNK-100 contains two sets of all the above accessories.

3.5.3 Installation Procedure

This section describes the steps to install and mount the device(s).

: The device must be installed by a trained professional who is familiar with radio frequency planning and the regulatory limits.

Perform the following steps to install and mount the device.

Step 1: Plan for Installation

There are several planning factors to be considered before installing the device. In addition to selecting the installation site, you should do the following:

Calculate:

- Required RSL and fade margin to achieve link availability objectives. For more details on how to calculate RSL and fade margin, please refer to the *'Antenna Installation Guide'* and '*Proxim Link Calculator'* that are available on the support site at http://my.proxim.com.
- Required path availability
- Anticipated multi-path reflection points

Determine:

- System frequency plan
- Required antenna mounting height to obtain proper path clearance
- Required transmission line types (like cable, waveguides) and lengths

Plan for:

- Device's continuous power consumption needs
- Lightning protection and system grounding
- Hardware mounting
- Cable installation including egress
- Pre-testing equipment (back-to-back test procedure)

Step 2: Choose a Location

To make optimal use of the device, you must find a suitable location to install the hardware. The range of the radio device largely depends upon the position of the antenna. Proxim recommends you do a site survey, observing the following requirements, before mounting the hardware.

- The location must allow easy disconnection of power to the radio, if necessary.
- Ensure free flow of air around the hardware.
- The radio device must be kept away from vibration and excessive heat.
- The installation must conform to local regulations at all times.

The devices are designed to directly mount to a pole. Using the supplied brackets and hardware, you can mount them to a 1.25 inch to 3-inch pole (outside diameter). Longer bolts (not supplied) are required for mounting the device to a larger diameter pole. By using just one of the pole mounting brackets, you can mount the device to a wall or other flat surface.

Step 3: Gather Required Tools

You should have the following tools available before installing the device:

- Cross-tip screwdrivers
- Small blade standard screwdriver
- Large blade standard screwdriver
- Wire crimpers (if using connectors that are not pre-made)
- Adjustable 6" wrench
- Weatherproofing material for sealing external connectors (such as butyl tape)
- Straight-through UV-protected STP-rated Cat5e/Cat6 Ethernet cable for connecting to PC, or cable for connecting to a hub or a switch.

Step 4: Unpack the Product Package

1. Unpack the device and its accessories from the shipping box.
2. Please make a note of the Ethernet addresses, MAC addresses and the serial number. These addresses may be used when configuring the device. Note that the serial number helps you to seek support from the Proxim's Customer support team.

Step 5: Weatherproofing RJ45 Connectors

The following steps explain how to weatherproof the RJ45 connectors:

1. Use a straight-through cable (Cat5e/Cat6) with one end bare.
2. Connect the crimped RJ45 connector end of the cable into the RJ45 Ethernet port inside the enclosure. The cable connector should latch into the Ethernet port.
3. Slide the Flat Washer (A) into the Connector Body (B) to make it waterproof and onto the bare end of the cable. Next, fasten the Connector Body into the Ethernet connector hole on the device.
4. Slide the tube-shaped Compression Washer (C) into the Compression Ring (D) and onto the cable from the bare end, and insert into the fixed Connector Body.
5. Slide the Sealing Nut (E) over the bare end of the cable and fasten it on the fixed Connector Body.
6. Crimp the bare end of the cable with RJ45 connector and connect it to the **PWR LAN-OUT** port on the PoE Injector.
7. Open the notch on both sides of the toroid and fix it on Ethernet cable. Then, lock the notch of the Toroid by pressing it.

: To avoid electro magnetic emissions, please ensure to fix Toroid to the Ethernet cable.
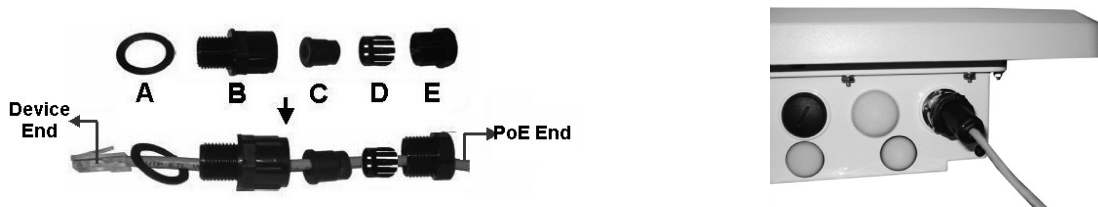
Figure 3-43 Weatherproofing RJ45 Connector

Additional Weatherproofing Steps

To add an additional layer of protection to the connectors against the environment, see Appendix - Additional Weatherproofing Steps.

Step 6: Assemble Mounting Hardware

Fix the Mounting Plate (A) by using the provided screws and washers (Torque 9 N.m/75 in-lbs) onto the bottom of the device. Fix the Extension Arm (B) to the fixed mounting plate with the provided screw, nut and washers. The extension arm gives the device more possible tilt, letting you adjust for azimuth or elevation over a larger angle. Fix the Mounting Bracket (C) to the fixed Extension Arm with the provided screw, nut and washers. Tighten the assembled parts (Torque 15 N.m/130 in-lbs). The last picture in the following figure shows the fully assembled mounting hardware fixed to the device.
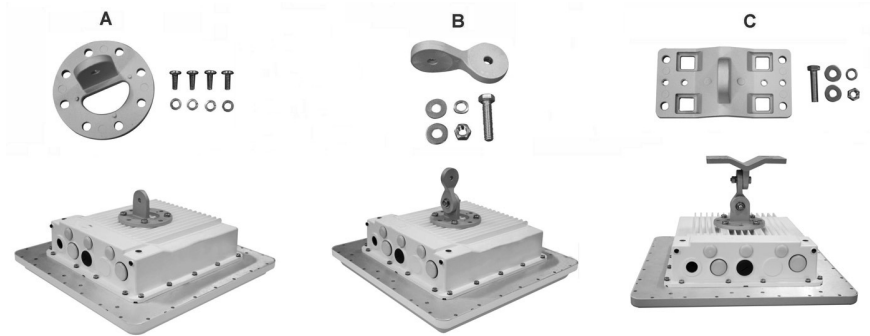
Figure 3-44 Assemble the Mounting Hardware

: This figure is for illustration only. Device should be mounted in square position with Ethernet/Serial port facing downward.

Step 7: Mount the Device

1. To pole-mount the device, insert the provided screws through bracket (F). Fasten around the pole to bracket (C) and secure (Torque 11 N.m/100 in-lbs).
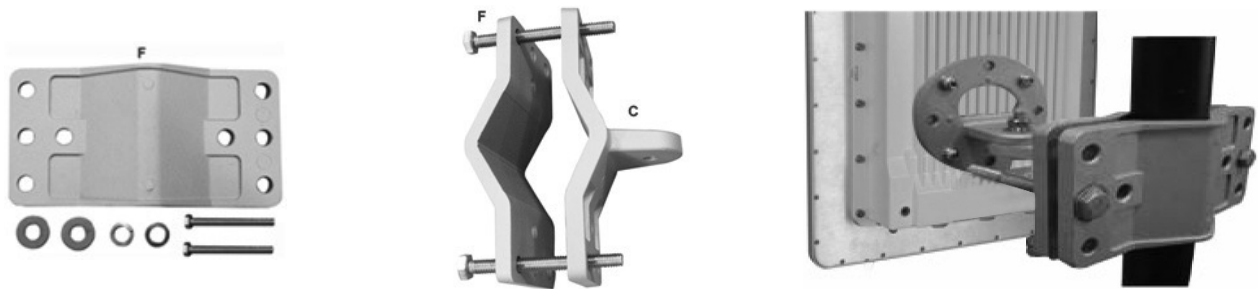
Figure 3-45 Pole Mounting

2. To wall-mount the device, mount the bracket to a wall using 4 screws (not provided).

Figure 3-46 Wall Mounting

Step 8: Plug in the Cables

: Unscrew the sealing cap for installation of the cable. Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.

1. Plug one end of the straight-through Cat5e/Cat6 cable into the Ethernet Port interface of the device by following the Weatherproofing steps explained under Step 5. Connect the other end of the cable into the **PWR LAN-OUT** port on the PoE Injector.

Figure 3-47 Cable Plugged In

2. Optionally, plug the Serial cable into the serial RJ11 telephone jack inside the enclosure for debugging and management, and audible antenna alignment.
3. To connect the device through a hub or a switch to a Personal Computer, connect an Ethernet cable between the network interface card in the Personal Computer and the hub, and between the hub and the RJ45 **LAN-IN** port on the PoE Injector.
4. To connect the device directly to a Personal Computer, connect an Ethernet cable between the network interface card in the Personal Computer and the RJ45 **LAN-IN** port on the PoE Injector.

Step 9: Install Surge Protector

Proxim recommends two approved lightning surge protectors to be installed, one near to the device and the other at the building ingress point.

: To buy a suitable Surge Protector, place an order separately with your distributor.

Perform the following steps to ensure proper surge protection:

1. Mount the surge protector near the outdoor device and use 10 AWG or larger wire to connect the protector's ground lug to the appropriate mounting ground point. The outdoor device and co-located surge protector should have a common grounding point by using the shortest possible grounding cable.
2. Mount a second surge protector near the building ingress and use 10 AWG or larger wire to connect the surge protector's ground lug to earth ground as shown in the following figure.
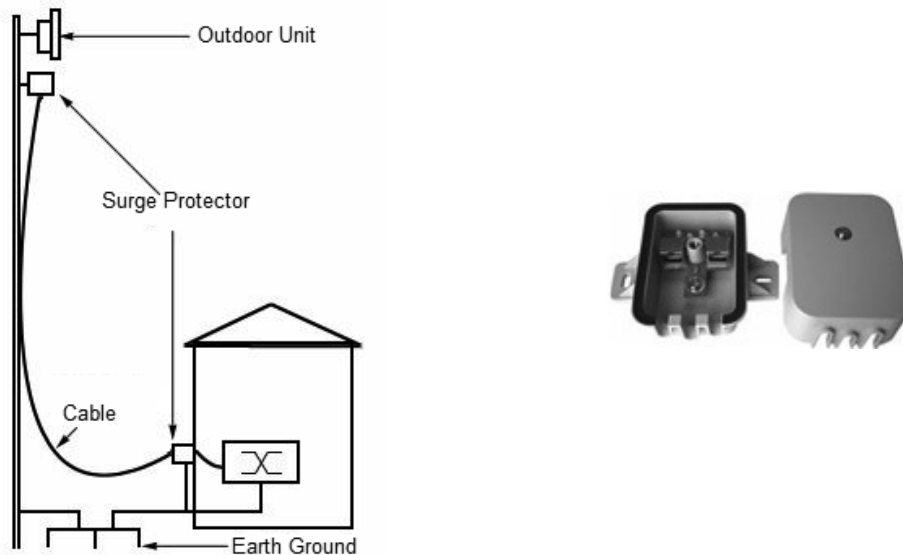
Figure 3-48 Surge Protector

 : Use Outdoor-rated, UV protected, shielded Cat5e/Cat6 cable for the following.

3. Connect an RJ45 terminated cable between the indoor equipment and to the port on the surge protector at the building ingress.
4. Connect a short RJ45 terminated cable between the outdoor equipment and the port on the co-located surge protector.
5. Connect an RJ45 terminated cable between the two surge protectors on their remaining ports.

 : Ensure to loop the cable before entering the premise to prevent water ingress.

Step 10: Ground the Unit

To ensure proper grounding, use either of the ground points which are situated at the bottom corners of the device and the grounding screw provided to attach a ground wire of at least 10 AWG stranded to the device. It is important that the following grounding guidelines are followed to protect the device against lighting or ESD events:

1. Connect one end of the grounding cable to the device as shown in the Figure 3-49 and the other end to the closest earthing system point at the installation.
2. Cut any extra ground wire length when finished connecting it to the single point earth ground.
3. Avoid sharp bends and never loop or coil up the ground wire, always connect it straight to ground.
4. A good earth ground impedance is less than 1.0 ohm.
5. Measure ground impedance at the point where the surge protector ground wire is connected and not at the ground rod.
6. Connect the surge protector ground wire and equipment ground (both power ground and telecomm ground) to a single common ground.
7. Make sure all connections are fastened securely and are tight.
8. Never install during a storm and always follow your local safety codes.
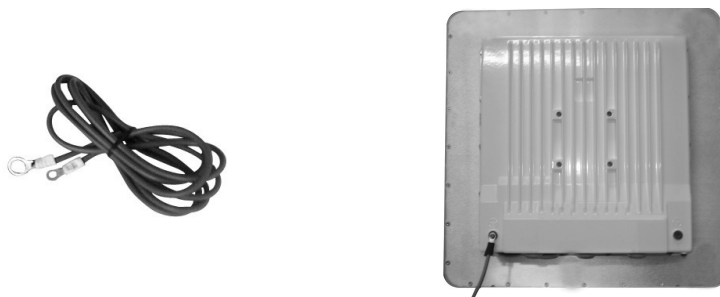
Figure 3-49 Ground the Device

Step 11: Power ON the Device

Plug in the power cord into a power outlet after having connected the PoE Injector and the device using straight-through Cat5e/Cat6 cable. There is no ON/OFF switch on the device. To disconnect power, unplug the RJ45 connector from the **PWR LAN-OUT** port on the PoE injector.

Step 12: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the device's operational state. The LEDs are available at the device's Ethernet connector inside the enclosure. You can see the LEDs through the ethernet connector. The LEDs will not be visible if the RJ45 connector is weatherproofed.
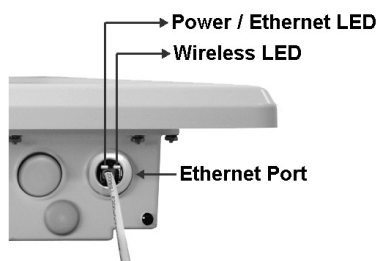
Figure 3-50 View LEDs

The following table states the status of LEDs and the corresponding operational state of the device:

LED State	Power/Ethernet LED	Wireless LED
	Ethernet	
Yellow	Device is self heating (Cold Start)	Power is ON and the device detects Reload signal
Off	No Power	Radio is not present or failed to detect
Blinking Green-Fast	Power is ON and the Ethernet link on Ethernet is DOWN	Radio is ON and wireless link has not been established yet
Blinking Green (5 times) and turns off	Bootloader detected no image	Not Applicable
Green	Power is ON and the Ethernet link on Ethernet is UP	Wireless link has been established

3.6 MP-8200-BSU / MP-8200-SUA / MP-8250-SUR / QB-8200-EPA&LNK /QB-8250-EPR&LNK / MP-8250-BS9 / MP-8250-BS1

This section provides the hardware overview and installation procedure for the following product(s):

- MP-8200-BSU
- MP-8250-BS9
- MP-8250-BS1
- MP-8200-SUA
- MP-8250-SUR
- QB-8200-EPA/LNK
- QB-8250-EPR/LNK

3.6.1 Hardware Overview
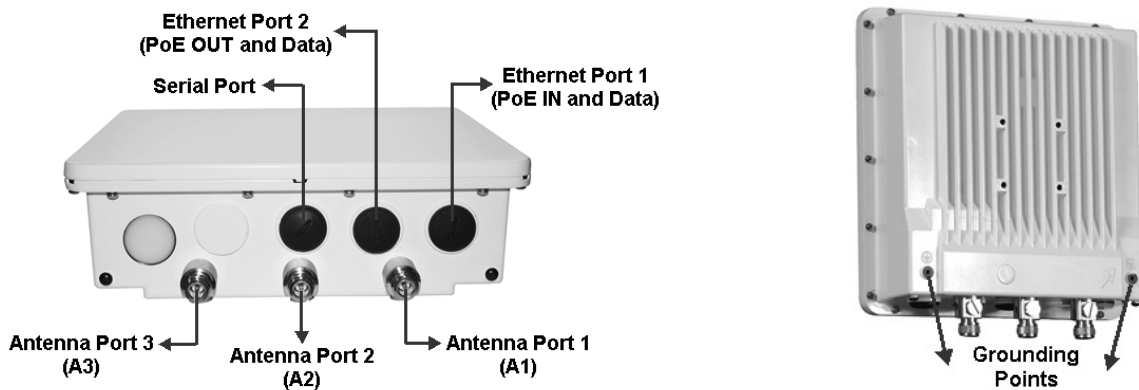
Figure 3-51 MP-8200-BSU / MP-8200-SUA / QB-8200-EPA
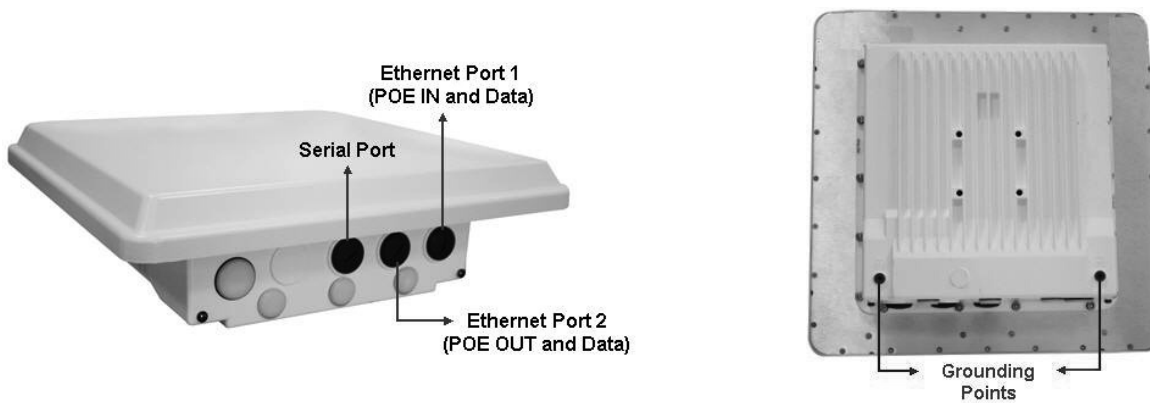
Figure 3-52 MP-8250-SUR / MP-8250-BS9 / MP-8250-BS1 / QB-8250-EPR

A detailed description about the various components of the device are explained in the following sections.

3.6.1.1 Gigabit Ethernet Ports

The device comes with two auto-sensing 10/100/1000 BASE-T Ethernet ports with configurable Tx Modes and Speeds.

3.6.1.1.1 a) Ethernet Port 1

The Gigabit Ethernet port 1 (PoE IN and Data) of the device allows the user to connect to the LAN by using Cat5e/Cat6 Ethernet cable, and also power ON the device by using the Power over Ethernet (PoE) Injector supplied with the product package.

- The device receives 48 VDC via a standard Cat5e/Cat6 cable connected between the PoE and the device.
- Maximum power supplied to the device is 32 Watts and the device typically draws 12 Watts.

Above 0° Celsius internal temperature, the device need not regulate its temperature, so the power drawn is generally lower in this temperature range. When the internal temperature gets close to the limits, the device starts to heat itself and the power draw increases. Powering the device when it is cold, triggers a special self-heat mode where the device is inoperable until the internal temperature is above -20° Celsius. This is signaled by a solid yellow LED on the Ethernet connector. Once the internal temperature is above -20° Celsius, the device boots normally.

Recommended Ethernet Cable Specifications	
Type	Cat5e/Cat6, STP, 24 AWG, UL rated, UV-shielded and outdoor-rated
Impedance	100 ohms
Cable Length	330 feet / 100 meters : *The total length of cabling between the Personal Computer and the device cannot exceed 100 meters (includes cable from the Personal Computer to the PoE, and the cable from the PoE to the device. Due to DC power requirements, the maximum cable length between the PoE Injector and the device is 75 meters.*

: *Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.*

3.6.1.1.2 b) Ethernet Port 2

The Gigabit Ethernet Port 2 is used for PoE OUT and data. While using this port, the following points should be considered:

- 48 VDC (15 W average) is present on the second Ethernet port. Make sure the connected device can support this voltage.
- If power from the second Ethernet Port is desired, then Proxim recommends you to use 60W PoE (not supplied).
- If a device is connected to the second Ethernet port for data only, then use a PoE Splitter (not supplied).

3.6.1.2 Serial Port

The Serial Port is used for debugging and management, and Audible Antenna Alignment through Command Line Interface (CLI).

The serial connection is established with an RJ11 to DB9 connector (also referred to as a "dongle") by connecting the RJ1 end of the dongle connector to the device and the other end to your Personal Computer.
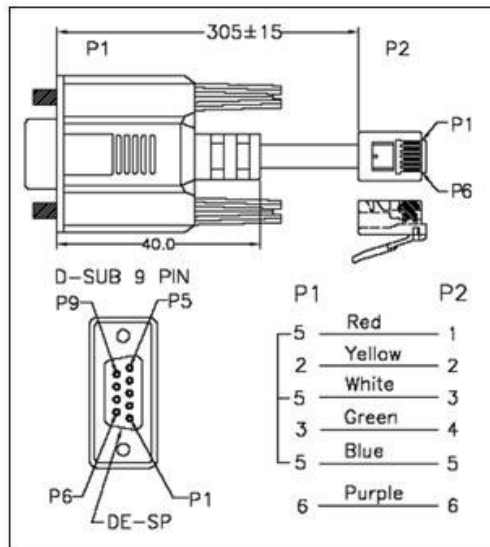
Figure 3-53 Serial Components

The pin assignments for DB9 connector are as follows:

D-Shell	RJ11
1	NC
2	2
3	4
4	NC
5	1 + 3 + 5
6	6
7	NC
8	NC
9	NC

: The pin6 on RJ11 connector is used as input for 12V DC IN for diagnostic purpose. Supplying power on this pin, when the device is powered by POE injector, might damage the device.

3.6.1.3 Antenna Ports

: Applicable only to MP-8200-BSU, MP-8200-SUA and QB-8200-EPA/LNK.

The Antenna Ports A1, A2 and A3 are used to connect external antenna (s). These antenna connectors are of N-Type female with built-in surge protection.

*: Use antenna port A1 for single polarization antennas, and antenna ports A1 and A3 for dual polarization antennas. By default, A1 and A3 ports are enabled. Enable A2 port, in case you are using 3*3 antennas.*

: When using a single polarized or dual polarized antenna, ensure to terminate the unused antenna ports with N-male 50 Ohm Terminator (supplied with the product package). Not doing so may damage the radio card. To buy an additional N-male 50 Ohm Terminator, place an order separately with your distributor.
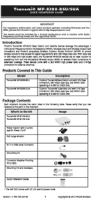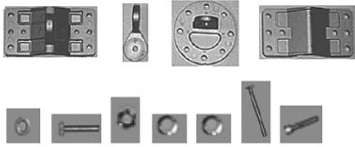
3.6.1.4 Grounding Points

To protect the device against lighting or ESD events, you must ground the device properly. To ensure proper grounding, use either of the ground points that are situated at the bottom corner of the device and the grounding screw (#8-32 thread size) provided to attach a ground wire of at least 10 AWG stranded to the device.

3.6.2 Product Package

Each shipment includes the items listed in the following table. Please verify that you have received all the parts in this shipment, prior to installation.

What's in the Kit	Image
MP-8200-BSU/ MP-8250-BS9/ MP-8250-BS1/ MP-8200-SUA/ MP-8250-SUR/ QB-8200-EPA/LNK QB-8250-EPR/LNK	**MP-8200-BSU/SUA** **QB-8200-EPA** **MP-8250-SUR / QB-8250-EPR** **MP-8250-BS9/BS1**
PoE Injector with Country specific Power Cord *WD - US, UK and EU power cords* *US and JP* - US power cord* *EU - UK and EU power cords* ** Not for MP-8250-BS9, MP-8250-BS1*	
RJ11 to DB9 Serial Connector	
Connector Weather Proofing Kit (2 sets)	
PoE Surge Arrestor	
Grounding Kit	

What's in the Kit	Image
N-male 50 Ohm Terminator *Supplied with MP-8200-BSU, MP-8200-SUA and QB-8200-EPA/LNK devices only*	
Quick Installation Guide	
Mounting Kit and Hardware	The mounting kit includes the following: • Mounting clamp for wall/pole • Extension arm • Mounting plate to enclosure • Mounting clamp for pole mounting The following table lists the items included with the mounting kit:

Quantity	Description	Image
6 each	Plain washer #5/16	
2 each	Hex Cap Screw NC 5/16-18 x 35	
2 each	Nut NC 5/16-18	
4 each	Helical Spring Lock Washer #1/4	
4 each	Helical Spring Lock Washer #5/16	
2 each	Hex Cap Screw NC 5/16-18 x 80	
4 each	68764, Screw, Machine, Pan, Philips, 1/4"-20, 5/8"L	

: QB-8200-LNK and QB-8250-LNK contains two sets of all the above accessories.

3.6.3 Installation Procedure

This section describes the steps to install and mount the device(s).

: Please note that we have taken MP-8200-BSU as an example to explain the steps to install and mount the device. Please correlate the same with your device.

: The device must be installed by a trained professional who is familiar with radio frequency planning and regulatory limits.

Perform the following steps to install and mount the device.

Step 1: Plan for Installation

There are several planning factors to be considered before installing the device. In addition to selecting the installation site, you should do the following:

Calculate:

- Required RSL and fade margin to achieve link availability objectives. For more details on how to calculate RSL and fade margin, please refer to the *'Tsunami® 800 and 8000 Series - Antenna Installation Guide'* and '*Proxim Link Calculator'* that are available on the support site at http://my.proxim.com.
- Required path availability
- Anticipated multi-path reflection points

Determine:

- System frequency plan
- Required antenna mounting height to obtain proper path clearance
- Required transmission line types (like cable, waveguides) and lengths

Plan for:

- Device's continuous power consumption needs
- Lightning protection and system grounding
- Hardware mounting
- Cable installation including egress
- Pre-testing equipment (back-to-back test procedure)

Step 2: Choose a Location

To make optimal use of the device, you must find a suitable location to install the hardware. The range of the radio device largely depends upon the position of the antenna. Proxim recommends you do a site survey, observing the following requirements, before mounting the hardware.

- The location must allow easy disconnection of power to the radio, if necessary.
- Ensure free flow of air around the hardware.
- The radio device must be kept away from vibration and excessive heat.
- The installation must conform to local regulations at all times.

The devices are designed to directly mount to a pole. Using the supplied brackets and hardware, you can mount them to a 1.25 inch to 3-inch pole (outside diameter). Longer bolts (not supplied) are required for mounting the device to a larger diameter pole. Using just one of the pole mounting brackets, you can mount the device to a wall or other flat surface.

Step 3: Gather Required Tools

You should have the following tools available before installing the device:

- Cross-tip screwdrivers
- Small blade standard screwdriver
- Large blade standard screwdriver
- Wire crimpers (if using connectors that are not pre-made)
- Adjustable 6" wrench
- Weatherproofing material for sealing external connectors (such as butyl tape)
- Straight-through UV-protected STP-rated Cat5e/Cat6 Ethernet cable for connecting to PC, or cable for connecting to a hub or a switch.

Step 4: Unpack the Product Package

1. Unpack the device and its accessories from the shipping box.
2. Please make a note of the Ethernet addresses, MAC addresses and the serial number. These addresses may be used when configuring the device. Note that the serial number helps you to seek support from the Proxim's Customer support team.

Step 5: Weatherproofing RJ45 Connectors

The following steps explain how to weatherproof the RJ45 connectors:

1. Use a straight-through cable (Cat5e/Cat6) with one end bare.
2. Connect the crimped RJ45 connector end of the cable into the RJ45 Ethernet port inside the enclosure. The cable connector should latch into the Ethernet port.
3. Slide the Flat Washer (A) into the Connector Body (B) to make it waterproof and onto the bare end of the cable. Next, fasten the Connector Body into the Ethernet connector hole on the device.
4. Slide the tube-shaped Compression Washer (C) into the Compression Ring (D) and onto the cable from the bare end, and insert into the fixed Connector Body.
5. Slide the Sealing Nut (E) over the bare end of the cable and fasten it on the fixed Connector Body.
6. Crimp the bare end of the cable with RJ45 connector and connect it to the **PWR LAN-OUT** port on the PoE Injector.

Figure 3-54 Weatherproofing RJ45 Connector

Additional Weatherproofing Steps

- For detailed explanation to weatherproof RJ45 connectors, refer to Appendix - Additional Weatherproofing Steps.
- For detailed explanation to weatherproof RF connections, refer to *Tsunami® 800 and 8000 Series Antenna Installation Guide*, which is available at http://my.proxim.com.

Step 6: Assemble Mounting Hardware

1. Fix the Mounting Plate (A) by using the provided screws and washers (Torque 9 N·m/75 in-lbs).
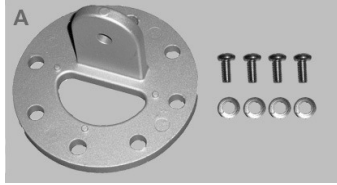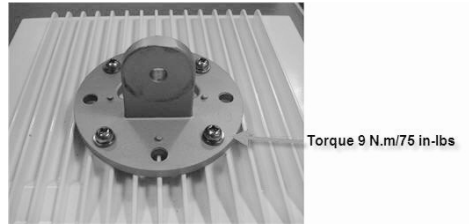
Mounting Plate

**Fixing Mounting Plate
to the device**

Torque 9 N.m/75 in-lbs

**Mounting Plate fixed to
the Device**

2. Fix the Extension Arm (B) to the fixed Mounting Plate with the provided screw, nut and washers. The Extension Arm gives the device more possible tilt, letting you adjust for azimuth or elevation over a larger angle.

Extension Arm
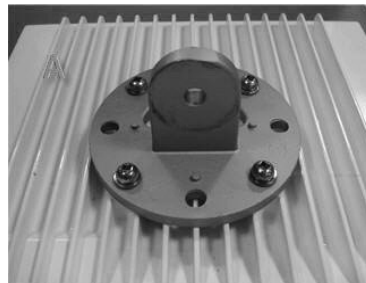
Mounting Plate fixed to the device

**Extension Arm fixed to
Mounting Plate**

3. Fix the Mounting Bracket (C) to fixed Extension Arm with the provided screw, nut and washers.
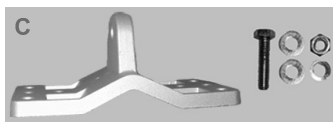
Mounting Bracket
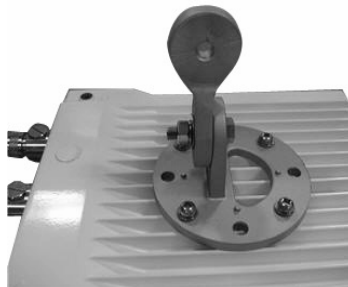
**Extension Arm fixed to
Mounting Plate**

**Mounting Bracket fixed to
Extension Arm**

4. Tighten the assembled parts (Torque 15 N·m/130 in-lbs).

The following figure shows the fully assembled mounting hardware fixed to the device.

Figure 3-55 Assembled Device

Step 7: Mount the Device

1. To pole-mount the device, insert the provided screws and washers through bracket (F). Fasten around the pole to bracket (C) and secure (Torque 11 N.m/100 in-lbs).
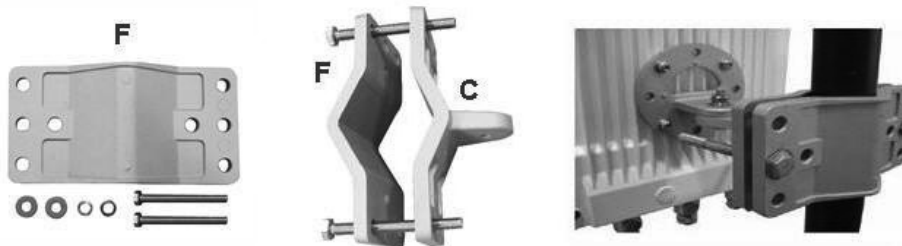
Figure 3-56 Pole Mounting

2. To wall-mount the device, mount the bracket (C) to a wall by using 4 screws (not supplied), as shown:

Figure 3-57 Wall Mounting

Step 8: Plug in the Cables

: Unscrew the sealing cap for installation of the cable.

1. Plug one end of the straight-through Cat5e/Cat6 cable into the Ethernet Port 1 of the device by following the Weatherproofing steps explained under Step5. Connect the other end of the cable into the **PWR LAN-OUT** port on the PoE Injector.

: Always use a straight cable from PoE to the device. When you use a 4-pair cross over ethernet cable, the reload functionality gets activated and forcibly deletes the operating image.

Figure 3-58 Cable Plugged In

2. Plugging in the second Cat5e/Cat6 cable into the Ethernet Port 2 interface of the device is optional. While using the second Ethernet Port for PoE OUT and data, the following should be considered:
    - 48 VDC (15 W average) is present on the second Ethernet port. Make sure the connected device can support this voltage.
    - If power from the second Ethernet Port is desired, then Proxim recommends to use 60W PoE (not supplied).
    - If the device is connected to the second Ethernet port for data, then use a PoE Splitter (not supplied)

3. Optionally, connect a RJ11 to DB9 Serial Connector to device's Serial Port for debugging and management, and audible antenna alignment.

Figure 3-59 PoE Injector

4. To connect the device through a hub or a switch to a Personal Computer, connect an Ethernet cable between the network interface card in the Personal Computer and the hub, and between the hub and the RJ45 **LAN-IN** port on the PoE Injector.

5. To connect the device directly to a Personal Computer, connect an Ethernet cable between the network interface card in the Personal Computer and the RJ45 **LAN-IN** port on the PoE Injector.

Step 9: Connect the Antenna

: Applicable only to MP-8200-BSU, MP-8200-SUA and QB-8200-EPA/LNK.

Connect the antenna to the device by connecting the straight N-male end of the cable to the device antenna port and the right angle N-male end of the cable at the antenna.

:

- *Record which port each antenna polarization is associated with, to ensure that each side matches and aid in configuration.*
- *Ensure to use antenna port A1 for single polarization antennas, and antenna ports A1 and A3 for dual polarization antennas.*

Step 10: Install Surge Protector

Proxim recommends two approved lightning surge protectors to be installed, one near to the device and the other at the building ingress point.

 : *For an additional Surge Protector, place an order separately with your distributor.*

Perform the following steps to ensure proper surge protection:

1. Mount the provided surge protector near the outdoor device and use 10 AWG or a better gauge wire to connect the protector's ground lug to the appropriate mounting ground point. The outdoor device and co-located surge protector should have a common grounding point using the shortest possible grounding cable.

2. Mount a second surge protector near the building ingress and use 10 AWG or a better gauge wire to connect the surge protector's ground lug to earth ground as shown in the figure below.
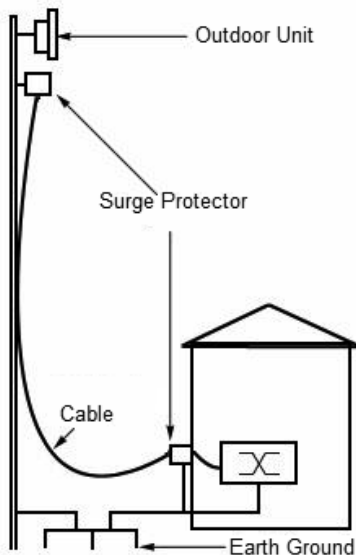
Figure 3-60 Surge Protector

 : *Use Outdoor-rated, UV protected, shielded Cat5e/Cat6 cable for the following:*

3. Connect an RJ45 terminated cable between the indoor device and to the port on the surge protector at the building ingress.

4. Connect a short RJ45 terminated cable between the outdoor device and the port on the co-located surge protector.

5. Connect an RJ45 terminated cable between the two surge protectors on their remaining ports.

 : ***Ensure to loop the cable before entering the premise to prevent water ingress.***

Step 11: Ground the Unit

To ensure proper grounding, use either of the ground points which are situated at the bottom corners of the device and the grounding screw(#8-32 thread size) provided to attach a ground wire of at least 10 AWG stranded to the device. It is important that the following ground guidelines are followed during installations to protect the device against lighting or ESD events:

1. Connect one end of the grounding cable to the device and the other end to the closest earthing system point at the installation.
2. Cut any extra ground wire length when finished connecting it to the single point earth ground.
3. Avoid sharp bends and never loop or coil up the ground wire, always connect it straight to ground.
4. A good earth ground impedance is less than 1.0 ohm.
5. Measure ground impedance at the point where the protector ground wire is connected and not at the ground rod.
6. Connect the surge protector ground wire and equipment ground (both power ground and telecomm ground) to a single common ground.
7. Make sure all connections are fastened securely and are tight.
8. Never install during a storm and always follow your local safety codes.

Connect the grounding wire, which is supplied with the product package, to the device as shown below:

Figure 3-61 Ground the Device

Step 12: Power ON the Device

Plug in the power cord into a power outlet after having connected the Power Injector and the radio device by using straight-through Cat5e/Cat6 cable. There is no ON/OFF switch on the device. To disconnect power, unplug the RJ45 connector from the **PWR LAN-OUT** port on the power injector.

Step 13: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the device's operational state. The LEDs are available at the device's Ethernet connector inside the enclosure. You can see the LEDs through the ethernet connector. The LEDs will not be visible if the RJ45 connector is weatherproofed.
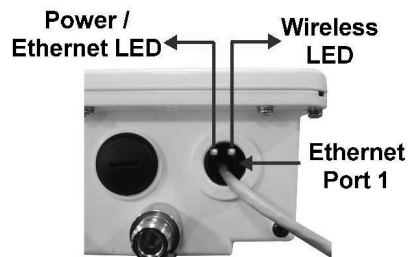
Figure 3-62 View LEDs

The following table states the status of LEDs and the corresponding operational state of the device:

LED State	Ethernet 1	
	Power/Ethernet LED	**Wireless LED**
Yellow	Device is self heating (Cold Start)	Power is on and the device detects Reload signal
Off	No Power	Radio is not present or failed to detect
Blinking Green-Fast	Power is on and the Ethernet link on Ethernet 1 is down	Radio is on and wireless link has not been established yet
Blinking Green (5 times) and turns off	Bootloader detected no image	Not Applicable
Green	Power is on and the Ethernet link on Ethernet 1 is up	Wireless link has been established

LED State	Ethernet 2	
	Power/Ethernet LED	**Wireless LED**
Yellow	Not Applicable	Not Applicable
Off	No Power	Normal Operation
Blinking Green-Fast	Power is on and the Ethernet link on Ethernet 2 is down	Not Applicable
Blinking Green (5 times) and turns off	Bootloader detected no image	Not Applicable
Green	Power is on and the Ethernet link on Ethernet 2 is up	Not Applicable

Step 14: Align the Antennas

Antenna alignment is the process of physically aligning the antenna of the radio receiver and transmitter to have the best possible link established between them. The antenna alignment process is usually performed during installation and after major repairs. If you are installing external antennas, refer to the documentation that accompanies the antenna for installation instructions.

The device has an audible antenna alignment tool that can be activated by plugging in the supplied RJ11 serial dongle. It is audible upto 30 minutes. The CLI command enables both audible and numerical feedback as the CLI shows the running Signal-to-Noise Ratio (SNR) values twice a second.

The output from the beeper for antenna alignment consists of short beeps with a variable interval. The interval changes with the SNR level to assist in correctly aligning the antenna. An increase in signal level is indicated by a shorter interval between beeps and a reduction in signal level results in beeps longer apart.

The alignment process averages the SNR, which is represented by an average length beep. When a higher SNR is received, the beep period becomes shorter, dependent upon the difference to the average. A lower SNR results in a longer period between beeps.
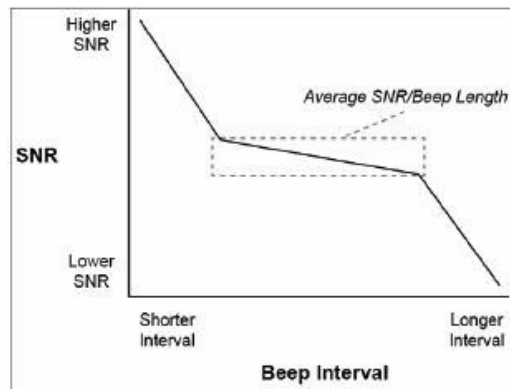
Figure 3-63 Beep Interval

When the antenna is aimed, the beep intuitively represents whether the SNR is rising or falling. The higher the SNR rises, the shorter the period of the beep is heard and the higher the frequency of the beep.

When you change the position of the antenna, SNR averaging settles at the new value and the beeping returns to the average length so the antenna can again be aimed for rising SNR.

Aiming is complete if moving in any direction results in a falling SNR value (which can be heard as longer periods between beeps).

_:_

- _The range of the average SNR has been limited to values from 5 to 43; therefore, anything over 43 always results in a short period between beeps and values below 5 always have a long period._
- _The Antenna Alignment Display (AAD) CLI output is disabled automatically 30 minutes after it is enabled to remove the load of extra messages on the wireless interface. The default telnet time-out is 300 seconds (5 minutes)._

Antenna Alignment Commands

To enable the antenna alignment display from the CLI prompt, enter the following commands:

- **aad enable local**: Enables display of the local signal, noise and SNR.
- **aad enable remote**: Enables display of the remote signal, noise and SNR.
- **aad enable**: Enables display of local and remote signal, noise and SNR.

: Use a flat blade screw driver to disconnect and pull out the Serial cable from the enclosure after the antenna alignment is done. After withdrawing the cables, seal the serial port carefully to avoid water seepage.

4

Technical Specifications

This chapter provides information on the following topics:

- Device Models
- Accessories
- OFDM Modulation Rates
- Wireless Protocol
- Interfaces
- Transmit Power Settings
- Receive Sensitivity
- Management
- Power Supply
- Hardware Specifications
- Integrated Antenna Specifications
- Physical Specifications
- Environmental Specifications
- MTBF

Device Models

Model	Part Number	Description
Base Stations		
MP-820-BSU-100-WD	901-00133	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 2 N-Type Connectors - WD PoE
MP-820-BSU-100-US	901-00135	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 2 N-Type Connectors - US PoE
MP-820-BSU-100-EU	901-00162	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 2 N-Type Connectors - EU PoE
MP-825-BS3-100-WD	901-00184	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 15 dBi Integrated Antenna - WD PoE
MP-825-BS3-100-US	901-00185	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 15 dBi Integrated Antenna - US PoE
MP-825-BS3-100-EU	901-00186	MP 820 Base Station Unit, 100 Mbps, GPS Sync Ready, 2x2 MIMO, 15 dBi Integrated Antenna - EU PoE
MP-8100-BSU-US	76705	MP 8100 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
MP-8100-BSU-WD	76708	MP 8100 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
MP-8100-BSU-EU	901-00158	MP 8100 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
MP-8160-BSU-WD	901-00109	MP 8160 Base Station Unit, 300Mbps, 2x2 MIMO, 2 N-Type Connectors - WD PoE
MP-8160-BS9-WD	901-00120	MP 8160 Base Station Unit, 300Mbps, 2x2 MIMO, 16 dBi Integrated 90 degree Sector Antenna - WD PoE

MP-8200-BSU-US	901-00118	MP 8200 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
MP-8200-BSU-WD	901-00116	MP 8200 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
MP-8200-BSU-JP	901-00148	MP 8200 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - JP PoE
MP-8200-BSU-EU	901-00155	MP 8200 Base Station Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
MP-8250-BS9-US	901-00119	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 16 dBi Integrated 90° Sector Antenna - US PoE
MP-8250-BS9-WD	901-00117	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 16 dBi Integrated 90° Sector Antenna - WD PoE
MP-8250-BS9-EU	901-00165	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 16 dBi Integrated 90° Sector Antenna - EU PoE
MP-8250-BS1-US	901-00170	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated 10° Panel Antenna - US PoE
MP-8250-BS1-WD	901-00171	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated 10° Panel Antenna - WD PoE
MP-8250-BS1-EU	901-00172	MP 8250 Base Station Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated 10° Panel Antenna - EU PoE
Subscribers		
MP-8100-SUA-US	76706	MP 8100 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
MP-8100-SUA-WD	76709	MP 8100 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
MP-8100-SUA-EU	901-00160	MP 8100 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
MP-8150-SUR-US	76707	MP 8150 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - US PoE
MP-8150-SUR-WD	76710	MP 8150 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - WD PoE
MP-8150-SUR-EU	901-00159	MP 8150 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - EU PoE
MP-8150-CPE-100a-US	901-00012	MP 8150 CPE, 100Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - US PoE
MP-8150-CPE-100a-WD	901-00014	MP 8150 CPE, 100Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - WD PoE
MP-8150-CPE-A100	901-00050	MP 8150 CPE, 100Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - WD PoE
MP-8150-SUR-100-US	901-00145	MP 8150 Subscriber Unit, 2x50 Mbps, MIMO 2x2, 21dBi Integrated Antenna - US PoE
MP-8150-SUR-100-WD	901-00146	MP 8150 Subscriber Unit, 2x50 Mbps, MIMO 2x2, 21dBi Integrated Antenna - WD PoE
MP-8150-SUR-100-EU	901-00161	MP 8150 Subscriber Unit, 2x50 Mbps, MIMO 2x2, 21dBi Integrated Antenna - EU PoE
MP-8160-SUA-WD	901-00111	MP 8160 Subscriber Unit, 300 Mbps, 2x2 MIMO, 2 N-Type connectors - WD PoE
MP-8160-CPE-A100-WD	901-00110	MP 8160 CPE, 100Mbps, 2x2 MIMO, 15 dBi Integrated Antenna - WD PoE
MP-826-CPE-50-WD	901-00153	MP 826 Customer Premise Equipment , 50 Mbps, 2x2 MIMO, 15dBi integrated antenna - World PoE
MP-8200-SUA-US	901-00123	MP 8200 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
MP-8200-SUA-WD	901-00121	MP 8200 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
MP-8200-SUA-JP	901-00151	MP 8200 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - JP PoE
MP-8200-SUA-EU	901-00157	MP 8200 Subscriber Unit, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
MP-8250-SUR-US	901-00124	MP 8250 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna – US PoE
MP-8250-SUR-WD	901-00122	MP 8250 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna – WD PoE
MP-8250-SUR-JP	901-00152	MP 8250 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna – JP PoE

MP-8250-SUR-EU	901-00156	MP 8250 Subscriber Unit, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna – EU PoE
MP-820-SUA-50⁺-WD	901-00134	MP 820 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 2 N-Type Connectors - WD PoE
MP-820-SUA-50⁺-US	901-00136	MP 820 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 2 N-Type Connectors - US PoE
MP-820-SUA-50⁺-EU	901-00163	MP 820 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 2 N-Type Connectors - EU PoE
MP-825-SUR-50⁺-WD	901-00175	MP 825 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi, Panel Antenna - WD PoE
MP-825-SUR-50⁺-US	901-00176	MP 825 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi, Panel Antenna - US PoE
MP-825-SUR-50⁺-EU	901-00177	MP 825 Subscriber Unit, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi, Panel Antenna - EU PoE
MP-825-CPE-50-US	901-00137	MP 825 Customer Premise Equipment, 50 Mbps, MIMO 2x2, 15 dBi integrated antenna - US PoE
MP-825-CPE-50-WD	901-00138	MP 825 Customer Premise Equipment, 50 Mbps, MIMO 2x2, 15 dBi integrated antenna - WD PoE
MP-825-CPE-50-EU	901-00154	MP 825 Customer Premise Equipment, 50 Mbps, MIMO 2x2, 15 dBi integrated antenna - EU PoE
MP-825-CPE-100-WD	901-00187	MP 825 Customer Premise Equipment, 100 Mbps, MIMO 2x2, 15 dBi integrated antenna - WD PoE
MP-825-CPE-100-US	901-00188	MP 825 Customer Premise Equipment, 100 Mbps, MIMO 2x2, 15 dBi integrated antenna - US PoE
MP-825-CPE-100-EU	901-00189	MP 825 Customer Premise Equipment, 100 Mbps, MIMO 2x2, 15 dBi integrated antenna - EU PoE
Quick Bridges		
QB-8100-EPA-US	76946	QB 8100 End Point A, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
QB-8100-EPA-WD	76947	QB 8100 End Point A, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
QB-8100-EPA-EU	902-00663	QB 8100 End Point A, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
QB-8100-LNK-US	77519	QB 8100 Link (A pair of QB-8100-EPA-US devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - US PoE
QB-8100-LNK-WD	77518	QB 8100 Link (A pair of QB-8100-EPA-WD devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - WD PoE
QB-8100-LNK-EU	902-00661	QB 8100 Link (A pair of QB-8100-EPA-EU devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - EU PoE
QB-8150-EPR-US	76821	QB 8150 End Point Ruggedized, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - US PoE
QB-8150-EPR-WD	76823	QB 8150 End Point Ruggedized, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - WD PoE
QB-8150-EPR-EU	902-00662	QB 8150 End Point Ruggedized, 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - EU PoE
QB-8150-LNK-US	76822	QB 8150 Link (A pair of QB-8150-EPR-US devices), 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - US PoE
QB-8150-LNK-WD	76824	QB 8150 Link (A pair of QB-8150-EPR-WD devices), 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - WD PoE

QB-8150-LNK-EU	902-00660	QB 8150 Link (A pair of QB-8150-EPR-EU devices), 300 Mbps, 2x2 MIMO, 23 dBi Integrated Antenna - EU PoE
QB-8150-LNK-12-WD	902-00056	QB 8150 Link (A pair of QB-8150-EPR-12-WD devices), 12 Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - WD PoE
QB-8150-LNK-50-US	902-00063	QB 8150 Link (A pair of QB-8150-EPR-50-US devices), 50 Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - US PoE
QB-8150-LNK-50-WD	902-00064	QB 8150 Link (A pair of QB-8150-EPR-50-WD devices), 50 Mbps, 2x2 MIMO, 16 dBi Integrated Antenna - WD PoE
QB-8150-LNK-100-US	902-00644	QB 8150 Link (A pair of QB-8150-EPR-100-US devices), 2x50 Mbps, MIMO 2x2, 21 dBi Integrated Antenna - US PoE
QB-8150-LNK-100-WD	902-00645	QB 8150 Link (A pair of QB-8150-EPR-100-WD devices), 2x50 Mbps, MIMO 2x2, 21 dBi Integrated Antenna - WD PoE
QB-8151-EPR-US	902-00748	QB 8151 End Point Ruggedized, 300 Mbps, 2x2 MIMO, 21 dBi Integrated Antenna - US PoE
QB-8151-EPR-WD	902-00750	QB 8151 End Point Ruggedized, 300 Mbps, 2x2 MIMO, 21 dBi Integrated Antenna - WD PoE
QB-8151-LNK-US	902-00749	QB 8151 Link (A pair of QB-8151-EPR-US devices), 300 Mbps, 2x2 MIMO, 21 dBi Integrated Antenna - US PoE
QB-8151-LNK-WD	902-00751	QB 8151 Link (A pair of QB-8151-EPR-WD devices), 300 Mbps, 2x2 MIMO, 21 dBi Integrated Antenna - WD PoE
QB-8200-EPA-US	902-00595	QB 8200 End Point, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - US PoE
QB-8200-EPA-WD	902-00594	QB 8200 End Point, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - WD PoE
QB-8200-EPA-JP	902-00654	QB 8200 End Point, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - JP PoE
QB-8200-EPA-EU	902-00668	QB 8200 End Point, 300 Mbps, 3x3 MIMO, 3 N-Type Connectors - EU PoE
QB-8200-LNK-US	902-00599	QB 8200 Link (A pair of QB-8200-EPA-US devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - US PoE
QB-8200-LNK-WD	902-00598	QB 8200 Link (A pair of QB-8200-EPA-WD devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - WD PoE
QB-8200-LNK-JP	902-00655	QB 8200 Link (A pair of QB-8200-EPA-JP devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - JP PoE
QB-8200-LNK-EU	902-00658	QB 8200 Link (A pair of QB-8200-EPA-EU devices), 300 Mbps, 3x3 MIMO, 3 N - Type Connectors - EU PoE
QB-8250-EPR-US	902-00600	QB 8250 End Point, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - US PoE
QB-8250-EPR-WD	902-00596	QB 8250 End Point, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - WD PoE
QB-8250-EPR-JP	902-00656	QB 8250 End Point, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - JP PoE
QB-8250-EPR-EU	902-00669	QB 8250 End Point, 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - EU PoE
QB-8250-LNK-US	902-00601	QB 8250 Link (A pair of QB-8250-EPR-US devices), 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - US PoE
QB-8250-LNK-WD	902-00597	QB 8250 Link (A pair of QB-8250-EPR-WD devices), 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - WD PoE
QB-8250-LNK-JP	902-00657	QB 8250 Link (A pair of QB-8250-EPR-JP devices), 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - JP PoE
QB-8250-LNK-EU	902-00659	QB 8250 Link (A pair of QB-8250-EPR-EU devices), 300 Mbps, 2x2 MIMO, 23 dBi, Panel Antenna - EU PoE

QB-825-EPR-50-US	902-00743	QB 825 End Point, 50 Mbps, 2x2 MIMO, 15 dBi Antenna - US PoE
QB-825-EPR-50-WD	902-00745	QB 825 End Point, 50 Mbps, 2x2 MIMO, 15 dBi Antenna - WD PoE
QB-825-LNK-50-US	902-00744	QB 825 Link (A pair of QB-825-EPR-50-US devices), 50 Mbps, 2x2 MIMO, 15 dBi Antenna - US PoE
QB-825-LNK-50-WD	902-00746	QB 825 Link (A pair of QB-825-EPR-50-WD devices), 50 Mbps, 2x2 MIMO, 15 dBi Antenna - WD PoE
QB-825-LNK-50$^+$-WD	902-00637	QB 825 Link (A pair of QB-825-EPR-50$^+$-WD devices), GPS Sync Ready, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi Antenna - WD PoE
QB-825-LNK-50$^+$-US	902-00638	QB 825 Link (A pair of QB-825-EPR-50$^+$-US devices), GPS Sync Ready, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi Antenna - US PoE
QB-825-LNK-50$^+$-EU	902-00665	QB 825 Link (A pair of QB-825-EPR-50$^+$-EU devices), GPS Sync Ready, 50 Mbps (Upgradable to 100 Mbps), 2x2 MIMO, 15 dBi Antenna - EU PoE
Note: GPS Sync Ready is subject to WORP Sync firmware.		

Accessories

Part Numbers	Accessories
76590	25m, RJ45 terminated, UV Rated, STP CAT5e cable for outdoor use
76591	50m, RJ45 terminated, UV Rated, STP CAT5e cable for outdoor use
76592	75m, RJ45 terminated, UV Rated, STP CAT5e cable for outdoor use
949-00075	6 ft Super-Low Loss Coaxial Antenna Cable, 0.600", Standard N-Male to Right Angle N-Male
235-00001	Surge Protector, Gigabit Surge Protector with Shielded RJ45 Connector
76593	Weatherproof Cable Gland Connector
76346	32W Gigabit PoE injector with RJ45 Connector and Reload button
949-00019	4.9 - 6.1 GHz, Dual Polarity, Vertical and Horizontal, 30 dBi Panel Antenna
76955	4.9 - 5.875 GHz, Dual Polarity, Slanted (±45°) or V/H, 23 dBi Panel Antenna
77067	4.9 - 6.1 GHz, Dual Polarity, Slanted (±45°), 17 dBi Sector Antenna - 60 degrees
77551	5.1 - 6.1 GHz, Triple Polarization MIMO, Slanted (±45°) and Vertical, 17 dBi Panel Antenna
949-00012	4.9-5.95GHz, Dual Polarity, Vertical and Horizontal, 14 dBi Sector Antenna- 90 degrees. Mounting kit included.
77552	4.9 - 6.1 GHz, Triple Polarizations MIMO, Slanted (±45°) and Vertical, 16 dBi Sector Antenna - 90 degrees
949-00011	4.9-6GHz, Dual Polarity, Vertical /Horizontal,16.5 dBi Sector Antenna - 60 degrees. Mounting kit included.
949-00024	5.9-6.425 GHz Dual Polarized Base Station Antenna 90 degrees
949-00025	5.9-6.425 GHz Dual Polarized Base Station Antenna 60 degrees
949-00026	5.7-6.425 GHz Dual Polarized Subscriber Antenna
949-00045	Cable Feed-Through Sealing Cap kits, PACK OF 20 (MP/QB.11)
125-00003	2-6 GHz High Performance RF Lightning Arrestor, N-Female to N-Male Protected
76409	Outdoor Universal Mounting Kit for TMP.11; TMP.16; TMP8000

400-00002	PoE Gigabit 48V DC Injector with terminal Jack - 25 pack
949-00027	2.3-2.7 GHz, Dual Polarity, Vertical and Horizontal, 20 dBi Panel Antenna
949-00083	Spare gas capsule for Tsunami 8100 N-Type connector
1087-UMK	Universal Mounting Bracket for Wall Mounting. Refer Universal Mounting Bracket
210-00046	N Male Terminator 50 Ohm, 0-6 GHz
949-00017	6 ft Super-Low Loss Coaxial Antenna Cable, 0.600", St-N - Male-Male

OFDM Modulation Rates

Given below are the OFDM modulation rates for the Tsunami® 800 and 8000 series products:

Modulation	Data Rates (Mbps)									
	5 MHz		10 MHz		20 MHz		40 MHz			
	Full GI-800ns		Full GI-800ns		Full GI-800ns		Short GI-400ns		Full GI-800ns	
	Longer Range	Higher Throughput	Longer Range	Higher Throughput	Longer Range	Higher Throughput	Longer Range	Higher Throughput	Longer Range	Higher Throughput
BPSK 1/2	1.6	3.3	3.3	6.5	6.5	13	15	30	13.5	27
QPSK 1/2	3.3	6.5	6.5	13	13	26	30	60	27	54
QPSK 3/4	4.9	9.7	9.7	19.5	19.5	39	45	90	40.5	81
16QAM 1/2	6.5	13	13	26	26	52	60	120	54	108
16QAM 3/4	9.7	19.5	19.5	39	39	78	90	180	81	162
64QAM 2/3	13	26	26	52	52	104	120	240	108	216
64QAM 3/4	14.6	29.3	29.3	58.5	58.5	117	135	270	121.5	243
64QAM 5/6	16.2	32.5	32.5	65	65	130	150	300	135	270

Note: Maximum Packet Size = 1500 Bytes (excluding one VLAN header, Ethernet header and FCS).

Products	Modulation	Legacy Data Rates (Mbps)		
		5 MHz	10 MHz	20 MHz
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 MP-8150-CPE MP-8200-BSU MP-8200-SUA MP-8250-SUR MP-8250-BS9 MP-8250-BS1 MP-820-BSU-100 MP-820-SUA-50+ MP-825-SUR-50+ MP-825-BS3-100 MP-825-CPE-50 MP-825-CPE-100	BPSK 1/2	1.5	3	6
	BPSK 3/4	2.25	4.5	9
	QPSK 1/2	3	6	12
	QPSK 3/4	4.5	9	18
	16QAM 1/2	6	12	24
	16QAM 3/4	9	18	36
	64QAM 2/3	12	24	48
	64QAM 3/4	13.5	27	54

Wireless Protocol

Category	Specification
Wireless Protocol	WORP® (Wireless Outdoor Router Protocol)

Interfaces

Products	Category	Specification
MP-8100-BSU; MP-8100-SUA MP-8150-SUR; MP-8160-BSU MP-8160-SUA; MP-8160-BS9 MP-8200-BSU; MP-8200-SUA MP-8250-SUR; MP-8250-BS9; MP-8250-BS1 QB-8100-EPA/LNK; QB-8150-EPR/LNK QB-8151-EPR/LNK QB-8200-EPA/LNK; QB-8250-EPR/LNK	Wired Ethernet	Two auto MDI-X RJ45 Gigabit Ethernet Ports – Port #1 with PoE IN and Data – Port #2 with PoE OUT (802.3af pin-out) and Data
	Serial Connector	RJ11 port built-in, DB9 Female via a converter included
MP-8150-CPE MP-8160-CPE-A100 MP-825-CPE-100 MP-825-CPE-50 MP-826-CPE-50 QB-825-EPR/LNK-50 QB-8150-LNK-12/50	Wired Ethernet	One auto MDI-X RJ45 100 Mbps Ethernet Port
	Serial Connector *	RS 232 Serial (RJ11 to DB9)
MP-8150-SUR-100 QB-8150-LNK-100 MP-820-BSU-100 MP-820-SUA-50$^+$ MP-825-BS3-100 MP-825-SUR-50$^+$ QB-825-EPR/LNK-50$^+$	Wired Ethernet	One auto MDI-X RJ45 Gigabit Ethernet Port
	Serial Connector	RS 232 Serial (RJ11 to DB9)
* Not applicable to MP-8160-CPE-A100, MP-825-CPE-100, MP-825-CPE-50, MP-826-CPE-50 and QB-825-EPR/LNK-50.		

Transmit Power Settings

2.4 and 5 GHz			
Products	**Stream**	**Modulation**	**Tx Power* for 20/40 MHz (+3/-2dB)**
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 QB-8100-EPA/LNK QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK	Single (or) Dual Stream	BPSK 1/2	21
		QPSK 1/2	21
		QPSK 3/4	21
		16 QAM 1/2	21
		16 QAM 3/4	21
		64 QAM 2/3	19
		64 QAM 3/4	18
		64 QAM 5/6	17

Note:
Output Power Attenuation: 0 – 25 dB, in 1 dB steps
Total EIRP must be calculated based on the antenna gain

* Tx Power indicates the power at the radio ports.
* In case of connectorized devices, the Tx Power at the antenna ports is 1 dB lower than the above tabulated values.
* Tx Power indicates the combined power for two Antenna ports. In order to use third antenna port, add 1.8 dB to the above values.

4.9 - 5.925 GHz				
Products	**Stream**	**Modulation**	**Tx Power* for 5/10/20 MHz (+/-1dB)**	**Tx Power* for 40 MHz (+/-1dB)**
MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8200-EPA/LNK QB-8250-EPR/LNK	Single (or) Dual Stream	BPSK 1/2	24	22
		QPSK 1/2	24	22
		QPSK 3/4	23	22
		16 QAM 1/2	22	21
		16 QAM 3/4	21	20
		64 QAM 2/3	20	19
		64 QAM 3/4	19	18
		64 QAM 5/6	18	17

Note:
Output Power Attenuation: 0 – 25 dB, in 1 dB steps
Total EIRP must be calculated based on the antenna gain

* Tx Power indicates the power at the radio ports.
* In case of connectorized devices, the Tx Power at the antenna ports is 1 dB lower than the above tabulated values.
* Tx Power indicates the combined power for two Antenna ports. In order to use third antenna port, add 1.8 dB to the above values.

6.4 GHz			
Products	**Stream**	**Modulation**	**Tx Power* for 5/10/20/40 MHz (+/-1dB)**
MP-8160-BSU MP-8160-BS9 MP-8160-SUA MP-8160-CPE-A100	Single (or) Dual Stream	BPSK 1/2	25
		QPSK 1/2	25
		QPSK 3/4	25
		16 QAM 1/2	25
		16 QAM 3/4	23
		64 QAM 2/3	22
		64 QAM 3/4	19
		64 QAM 5/6	16

Note:
Output Power Attenuation: 0 – 25 dB, in 1 dB steps
Total EIRP must be calculated based on the antenna gain

* Tx Power indicates combined power at the radio ports.
* In case of connectorized devices, the Tx Power at the antenna ports is 1 dB lower than the above tabulated values.

5 GHz			
Products	**Stream**	**Modulation**	**Tx Power* (dBm) for 20/40 MHz**
MP-8150-CPE QB-8150-LNK-12/50	Single (or) Dual Stream	BPSK 1/2	23
		QPSK 1/2	23
		QPSK 3/4	23
		16 QAM 1/2	23
		16 QAM 3/4	22
		64 QAM 2/3	21
		64 QAM 3/4	20
		64 QAM 5/6	19

Note:
Output Power Attenuation: 0 – 23 dB, in 1 dB steps
Output Power Values will have a tolerance of +/-1 dB
Total EIRP must be calculated based on integrated 16 dBi antenna gain

* Tx Power for 5GHz indicates the combined power.

5.150 - 5.925 GHz						
Products	**Stream**	**Modulation**	**Tx Power* (dBm)**			
			40 MHz	**20 MHz**	**10 MHz**	**5 MHz**
MP-820-BSU-100 MP-820-SUA-50+ MP-825-SUR-50+ MP-825-BS3-100 MP-825-CPE-50 MP-825-CPE-100 QB-825-EPR/LNK-50 QB-825-EPR/LNK-50+	Single (or) Dual Stream	BPSK 1/2	26	26	26	26
		QPSK 1/2	26	25	25	26
		QPSK 3/4	25	24	25	25
		16 QAM 1/2	24	24	24	24
		16 QAM 3/4	23	23	23	23
		64 QAM 2/3	22	22	22	22
		64 QAM 3/4	21	21	21	21
		64 QAM 5/6	17	18	18	18

: Integrated 15 dBi dual Polarized (H+V) panel antenna (14 dBi beyond 5.850 GHz)

Note:
Output Power Attenuation: 0 – 15 dB, in 1 dB steps
Output Power Values will have a tolerance of +/-2 dB (It is at the lower limit beyond 5.850 GHz)
Total EIRP must be calculated based on integrated 15 dBi antenna gain

* Tx Power for 5GHz indicates the combined power.

5.900 - 6.425 GHz						
Products	**Stream**	**Modulation**	**Tx Power* (dBm)**			
			40 MHz	**20 MHz**	**10 MHz**	**5 MHz**
MP-826-CPE-50	Single Stream	BPSK 1/2	25	25	25	25
		QPSK 1/2	25	25	25	25
		QPSK 3/4	25	25	25	25
		16 QAM 1/2	24	25	25	25
		16 QAM 3/4	23	24	24	24
		64 QAM 2/3	23	23	23	23
		64 QAM 3/4	21	21	21	21
		64 QAM 5/6	20	20	20	20

5.900 - 6.425 GHz
Note: Output Power Attenuation: 0 – 22 dB, in 1 dB steps Output Power Values will have a tolerance of +/-2 dB Total EIRP must be calculated based on integrated 15 dBi antenna gain ** Tx Power findicated above is the combined power.*

Receive Sensitivity

Products	Stream	Modulation	Receive Sensitivity (dBm)							
			2.4 GHz				5 GHz			
			40 MHz	20 MHz	10 MHz	5 MHz	40 MHz	20 MHz	10 MHz	5 MHz
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 QB-8100-EPA/LNK QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK	Single Stream	BPSK 1/2	-89	-92	-95	-96	-87	-92	-94	-97
		QPSK 1/2	-89	-91	-95	-96	-87	-89	-91	-95
		QPSK 3/4	-88	-89	-92	-94	-84	-87	-89	-92
		16 QAM 1/2	-85	-87	-88	-93	-81	-83	-86	-89
		16 QAM 3/4	-82	-85	-84	-90	-78	-80	-83	-86
		64 QAM 2/3	-77	-78	-83	-84	-73	-75	-78	-81
		64 QAM 3/4	-76	-77	-81	-83	-72	-74	-77	-80
		64 QAM 5/6	-74	-73	-79	-81	-70	-72	-75	-78
	Dual Stream	BPSK 1/2	-85	-87	-90	-93	-87	-90	-92	-95
		QPSK 1/2	-83	-85	-87	-89	-84	-87	-89	-92
		QPSK 3/4	-79	-81	-84	-86	-81	-84	-87	-90
		16 QAM 1/2	-77	-78	-82	-85	-78	-81	-84	-87
		16 QAM 3/4	-73	-75	-78	-80	-75	-78	-80	-83
		64 QAM 2/3	-68	-71	-74	-76	-71	-73	-76	-79
		64 QAM 3/4	-66	-68	-71	-74	-69	-72	-74	-78
		64 QAM 5/6	-64	-66	-70	-72	-68	-70	-73	-76
Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.										

Products	Stream	Legacy Data Rate (Mbps)	Receive Sensitivity (dBm) 5 GHz		
			20 MHz	**10 MHz**	**5 MHz**
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100	Single Stream	6	-91	-94	-97
		9	-91	-94	-97
		12	-92	-94	-96
		18	-90	-92	-95
		24	-86	-88	-92
		36	-83	-85	-88
		48	-78	-81	-84
		54	-77	-79	-82

Products	Stream	Modulation	Receive Sensitivity (dBm) 4.900 - 5.925 GHz			
			40 MHz	**20 MHz**	**10 MHz**	**5 MHz**
MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8200-EPA/LNK QB-8250-EPR/LNK	Single Stream	BPSK 1/2	-85	-90	-92	-95
		QPSK 1/2	-85	-87	-90	-92
		QPSK 3/4	-83	-85	-88	-90
		16 QAM 1/2	-80	-82	-84	-87
		16 QAM 3/4	-76	-78	-81	-84
		64 QAM 2/3	-72	-74	-76	-80
		64 QAM 3/4	-70	-72	-75	-77
		64 QAM 5/6	-68	-71	-73	-76
	Dual Stream	BPSK 1/2	-85	-88	-90	-93
		QPSK 1/2	-82	-85	-87	-91
		QPSK 3/4	-80	-83	-85	-88
		16 QAM 1/2	-77	-79	-82	-85
		16 QAM 3/4	-74	-76	-79	-82
		64 QAM 2/3	-69	-72	-74	-77
		64 QAM 3/4	-68	-70	-73	-76
		64 QAM 5/6	-66	-69	-71	-74
Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.						

Products	Stream	Legacy Data Rate (Mbps)	Receive Sensitivity (dBm) 4.900 - 5.925 GHz		
			20 MHz	**10 MHz**	**5 MHz**
MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR	Single Stream	6	-89	-92	-95
		9	-90	-92	-95
		12	-90	-92	-95
		18	-88	-90	-93
		24	-84	-87	-90
		36	-81	-84	-87
		48	-77	-79	-82
		54	-75	-78	-80

Products	Stream	Modulation	Receive Sensitivity (dBm) 6.4 GHz			
			40 MHz	**20 MHZ**	**10 MHZ**	**5 MHZ**
MP-8160-BSU MP-8160-BS9 MP-8160-SUA MP-8160-CPE-A100	Single Stream	BPSK 1/2	-90	-92	-95	-98
		QPSK 1/2	-88	-90	-92	-96
		QPSK 3/4	-86	-87	-90	-94
		16 QAM 1/2	-82	-84	-87	-91
		16 QAM 3/4	-79	-80	-83	-87
		64 QAM 2/3	-75	-77	-79	-83
		64 QAM 3/4	-73	-75	-77	-81
		64 QAM 5/6	-72	-73	-76	-80
	Dual Stream	BPSK 1/2	-88	-90	-92	-96
		QPSK 1/2	-86	-87	-90	-93
		QPSK 3/4	-83	-85	-87	-91
		16 QAM 1/2	-80	-81	-84	-88
		16 QAM 3/4	-77	-78	-81	-85
		64 QAM 2/3	-72	-74	-76	-80
		64 QAM 3/4	-71	-72	-75	-78
		64 QAM 5/6	-69	-70	-73	-76
Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.						

Products	Stream	Modulation	Receive Sensitivity (dBm) 5 GHz			
			40 MHz	**20 MHz**	**10 MHz**	**5 MHz**
MP-8150-CPE QB-8150-LNK-12/50	Single Stream	BPSK 1/2	-89.0	-93.0	-95	-96
		QPSK 1/2	-89.0	-92.0	-93	-94
		QPSK 3/4	-87.0	-90.0	-90	-92
		16 QAM 1/2	-84.0	-86.0	-87	-89
		16 QAM 3/4	-81.0	-83.0	-84	-86
		64 QAM 2/3	-77.0	-80.0	-79	-81
		64 QAM 3/4	-75.0	-78.0	-78	-80
		64 QAM 5/6	-73.0	-76.0	-76	-78
	Dual Stream	BPSK 1/2	-89.0	-93.0	-93	-94
		QPSK 1/2	-89.0	-92.0	-90	-91
		QPSK 3/4	-87.0	-90.0	-87	-89
		16 QAM 1/2	-84.0	-86.0	-84	-87
		16 QAM 3/4	-81.0	-83.0	-81	-83
		64 QAM 2/3	-77.0	-80.0	-77	-79
		64 QAM 3/4	-75.0	-78.0	-75	-77
		64 QAM 5/6	-73.0	-76.0	-73	-75
Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.						

Products	Stream	Modulation	Receive Sensitivity (dBm) 5.150 - 5.925 GHz			
			40 MHz	**20 MHz**	**10 MHz**	**5 MHz**
MP-820-BSU-100 MP-820-SUA-50^{+} MP-825-SUR-50^{+} MP-825-BS3-100 MP-825-CPE-50 MP-825-CPE-100 QB-825-EPR/LNK-50 QB-825-EPR/LNK-50^{+}	Single Stream	BPSK 1/2	-88	-92	-93	-94
		QPSK 1/2	-87	-90	-92	-93
		QPSK 3/4	-85	-88	-90	-91
		16 QAM 1/2	-82	-85	-87	-89
		16 QAM 3/4	-79	-81	-83	-85
		64 QAM 2/3	-75	-77	-79	-81
		64 QAM 3/4	-73	-75	-77	-79
		64 QAM 5/6	-72	-74	-75	-77
	Dual Stream	BPSK 1/2	-88	-91	-93	-94
		QPSK 1/2	-85	-88	-90	-92
		QPSK 3/4	-83	-85	-87	-89
		16 QAM 1/2	-80	-83	-85	-87
		16 QAM 3/4	-77	-79	-81	-83
		64 QAM 2/3	-72	-75	-77	-79
		64 QAM 3/4	-70	-73	-74	-77
		64 QAM 5/6	-69	-71	-72	-75

: Integrated 15 dBi dual Polarized (H+V) panel antenna (14 dBi beyond 5.850 GHz)

Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.

Products	Stream	Legacy Data Rate (Mbps)	Receive Sensitivity (dBm) 5.150 - 5.925 GHz		
			20 MHz	10 MHz	5 MHz
MP-820-BSU-100 MP-820-SUA-50+ MP-825-SUR-50+ MP-825-BS3-100 MP-825-CPE-50 MP-825-CPE-100	Single Stream	6	-92	-93	-94
		9	-92	-93	-94
		12	-92	-93	-94
		18	-90	-91	-92
		24	-86	-88	-90
		36	-83	-85	-87
		48	-79	-81	-83
		54	-77	-79	-81

Products	Stream	Modulation	Receive Sensitivity (dBm) 5.900 - 6.425 GHz			
			40 MHz	20 MHz	10 MHz	5 MHz
MP-826-CPE-50	Single Stream	BPSK 1/2	-89	-92	-95	-97
		QPSK 1/2	-87	-90	-93	-95
		QPSK 3/4	-85	-87	-90	-92
		16 QAM 1/2	-82	-84	-87	-89
		16 QAM 3/4	-78	-80	-83	-86
		64 QAM 2/3	-74	-76	-79	-81
		64 QAM 3/4	-72	-74	-77	-79
		64 QAM 5/6	-69	-72	-75	-77
	Dual Stream	BPSK 1/2	-88	-90	-93	-96
		QPSK 1/2	-85	-87	-90	-92
		QPSK 3/4	-82	-84	-87	-90
		16 QAM 1/2	-79	-81	-84	-87
		16 QAM 3/4	-75	-78	-81	-83
		64 QAM 2/3	-70	-73	-75	-78
		64 QAM 3/4	-68	-71	-73	-76
		64 QAM 5/6	-61	-68	-70	-73
Note: Receive Sensitivity values should be considered with a tolerance +/- 2 dB.						

Management

Category	Specification
Local*	RS232 serial CLI (up to 115200 bps)
Remote	• Telnet and SSH, Web GUI (http) and SSL (https), TFTP • SNMP v1, v2c and v3 • SNMP trap and Syslog
* Not applicable to MP-8160-CPE-A100, MP-825-CPE-50, MP-825-CPE-100, MP-826-CPE-50 and QB-825-EPR/LNK-50.	

Power Supply

Products	Category	Specification
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8100-EPA/LNK QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK QB-8200-EPA/LNK QB-8250-EPR/LNK	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.67A on Ethernet Port#1 • 12 V-DC through RJ-11 serial port (for diagnostic purpose) *: Only one of the above input voltage options should be used at a time, to power on the device. Combination of any two options, may damage the device.* Tabulated below are the power consumption details. <table><tr><th>Products</th><th>Typical Consumption</th><th>Consumption (With Heaters ON)</th></tr><tr><td>MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 QB-8100-EPA/LNK QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK QB-8250-EPR/LNK</td><td>6 Watts</td><td>17 Watts maximum, with two heaters ON</td></tr><tr><td>MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8200-EPA/LNK QB-8250-EPR/LNK</td><td>12 Watts</td><td>22 Watts maximum, with two heaters ON</td></tr></table>
	Output Voltage*	48VDC through Ethernet Port #2. Power Always ON. *: Output voltage of 48VDC requires a 60-80W high power POE, available with Proxim Wireless Corporation on request.*
	Power over Ethernet Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.67 A (32 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Siz**e: 5.24x2.13x1.42 inches(133x54x36 mm) • **Weight:** 7 ounces (200 g) • **Temp:** 0 to 40° C
Note: Not applicable to MP-8150-SUR-100, and QB-8150-LNK-100 as they support only one Ethernet Port.		

Products	Category	Specification
MP-8160-BSU MP-8160-BS9 MP-8160-SUA	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.67 A on Ethernet Port#1 • 12 V-DC through serial port (for diagnostic purpose) • Consumption 10 Watts typical (13.8 Watts maximum with one heater ON) *: Only one of the above input voltage options should be used at a time, to power on the device. Combination of any two options, may damage the device.*
	Output Voltage*	48VDC through Ethernet Port #2. Power Always On.
	Power over Ethernet Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.67 A (32 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Size:** 5.24x2.13x1.42 inches(133x54x36 mm) • **Weight:** 7 ounces (200 g) • **Temp:** 0 to 40° C

Products	Category	Specification
MP-8150-CPE QB-8150-LNK-12 QB-8150-LNK-50	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.40 A on Ethernet Port • 12 V-DC through serial port (for diagnostic purpose) • Consumption 7 Watts typical (13.8 Watts maximum) *: Only one of the above input voltage options should be used at a time, to power on the device. Combination of any two options, may damage the device.*
	PoE Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.40 A (19 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Size:** 3.98 x 2.40 x 1.35 inches (101.0x61.5x32.2 mm) • **Weight:** 5.6 ounces (160 g) • **Temp**: 0 to 40° C

Products	Category	Specification
MP-826-CPE-50	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.40A on Ethernet Port • Consumption of 10 Watts typical (18 Watts max with one heater ON)
	PoE Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.40 A (19 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Size:** 4.96 x 8.62 x 2.58 inches (126 x 219 x 65.5 mm) • **Weight:** 5.6 ounces (160 g) • **Temp:** 0 to 40° C

Products	Category	Specification
MP-8160-CPE-A100	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.40A on Ethernet Port • Consumption 5 Watts typical (10 Watts maximum)
	PoE Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.40 A (19 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Size:** 3.98 x 2.40 x 1.35 inches (101.0x61.5x32.2 mm) • **Weight:** 5.6 ounces (160 g) • **Temp:** 0 to 40° C

Products	Category	Specification
MP-825-CPE-50 MP-825-CPE-100 QB-825-EPR-50	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.40A on Ethernet Port • Consumption 6 Watts typical (15 Watts max with two heaters ON)
	PoE Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.40 A (16 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Size:** 3.98 x 2.40 x 1.35 inches (101.0x61.5x32.2 mm) • **Weight:** 5.6 ounces (160 g) • **Temp:** 0 to 40° C

Products	Category	Specification
MP-820-BSU-100 MP-820-SUA-50⁺ MP-825-SUR-50⁺ MP-825-BS3-100 QB-825-EPR/LNK-50⁺	Input Voltage	• Via RJ-45 Ethernet interface supplying 48 VDC and 0.67A on Ethernet Port#1 • 12 V-DC through RJ-11 serial port (for diagnostic purpose) *: Only one of the above input voltage options should be used at a time, to power on the device. Combination of any two options, may damage the device.*
	Power Consumption	• **Typical Consumption:** 6 Watts • **Consumption (With Heaters ON):** 16 Watts maximum, with two heaters ON
	PoE Injector	• **Input:** 100 – 250 V-AC (47 – 63 Hz) • **Output:** 48 V-DC at 0.67 A (32 Watts) • **Pin-out:** +48 V on pins 4/5, -48 V on pins 7/8 • **Siz**e: 5.24x2.13x1.42 inches(133x54x36 mm) • **Weight:** 7 ounces (200 g) • **Temp:** 0 to 40° C

Hardware Specifications

Products	Radio	Clock Speed	Memory	Input Power	Power Consumption
MP-8100-BSU MP-8100-SUA QB-8100-EPA	2.4 and 5 GHz MIMO dual band radio	680 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	6 Watts typical (17 Watts max with two heaters ON)
MP-8150-SUR QB-8150-EPR	4.900 to 5.925 GHz MIMO radio	680 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	6 Watts typical (17 Watts max with two heaters ON)
MP-820-BSU-100 MP-820-SUA-50⁺ MP-825-SUR-50⁺ MP-825-BS3-100 QB-825-EPR-50⁺	5.150 to 5.925 GHz MIMO radio	560 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	6 Watts typical (16 Watts max with two heaters ON)
MP-8150-SUR-100 QB-8150-EPR-100 QB-8151-EPR	4.900 to 5.875 GHz MIMO radio	680 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	6 Watts typical (17 Watts max with two heaters ON)
MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8200-EPA QB-8250-EPR	4.900 to 5.925 GHz MIMO High Power radio	680 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	12 Watts typical (22 Watts max with two heater ON)
MP-8160-BSU MP-8160-BS9 MP-8160-SUA	5.900 to 6.425 GHz MIMO radio	680 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.67 A	10 Watts typical (13.8 Watts max with one heater ON)

MP-8150-CPE QB-8150-EPR-12 QB-8150-EPR-50	5.3 to 6.1GHz MIMO radio	333 MHz	333 MHz	Power-over-Ethernet 48 VDC, 0.40 A	7 Watts typical (13.8 Watts max)
MP-8160-CPE-A100	5.900 to 6.425 GHz MIMO radio	333 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.40 A	5 Watts typical (10 Watts max)
MP-825-CPE-50 MP-825-CPE-100 QB-825-EPR-50	5.15 to 5.925 GHz MIMO radio	560 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.4 A	6 Watts typical (15 Watts max with two heaters ON)
MP-826-CPE-50	5.900 to 6.425 GHz MIMO radio	560 MHz	Flash: 16 MB RAM: 128 MB	Power-over-Ethernet 48 VDC, 0.4 A	10 Watts typical (17 Watts max with one heater ON)

Integrated Antenna Specifications

Products: MP-8150-SUR; QB-8150-EPR/LNK; MP-8250-SUR; MP-8250-BS1; QB-8250-LNK	
Feature	**Specification**
Frequency Band	4.900 – 5.875 GHz
Gain	22 dBi (Cable loss included)
3dB Beamwidth	7° - 9° (Hplane)
3dB Beamwidth	7° - 9° (Eplane)
Polarization	Dual (Vertical + Horizontal)
Cross Polarization	-25 dB
Port to Port Isolation	-30 dB
Power Handling	5 W (cw)
VSWR	1.7:1 Max
Standard Compliance	ETSI TS3, TS4, TS5
Lightning Protection	DC Ground
Radio Patterns	

Antenna Tilt Angles and corresponding EIRP values:

: *These values are applicable only to the devices operating in U-NII-1US frequency band (5.15 - 5.25GHz)*

:

- -10 degree indicates that the antenna is tilted downwards
- 10 degrees indicates that the antenna is tilted upwards

Products: MP-8150-SUR; QB-8150-EPR/LNK; MP-8250-SUR; MP-8250-BS1; QB-8250-LNK					
Tilt Angle	**Horizontal Side Lobe**	**Vertical Side Lobe**	**Allowed Transmit Power**	**EIRP of Product**	**Remarks**
0	12	16	7	33	
-10	12	16	7	33	
-20	19	18	13	39	
-30	19	19	14	40	
10	12	14	7	33	
20	10	13	5	31	
30	0	0	-5	21	Not recommended

For detailed exlplanation of the various constituents in the table, please refer **Antenna Installation guide > 1.2.3.2 Antenna Tilt Angles and Corresponding EIRP values** in the page number 12

Products: **MP-8150-CPE; QB-8150-LNK-12/50**		
Feature	**Specification**	
	Vertical Polarization	**Horizontal Polarization**
Frequency Band	5.300 – 6.100 GHz	
Gain	15 - 16 dBi	15 - 16 dBi
Horizontal Half Power Beam Width	17.6º – 20.3º	16.5º – 18.3º
Vertical Half Power Beam Width	16.1º - 20.5º	17.0º - 24.0º
Sidelobes Level	-10 dB (Max)	-8 dB (Max)
Front-to-back-ratio	23 dB (Max)	-21 dB (Max)
Polarization	Linear, Vertical	Linear, Horizontal
Port to Port Isolation	27 dB (Min.)	
Power Handling	6 W (cw)	
VSWR	2.0:1 (Max)	
Input Impedance	50 ohm	
Standard Compliance	ETSI TS3, TS4, TS5	
Lightning Protection	DC Ground	
Radio Patterns		

Product: MP-8160-CPE-A100, MP-826-CPE-50	
Feature	**Specification**
Frequency Range	5900 – 6400 MHz
Polarization	Vertical/Horizontal
Gain	13.5-14.5 dBi / 14.0-15 dBi
Horizontal Half Power Beam Width	35°-40° / 25°-35°
Vertical Half Power Beam Width	15°- 18°
VSWR	2:1 (Max)
Isolation	25 dB (Min)
Input Impedance	50 ohm
Lightning Protection	DC Ground
Radio Patterns (V-Polar Port)	
Radio Patterns (H-Polar Port)	

Products: MP-8150-SUR-100; QB-8151-EPR / LNK		
Feature	**Specification**	
	Vertical Polarization	**Horizontal Polarization**
Frequency Band	4900 - 5875 MHz	
Gain	20.0±1 dBi	21.0±1 dBi
Horizontal Half Power Beam Width	8° (typ.)	
Vertical Half Power Beam Width	8° (typ.)	
Sidelobes Level	-8 dB (Max)	
Front-to-back-ratio	-30 dB (Max)	
Polarization	Linear, Vertical	Linear, Horizontal
Isolation	25 dB (min.)	
Power Handling	2W (cw)	
VSWR	2.0: 1 (Max)	
Input Impedance	50 ohm	
Lightning Protection	DC Ground	
Radio Patterns		

Antenna Tilt Angles and corresponding EIRP values:

: *These values are applicable only to the devices operating in U-NII-1US frequency band (5.15 - 5.25GHz)*

Products: MP-8150-SUR-100; QB-8151-EPR / LNK					
Tilt Angle	**Horizontal Side Lobe**	**Vertical Side Lobe**	**Allowed Transmit Power**	**EIRP of Product**	**Remarks**
0	13	13	10	34	
-10	13	14	10	34	
-20	14	14	11	35	
-30	14	14	11	35	
10	13	11	8	32	
20	7	10	4	28	
30	0	0	-3	21	Not recommended

Products: MP-8160-BS9	
Feature	**Specification**
Frequency Range	5.7 - 6.425 GHz
Polarization	Dual, Vertical and Horizontal
Gain	16 dBi
VSWR, max.	1.7:1
3.5 dB Beam-Width, H-Plane	90°
3 dB Beam-Width, E-Plane	8.5°
Side Lobes, min.	-25 dB (azimuth)
Cross Polarization, min.	-18 dB
Port to Port Isolation	-45 dB
Front to Back Ratio, min.	-40 dB
Input Power, max	10 Watt
Input Impedance	50 Ohm
Lightning Protection	DC Grounded

Products: MP-8160-BS9	
Feature	**Specification**
Radio Patterns	

MP-825-CPE-50, MP-825-CPE-100, MP-825-SUR-50⁺, MP-825-BS3-100, QB-825-LNK-50, and QB-825-LNK-50⁺		
Feature	**Specification**	
	Vertical Polarization	**Horizontal Polarization**
Frequency Band	5.15 - 5.925 MHz	
Gain	15 - 16 dBi (14 dBi beyond 5.850 GHz)	
Horizontal Half Power Beam Width	$31^o - 38^o$	$30^o - 34^o$
Vertical Half Power Beam Width	$14^o - 16^o$	$14^o - 17^o$
Sidelobes Level	12 dB (Min)	10 dB (Min)
Polarization	Dual, Vertical and Horizontal	
Isolation	> 30 dB typl.	
VSWR	< 2.0:1 (Max)	
Lightning Protection	DC Grounded	

MP-825-CPE-50, MP-825-CPE-100, MP-825-SUR-50^{+}, MP-825-BS3-100, QB-825-LNK-50, and QB-825-LNK-50^{+}	
Feature	**Specification**
Radio Patterns (V-Polar Port)	
Radio Patterns (H-Polar Port)	

Antenna Tilt Angles and corresponding EIRP values:

📝 : *These values are applicable only to the devices operating in U-NII-1US frequency band (5.15 - 5.25GHz)*

MP-825-CPE-50, MP-825-CPE-100, MP-825-SUR-50^{+}, MP-825-BS3-100, QB-825-LNK-50, and QB-825-LNK-50^{+}					
Tilt Angle	**Horizontal Side Lobe**	**Vertical Side Lobe**	**Allowed Transmit Power**	**EIRP of Product**	**Remarks**
0	9	13	11	30	
-10	13	16	15	34	
-20	13	16	15	34	
-30	13	20	15	34	
10	8	13	10	29	
20	0	0	2	21	
30	0	0	2	21	

Products: MP-8250-BS9	
Feature	**Specification**
Frequency Band	4.9 – 6.1 MHz
Gain, typ.	16 dBi
VSWR, Max.	1.7:1
Polarization	Dual Pol., Vertical and Horizontal
3 dB Beam-Width, H-Plane, typ.	90°
3 dB Beam-Width, E-Plane, typ.	8°
Sidelobes Level, Min.	**V-Pol**: ETSI EN 302 085 V1.2.3 – CS2 **H-Pol**: ETSI EN 302 085 V1.2.3 – CS3
Cross Polarization, min.	-15 dB
Front to Back Ratio, min.	-30 dB
Port to Port Isolation, min.	-30 dB
Input power, max	10 Watt
Input Impedance	50 Ohm
Lightning Protection	DC Grounded
Radio Patterns (V-Polar Port)	

Products: MP-8250-BS9	
Feature	**Specification**
Radio Patterns (H-Polar Port)	E-Plane Pattern H-Plane Pattern

Antenna Tilt Angles and corresponding EIRP values:

: These values are applicable only to the devices operating in U-NII-1US frequency band (5.15 - 5.25GHz)

Products: Products: MP-8250-BS9					
Tilt Angle	**Horizontal Side Lobe**	**Vertical Side Lobe**	**Allowed Transmit Power**	**EIRP of Product**	**Remarks**
0	16	18	18	37	
-10	17	18	19	38	
-20	17	18	19	38	
-30	17	20	19	38	
10	17	18	19	38	
20	13	10	12	31	
30	0	0	2	21	

Physical Specifications

Products	Category	Specification
MP-8100-BSU, MP-8100-SUA QB-8100-EPA	Dimensions (L x W x H)	10.79 x 11.14 x 3.38 inches (274 x 283 x 86 mm)
	Weight	7.7 lbs (3.5 kg)
MP-8150-SUR QB-8150-EPR	Dimensions (L x W x H)	14.57 x 14.57 x 4.47 inches (370 x 370 x 113.5 mm)
	Weight	9.0 lbs (4.1 kg)
MP-8150-SUR-100 QB-8150-EPR-100 QB-8151-EPR	Dimensions (L x W x H)	14.57 x 14.57 x 4.21 inches (370 x 370 x 107 mm)
	Weight	8.45 lbs (3.85 kg)
MP-8200-BSU MP-8200-SUA QB-8200-EPA	Dimensions (L x W x H)	10.79 x 11.14 x 3.38 inches (274 x 283 x 86 mm)
	Weight	7.9 lbs (3.6 kg)
MP-8250-SUR MP-8250-BS9 MP-8250-BS1 QB-8250-EPR	Dimensions (L x W x H)	14.57 x 14.57 x 4.47 inches (370 x 370 x 113.5 mm)
	Weight	9.26 lbs (4.2 kg)
MP-8160-BSU MP-8160-SUA	Dimensions (L x W x H)	10.79 x 11.14 x 3.38 inches (274 x 283 x 86 mm)
	Weight	7.38 lbs (3.35 kg)
MP-8160-BS9	Dimensions (L x W x H)	14.57 x 14.57 x 4.47 in (370 x 370 x 113.5 mm)
	Weight	8.82 lbs (4 kg)
MP-8150-CPE	Dimensions (L x W x H)	7.77 x 7.56 x 3.94 inches (197.5 x 192 x 100mm)
	Weight	1.6 lbs (0.73 kg)
MP-8160-CPE-A100	Dimensions (L x W x H)	8.46 x 4.78 x 2.56 inches (215 x 121.5 x 65 mm)
	Weight	1.93 lbs (0.88 kg)
MP-820-BSU-100 MP-820-SUA-50^{+}	Dimensions (L x W x H)	5.02 x 8.68 x 2.85 inches (127.5 x 220.5 x 72.5 mm)
	Weight	2.75 lbs (1.250 kg)
MP-826-CPE-50 MP-825-CPE-50 MP-825-CPE-100 MP-825-SUR-50^{+} MP-825-BS3-100 QB-825-EPR-50 QB-825-EPR-50^{+}	Dimensions (L x W x H)	4.96 x 8.62 x 2.58 inches (126 x 219 x 65.5 mm)
	Weight	2.1 lbs (0.95 kg)
QB-8150-EPR-12 QB-8150-EPR-50	Dimensions (L x W x H)	7.77 x 7.56 x 3.94 inches (197.5 x 192 x 100mm)
	Weight	1.6 lbs (0.73 kg)

Environmental Specifications

Products	Operating Temperature	Storage Temperature	Humidity
MP-8100-BSU; MP-8100-SUA MP-8150-SUR; MP-8150-SUR-100 MP-8200-BSU; MP-8200-SUA MP-8250-SUR; MP-8160-BSU MP-8160-BS9; MP-8160-SUA MP-8250-BS9; MP-8250-BS1 QB-8100-EPA/LNK; QB-8150-EPR/LNK QB-8150-LNK-100; QB-8151-EPR/LNK QB-8200-EPA/LNK; QB-8250-EPR/LNK	-40° to 60°C (-40° to 140° Fahrenheit)	-55° to 80°C (-67° to 176° Fahrenheit)	100% (non-condensing)
MP-8150-CPE QB-8150-LNK-12/50	-35° to 55°C (-31° to 131° Fahrenheit)	-40° to 70°C (-40° to 158° Fahrenheit)	Max 95% relative humidity (non-condensing)
MP-8160-CPE-A100	-40° to 55°C (-40° to 131° Fahrenheit)	-45° to 70°C (-49° to 158° Fahrenheit)	Max 95% relative humidity (non-condensing)
MP-826-CPE-50 MP-825-CPE-50 MP-825-CPE-100 MP-820-BSU-100 MP-820-SUA-50^{+} MP-825-SUR-50^{+} MP-825-BS3-100 QB-825-EPR/LNK-50^{+} QB-825-EPR/LNK-50	-40° to 55°C (-40° to 131° Fahrenheit)	-55° to 70°C (-67° to 158° Fahrenheit)	100% (non-condensing)

MTBF

Products	MTBF
MP-8100-BSU MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 MP-8160-BSU MP-8160-BS9 MP-8160-SUA QB-8100-EPA/LNK QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK	>80,000 hours
MP-8150-CPE MP-8160-CPE-A100 QB-8150-LNK-12/50	75,000 hours
MP-826-CPE-50	>2,00,000 hours
MP-8200-BSU MP-8250-BS9 MP-8250-BS1 MP-8200-SUA MP-8250-SUR QB-8200-EPA/LNK QB-8250-EPR/LNK	>250,000 hours
MP-820-BSU-100 MP-820-SUA-50^{+} MP-825-SUR-50^{+} MP-825-BS3-100 MP-825-CPE-50 MP-825-CPE-100 QB-825-EPR/LNK-50 QB-825-EPR/LNK-50^{+}	>350,000 hours

Appendix - Additional Weatherproofing Steps

A

This chapter explains the method to add an additional layer of protection to the connectors (Ethernet) against the environment.

> (!) : *We have taken MP-8100-BSU as an example to explain the weatherproofing steps. The same method should be followed to weatherproof the Ethernet connectors of the Tsunami® 800 and 8000 series products.*

A.1 Material for Weatherproofing

The material required for weatherproofing connectors are,

1. Any standard Butyl Mastic Tape
2. Any standard Vinyl Tape

We have used the following Butyl Mastic Tape and Vinyl Tape as an example to demonstrate the weatherproofing steps:

Butyl Mastic Tape   **Vinyl Tape**

A.2 Weatherproofing Steps

1. Wrap a vinyl tape in a half-lapped fashion, from the weatherproofed connector end and continue wrapping till 3 inches onto the cable.

(a)   (b)   (c)

Figure A-1 Step1

2. Wrap a second layer of the vinyl tape over the first layer but in other direction.

(a)   (b)

Figure A-2 Step2

3. Now, wrap a layer of vinyl tape with the adhesive side out as it provides sticky surface for the next layer.

(a)   (b)

Figure A-3 Step3

4. Next, wrap a layer of the butyl mastic tape on the adhesive side.

(a)   (b)
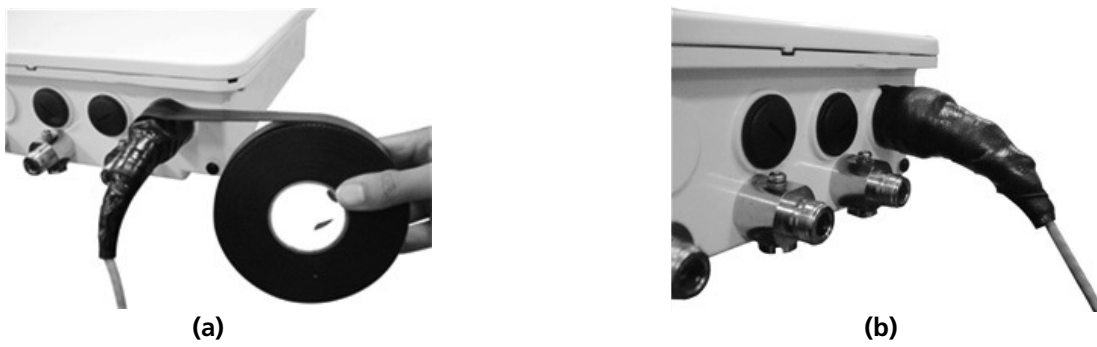
Figure A-4 Step3

5. Finally, wrap vinyl tap over the butyl layer.

(a)   (b)

Figure A-5 Step3

Appendix - Lightning Protection

B

Lightning protection is used to maximize the reliability of the communications equipment by safely re-directing current from a lightning strike or a power surge traveling along the Cat 5/Cat5e/Cat 6 Ethernet cabling to the ground using the shortest path possible. Designing a proper grounding system prior to installing any communications equipment is critical to minimize the possibility of equipment damage, void warranties, and cause serious injury.

The surge arrestor (sometimes referred to as a lightning protector) can protect your sensitive electronic equipment from high-voltage surges caused by discharges and transients at the PoE.

Proxim Wireless offers superior lightning and surge protection for Tsunami® series products. Contact your reseller or distributor for more information.

Appendix - Abbreviations

C

Abbreviations	
AWG	American Wire Gauge
BSU	Base Station Unit
CLI	Command Line Interface
CPE	Customer Premises Equipment
DC	Direct Current
ESD	Electrostatic Discharge
FCS	Frame Check Sequence
LED	Light Emitting Diode
MIMO	Multiple-input and Multiple-output
MTBF	Mean Time Between Failures
OFDM	Orthogonal frequency-division multiplexing
PC	Personal Computer
PoE	Power Over Ethernet
PTMP	Point-to-multipoint
PTP	Point-to-point
QB	Quick Bridge
QIG	Quick Installation Guide
RSSI	Received Signal Strength Indicator
Rx	Receiver
SU	Subscriber Unit
Tx	Transmission
WORP	Wireless Outdoor Router Protocol

Appendix - Statement of Warranty

D

Warranty Coverage

Proxim Wireless Corporation warrants that its products are manufactured solely from new parts, conform substantially to specifications, and will be free of defects in material and workmanship for a Warranty Period of 1 year from the date of purchase.

Repair or Replacement

When Proxim determines that a returned product does not meet the warranted criteria during the warranty period, Proxim at its option, will either: (a) repair the defective product; (b) replace the defective product with a new or refurbished product that is at least equivalent to the original; or (c) refund the price paid for the defective product. Generally, products are repaired or replaced within thirty (30) business days of receipt of the product at a Proxim Logistical/Repair Center. The warranty period for repaired or replacement products is ninety (90) days or the remainder of the original warranty period, whichever is longer. These three alternatives constitute the customer's sole and exclusive remedy and Proxim's sole and exclusive liability under warranty provisions.

Limitations of Warranty

Proxim's warranties do not apply to any product (hardware or software) which has (a) been subjected to abuse, misuse, neglect, accident, or mishandling, (b) been opened, repaired, modified, or altered by anyone other than Proxim, (c) been used for or subjected to applications, environments, or physical or electrical stress or conditions other than as intended and recommended by Proxim, (d) been improperly stored, transported, installed, or used, or (e) had its serial number or other identification markings altered or removed.

Buyers can contact Proxim Wireless Customer Service Center either by telephone or via web. Support and repair of products that are out of warranty will be subject to a fee. Contact information is shown below. Additional support information can be found at Proxim Wireless's web site at http://my.proxim.com.

Contact technical support via telephone as follows:

USA and Canada Customers

- **Phone**: +1-408-383-7700; +1-866-674-6626
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

International Customers

- **Phone**: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

General Procedures

When contacting the Customer Service for support, Buyer should be prepared to provide the product description and serial number and a description of the problem. The serial number should be on the product.

In the event the Customer Service Center determines that the problem can be corrected with a software update, Buyer might be instructed to download the update from Proxim Wireless's web site or, if that's not possible, the update will be sent to Buyer. In the event the Customer Service Center instructs Buyer to return the product to Proxim Wireless for repair or replacement, the Customer Service Center will provide Buyer a Return Material Authorization ("RMA") number and shipping instructions. Buyer must return the defective product to Proxim Wireless, properly packaged to prevent damage, shipping prepaid, with the RMA number prominently displayed on the outside of the container.

Calls to the Customer Service Center for reasons other than product failure will not be accepted unless Buyer has purchased a Proxim Wireless Service Contract or the call is made within the warranty period. After the warranty period, Technical Support is fee based (detailed in Appendix - Technical Services and Support).

If Proxim Wireless reasonably determines that a returned product is not defective or is not covered by the terms of this Warranty, Buyer shall be charged a service charge and return shipping charges.

Other Information

Search Knowledgebase

Proxim Wireless stores all resolved problems in a solution database at the following URL: http://my.proxim.com.

Create a Support Request

Create a support request with Proxim Wireless technical support staff at the following URL: https://my.proxim.com/new_case.

Appendix - Technical Services and Support

E

Obtaining Technical Service and Support

If you are having trouble using the Proxim product, please read this manual and the additional documentation provided with your product. If you require additional support to resolve your issue, please be ready to provide the following information before you contact Proxim's Technical Services team:

- Product information
    - Part number and serial number of the suspected faulty device
- Trouble/error information
    - Trouble/symptom being experienced
    - Activities completed to confirm fault
    - Network information (What kind of network are you using?)
    - Circumstances that preceded or led up to the error
    - Message or alarms viewed
    - Steps taken to reproduce the problem
- ServPak information (if a Servpak customer):
    - ServPak account number
- Registration information
    - If the product is not registered, date and location where you purchased the product

: Technical Support is free for the warranty period from the date of purchase.

Support Options

Proxim eService Web Site Support

The Proxim eService Web site is available 7x24x365 at http://my.proxim.com.

On the Proxim eService Web Site, you can access the following services:

- **Product Download Page**: Provides quick links to product firmware, software, and documentation downloads.
- **Proxim TV Links**: A link to helpful video tutorials.
- **Knowledgebase**: A solution database of all the resolved problems. You can search by product, category, keywords, or phrases.
- **Live Chat**: Chat with a support technician on-line or request to call back at a later time.
- **Create a Support Request**: Create a support request with our technical support staff who will reply to you by email.
- **Case Management**: Login to check the status of your support cases, update your personal profile, or access restricted information and features.
- **Provide Feedback**: Submit a suggestion, complaint, or other feedback about the support site and our products.

Telephone Support

Contact technical support via telephone as follows:

USA and Canada Customers

- **Phone**: +1-408-383-7700; +1-866-674-6626
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

International Customers

- **Phone**: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

ServPak Support

To provide even greater investment protection, Proxim Wireless offers a cost-effective support program called ServPak. ServPak is a program of enhanced service support options that can be purchased as a bundle or individually, tailored to meet your specific needs. Whether your requirement is round the clock technical support or advance replacement service, we are confident that the level of support provided in every service in our portfolio will exceed your expectations.

All ServPak service bundles are sold as service contracts that provide coverage for specific products from 1 to 3 years. Servpak bundles are considered an upgrade to the standard product warranty and not an extension.

All Plans Include	ServPak Plus	ServPak Prime	ServPak Elite
24x7 Basic Technical Support	**Basic Advanced Replacement (Two business days/ International economy shipment service)**	**Priority Advanced Replacement (Next business day/ International priority shipment service)**	**Priority Comprehensive Advance Replacement (Next business day/ International priority shipment service)**
8x7 Advanced Technical Support		**24x7 Advanced Technical Support**	**24x7 Advanced Technical Support**
Software Maintenance		**PVES & PV NMS Support**	**PVES & PV NMS Support**
Access to Knowledge Base			**Post-Installation Optimization**
			50% discount on Onsite Technical Support and Services

Additional Information on ServPak Options

Advanced Replacement of Hardware

In the event of a hardware failure, our guaranteed turnaround time for return to factory repair is 30 days or less. Customers who purchase this service are guaranteed replacement of refurbished or new hardware to be shipped out within one or two business days, as applicable. Options are available for shipment services depending on the customer's support needs. Hardware is shipped on business days, Monday – Friday excluding Holidays, 8:00 AM – 3:30 PM Eastern Time.

Comprehensive Advanced Replacement of Hardware

In addition to ServPak Prime options, in the event of a hardware failure, Proxim will repair or replace the failed product for any reason, other than vandalism.

7x24x365 Availability

Unlimited, direct access to technical support engineers 24 hours a day, 7 days a week, 365 days a year including Holidays.

8x5 Availability

Unlimited, direct access to world-class technical support engineers 8 hours a day, 5 days a week, Monday through Friday from 8:00AM - 5:00PM Pacific Standard Time.

Basic Technical Support

Customers who purchase this service can be rest assured that their call will be answered by Proxim's Tier 1 technical support and a case opened immediately to document the problem and provide initial troubleshooting to identify the solution and resolve the incident in a timely manner.

Advanced Technical Support

In addition to Proxim's world-class Tier 1 technical support, customers will be able to have their more complex issues escalated to our world-class Tier 3 technical support engineers. Our Tier 3 engineers will review specific configurations to troubleshoot intricate issues and will also provide helpful insights regarding Proxim's products and various tips from decades of collective experience in the wireless industry.

Software Maintenance

It's important to maintain and enhance security and performance of wireless equipment and Proxim makes this easy by providing a Software Maintenance program that enables customers to access new feature and functionality rich software upgrades and updates. Customers will also have full access to Proxim's vast Knowledgebase of technical bulletins, white papers and troubleshooting documents.

Post-Installation Optimization

You can consult with our technical support engineers to enhance performance and efficiency of your network. Post-installation optimization services include:

- Review frequencies to select best possible channel
- Review Modulation, Channel Bandwidth, MIMO, and WORP settings to optimize throughput and link quality
- Review Satellite Density & TPC/ATPC settings
- Assistance with Bandwidth controls

- Assistance with QoS, RADIUS, and VLAN settings on Proxim equipment

To purchase ServPak support services, please contact your authorized Proxim distributor. To receive more information or for questions on any of the available ServPak support options, please visit our website at http://www.proxim.com/support/servpak, call Proxim Support (For telephone numbers, see Telephone Support) or send an email to servpak@proxim.com.

Technical Support Policy

Technical Support for Current Products during Warranty Period

All Customers are entitled to free technical support for the Proxim products they purchase from Proxim's authorized resellers or distributors. Technical Support is defined as communication via the Proxim Support website (http://my.proxim.com) and/or via telephone. This technical support will be provided for free for the entire time the product is covered by a Proxim warranty.The term of Proxim's warranty is determined according to the agreement under which the product was sold and generally varies from 3 months to 2 years depending on the product. If a Customer disagrees with Proxim's determination of warranty duration, a request for review supported by a copy of all product purchase documentation may be submitted.

Technical Support for Current Products after Warranty Period

After the warranty period, technical support on products then being sold by Proxim will be based upon one of the following three options Customers can choose:

- Customers can choose to purchase one of Proxim's ServPak extended warranty and enhanced support packages for the product
- Customers can choose to purchase one-time per-incident technical support for the product for a fee
- Customers can choose to call the reseller or distributor who sold them the product for technical support

Tech Support on Discontinued Products

Technical Support on some products that Proxim has declared as EOL (End of Life) or otherwise is no longer selling is available based upon one of the following three options Customers can choose:

- For some discontinued products, Customers can choose to purchase one of Proxim's EOL ServPak support packages for the product
  - No EOL ServPak support package will be available for any product discontinued more than 5 years ago
  - No EOL ServPak support package is available for certain discontinued products
- Customers can choose to purchase one-time per-incident technical support for the product on a per hour basis at a rate of $125 an hour (4 hours minimum payable in advance by major credit card). This fee is payable in addition to any RMA fee that may be charged to subsequently repair the product.
- Customers can choose to call the reseller or distributor who sold them the product for technical support

All Proxim technical support for discontinued products, whether through an EOL ServPak package or otherwise, is provided on a "best effort" basis and is subject to the continued availability of necessary components, equipment, and other technical resources.

Note that Proxim is unable to support or warrant any equipment that has been modified, whether this modification is physical, or if third-party software codes have been loaded onto the product.