

**RUGGEDCOM<sup>®</sup>**  
**INDUSTRIAL STRENGTH NETWORKS<sup>™</sup>**

# **RuggedMAX<sup>™</sup> WiN7000** **High Power Base Station**

## **Installation Guide**



Revision 1.1 - November 3, 2011

[www.ruggedcom.com](http://www.ruggedcom.com)

## RuggedMAX™ WiN7000 High Power Base Station: Installation Guide

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## FCC Statement And Cautions

### Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



**Caution: Service**

*This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.*

*Changes or modifications not expressly approved by could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.*

*Should this device require service, refer to [Appendix D, Warranty](#) in this guide.*



**Caution: Physical Access**

*This product should be installed in a restricted access location where access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.*

## 1. Introduction

The WiN7000 High Power Base Station is a member of the RuggedMAX™ family, a line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile WiMAX standard. RuggedMAX systems are designed for robustness and simplicity, offering feature-rich services with low deployment and operation costs.

The WiN7000 High Power Base Station is a member of a line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile WiMAX standard. These systems are designed for robustness and simplicity, offering feature-rich services with low deployment and operation costs.

The WiN7000 High Power Base Station is a cost-effective solution for wireless access services, designed for point-to-multipoint broadband wireless access applications in varying conditions and locations. The WiN7000 High Power Base Station is a one-sector base station, supporting up to 800 subscriber units. Through the addition of routing units, the system can be extended to as many sectors as required and can support additional subscribers and bandwidths.

The base station communicates with fixed and mobile subscriber units, according to defined service criteria and customer service level agreements. The WiN7000 High Power Base Station also connects to the service provider backbone, supporting end-to-end Quality of Service (QoS) requirements.

The system uses OFDMA radio technology, providing robustness in adverse channel conditions and enabling Non-Line-Of-Sight (NLOS) operation. This improves coverage and maintains a high level of spectral efficiency. Modulation and coding are continuously adapted to prevailing link conditions, ensuring an optimal balance between robustness and efficiency. The use of STC/MRC and MIMO radio technologies optimizes link performance, ensuring enhanced bandwidth and service coverage.

The RuggedMAX™ WiN7000 High Power Base Station is a full outdoor base station, designed for easy installation and mounting on poles, street lamps, towers, or walls. The WiN7000 High Power Base Station can be equipped with copper or fibre network interfaces for flexible integration into the operator's backbone.

The WiN7000 High Power Base Station is supported by RuggedNMS™, RuggedCom's comprehensive Network Management System.

### 1.1. About this Guide

This installation guide describes the installation of the RuggedMAX™ WiN7000 High Power Base Station.

This guide is intended for use by base station installers and operators, and assumes readers have a working knowledge of WiMAX technologies and procedures. While some safety precautions are reviewed here, it is assumed that installers are trained in safe installation practices. Users unfamiliar with safe installation procedures, WiMAX technologies, and service procedures should not rely on this manual for comprehensive guidance.

## 1.2. Capabilities and Features

The WiN7000 High Power Base Station provides the full base station functionality necessary for serving a single sector:

- All-outdoor, single-box installation
- IEEE802.16e Wave2 Standard Compliance
- Backbone Ethernet connectivity via a 10/100 Base-T network interface
- Fixed and mobile CPE support
- 3.5 MHz, 5MHz, 7MHz (Not available for WiN7023) and 10MHz channel bandwidth support
- MIMO (2×2) support
- Various Radio Frequency (RF) options, including 1.x, 2.x and 3.x GHz band support
- Traffic classification and connection establishment initiation
- Policy-based data switching
- Quality of Service (QoS) management
- Alarm management
- Internal SNMP agent, enabling extensive In-Band (IB) management of the base station and its registered CPEs
- R6 interface to ASN-GW profile C
- Power requirement: 48VDC



## 1.3. Safety Information

### 1.3.1. General

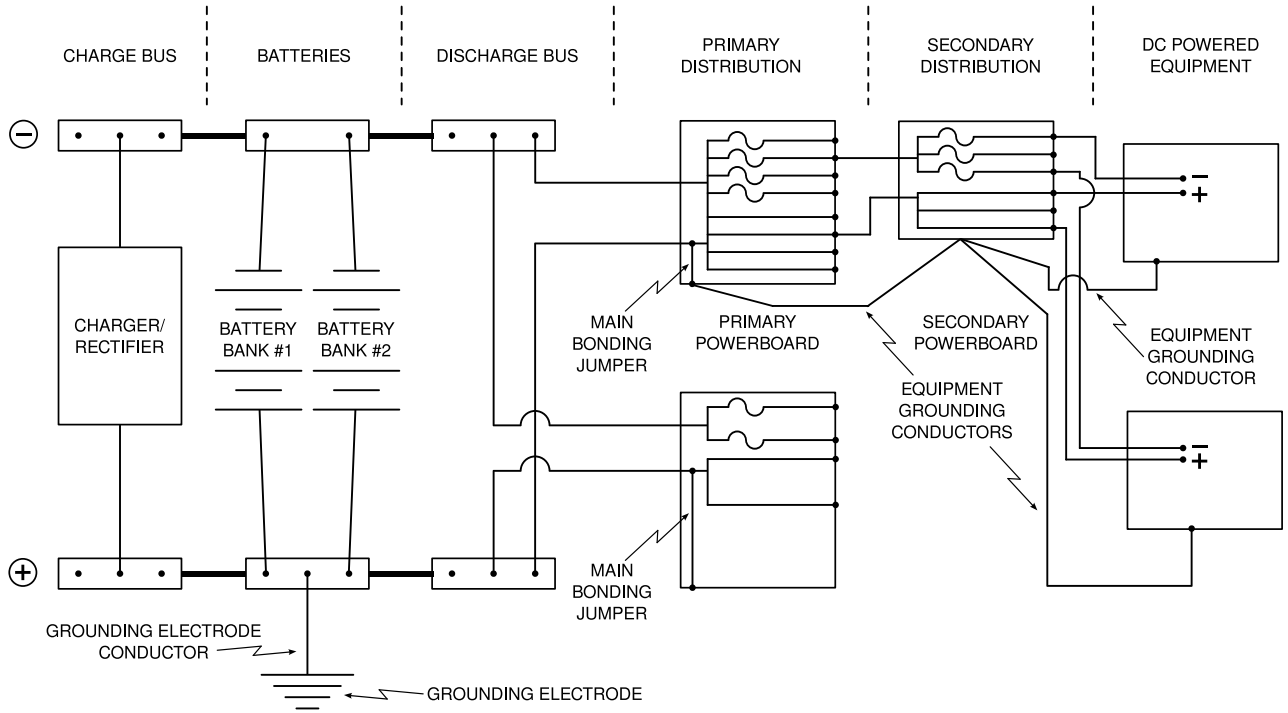
- Read this user manual and follow all operating and safety instructions.
  - The base station and antenna must be installed by a professional installer.
  - Do not exceed the described limits.
- .....

### 1.3.2. Power Supply Requirements

- The power supply unit should be a Class 2 power supply, safety-certified according to national codes.
- Maximum output current should not exceed 5A.
- Maximum output voltage of the power supply should not exceed 60VDC.
- Minimum output voltage should not be below 42VDC.
- The disconnecting device is defined as the following:
  - When connected to an AC/DC power supply, the appliance coupler of the AC/DC power supply is regarded as the main disconnecting device for the base station.
  - When connected to a DC battery power supply, a double pole circuit breaker, rated 10A 60VDC, is regarded as the main disconnecting device for the base station.

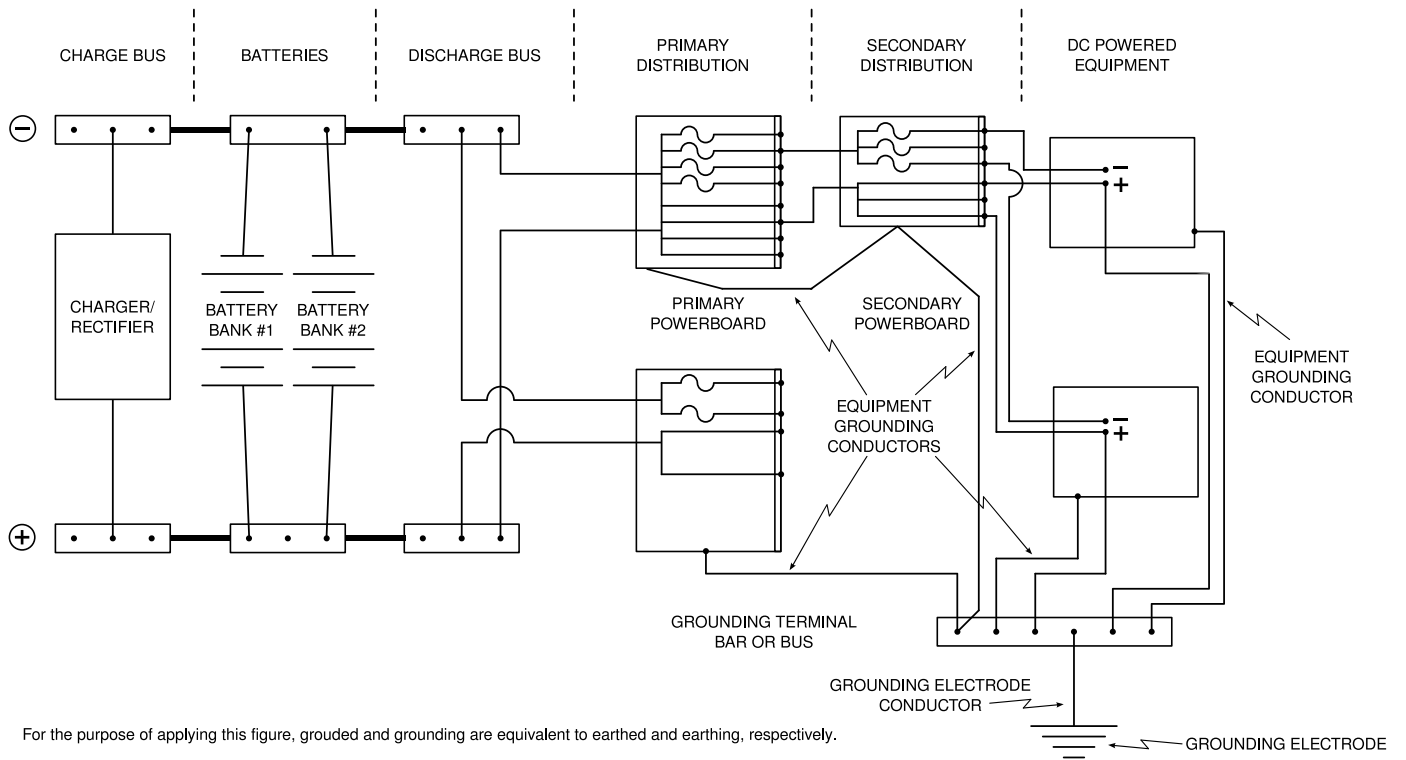
The unit is considered to be connected to a centralized DC power system, therefore the power line should be grounded. The unit should be permanently connected to ground with 16AWG cable or less. See the figures below for two methods of power grounding (from the UL 60950-1 standard; according to UL 60950-22). When the unit is connected to a centralized DC Power System, the "+" side of the supply should be grounded, as per UL60950-1 and UL 60950-22 requirements.

# 1. Introduction



For the purpose of applying this figure, grounded and grounding are equivalent to earthed and earthing, respectively.

**Figure 1.1. Typical Centralized DC Power System, Plant and Distribution Source-Grounded DC Power System**



For the purpose of applying this figure, grounded and grounding are equivalent to earthed and earthing, respectively.

**Figure 1.2. Typical Centralized DC Power System, Plant and Distribution DC Power System Grounded at Equipment Location**

### 1.3.3. Equipment Installation

Install the equipment in accordance with the electrical code relevant to the country of installation, such as the National Electrical Code (NEC), ANSI/NFPA 70; the Canadian Electrical Code (CEC), Part 1, CSA C22.1; and when applicable, the National Electrical Safety Code IEEE C2. Unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75, also applies.

### 1.3.4. Radio Frequency (RF) Exposure

The WiN7000 High Power Base Station is compliant with the requirements set forth in CFR 47, section 1.1307, addressing Radio Frequency (RF) exposure from radio frequency devices as defined in OET Bulletin 65. The emitted radiation should be as little as possible. To achieve minimum RF exposure, install the WiN7000 when it is configured not to transmit and set it to operational mode remotely, rather than enabling transmission by the installer on-site. For maintenance of the WiN7000, or other operations which require RF exposure, the exposure should be minimized in time and according to the regulations set by the FCC or the regulations relevant to the country of installation. Install antenna always at distance at least 3.6 m from the people and public area.

### 1.3.5. Lightning Protection



*When the WiN7000 High Power Base Station is installed in an outdoor location, all indoor components (such as Ethernet and power supply) should be connected through a lightning protector.*

*Lightning protection protects people and equipment located indoors from lightning that might strike the WiN7000 High Power Base Station or its outdoor cables. Therefore, install the lightning protector device indoors, as close as possible to the point where the cables enter the building. The lightning protector can also be installed outdoors as long as the cables that lead indoors are well protected from lightning between the protector and the building entrance.*

### 1.3.6. Power Cord Protection

Route all power supply cords so that people cannot walk on them or place objects on or against them. Walking on the cords or placing objects on or against the cords can damage the cords.

### 1.3.7. Servicing

Do not open the cover of this product to attempt service unless instructed by a RuggedMAX™ certified technician. Refer all repairs to qualified service personnel. Removing the covers or modifying any part of this device voids its warranty.



*Keep away from electric power lines.*

*You can be killed if the antennas are in close proximity to electric power lines. Carefully read and follow all instructions in this manual. By nature of the installation, you may be exposed to hazardous environments and high voltage. Use caution when installing the outdoor system.*

### 1.3.8. Antenna Grounding Requirements

The antenna installation must be as per Article 810 of the NEC. Of particular note is the requirement that the grounding conductor not be less than 10 AWG (Cu). The scheme should be either in accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems, or tested in accordance with UL 50 and UL 497.

### 1.3.9. Outdoor Grounding System



*Verify that the base station is grounded.*

*The system must be properly grounded to protect against power surges and accumulated static electricity. It is the installer's responsibility to install this device in accordance with the local electrical codes.*

### 1.3.10. User ports and power supply

If the length of outdoor exposed communication lines is greater than 40 m (140 feet), these lines must be treated as TNV-1 circuits. The installer must ensure that the power supply and network ports are designed for full compliance with the TNV-1 telecommunication network.

### 1.3.11. Safety Hazards



*Installing the Win7000 High Power Base Station can pose a serious hazard. Be sure to take precautions to avoid the following:*

- *Exposure to high voltage lines during installation*
- *Falling when working at heights or with ladders*
- *Injuries from dropping tools*
- *Contact with AC wiring (power system connection)*



*To reduce the risk of fire, use only 26AWG or larger telecommunication line cord.*

## 1.4. WiN7000 High Power Base Station Physical Specifications

The WiN7000 High Power Base Station is packed in a waterproof metal housing. A mounting bracket and mounting kit allows for pole or wall installation. The assembled unit weighs approximately 15kg.

For information on the WiN7000 High Power Base Station wiring connections, see [Section 3.4.5, "Cable Connections"](#).

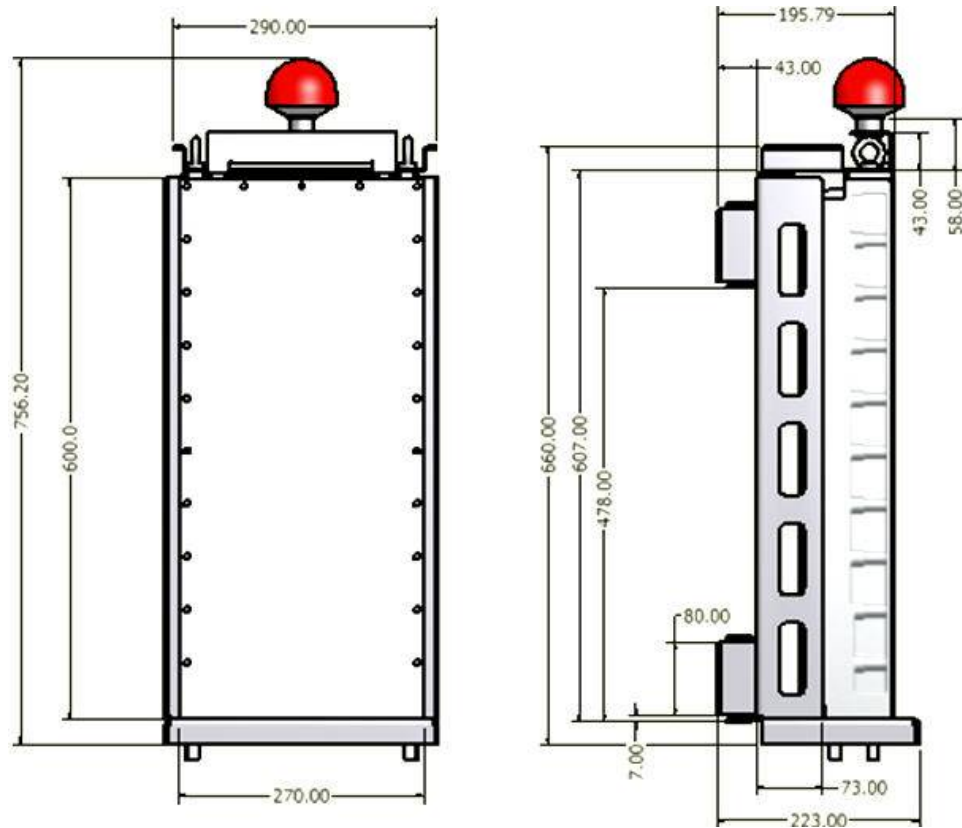


Figure 1.3. WiN7000 Dimensions

## 2. Site and Installation Requirements

### 2.1. Mounting Considerations

When choosing a mounting location, consider the available mounting structures and antenna clearance. To provide better weather protection, the WiN7000 High Power Base Station should be mounted with the connection panel facing downwards.

The base station is equipped with a mounting kit, which allows several mounting options:

- Poles: Attach the WiN7000 High Power Base Station to any pipe or pole with diameter 1.75" to 10".
- Towers and Walls: Attach the WiN7000 High Power Base Station to any tower or wall that can support the load of the unit.

The following antenna options are available:

- 2 × omni-directional antenna
- External sector dual slant  $\pm 45^\circ$  antenna
- Two separate antennas

Before mounting the antennas, conduct a site survey to determine the optimal position for the antennas. Observe the following guidelines:

- Mount the antennas at the highest point possible. Reception will increase according to the height of the antennas.
- Mount the antennas in a place with as few obstacles as possible between the antennas and the planned service area.
- To avoid interference, mount the antennas and base station as far as possible from antennas of other devices and other base stations.
- To keep the cable from the base station to the antenna as short as possible, mount the antennas as close as possible to the base station. Using a cable longer than 2 meters will result in greater loss and more interference, as the cable will act as an antenna.
- Do not point the antennas directly at populated areas, closer than the distance allowed by national regulations.
- Mount the antennas and base station in a place that allow for maintenance access to the unit.
- Mount the GPS antenna in a position where the whole sky is visible to the antenna. If the base station is mounted on a wall and the GPS antenna is mounted on top of the base station, only half of the sky will be visible to the antenna. This may not be enough for proper operation.

## 3. Installation Procedures

### 3.1. Pre-Installation Safety Instructions



*Installing the WiN7000 High Power Base Station can pose a serious hazard. Be sure to take precautions to avoid the following:*

- *Exposure to high voltage lines during installation*
- *Falling when working at heights or with ladders*
- *Injuries from dropping tools*
- *Contact with AC wiring (power system connection)*

### 3.2. Package Components and Unpacking

Check that the package contains:

- WiN7000 High Power Base Station.
- GPS antenna
- 2 × RF cables 1.6 m for connection to antenna
- Pole / wall mount kit
- 48V power supply for Copper and SFA configuration

### 3.3. Installation Tools

- Phillips screwdriver
- Wrench or socket set
- Drill and 5/16" drill bit
- Self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment

## 3.4. Installing the Base Station



*The equipment should be installed in compliance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part 1, CSA C22.1; and when applicable, the National Electrical Safety Code IEEE C2. Unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.*

The following components are required for the installation:

- Mounting bracket
- WiN7000 High Power Base Station
- RF antennas
- GPS antenna
- Power supply
- Ground, data, and power cables

To install the WiN7000 High Power Base Station, follow these general steps:

1. Install the mounting bracket at the chosen location.
2. Install the antennas.
3. Prepare the grounding cables.
4. Lay out the connection cables.
5. Mount the power supply.
6. Mount the base station to the mounting bracket.
7. Connect all cables to the WiN7000 High Power Base Station and seal connections with suitable electrical tape or putty.



### 3.4.1. WiN7000 High Power Base Station Mounting Bracket

The mounting bracket is used for both pole- and wall-mount installations.

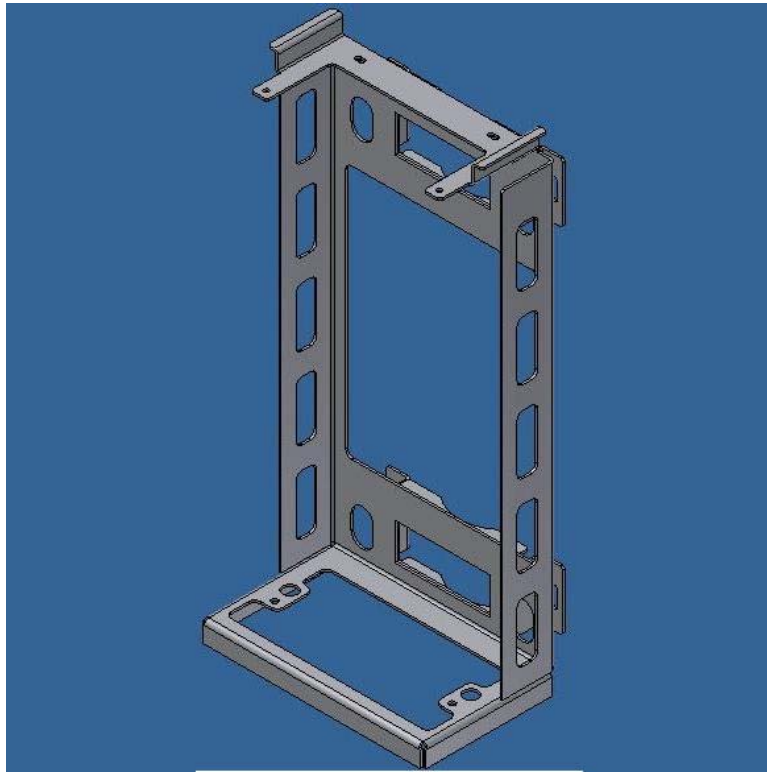


Figure 3.1. Mounting Bracket

### 3.4.2. Pole Mounting

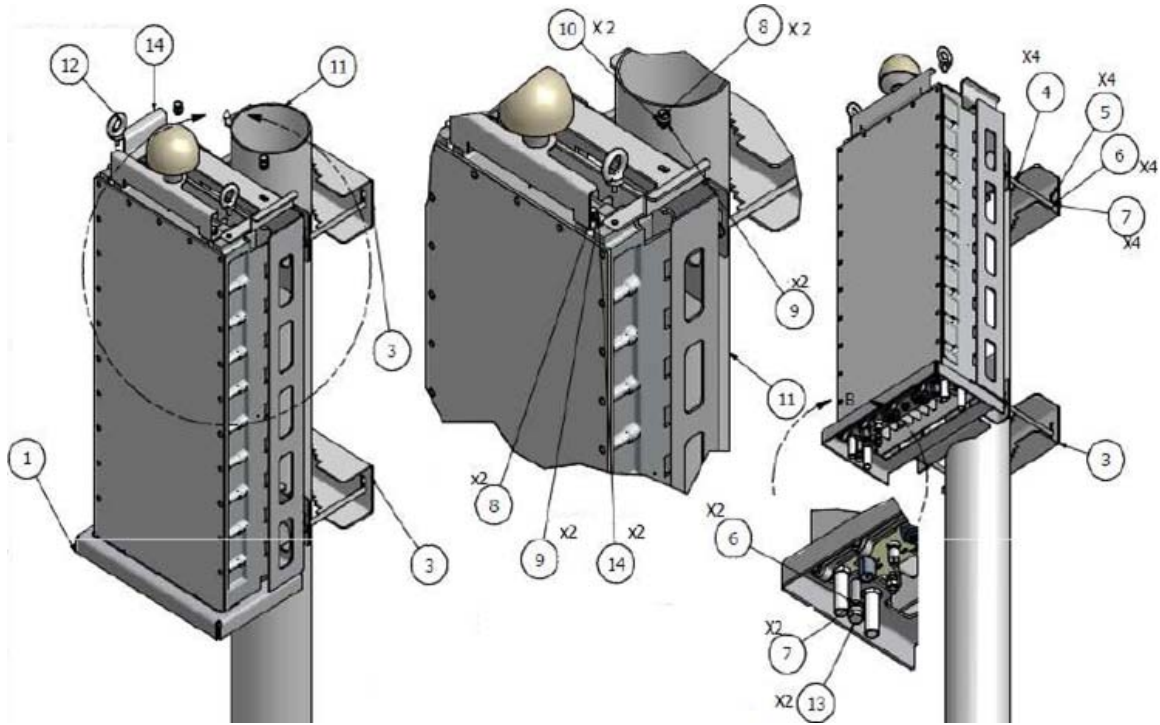


Figure 3.2. WiN7000 High Power Base Station Pole Mounting Diagram

Item	Quantity	Description
1	1	Mounting brackets
2	1	WiN7000 High Power Base Station
3	2	Fastening brackets
4	4	Screw 5/16" hex cap × 6"
5	8	Nut NF 16 hex
6	10	Washer flat 5/16"
7	10	Washer spring 5/16"
8	4	Screw NC 1/4" × 1/2" hex
9	4	Washer flat NC 1/4"
10	4	Washer spring NC 1/4"
11	1	Pole
12	2	Bolt NC 1/4"
13	2	Screw NC 5/16" × 1/2"
14	1	Mounting Upper Bracket

Table 3.1. WiN7000 High Power Base Station Pole Mount Parts List

#### Procedure 3.1. Installing the WiN7000 High Power Base Station on a Pole

1. Select a mounting location on the pole.
2. Assemble the fastening brackets to the mounting bracket using the 5/16" × 6" hex cap screws (Item 4), NF 16 hex nuts (Item 5), 5/16" flat washers (Item 6), and 5/16" spring washers (Item 7).

### 3. Installation Procedures

3. Lift the base station by the eye bolts and secure it to the mounting bracket. At the top of the unit and mounting bracket, use NC 1/4" × 1/2" hex screws (Item 8) and NC 1/4" flat washers (Item 9). At the bottom of the unit and mounting bracket, use 5/16" flat washers (Item 6), 5/16" spring washers (Item 7), and NC 5/16" × 1/2" screws (Item 13).
4. Complete the wiring connections.

**i** Seal all connectors with self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment

#### 3.4.3. Wall Mounting

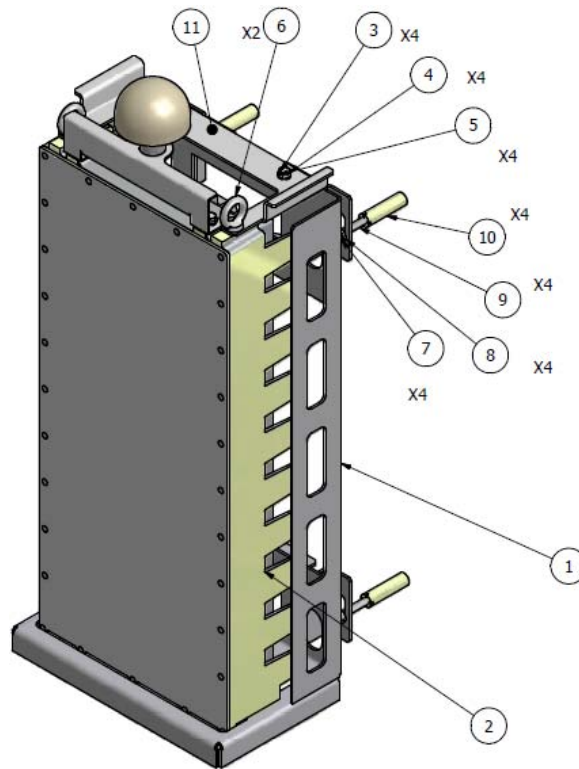


Figure 3.3. WiN7000 High Power Base Station Wall Mounting Diagram

Item	Quantity	Description
1	1	Mounting brackets
2	1	WiN7000 High Power Base Station
3	4	Screw NC 1/4" × 1/2" hex
4	4	Washer flat NC 1/4"
5	4	Washer spring NC 1/4"
6	2	Bolt NC 1/4"
7	4	Screw 5/16" hex cap × 2"
8	4	Washer flat 5/16"
9	4	Washer spring 5/16"
10	4	Dowel 5/16"
11	1	Mounting upper bracket

Table 3.2. WiN7000 High Power Base Station Wall Mount Parts List

#### Procedure 3.2. Installing the WiN7000 High Power Base Station on a Wall

1. Select a mounting location.
2. Place the mounting bracket on the wall and mark the location of the four mounting holes, two at the top and two at the bottom.
3. With a 5/16" drill bit suitable for the wall material, drill holes at the marked locations.
4. Insert the 5/16" dowels (Item 10) into the holes.
5. Assemble four 5/16" flat washers (Item 8), four 5/16" spring washers (Item 9), and four 5/16" × 2" hex cap screws (Item 7) into the holes on the mounting bracket.
6. Secure the mounting bracket to the wall.
7. Lift the base station by the eye bolts and secure it to the mounting bracket. At the top of the unit and mounting bracket, use NC 1/4" × 1/2" hex screws (Item 3), NC 14" flat washers (Item 4), and NC 1/4" spring washers (Item 5).
8. Complete the wiring connections.



Seal all connectors with self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment. For more information on sealing the connectors, see [Section 3.5, "Weatherproofing"](#).

#### 3.4.4. Tower Mount

Follow the same procedure as for wall mounting; see [Section 3.4.3, "Wall Mounting"](#). Ensure that the tower can hold the load of the base station.

#### 3.4.5. Cable Connections

The WiN7000 High Power Base Station can be equipped with copper or fiber Ethernet connections.

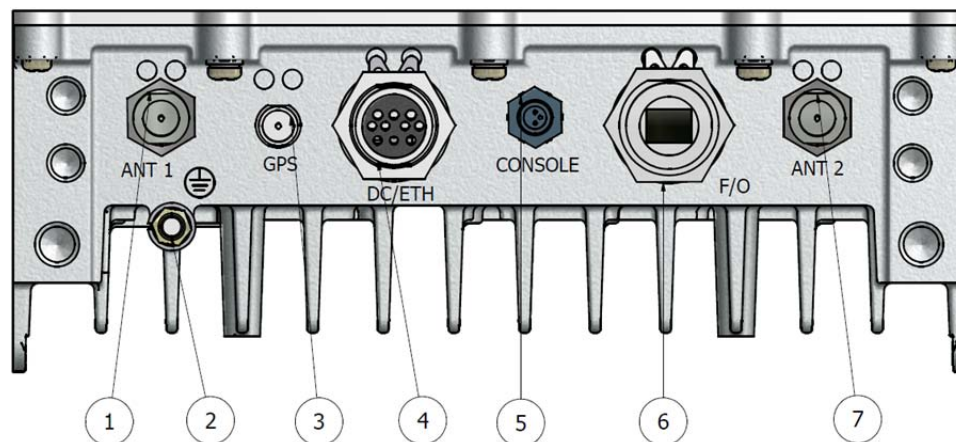
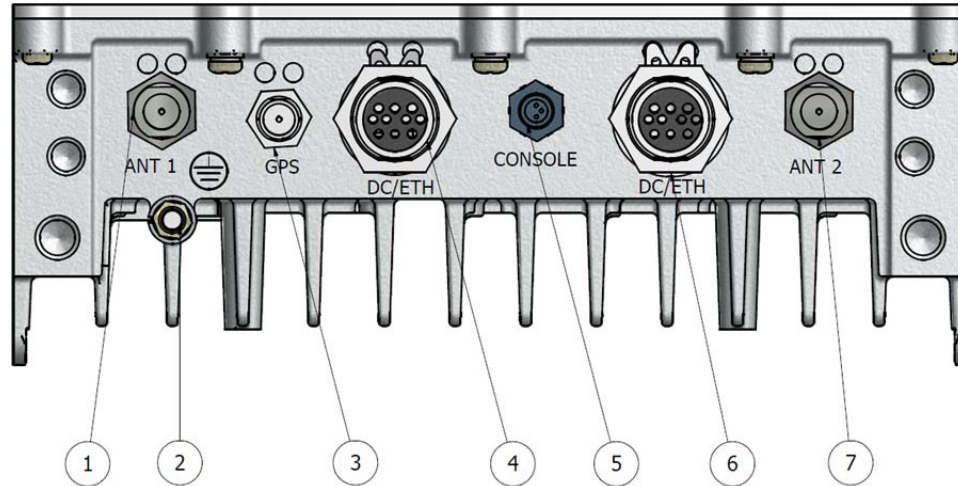


Figure 3.4. Fiber Optic Ethernet Port Option

### 3. Installation Procedures



**Figure 3.5. Copper Ethernet Port Option**

Number	Connector Name	Connector Type	Cable Type	Function	Connected to
1	ANT1	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna
2	GND	Adjustable nut	#10 AWG bare copper wire	Grounding	Central earth ground, tower or pole chassis
3	GPS	TNC Female		GPS signal	GPS antenna
4	DC/ETH or DC	DC/ETH or DC	Proprietary cable	48 VDC / Return / 5A + Ethernet Cat5 Or 48 VDC / Return / 5A	Power supply + Network/Router/Switch Or Power supply
5	Console	3-pin	UART 3P to DB9F"	Low level CLI for technicians	PC
6	DC/ETH	DC + ETH	Proprietary cable	48 VDC/ Return / 5A + Ethernet Cat5	Power supply + Network/Router/Switch
	F/O	Optic SM Mini LC	Fiber Optic SM OFNR I/O with Industrial Plug, ODVA Cable	Optic 100M/1Gmbit	Network/Router/Switch
7	ANT2	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna

**Table 3.3. WiN7000 High Power Base Station Connectors and Cables**

### 3.4.6. 2.3GHz Band Cavity Filters Installation

To comply with FCC limits, the unit must be connected to cavity filters (for full-power configuration only).

Follow these steps to assemble the 2.3GHz cavity filters and connect them to the base station antennas.

There are two types of cavity filters: one for A+B band, and one for C+D band.



Figure 3.6. A+B Band Cavity Filter



Figure 3.7. C+D Band Cavity Filter

### 3. Installation Procedures

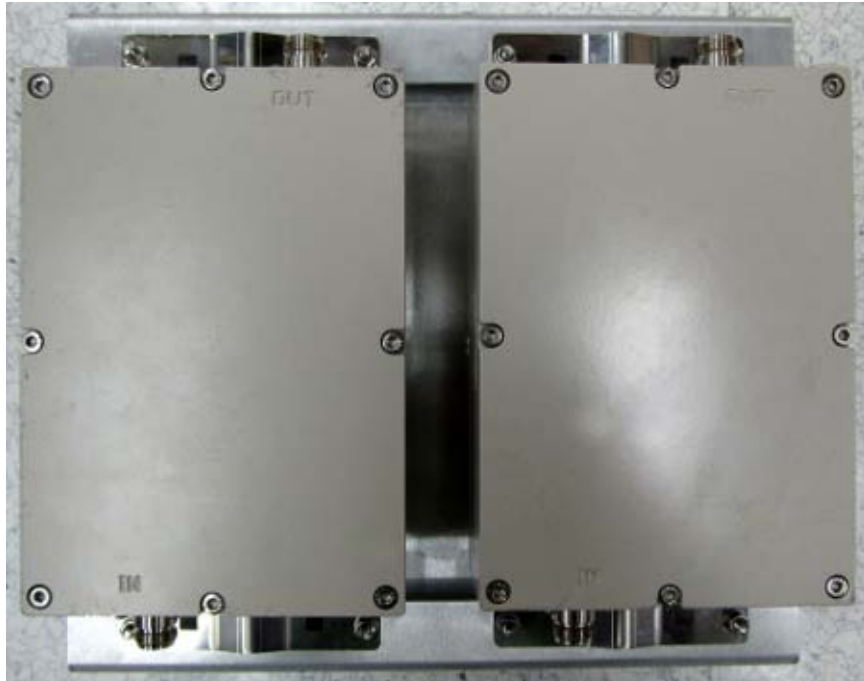
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The cavity filter mounting kit provides the following mounting options:

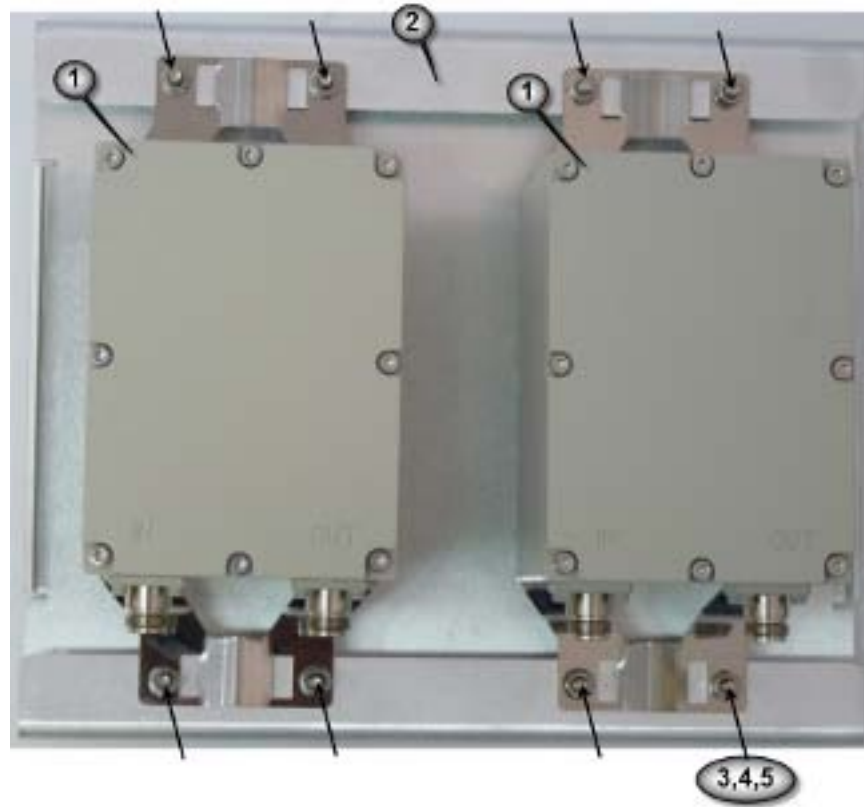
- Pole mounting: Attach the filters to any pipe or pole with a diameter of 1.75" to 10".
- Wall mounting: Attach the filters to any wall that can support the weight of the filters and mounting bracket.

#### **Procedure 3.3. Assembling and Connecting Cavity Filters**

1. Position the cavity filters (Item 1 × 2) on the baseplate (Item 2).
2. Secure the filters to the baseplate using Flat Washer (M5), Spring Washer (M5), and Hex Nut (M5) (Items 3, 4, and 5 × 8).



**Figure 3.8. A+B Band Cavity Filters Mounted on Baseplate**



**Figure 3.9. C+D Band Cavity Filters Mounted on Baseplate**

3. Position the adaptor plate (MT-120018) on the baseplate in the position shown in [Figure 3.10, "Adaptor Plate Mounted on Baseplate"](#).
4. Secure the adaptor plate using Flat Washer (M5), Spring Washer (M5), and Hex Nut (M5) (Items 2, 3, and 4 × 4).



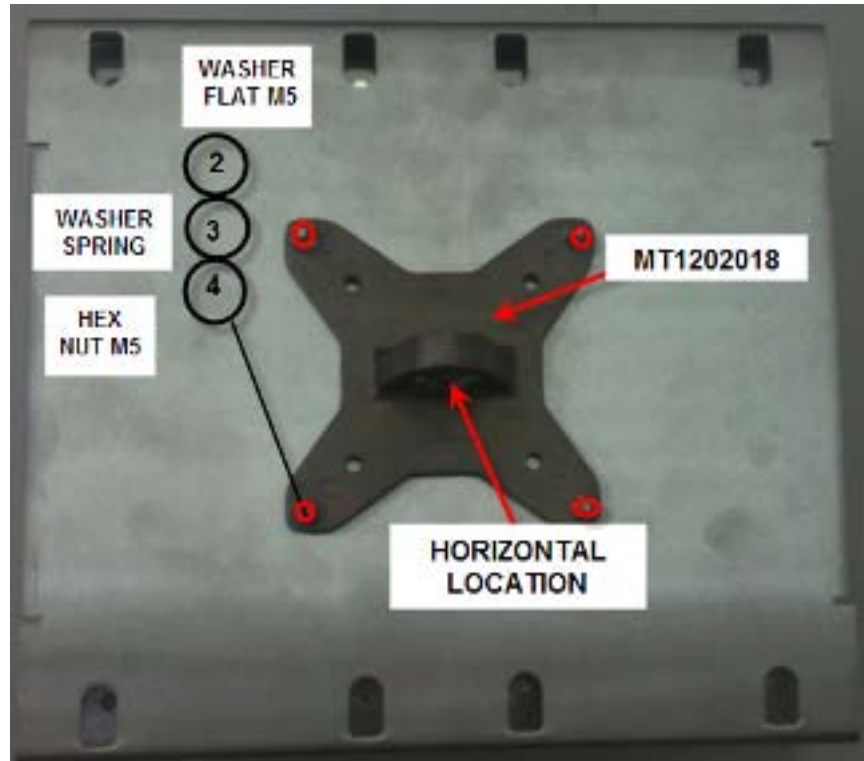


Figure 3.10. Adaptor Plate Mounted on Baseplate

5. Insert the adaptor bracket into the adaptor plate.
6. Secure the adaptor bracket with Set Screw (M5) as shown in [Figure 3.11, “Adaptor Bracket Mounted to Adaptor Plate”](#).

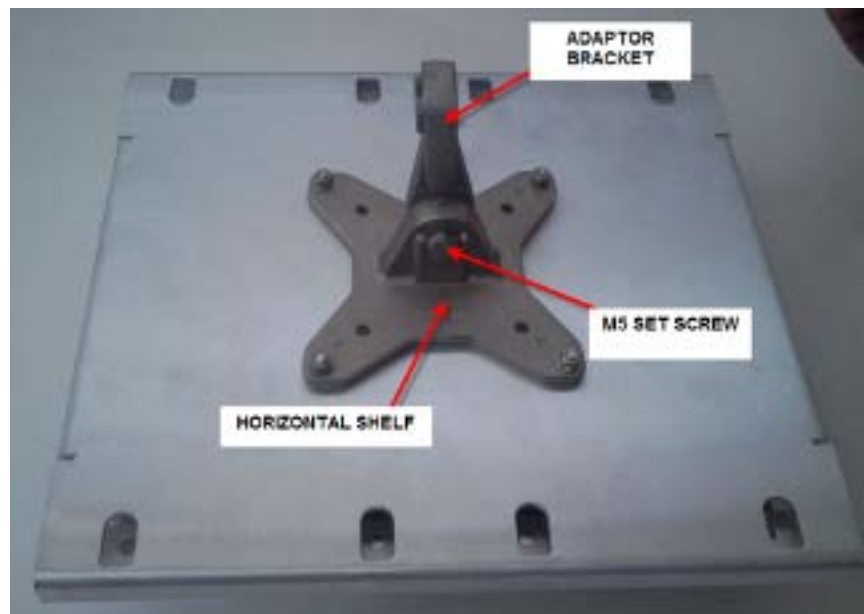
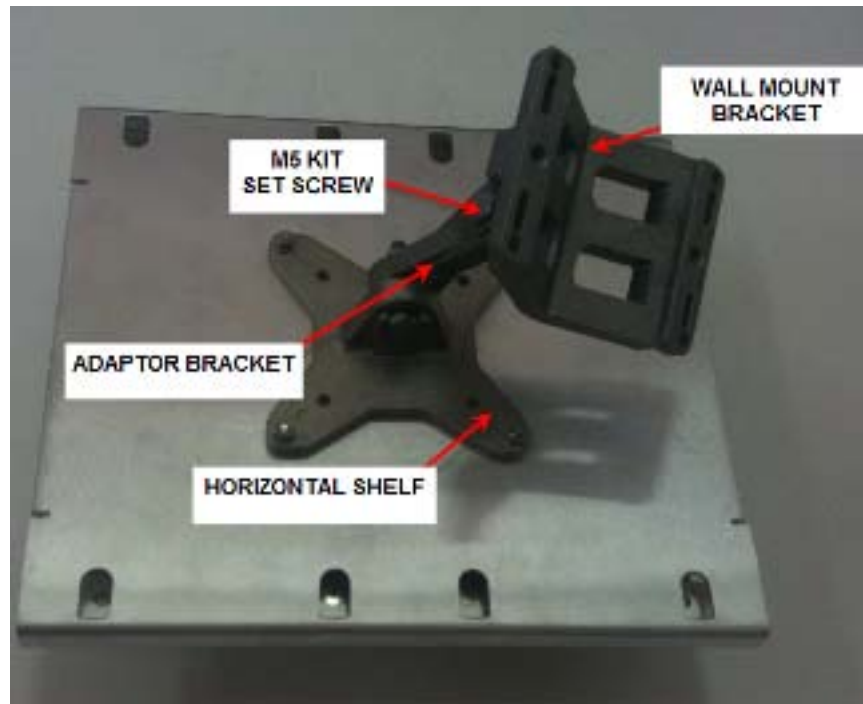


Figure 3.11. Adaptor Bracket Mounted to Adaptor Plate

7. Attach the wall mount bracket to the adaptor bracket.

### 3. Installation Procedures

- Secure the wall mount bracket with Flat Washer (M5), Spring Washer (M5), and Set Screw (M5) as shown in [Figure 3.12, "Wall Mount Bracket Assembly"](#).



**Figure 3.12. Wall Mount Bracket Assembly**



*For the wall mounting option, assembly of the cavity filter mounting bracket is now complete. Mount the assembly to the wall and complete the antenna connections described in [Step 11](#).*

- For pole mounting, attach the pole mounting bracket to the wall mounting bracket as shown in [Figure 3.13, "Pole Mount Bracket Assembly"](#).
- Secure the pole mounting bracket with Flat Washer (M5), Spring Washer (M5), and Set Screw (M5) as shown in [Figure 3.13, "Pole Mount Bracket Assembly"](#).

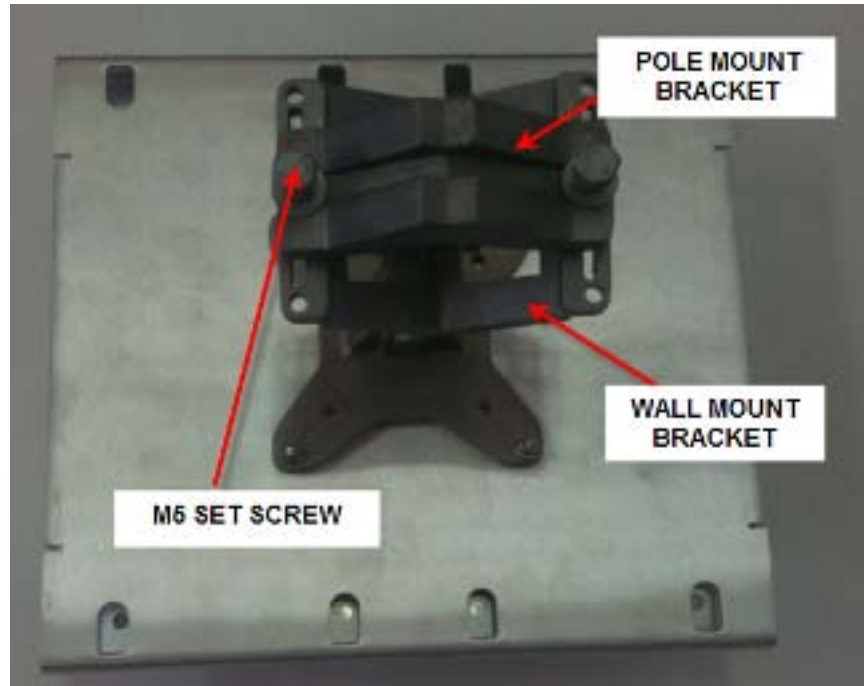


Figure 3.13. Pole Mount Bracket Assembly

11. Connect the RF cables to the cavity filters and the base station. Connect cavity filter IN to the base station. Connect cavity filter OUT to the antenna.

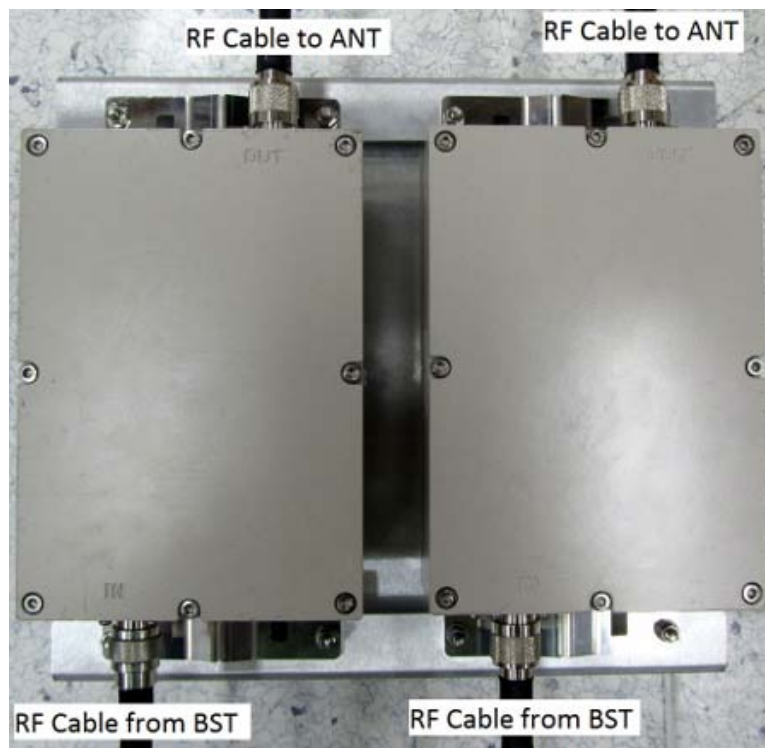


Figure 3.14. A+B Band Cavity Filter Antenna Connections

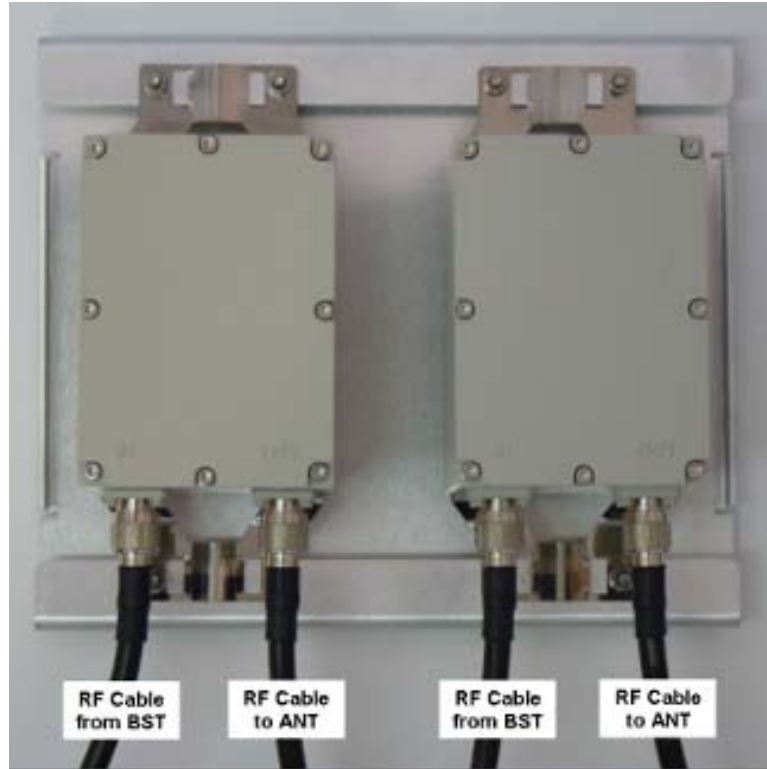


Figure 3.15. C+D Band Cavity Filter Antenna Connections

## 3.5. Weatherproofing

It is extremely important to weatherproof all outdoor cable connections. Weatherproofing the connections at the outdoor unit and antennas prevents corrosion, prevents water from interfering with the connection, and helps to keep the connection tight. Because cables also carry DC current, the need for proper weatherproofing cannot be overstated.

We recommend the use of sealing tapes designed for outdoor use:

- 3M™ Scotch® Super 88 Electrical Tape
- Heavy-duty weather-, abrasion-, and UV-resistant rubber splicing tape or self-amalgamating tape

Rubber mastic putty or duct sealing putty must also be used to complete the weatherproofing where needed. We do not recommend silicon seal or glue. These materials are difficult to apply accurately and are difficult to remove. Do not use PVC tape.

### 1. Weatherproofing Cable Connections

Most outdoor unit, antenna, or cable problems are caused by coaxial cable connections loosened by vibration, allowing moisture to penetrate the connector interface. We recommend that all outdoor unit-to-cable connections be weatherproofed using a procedure similar to the one described below.

This method of weatherproofing must be completed on *all* external connections. If surge arrestors are used, all the associated connections and arrestors must be completely wrapped with splicing tape or self-amalgamating tape.



*Before waterproofing, ensure all connectors are correctly tightened. Ensure the connector and cables are free of foreign substances such as oil, water, grease, and dirt. Ensure that the cable extends below the connector to which it is attached, providing a path for water to follow away from the connected device.*

#### Procedure 3.4. Weatherproofing Cable Connectors

1. Begin to wrap the rubber-splicing or self-amalgamating tape. Start as close to the equipment body as possible. Stretch and wind the tape around the connector housing, ensuring there are no gaps in the tape.



**Figure 3.16. Wrapping the Connector with Rubber-splicing or Self-amalgamating Tape**

### 3. Installation Procedures

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2. Tightly wrap the connector and the cable. Overlap the tape, without gaps, all the way along the connector. Continue wrapping the tape 25 mm (1") onto the cable.



**Figure 3.17. Wrapping the Cable with Rubber-splicing or Self-amalgamating Tape**

3. For UV protection of the rubber splicing tape, wrap two layers of electrical tape on top of the rubber splicing tape.



**Figure 3.18. Wrapping the Connector with Electrical Tape**

4. Work mastic putty or duct sealing putty between the connector and the body of the radio or antenna. Ensure the putty fills any gaps not covered by the tape.



**Figure 3.19. Sealing Gaps with Putty**

## 3.6. Power Connections

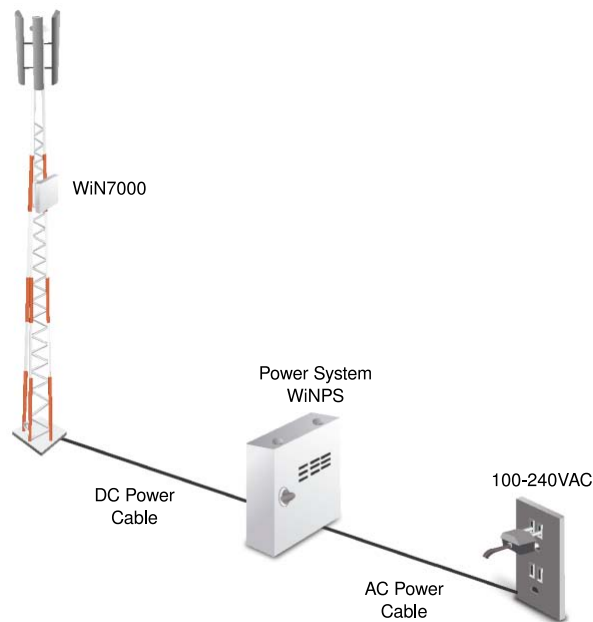
### 3.6.1. Copper and SFA Type Base Station

The power system can be supplied by RuggedCom (WiNPS) or by the operator.

Connect the power system DC + ETH output to the supplied connector and cable.

Connect the other end (open end) of the supplied cable to the WiN7000 High Power Base Station DC + ETH connector.

The illustration below shows the physical connection between the WiN7000 High Power Base Station, the power system, and the AC power source.



**Figure 3.20. Base Station Power Connection**

### 3.6.2. SFD Type Base Station

The power system is supplied by the operator.

Connect the power system DC output to the supplied connector.

Connect the other end (open end) of the supplied cable to the operator’s power system (according to the labelling on the cable and the tables below).

Supplied Cable	Power Supply	Note
-48VDC	-48VDC	GND
+48VDC	+48VDC/ GND	“HOT Line”
GND	-48VDC/ GND	Connect -48V and GND

Table 3.4. +48 VDC Power System

Supplied Cable	Power Supply	Note
-48VDC	-48VDC	“HOT Line”
+48VDC	+48VDC/ GND	GND
GND	+48VDC/ GND	Connect +48V and GND

Table 3.5. -48 VDC Power System

Figure 3.21, “Positive 48V Configuration” and Figure 3.22, “Negative 48V Configuration” show +48V and -48V configurations.

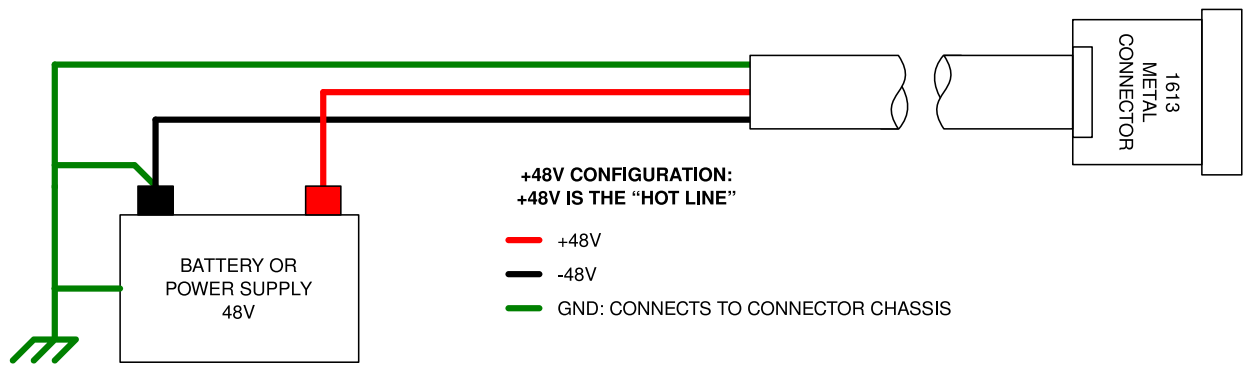


Figure 3.21. Positive 48V Configuration

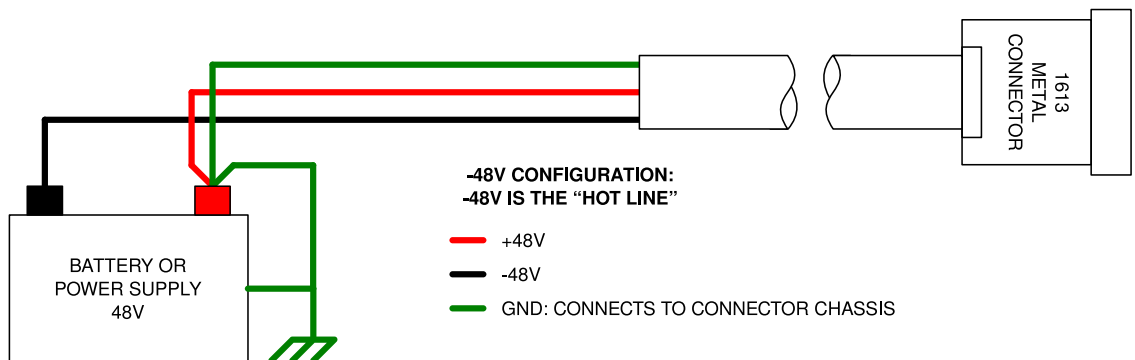


Figure 3.22. Negative 48V Configuration



## 4. Setup

The initial setup procedure consists of:

- Configuring the computer's network parameters and connecting to the WiN7000 High Power Base Station Web interface
- Verifying IP connectivity

### 4.1. Connecting to the WiN7000 High Power Base Station Web Interface

This section describes how to configure the network parameters in Microsoft Windows so you can connect a computer to the WiN7000 High Power Base Station. For instructions on how to configure the network parameters for other operating systems, refer to your operating system documentation.

Before beginning, ensure that the base station is connected to the Power over Ethernet (PoE) power adaptor and that power is applied.

Follow these steps connect a computer to the WiN7000 High Power Base Station Web interface:

#### Procedure 4.1. Connecting a computer to the base station

1. Ensure that the PoE adaptor is connected to the base station. Connect the computer's Ethernet port to the PoE adaptor's Ethernet port.
2. On the computer, click **Start** and select **Control Panel**.
3. In the **Control Panel**, select **Network and Internet Connections**.
4. Select **Network Connections** and then double-click **Local Area Connection**. The **Local Area Connections Properties** dialog appears with the **General** tab selected.

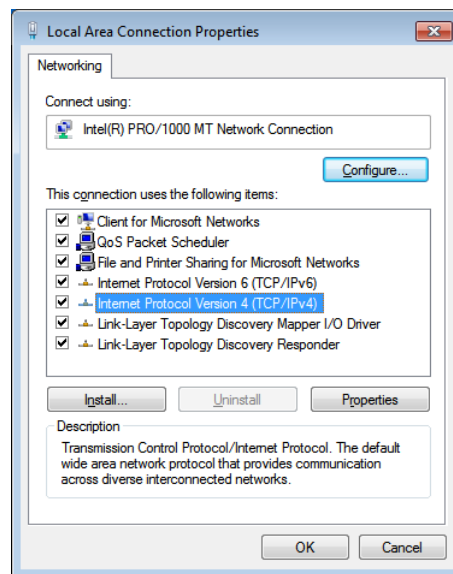


Figure 4.1. Microsoft Windows Local Area Connection Properties dialog box

5. In the **Items** list, select **Internet Protocol (TCP/IP)** and click the **Properties** button. The **Internet Protocol (TCP/IP) Properties** dialog appears.

- Assign your computer the IP address 192.168.100.99 and the subnet 255.255.255.0.

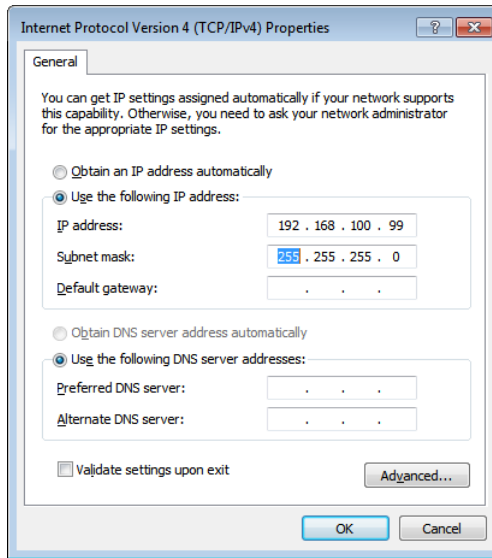


Figure 4.2. Microsoft Windows Internet Protocol (TCP/IP) Properties dialog box

- On the **Internet Protocol (TCP/IP) Properties** dialog, click **OK**. On the **Local Area Connection Properties** dialog, click **Close**.
- Launch your web browser and type **http://192.168.100.100** in the address field. The **Login** window appears. Enter your user name and password and click **Log In**. The Win7000 High Power Base Station web interface appears.

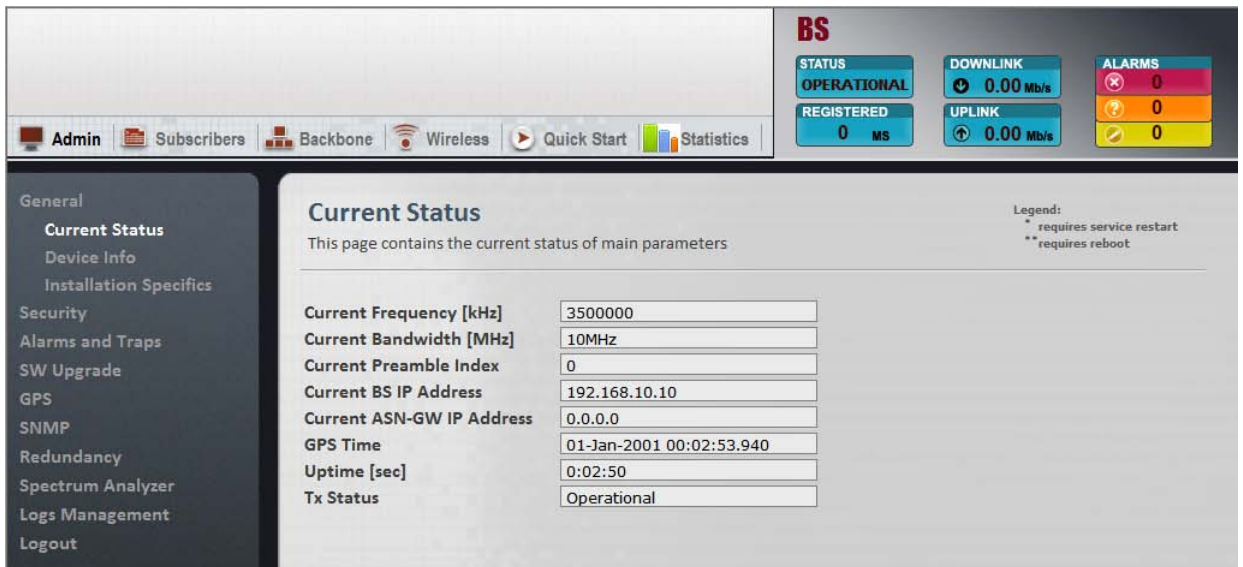


Figure 4.3. Win7000 High Power Base Station Web Interface: General Status page

## 5. Troubleshooting

### 5.1. No IP connectivity

If there is no IP connectivity between the WiN7000 High Power Base Station unit and the NMS, perform the following steps:

1. Connect the the computer and the WiN7000 High Power Base Station Console connector (serial connection), located on the unit's bottom panel.
2. In the terminal, type **showIPAddr** and press **Enter**. The base station's IP address will be displayed.
3. Ping the WiN7000 High Power Base Station unit address.
4. If connectivity is still not established, contact customer support.

### 5.2. No Serial Connection

If there is no serial connection when using the serial cable, perform the following:

1. Verify IP connectivity using a ping to the WiN7000 High Power Base Station unit IP address.
2. If there is no IP connectivity, verify the power connections.
3. If the power connections are okay and there is still no serial connection or IP connectivity, contact customer support.

## Appendix A. Connector and Cable Pinouts

### A.1. Power and Ethernet Cable Pinouts

The pinout of the power cable is shown below:

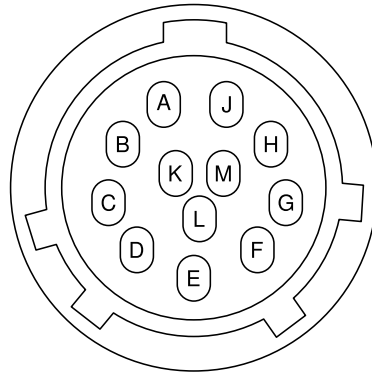


Figure A.1. WiN7000 High Power Base Station Power Cable Pinout

Pin Number	Type
A	NC
B	NC
C	+TX Ethernet
D	- TX Ethernet
E	+RX Ethernet
F	- RX Ethernet
G	NC
H	NC
J	NC
K	48VDC (RTN)
L	48VDC (+)
M	Ethernet GND

Table A.1. WiN7000 High Power Base Station Power Cable Pinout

## A.2. Console Cable Pinouts



*In normal operation, the console connector should remain closed and should only be used by an authorized technician.*

The console connection is a 3-pin female connector, based on the RS-232 serial standard. The port provides a standard terminal connection through which a technician can configure and monitor the base station through its command line interface (CLI).

- Cable type: 3 wire 28AWG
- Cable connectors: proprietary 3 pin console connector; DBF9
- Cable length: 2m
- The cable is supplied by RuggedCom.

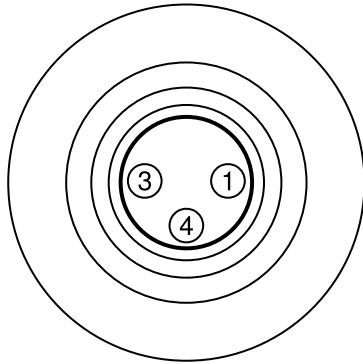


Figure A.2. 3-pin Console Connector Pinout

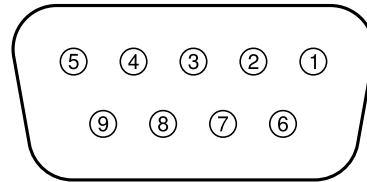


Figure A.3. DB9F Console Connector Pinout

3-Pin Connector Pin Number	DB9F Connector Pin Number	Connection
1	2	TX
3	3	RX
4	5	GND

Table A.2. WiN7000 High Power Base Station Console Connector Pinout

## Appendix B. WiN7000 High Power Base Station Specifications

### Radio and Modem:

- Frequency, by Base Station model number:
  - WiN7013: 1350 MHz to 1400 MHz
  - WiN7023: 2305 MHz to 2320 MHz, 2345 MHz to 2360 MHz
  - WiN7025: 2496 MHz to 2690 MHz
  - WiN7035: 3400 MHz to 3600 MHz
  - WiN7037: 3600 MHz to 3720 MHz
- IEEE802.16-2005 (16e OFDMA)
- WiMAX Forum Wave 2 Profile
- Time Division Duplex (TDD)
- Channel Bandwidth (MHz) 3.5, 5, 7 (Not available for WiN7023) , 10
- Frequency Resolution 0.25 MHz
- Diversity Support 2x2, STC/MIMO-SM
- FEC Convolution Code and Turbo Code
- Transmit Power Control
- Output Power (average) 2 X 36 dBm
- Modulation 512/1024 FFT points; QPSK, 16QAM, 64QAM

### Radio Interfaces:

- Number of Antennae: 2
- Antenna Connectors 2 × N-Type, 50 ohm
- Integrated or External Sector or Omni Antenna
- Built-in GPS

### Network Interfaces:

- 10/100BaseT Half/Full Duplex IEEE 802.3 CSMA/CD
- ASN GW Compatibility WiMAX Forum R6, Profile C
- Compatible with Cisco and WiChorus ASN-GW
- Fiber Optic (Optional)

**Configuration and Management:**

- Web-based user interface
- Management SNMP
- SNMP Agent SNMP ver 2 client: MIB II
- Software Upgrade via FTP
- Remote Configuration via FTP

**Mechanical:**

- Dimensions [H × W × D] 756 mm × 290mm × 195 mm
- Weight <15kg

**Power Interface:**

- Power supply Input 85-265VAC
- Power Consumption 120W max

**Environmental:**

- Operating Temperature: -40°C to +65°C
- Operating Humidity 5% to 95% non condensing

**1613 & IEC61850-3 EMC:**

- 1613 Section 6.3, 7, 8, 9 Class1
- IEC61850-3 Section 5.7, 5.8
- FCC 47CFR Part15, Subpart B
- EN 55022

**1613 & IEC61850-3 Safety:**

- 1613 section 5, 6.2
- IEC 60255-5 section 6.1.4

**1613 & IEC61850-3 Environmental:**

- IEC61850-3 Section 5.2, 5.3, 5.5
- 1613 Section 10
- IEC 870-2-2 Section 3

**CE EMC:**

- EN 301 489-4 V1.3.1
- EN 301 489-1 V1.8.1

**CE Safety:**

- EN 60950-1
- IEC 60950-1
- EN 60950-22

**CE Radio:**

- EN 302 326-2

**FCC:**

- 47CFR Part15, Part27, Part90 Subpart B.

**IC:**

- SRSP-301.7 Issue 2 (Industry Canada)



## Appendix C. List of Acronyms

Acronym	Description
ASN	Access Service Network
BST	Base Station
IP	Internet Protocol
LAN	Local Area Network
LOS	Line-of-sight
MIMO	Multiple-Input, Multiple-Output
NMS	Network Management System
NLOS	Non-line-of-sight
RF	Radio Frequency
WiMAX	Worldwide Interoperability for Microwave Access
RuggedMAX™	RuggedMAX WiMAX Product Family
RuggedNMS™	RuggedMAX Network Management System

**Table C.1. List of Acronyms**

## Appendix D. Warranty

RuggedCom warrants this product for a period of five (5) years from the date of purchase. This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. For warranty details, visit [www.RuggedCom.com](http://www.RuggedCom.com) or contact your customer service representative.

Should this product require service, contact the factory at:

*RuggedCom Inc.*  
300 Applewood Crescent  
Concord, Ontario  
Canada L4K 5C7  
Phone: +1 905 856 5288  
Fax: +1 905 856 1995