INSTALLATION GUIDE

RADWIN 5000

Document version 24

July 2024

RADWIN

Contents

Introduction

Scope of This Document

This guide covers the following products supported by software releases 5.1.xx

- Base station models: JET PRO, JET DUO, JET AIR, JET AIR DUO, NEO, NEO DUO, MultiSector, 5000L
- Subscriber units: SU AIR/PRO, SU ECO, Alpha, Alpha-PRO

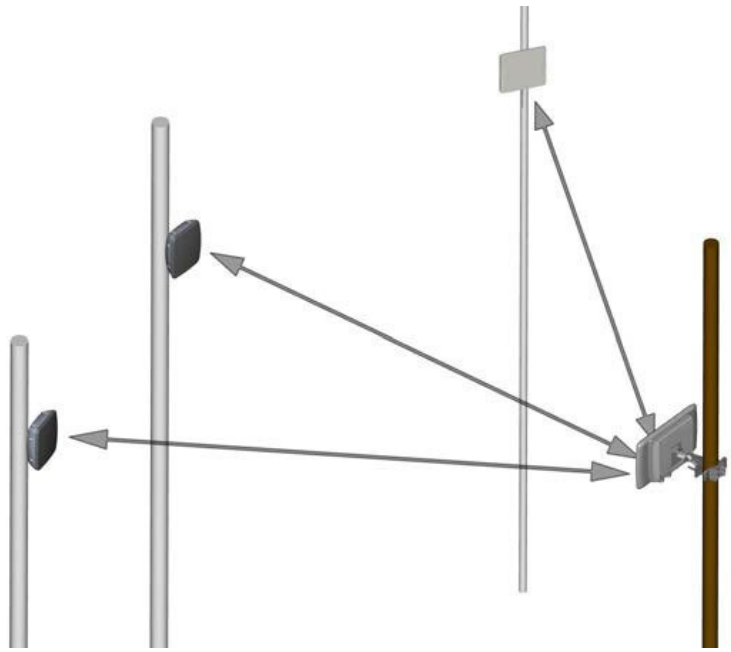
For legacy JET, LFF HBS 5200, SFF HBS 5050 base stations, or LFF/SFF HSU subscribers - please refer to RW5000 Install Guide Aug-2022.

For guidance on how to configure and operate RADWIN 5000 radios and sectors, please refer the RADWIN 5000 Configuration Guides.

RADWIN 5000 Overview

Sector

The RADWIN 5000 is a point-to-multipoint fixed wireless communication system. Basic topology element is a sector that includes a base station and multiple subscriber units.

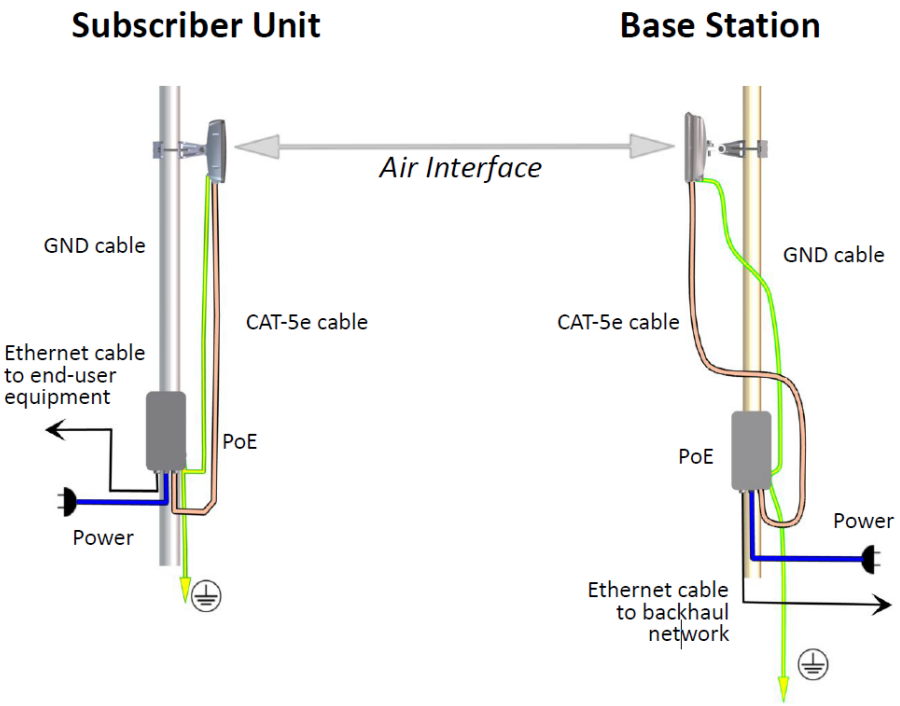


RADWIN 5000 Sector topology

System Components and Connectivity

Typical base station or subscriber site includes the following:

- Radio outdoor unit (ODU)
- POE source (POE unit / POE switch)
- POE cable (outdoor CAT-5e) connected to ODU POE port
- Grounding cable connected to ODU GND terminal
- (Optional, for any HBS other than 5000L): Fiber / RJ45 SFP transceiver installed in SFP slot



RADWIN 5000 General Connection Scheme

Warning

These products shall be located in a Restricted Access Location and be accessible only to a certified person familiar with the unit operation and possible hazards.

Check the voltage on the antenna connectors when using an external antenna. Hazardous voltage 56VDC may exist on antenna connections.

Use Personal Protection Equipment (e.g. insulating gloves) when working with the units or antennas.

Note

For simplicity, Lightning Protection Units (LPU) are not shown in Figure 18, but these are recommended. See Mounting the Lightning Protection Units for directions on how to install the LPUs.

Also for simplicity, external antennas are not shown.

Base Stations

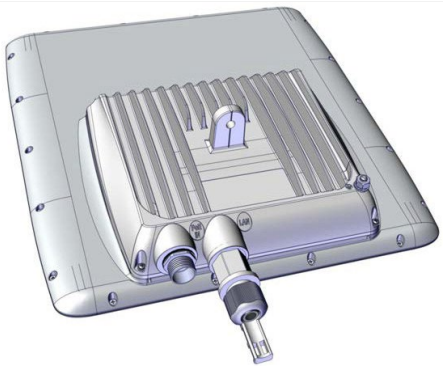
There are several models of base stations available:

5000L Integrated
(12dbi integrated antenna)

5000L Connectorized
(connectorized for external antenna)

5000L 6.4 GHz
(16dbi integrated antenna)

JET PRO
(integrated beamforming antenna)



JET DUO
(integrated beamforming antenna)

NEO, NEO DUO, JET AIR and JET AIR DUO
(integrated beamforming antenna)

MultiSector Integrated
(2x integrated antenna**s and connectorized for 2x external antennas**)

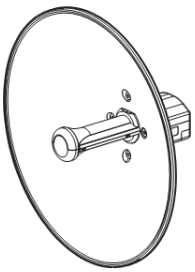
MultiSector Connectorized
(connectorized for **up to 4x** external antenna**s**)

Subscriber Units (SU)

There are several types of RADWIN 5000 subscriber units:

SU PRO / SU AIR / Alpha / Alpha-PRO Integrated (integrated 21dbi antenna)

SU PRO / SU AIR / Alpha / Alpha-PRO Connectorized
(connectorized for external antenna)



SU ECO
(integrated 23dbi dish antenna)

POE sources

RADWIN POE units (POE power supplies) are available for any standard type of power feed (AC or DC), for indoor or outdoor installation scenarios. RADWIN IDU series POE switches are also available.

See **Appendix A** for more details.

Power feed voltage	56W Indoor POE units for HBS	24W Indoor POE units for SU	35W Outdoor POE units
100-240V AC	RW-9921-400x series 	Included with SU or Alpha-PRO and available as RW-9921-102x series 	RW-9921-0080 
20-60V DC	RW-9921-1059 	RW-9921-1039 	RW-9921-0110 

POE Cable

POE feed for RADWIN ODUs must be connected using an outdoor rated CAT-5e STP cable, 24 AWG, terminated with shielded RJ-45 connectors.

RADWIN ODU-IDU cables in various lengths are available for purchase (see WINPro catalog). These cables are shipped ready for installation with an IP-67 protective gland pre-installed on one end of the cable for connection to the ODU, and with RJ-45 male shielded connectors on both ends.

The cable contains 4 twisted pairs, overall shielded with aluminium foil and jacketed with a heavy duty, black, UV resistant & flame-retardant PVC compound.

RADWIN ODU-IDU cables have the following specifications:

Parameter	Value
Cabling standards	Conforms to ANSI/TIA/EIA-568-B.2, ISO/IEC 11801, IEC 61156-5
Inner and outer jacket	Heavy-duty, UV-resistant, Flame-retardant PVC compound for outdoor use
Flame test	IEC 60332-1 & UL 1581 VW-1
UV resistance test	2016 Hr min. exposure according to ASTM G53
NEC rating	CMX UL 444 / CSA C22.2 No 214-02, UL Listed
EU RoHS	Fully conforms to Directive 2002/95/EC
China RoHS	Fully conforms to Directive SJ/T-11363-2006

External Antennas

Various RADWIN sector and directional antennas are available for connectorized base station and subscriber radios. All RADWIN antennas are supplied with mounting kit and 2x low attenuation 1.2 meter RF cables (LMR-400) with N-type connectors at both ends.

Please refer to WINPro catalog and datasheets for more details.

Any RADWIN radio connectorized for external antenna can be used with external antennas provided by RADWIN or 3rd party, provided the antenna meets the basic specs:

- 50 Ohm impedance
- Frequency range matching the operating frequencies
- Rated for outdoor installation
- Meets regulation terms (see **Appendix E**)

Worldwide regulation products

JET AIR and JET AIR DUO base stations support worldwide regulation.

These products include a built-in GPS/GNSS receiver. The radios identify their location from GNSS, and determine the country in which they are located and the regulation that applies in that country.

In cases where the operator is permitted by his local regulatory authority to operate in additional bands not specified by the regulation in his country, a licensing mechanism is available to enable opening additional bands for use in the radio device.

In cases where the installation / setup process is performed without GNSS reception, the installer is allowed to manually select the country in which the radio is located. When GNSS fix is obtained by the radio, the radio will automatically set the country and regulation to the one detected by GNSS.

If the installer manually selected a regulation band that is not supported in the current country, the link will be stopped and the installer will have to select an allowed band.

Lightning Protector Units (LPU)

RADWIN LPU are robust outdoor units designed to be installed on a pole or on a wall at each end of the ODU-IDU cable. It has two ports with protective glands for CAT-5e cables and a grounding lug. Each LPU is supplied with a 0.5m CAT5e cable and a stainless-steel pole mounting band.

Parameter	Specification
Ingress protection grade	IP-67
Compatible Interfaces	10/100/1000/2500BaseT
Data Rates	Up to 2500 Mbps
Nominal Operational Voltage	48 VDC
Maximum Operational Voltage	60 VDC (@ 650 mA)
Maximum Continuous current	1 A
Impedance	90 to 110 Ohm
Connection type	RJ45, CAT 5e STP (shielded)
Protected pins	All 8 pins
Response time	<5 microseconds (with ODU)
Nominal discharge currents	
Line to Line	500 A @ 8/20µs
Line to Ground	2000 A @ 8/20µs
Impulse Discharge Current	
20000 A, 8/20 µs	At least 1 operation
10000 A, 8/20 µs	10 operations
2000 A, 10/350 µs	1 operation
200 A, 10/1000 µs	> 300 operations
200 A, 10/700 µs	> 500 operations
Impulse Spark-over	
DC Spark-over ±20 % @ 100 V/s	150 V
DC Spark-over ±20 % @ 100 V/µs	350 V
DC Spark-over ±20 % @ 1000 V/µs	500 V
Capacitance	< 2 pF
DC Holdover Voltage	80 V

Installation Steps

Check items to be installed

- Radio unit + mounting kit
- LPUs for each radio (recommended)
- PoE (if outdoor, requires mounting kit)
- CAT-5e cables
- Grounding cables (14 AWG) for radio unit, LPUs and outdoor PoE (if used)
- External antenna + mounting kit (if using an external antenna)
- RF cables (if using an external antenna)

Required Tools

- 13mm spanner/wrench (for ODUs with a standard mounting kit)
- 12mm, 14mm spanner/wrench and Phillips screwdriver (for SU ECO)
- 11mm spanner/wrench (for grounding lug)
- Cable ties
- Waterproofing tape (Scotch 23 or equivalent)
- RJ45 crimping tool (in case CAT-5e outdoor cables will be prepared on-site)

Connect to Radio Unit

Make sure you are using the appropriate PoE source for your radio unit.

- For subscriber units (SU PRO, SU AIR, SU ECO, Alpha PRO), AC POE is included in the package
- For base stations, AC POE model RW-9921-400x is recommended
- See POE Compatibility table in **Appendix A**

Connect PoE to power, connect the laptop's ethernet port to the IN (or LAN) socket on the PoE, then connect the OUT (or PoE) socket on the PoE to the appropriate socket on the radio unit

See **Connect POE cable** for details on POE port locaiton for specific models.

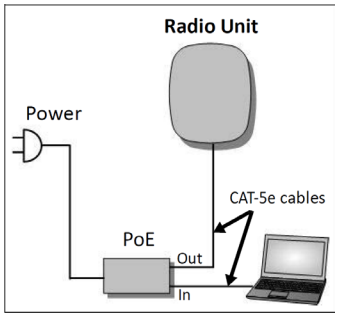


Figure 1: Connecting laptop to a radio unit

Accessing Web UI

To connect to any ODU via POE port using a PC/laptop:

1. Configure a static IP address for the Ethernet NIC

2. Set IP address to 10.0.0.1 (or any other address in 10.0.0.X other than 10.0.0.120)
3. Set Subnet mask to 255.255.255.0, default Gateway not required
4. In your browser enter the ODU's IP address (default value: **10.0.0.120**)

To connect via Wi-Fi (for subscriber units):

1. Scan for Wi-Fi networks on a laptop or a mobile device
    - Connect to a network with an SSID of **R-[serial number of the unit]**
    - Enter default WPA2 password **wireless**
2. Once connected, your device will get a DHCP address in the 192.168.1.x/24 subnet.
3. In your browser enter the ODU's Wi-Fi IP address (default value: **192.168.1.1**)

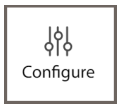
In the login page, enter the login credentials. The default credentials are:

- username: **admin**
- password: netwireless

Updating network settings

This step may be done before or after physical installation, depending on your workflow and availability of a direct connection to the ODU after physical installation.

SU models

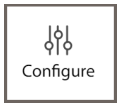
1. Log in to the Web UI.
2. Click the Configure icon 

3. Select Management -> Network

1. Enter IP address, Subnet Mask and Default Gateway (Management VLAN ID can be set as well)
2. Click Save and confirm the network parameters update
3. Connect the radio unit to network device / PC with IP and VLAN configured accordingly
4. Ping radio unit using the new IP address to verify update.

HBS models

5. Log in to the Web UI.

1. Select the HBS by placing a checkmark
2. Click the Configure icon 

3. Select Management -> Network
4. Enter IP address, Subnet Mask and Default Gateway (Management VLAN ID can be set as well)
5. Click Save and confirm the network parameters update
6. Connect the radio unit to network device / PC with IP and VLAN configured accordingly
7. Ping radio unit using the new IP address to verify update.

Mounting Integrated ODUs

Standard Mounting Kit

Standard mounting kit is supplied with:

- SU PRO/AIR and Integrated
- JET DUO, JET PRO, NEO, NEO DUO, JET AIR, JET-AIR DUO
- MultiSector integrated
- Outdoor POE
-

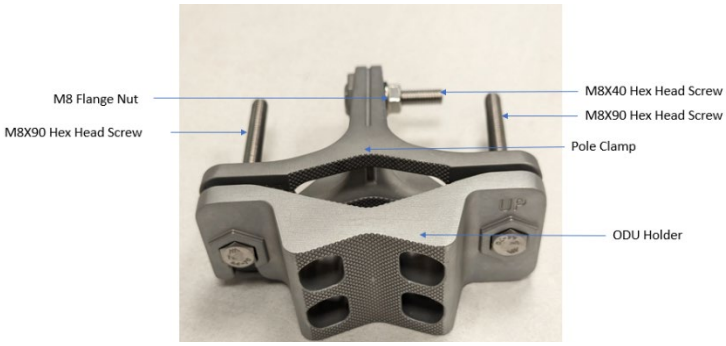
Pole Mount Installation

The standard mounting kit can be used on a thin, medium, or thick pole.

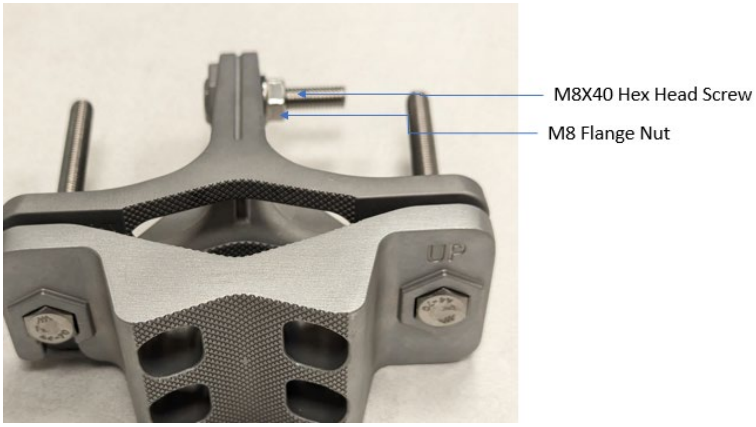
Thin Pole	Diameter 3/4” to 1 1/2” (2cm to 4cm)
Medium Pole	Diameter 2” to 3” (5cm to 7.5cm)
Thick Pole	Diameter larger than 3” (7.5cm)

Thin and Medium Pole

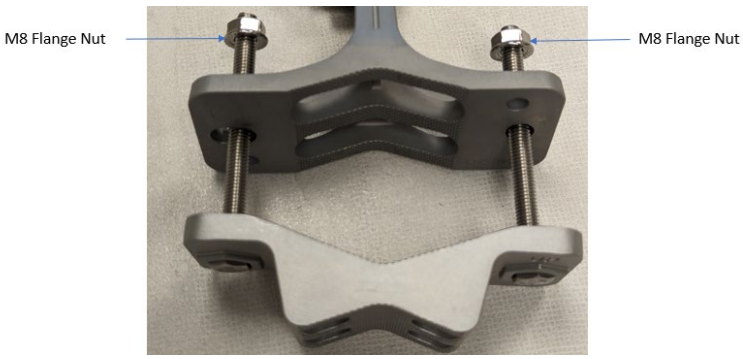
1. Remove the mounting kit from the ODU packaging box.



2. Remove the M8X40 Hex Head Screw and the M8 Flange Nut from the mounting kit.



3. Loosen both M8X90 Hex Head Screws by rotating both M8 Flange Nuts until the end of the Hex Head Screw.

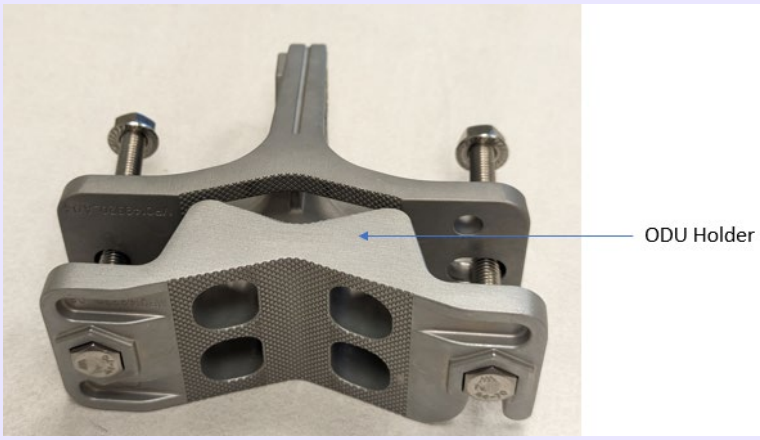


For thin pole:

The mounting kit is preassembled for mounting on a medium sized 2-3” pole.

If you are mounting the ODU on a small sized ¾ -1½” pole, perform the following:

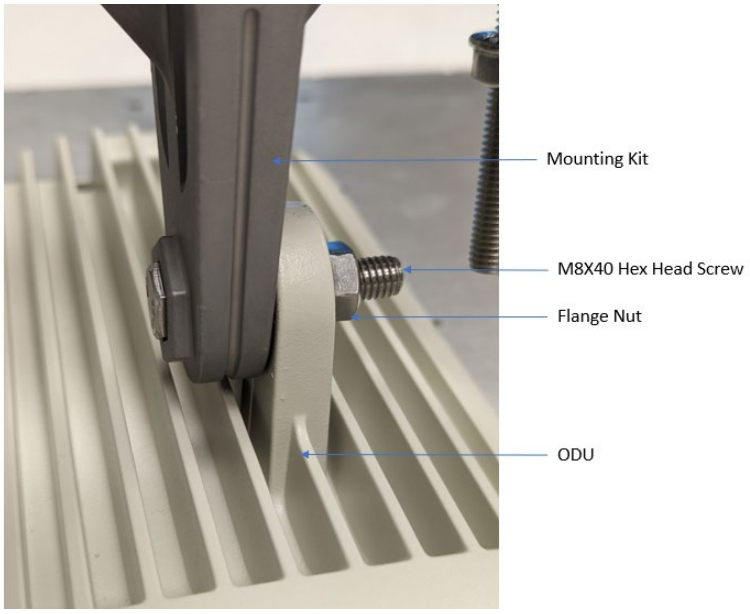
1. Remove the Pole Clamp by dissembling both M8 Flange Nuts and both M8X90 Head Hex Screws.
2. Reverse the Pole Clamp and reattach it to the ODU holder by reassembling both M8X90 Head Hex Screws and both M8 Flange Nuts.



4. Mount the mounting kit on the ODU by inserting the M8X40 Hex Head Screw in the hole of the ODU.

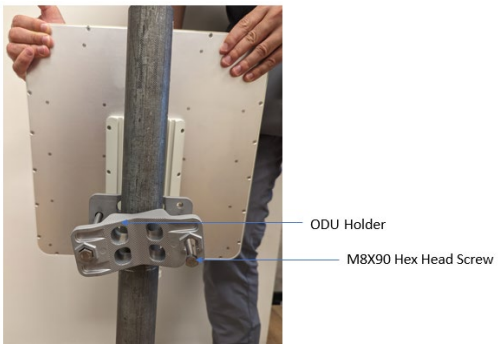
Note:
Align the antenna before tightening the pole bracket bolts.

5. Tighten the M8 Flange Nut with a torque of 15 Nm until the mounting kit is firmly on the ODU.

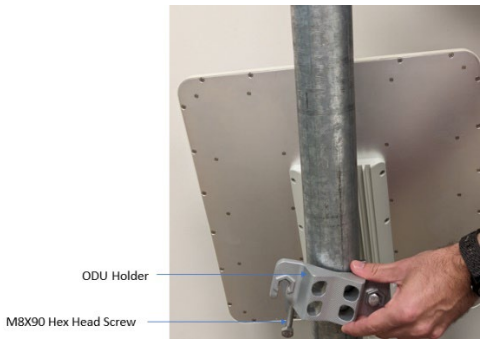


6. Open the Pole Clamp allowing the ODU Holder to attach onto the pole, then close the Pole Clamp on the M8X90 Hex Head Screw.

Thin Vertical Pole ¾” -1½”



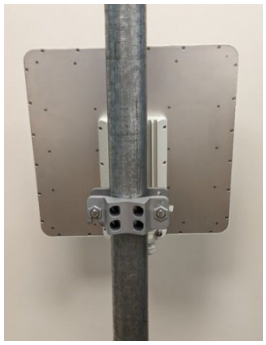
Medium Vertical Pole 2 - 3”



7. Tighten both M8 Flange Nuts with a torque of 15 Nm until firmly secure on the pole.

Thin Vertical Pole ¾” -1½”

Medium Vertical Pole 2 - 3”



Thick Pole

8. Use worm drive clamps (not supplied), threaded through the holes as shown:

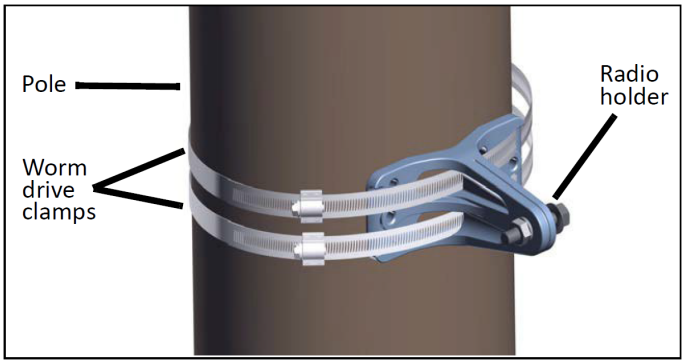
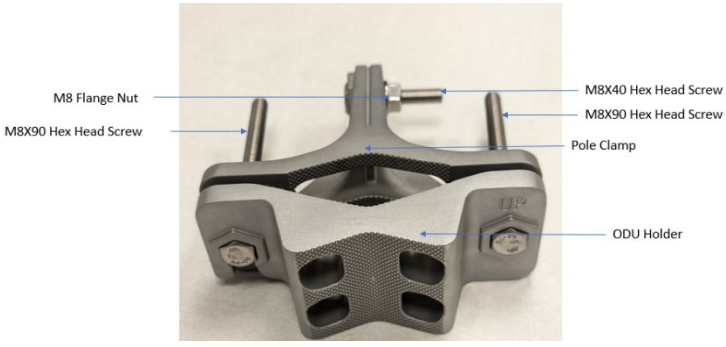


Figure 2: Mounting kit on a thick pole

.Wall Mount Installation

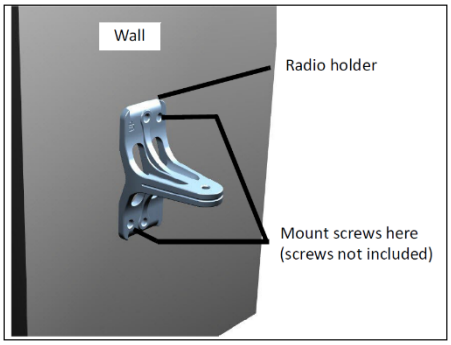
1. Remove the mounting kit from the ODU packaging box.



2. Disassemble all parts from the ODU Holder.

3. Install the mounting kit on a wall using two mounting screws (not included) appropriate for the type of wall. Make sure you use the indicated holes.

   Vertical adapter may be required, depending on the ODU type.



SU or Alpha Integrated, 5000L Integrated, NEO, NEO DUO, JET-AIR, JET-AIR DUO, MultiSector Integrated, Outdoor POE

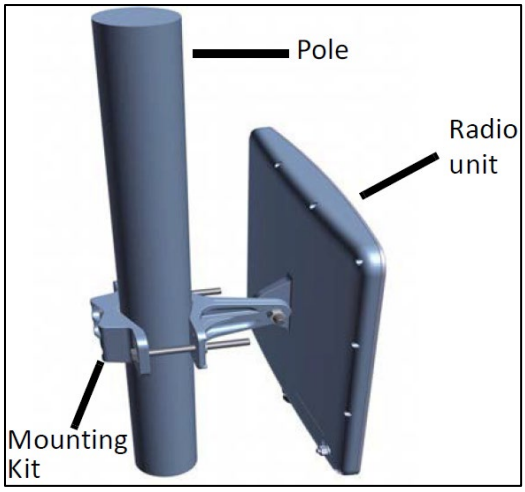


Figure 3: SU Integrated, Alpha Integrated, NEO, NEO DUO, JET AIR, JET AIR DUO

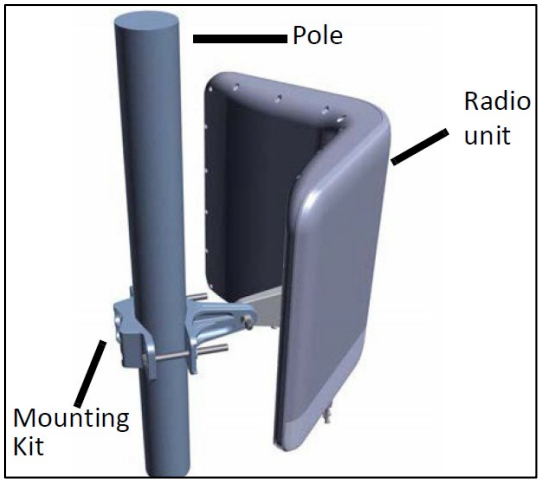


Figure 4: MultiSector base station or antenna

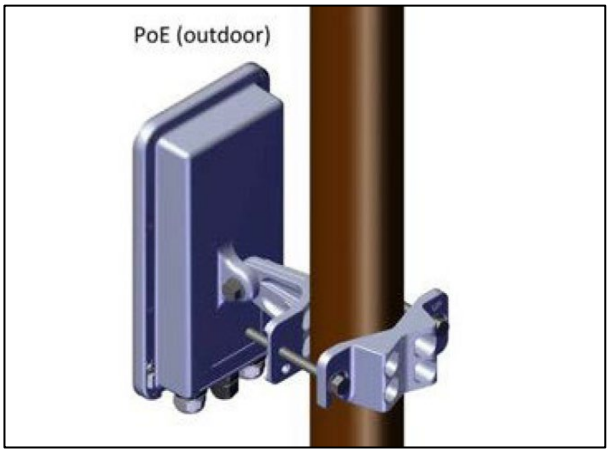


Figure 5: Outdoor PoE

If mounting one of these units on a horizontal pole or on a wall, use the radio vertical adaptor

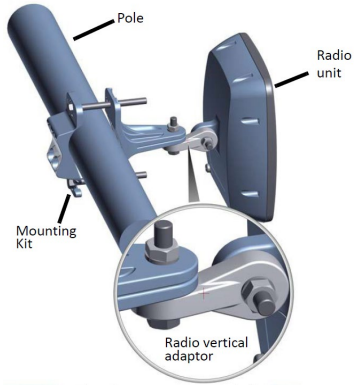


Figure 6 Mounting an ODU on a horizontal pole

JET PRO, JET DUO

Use the radio vertical adaptor when mounting a JET PRO or JET DUO unit on a vertical pole as shown here:

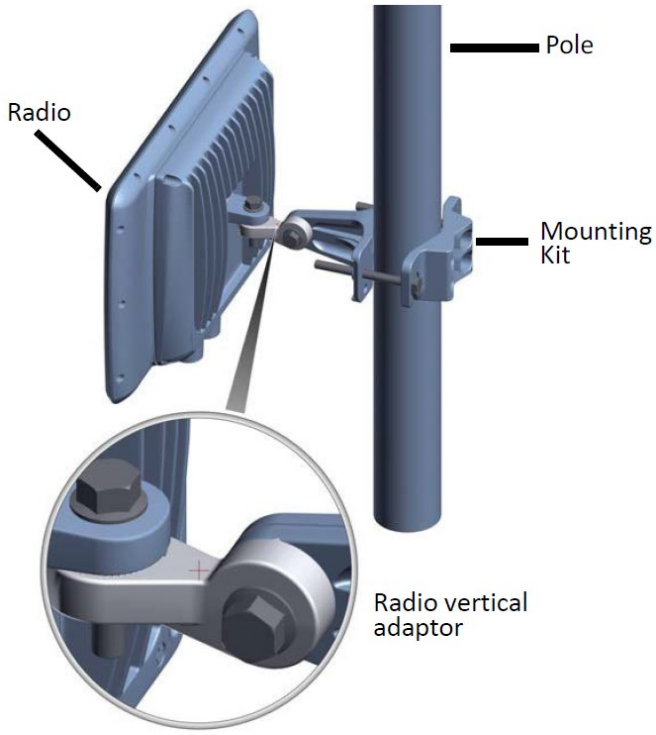


Figure 7 JET PRO or JET DUO radio unit mounted on a vertical pole

When mounting a JET PRO or JET DUO unit on a horizontal pole or on a wall, the radio vertical adaptor is not needed:

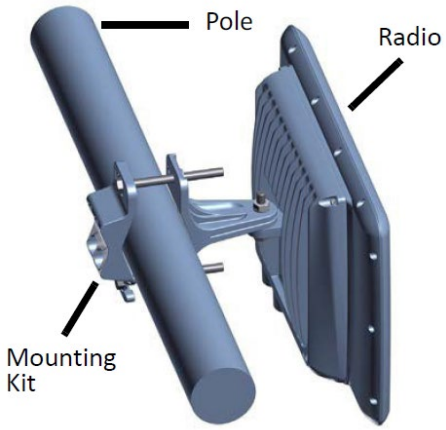


Figure 8: JET radio unit mounted on a horizontal pole

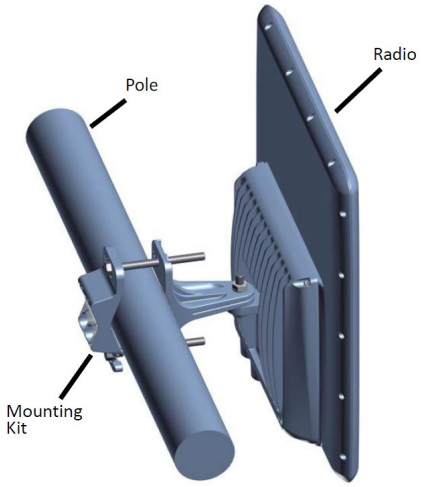


Figure 9: DUO radio unit mounted on a horizontal pole

Mounting MultiSector Integrated for 360-degree coverage

When working with MultiSector Integrated, the basic coverage is 180 degrees. Coverage with one MultiSector Base Station Integrated (view from above):

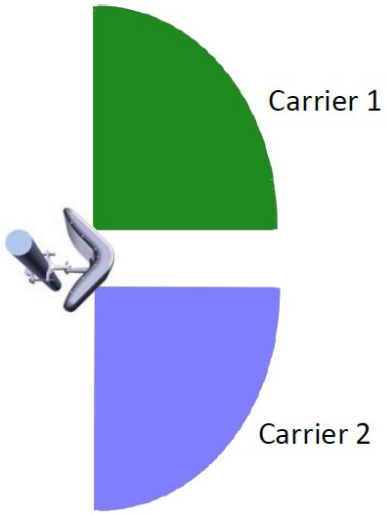


Figure 10: MultiSector Integrated coverage: one unit

The coverage can be increased to 360 degrees, either by adding a MultiSector antenna (or an additional MultiSector Integrated base station) – see view from above:

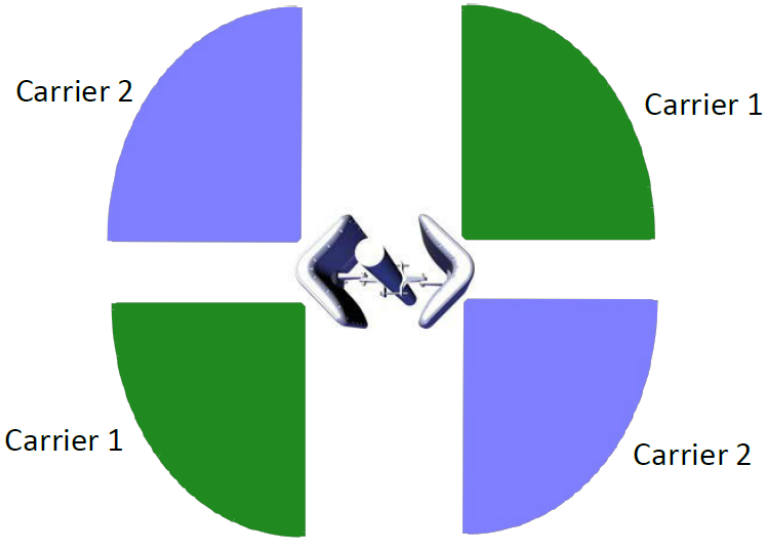


Figure 11: MultiSector coverage: with MultiSector antenna

It is possible to mount a MultiSector Base Station Integrated back-to-back with a MultiSector antenna (or an additional MultiSector Integrated base station) on the same pole. Do this as follows:

1. Fasten a radio holder to one MultiSector unit. Make sure you use a radio holder with the screw threading.

Figure 12: Radio holder fastened to a MultiSector Integrated unit

2. Place this on a pole in the location where you want to mount the units:

Figure 13: MultiSector Integrated unit with radio holder on a pole

3. Use the additional radio holder included in the MultiSector (the one without threading), and fasten this around the pole to the first radio holder as shown:

Figure 14: Second radio holder fastened to a MultiSector unit

4. Fasten the MultiSector antenna to the second radio holder as shown:

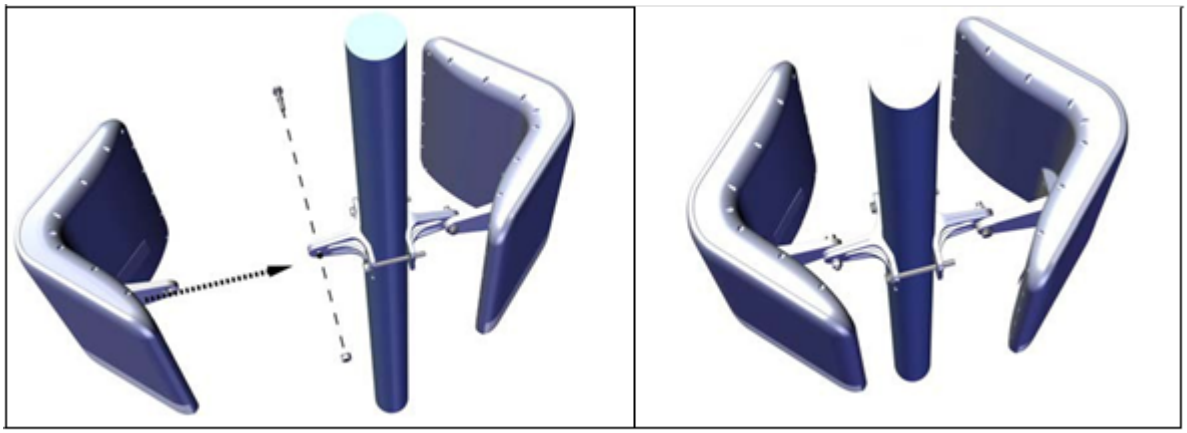


Figure 15: Fasten the MultiSector antenna

See Connecting MultiSector Integrated Units to Antennas for a description of how to connect an external antenna (standard antennas or a MultiSector antenna).

Mounting MultiSector Connectorized

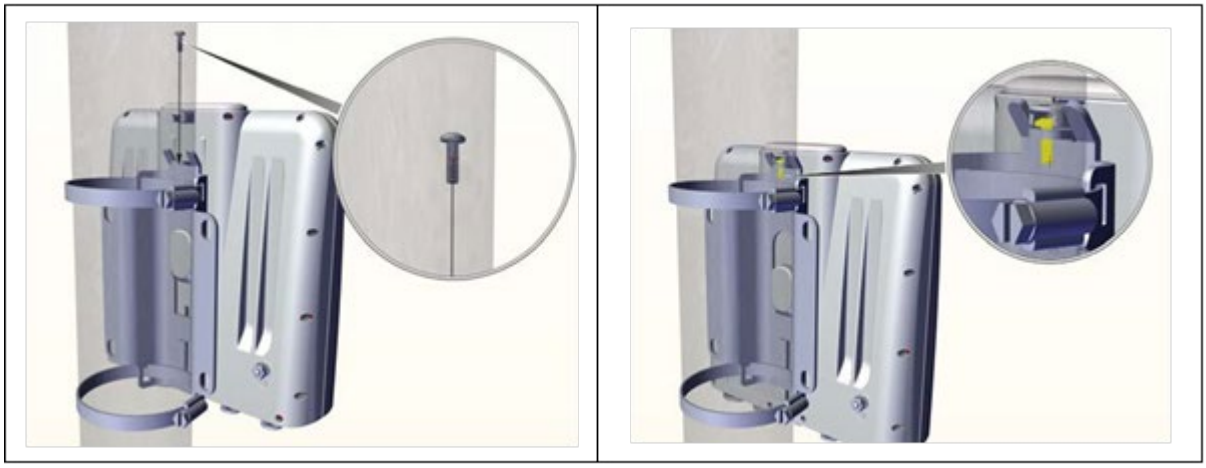
The MultiSector Connectorized unit can be mounted on a vertical pole or on a wall.

Vertical Pole

1. Recommended diameter of the pole is 2 to 4 in (5-10 cm).
   - Use worm-drive clamps to install the supporting mount on a pole. The included worm-drive clamps support poles whose diameter is 2 to 4 in (5 to 10 cm).

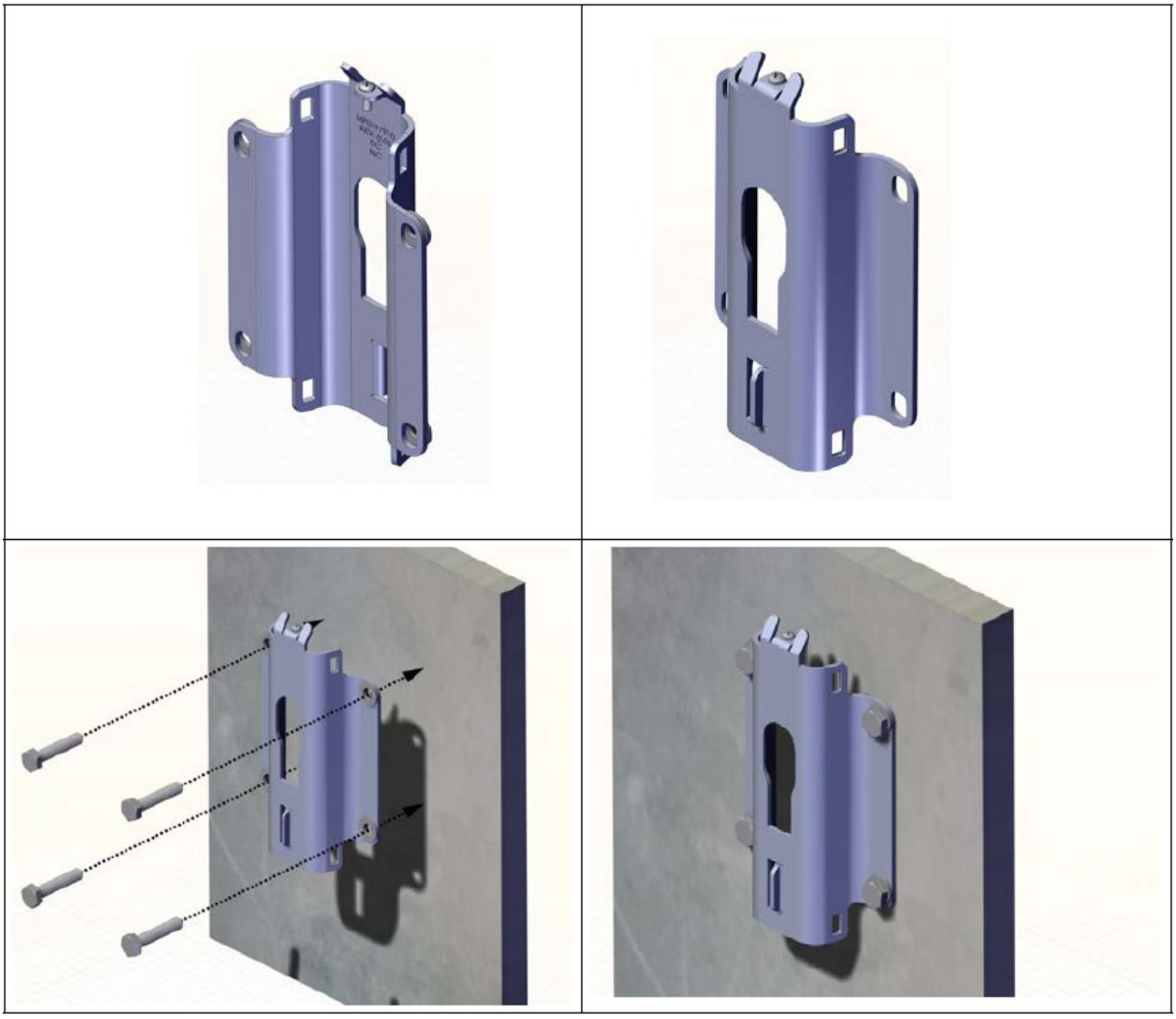
2. Place the mounting tongue of the MultiSector Base Station Connectorized in the indicated hole of the supporting mount, while aligning the vertical channel of the unit with the flange of the supporting mount. Make sure the MultiSector Base Station Connectorized is attached firmly to the mount:

3. Push down on the MultiSector Base Station Connectorized until you hear a click, then fasten the locking screw as shown (the locking screw is found on the mounting tongue):

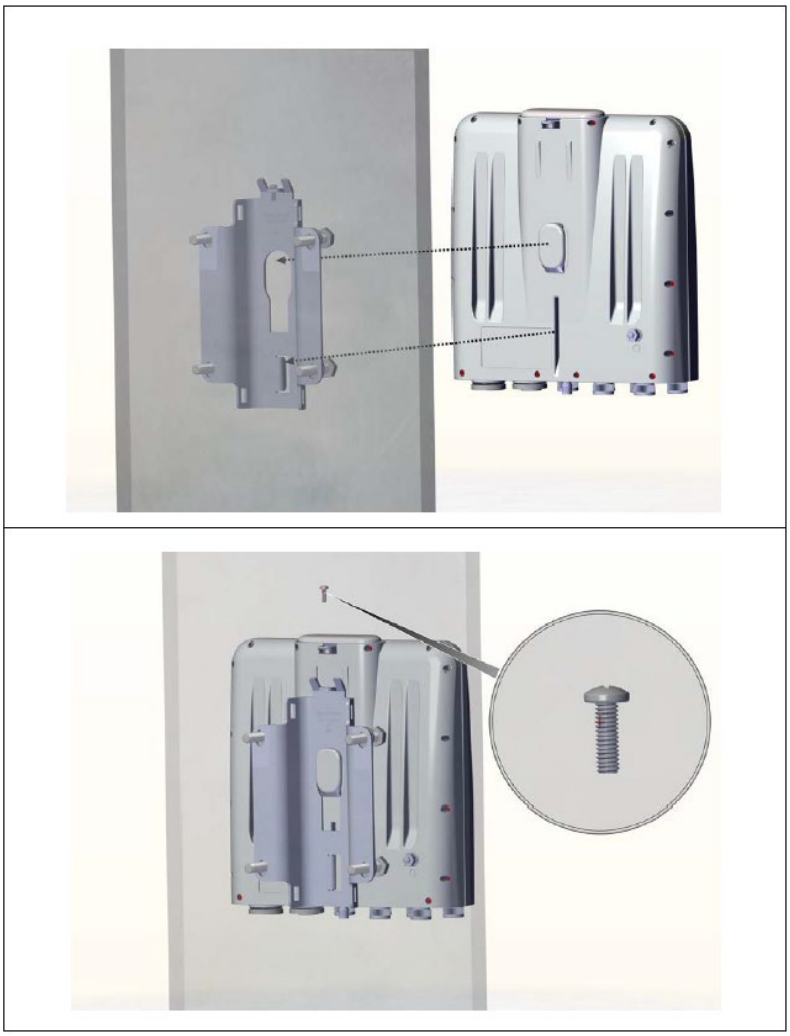


Wall

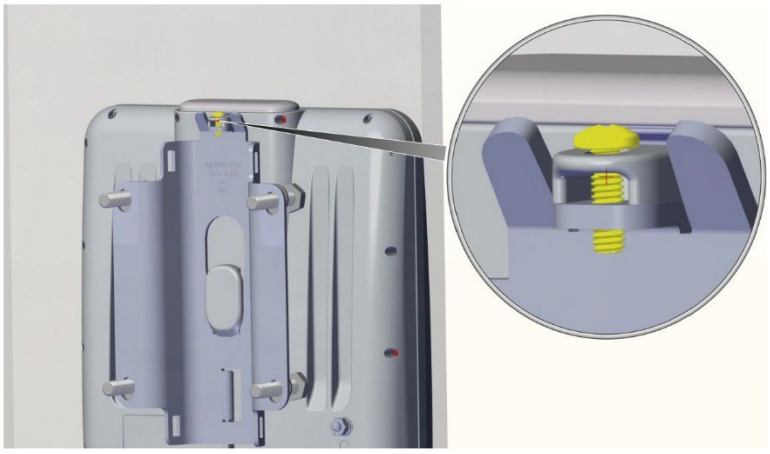
1. Use four bolts (not supplied) to install the supporting mount on a wall.
   - The recommended material of the bolts is 316 stainless steel, minimum diameter 8mm.



2. Place the mounting tongue of the MultiSector Base Station Connectorized unit in the indicated hole of the supporting mount,while aligning the vertical channel of the MultiSector Base Station Connectorized with the flange ofthe supporting mount. Make sure the MultiSector Base Station Connectorized is attached firmly to the mount:



3. Push down on the MultiSector Base Station Connectorized unit until you hear a click,then fasten the locking screw as shown (the locking screw is found on the mounting tongue):



Mounting SU or Alpha PRO Connectorized

SU Connectorized or Alpha PRO Connectorized is mounted on a pole using worm-drive clamps.

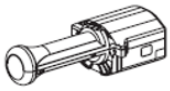
1. Place the unit on a pole.

2. Fasten the unit to the pole using worm-drive clamps.

Figure 16: SU Connectorized mounted with worm drive clamps

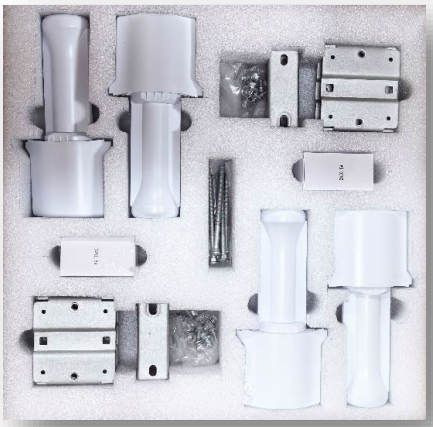
Installing SU ECO

SU ECO must be assembled before installation. The supply kit has the following components:

		
Antenna Reflector	Radio Unit	L-shape bracket and mounting kit hardware

			
Cable Tie	Declaration of Compliance	AC POE Unit	AC Power Cable

The product is shipped in a pack of 4x SU ECO units, with components stored on stacked trays:



Initial assembly

- Open the package, take a radio unit and a set of bolts from the top tray



- Remove the top tray, pull out an L-shaped bracket and a reflector
- Align flat groove of the antenna central cutout with the bracket's upper side



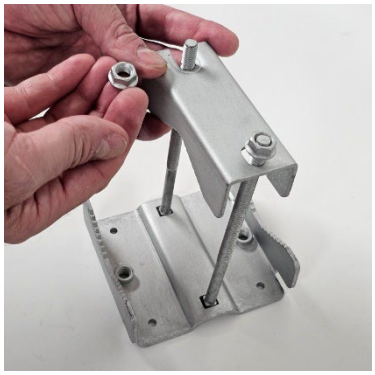
- Attach the reflector to the bracket using 2x bolts in top and bottom positions
- Insert the radio unit into the cutout, aligning the flat part with the upper side of the radio



- Secure the radio using 2x bolts in left and right positions



- Assemble the pole mount adapter

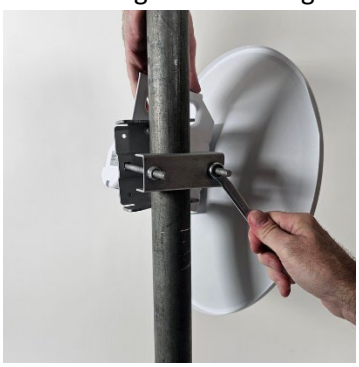

- Attach the adapter to the L-shaped bracket – the radio is now ready for pole installation



Mounting on a vertical pole

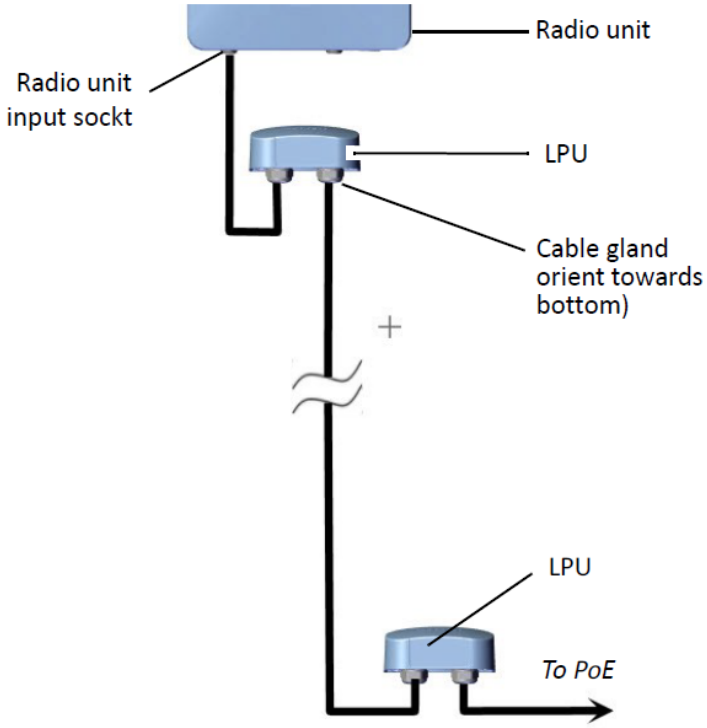
- Attach and secure the bracket on the pole


- Connect POE cable and POE device (see relevant chapters below)
- Perform alignment and tighten the bolts

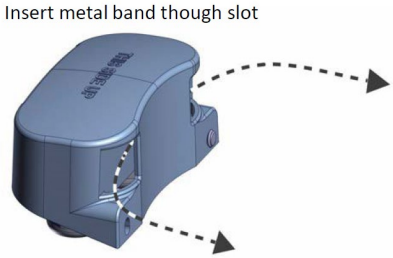



Lightning Protection Units

- We recommend using two lightning protection units (LPUs) for each radio unit installation: one near the radio unit and one near the PoE.
- Make sure the LPU is oriented with the cable glands oriented towards the bottom.
- Mount one LPU near the radio unit, and the second near the PoE:

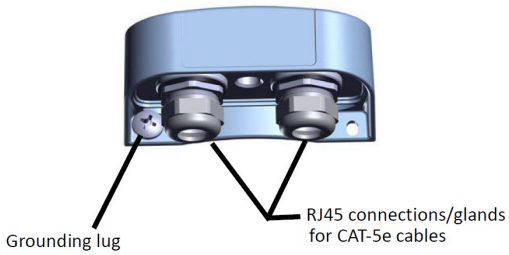


1. Insert the metal band through the slots on the LPU as shown:

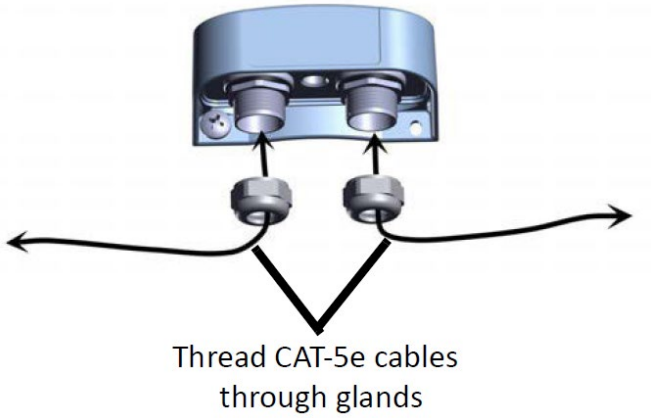


2. Tighten the metal band.

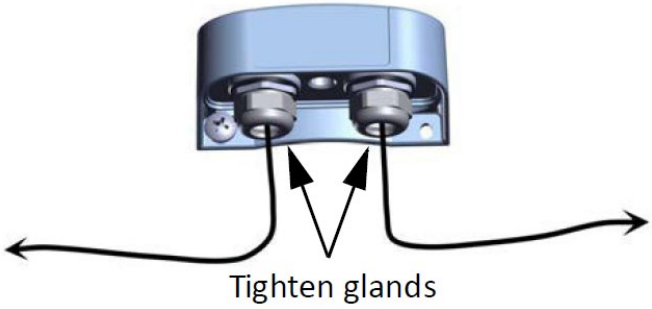
3. Connect the grounding lug to a ground source.



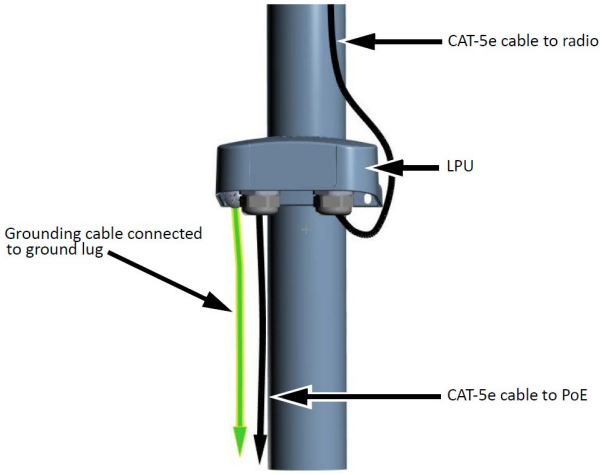
4. Remove the cable glands, and thread the CAT-5e cables through them:



5. Connect the cables to the LPU's sockets, and the glands around the cables as shown:



6. Route one CAT-5e cable up to the radio unit, and the other down to the PoE (via the lower LPU). An LPU installed on a pole is shown below:


CAT-5e cable to radio
LPU
Grounding cable connected to ground lug
CAT-5e cable to PoE

Connect Ground Cable

Caution

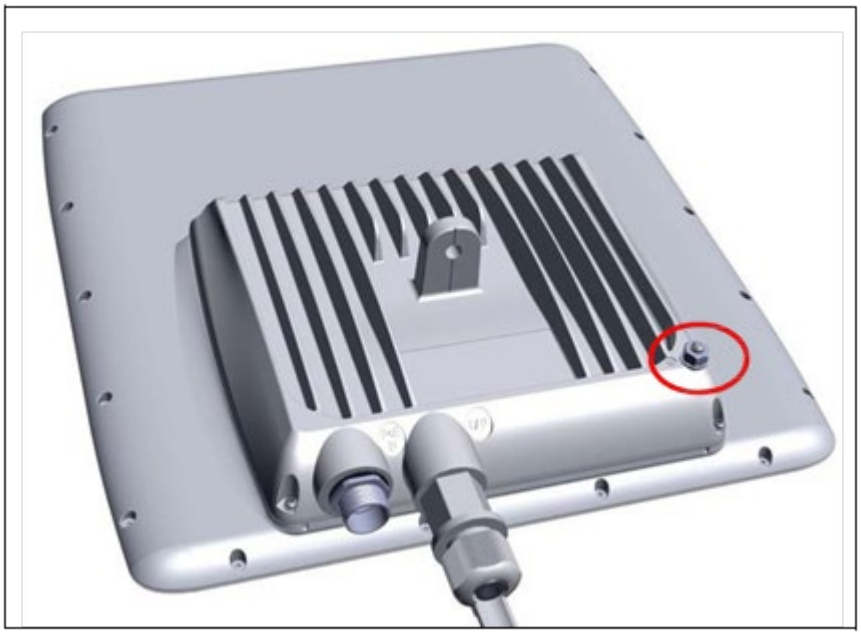
Unit shall be permanently connected to protective earth by a skilled person using min. 14 AWG wiring.

Connect a ground cable to the indicated ground connection on the radio unit

JET PRO

Ground: JET radio unit

JET DUO



Ground: JET radio unit

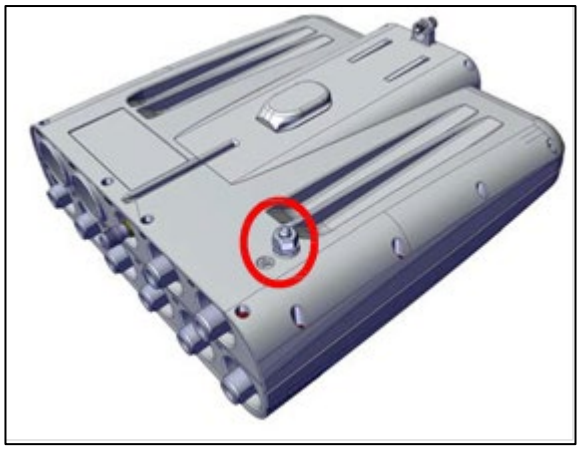
NEO, NEO DUO, JET-AIR and JET-AIR DUO

Ground: NEO, JET AIR and JET-AIR DUO radio unit

MultiSector Integrated

Ground: MultiSector Integrated radio unit or Multisector antenna

MultiSector Connectorized



Ground: MultiSector Connectorized unit

SU PRO/AIR Integrated

Ground: SU Integrated radio unit

SU PRO/AIR Connectorized

Ground: SU Connectorized unit

Connect External Antenna

Follow these steps to connect an external antenna:

1. Mount the external antenna
2. Route and connect the cables between the radio and the antenna
3. Follow a consistent connection scheme – we recommend to always connect:
   - ANT 1 radio port to V polarization of the antenna
   - ANT 2 radio port to H polarization of the antenna
4. Seal the connectors (See Waterproofing on page 52).

Possibility of hazardous voltage 56VDC appearance exists on accessible antenna connections. Use Personal Protection Equipment (e.g. insulating gloves) when working with the unit or the antenna.

SU or Alpha PRO Connectorized

Antenna ports: SU or Alpha PRO Connectorized unit

MultiSector Integrated

The MultiSector Base Station Integrated can be operated with or without external antennas. If using external antennas with the MultiSector Base Station Integrated, make sure you connect them in the manner described here.

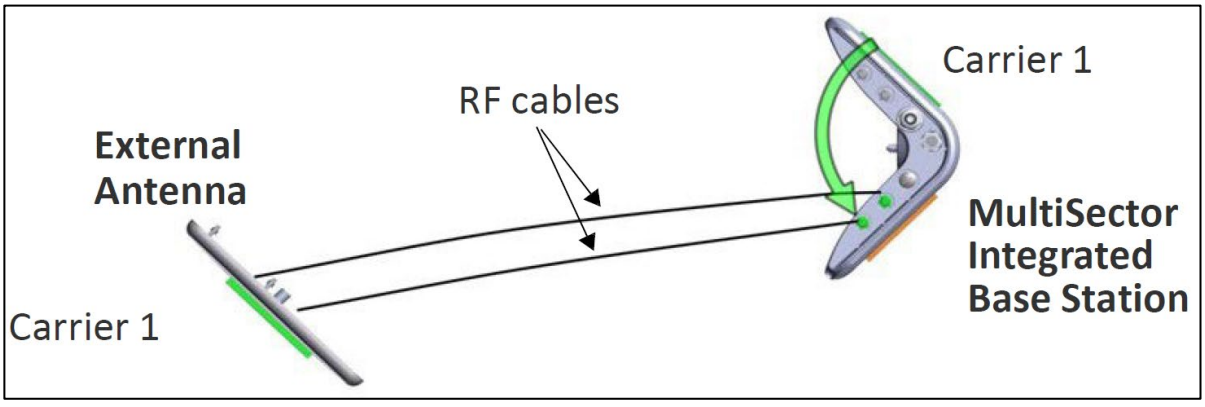
Mounting the MultiSector Base Station Integrated, the MultiSector antenna, and standard external antennas are described in section 2.8.Mounting a Unit with the Standard Mounting Kit.

Once antennas are connected, make sure you add waterproofing tape (See Waterproofing on page 52).

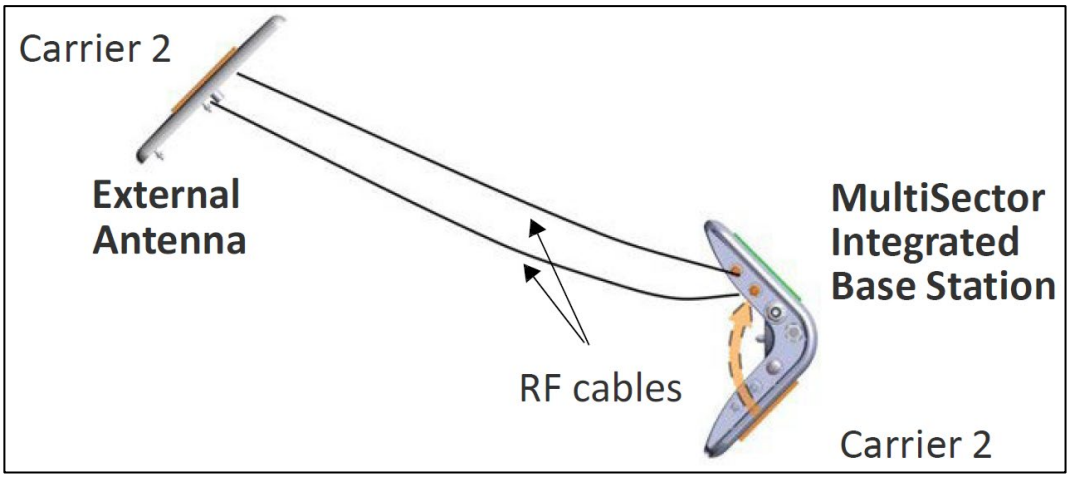
MultiSector Base Station Integrated and Standard Antennas

Connect the MultiSector Base Station to an external antenna as shown below.

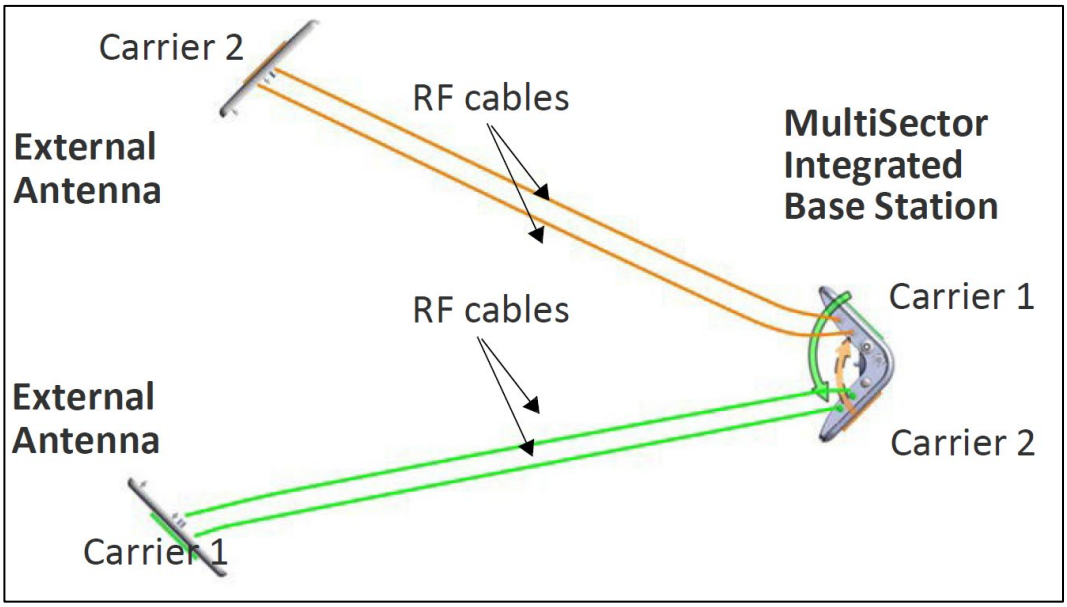
- The connecting ports are located on the wing of the base station opposite the wing that has the carrier. This helps to reduce complexity in RF cable routing.
- While the MultiSector antenna has a beamwidth of 90 degrees for each wing, approved standard external antennas have can have narrower or wider beamwidth values. See Certified Antennas for a list of approved antennas and their characteristics.
- Sector Self-Backhaul: This feature uses one of the subscriber units as a backhaul link. That subscriber unit uses the air interface to communicate with an external antenna connected to the base station as shown below. Note that this feature must also be configured properly. See the RADWIN 5000 Configuration Guide.



MultiSector Base Station Integrated connected to external antenna (Carrier 1 only)



MultiSector Base Station Integrated connected to external antenna (Carrier 2 only)



MultiSector Base Station Integrated connected to external antennas (both Carriers)

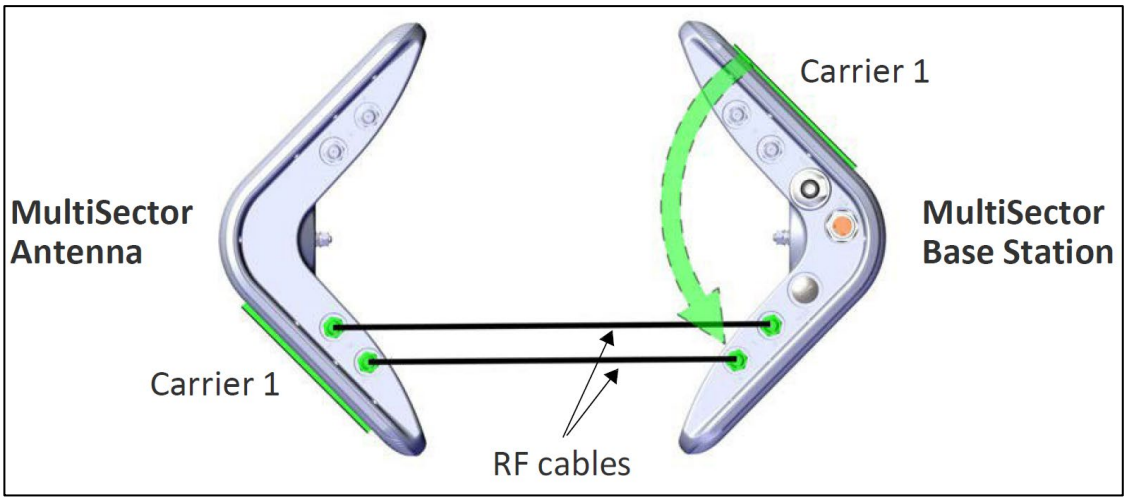
Caution

Per FCC and ETSI regulations, no overlap between antennas is allowed, with the exception of Self Backhaul.

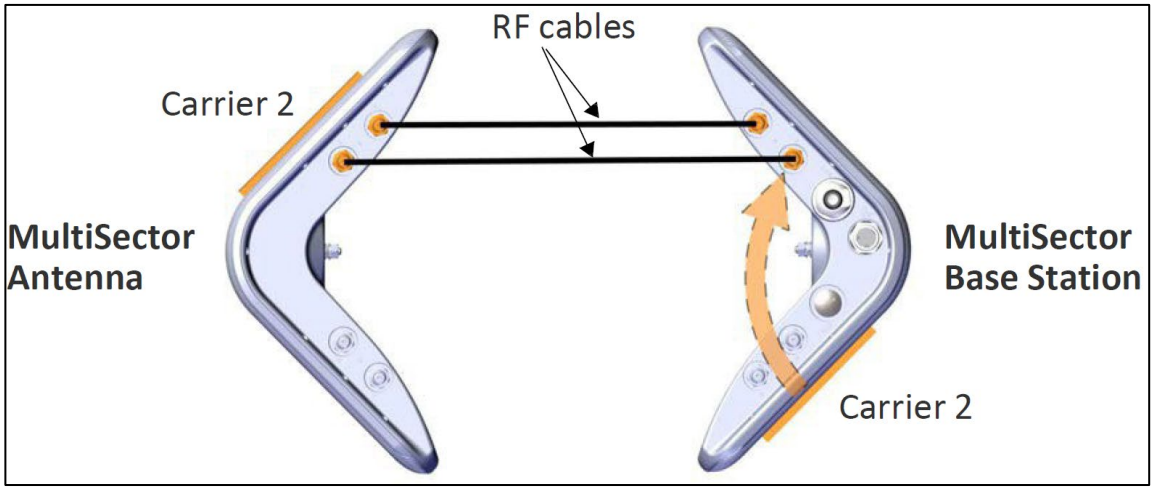
MultiSector Base Station Integrated and the MultiSector Antenna

Connect the MultiSector Base Station to a MultiSector antenna as shown below.

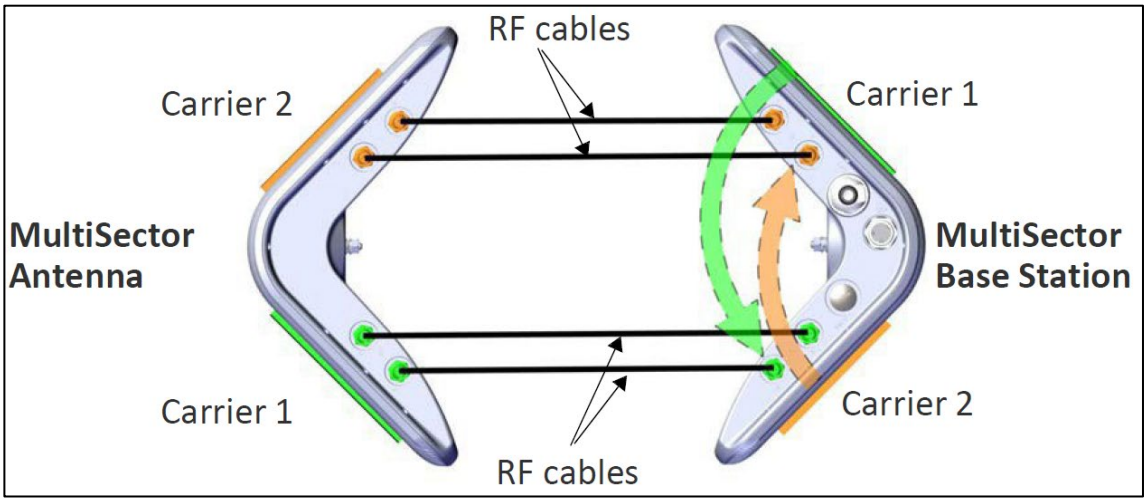
- The connecting ports are located on the wing of the base station opposite the wing that has the carrier. This helps to reduce complexity in RF cable routing.
- The base station and antenna can be mounted anywhere it is convenient according to your radio plan. They need not be mounted back-to-back.



MultiSector Base Station Integrated connected to MultiSector antenna (Carrier 1 only)



MultiSector Base Station Integrated connected to MultiSector antenna (Carrier 2 only)

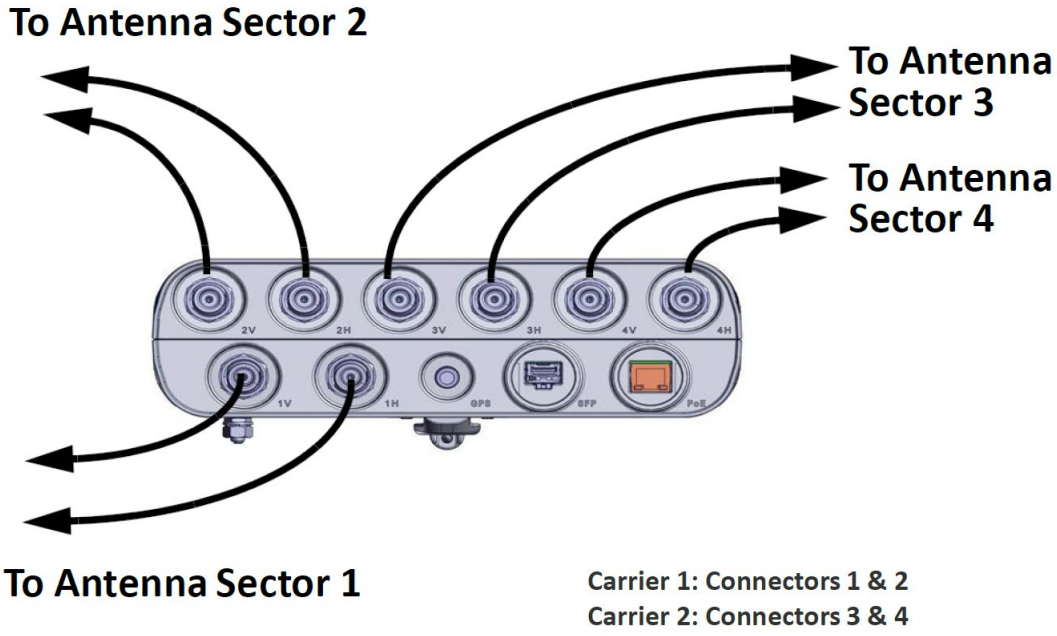


MultiSector Base Station Integrated connected to MultiSector antenna (both Carriers)

MultiSector Connectorized

Connect the external antennas to the radio unit as shown in Figure 84: Antenna connection scheme for the MultiSector Connectorized unit.

- Each antenna sector has one antenna.
- Each carrier frequency is applied to two antenna sectors.
- Antenna Sector 1 uses Antenna 1V+1H, Antenna Sector 2 uses 2V+2H, Antenna Sector 3 uses Antenna 3V+3H, and Antenna Sector 4 uses 4V+4H.
- If the antenna does not have a connection labeled “V” or “H”, but rather with a number or other letter, make sure you stay consistent with the polarization. For instance, if you connect the V port on the MultiSector to the port labeled 1, make sure you do that for all the connections.



Antenna connection scheme for the MultiSector Connectorized unit

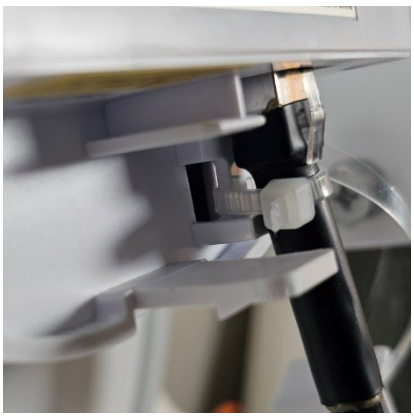
Connect POE cable

SU ECO

- Press firmly on the port cover's plastic latch, pull the cover out and connect POE cable

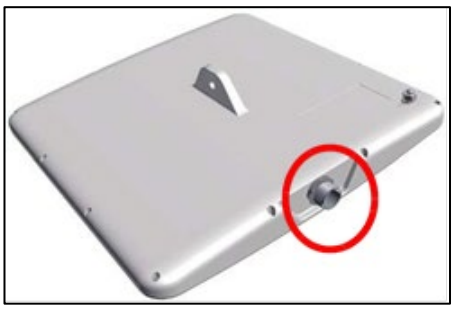

- Secure the cable using the supplied cable tie


- Cut the cable tie, slide the cover onto the unit until the latch is secure


SU PRO/AIR Integrated or Connectorized

1. Connect a CAT-5e cable to the input port of the radio as shown:

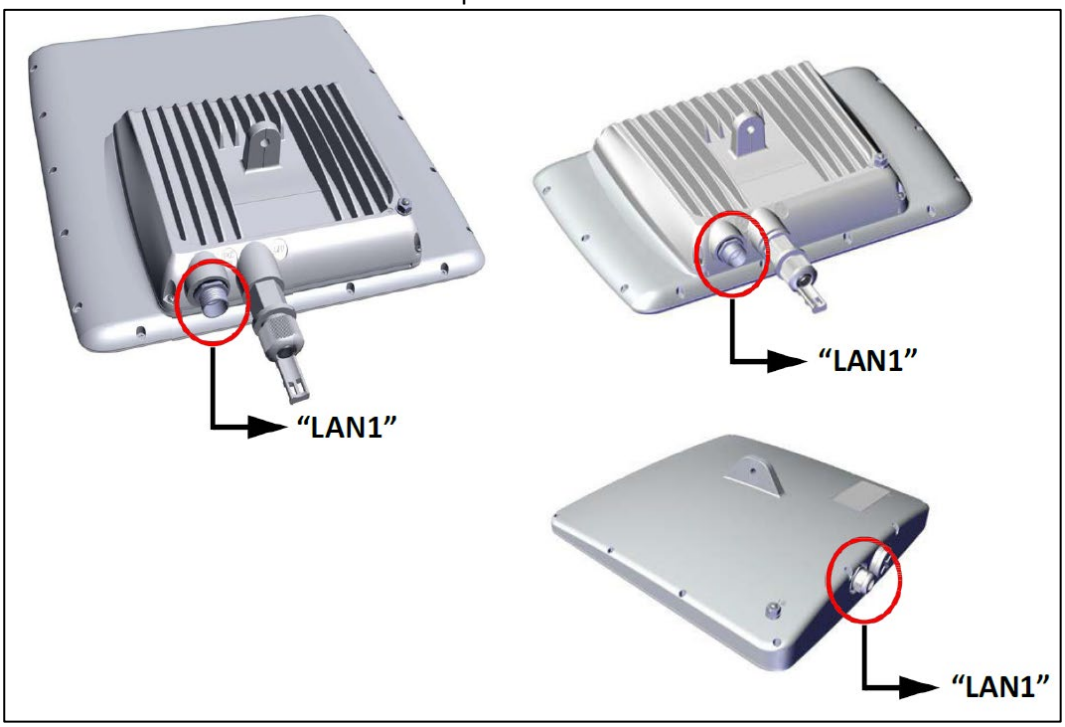


POE port: SU Integrated unit

POE port: SU Connectorized unit (“PoE In”)

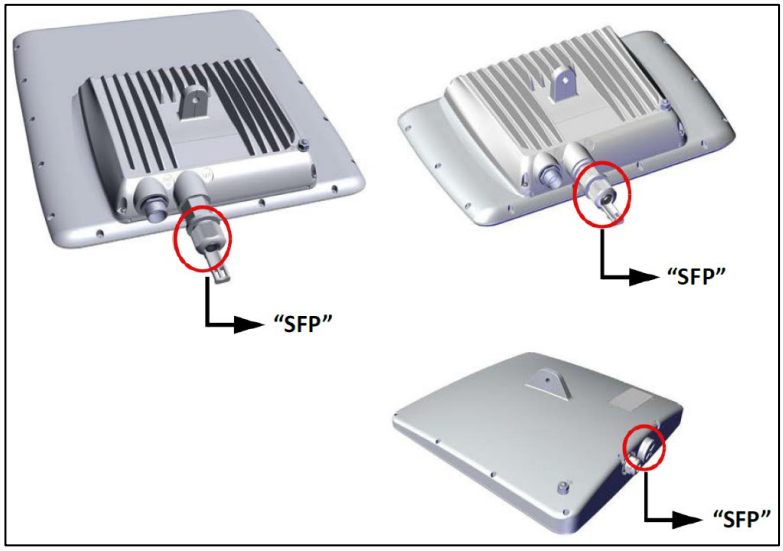
JET DUO, JET PRO, JET AIR, JET-AIR DUO, NEO and NEO DUO

1. Connect a CAT-5e cable to the “PoE IN” port of the radio as shown.



POE port: JET-DUO 3/5 GHz, JET AIR, JET PRO, JET-AIR DUO, and NEO DUO

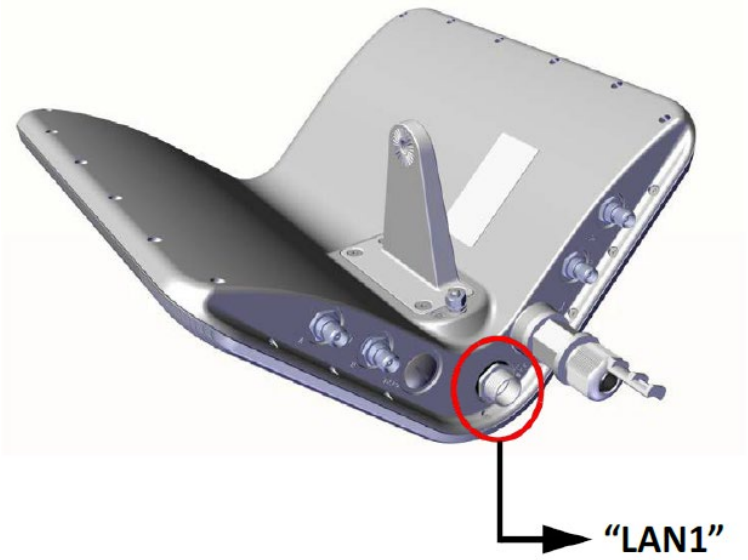
2. SFP port can be used to connect fiber (for data only). Note that POE cable must still be used to provide power, and may also be used for management access to the unit:



SFP port: JET-DUO 3/5 GHz, JET AIR, JET PRO, JET-AIR DUO and NEO DUO

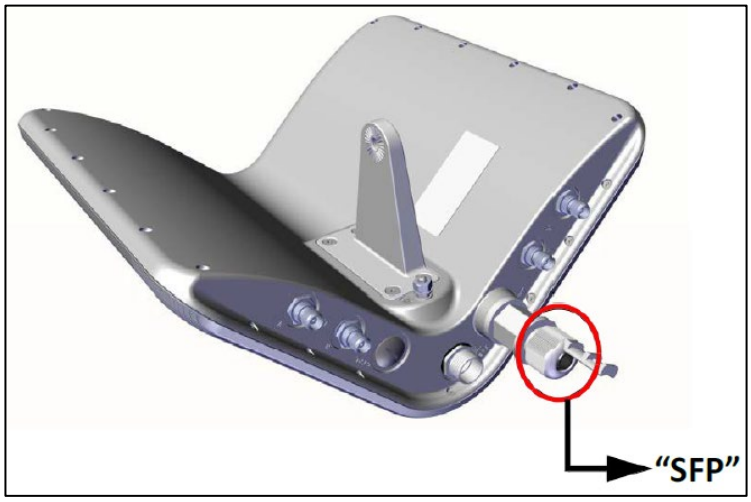
MultiSector Integrated

1. Connect a CAT-5e cable to the “PoE IN” port of the radio as shown. It is referred to as “LAN1” in the Web user interface.



POE port: MultiSector Base Station

2. Alternatively, you can use the SFP connection, which provides management and data connection only (no power). It is labeled “LAN” on the unit, and is referred to as “SFP” in the Web user interface. Note that you must still connect a CAT-5e cable to “PoE In” to provide power:



SFP port: MultiSector Base Station

MultiSector Connectorized

1. Connect a CAT-5e cable to the “PoE” port of the radio as shown. It is referred to as “LAN1” in the Web user interface.

POE port: MultiSector Base Station Connectorized

2. Alternatively, you can use the SFP connection, which provides management and data connection only. It is labeled “LAN” on the unit, and is referred to as “SFP” in the Web user interface. Note that you must still connect a CAT-5e cable to “PoE” to provide power:

SFP port: MultiSector Base Station Connectorized

Connect POE device

RADWIN 5000 radio units require a Power-over-Ethernet (PoE) source to supply both power and ethernet connectivity. RADWIN portfolio includes single PoE devices or IDU series switches.

These devices are briefly described in this section. See **POE compatibility table** in **Appendix A** to verify compatibility between RADWIN radios and POE sources.

Indoor AC PoE

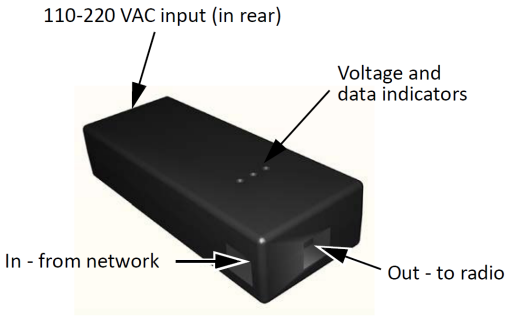


Figure 17: Indoor PoE connections

1. Connect ODU POE cable from to “Out” port.
2. Connect LAN cable to “In” port.
3. Connect power cable

Indoor AC PoE for the SU PRO/AIR

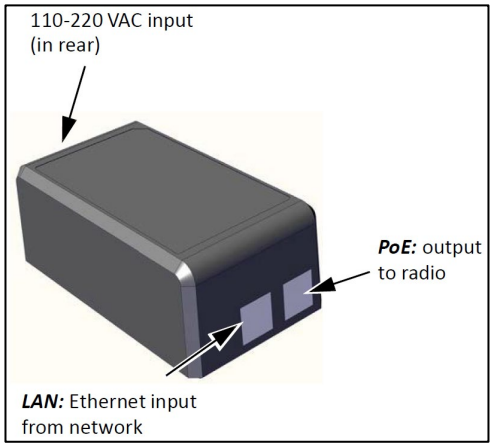


Figure 18: PoE for the SU PRO/AIR

1. Connect CAT-5e cable from radio via the lower LPU to the “PoE” port.
2. Connect LAN cable to “LAN” port.
3. Connect power cable.

Outdoor AC PoE

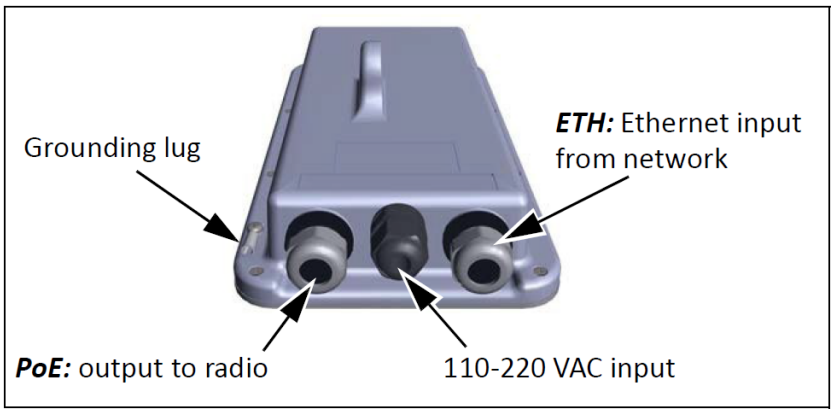


Figure 19: Outdoor PoE

1. Connect ground cable.
2. Connect LAN cable from the network to the “ETH” port, fasten with cable gland.
3. Connect CAT-5e cable from the radio to the “PoE” port, fasten with cable gland.
4. Connect power cable.

IDU-H

The IDU-H is an unmanaged POE switch and serves as a basic solution to connect several collocated radios.

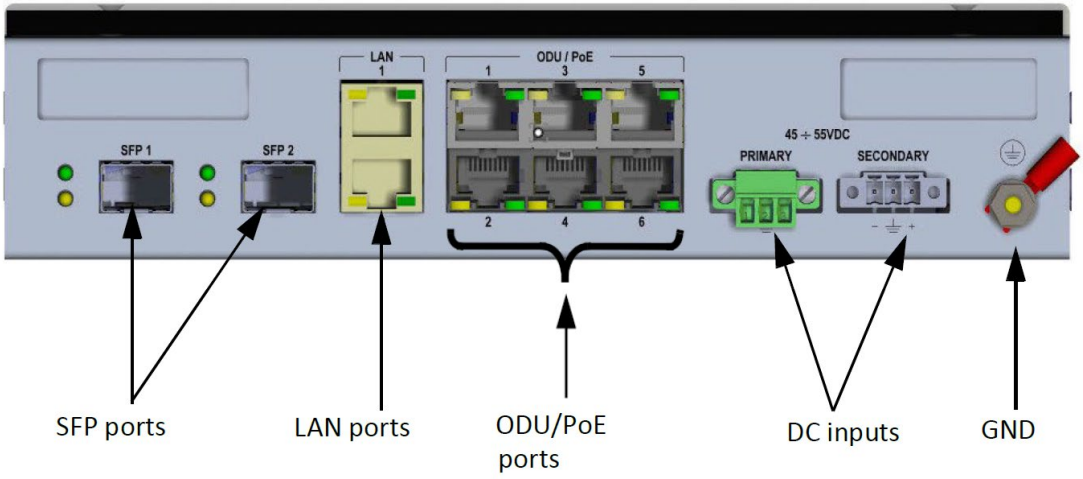


Figure 20: IDU-H

The IDU-H has the following connections:

- SFP ports
- LAN ports: Ethernet, supporting GbE.
- ODU/PoE ports: Function identically to the LAN-Out port on a PoE device.
- DC Inputs
- Grounding lug
- LED colors: Green = link/activity, Yellow = Duplex/two-way communication

Installing the IDU-H

- Install the IDU-H on a surface or in a 19” rack (using the included rack mount brackets).
- Connect the radio’s input port to any of the six ODU/PoE ports.
- Use either of the two LAN ports as a network connection.
- The IDU-H has redundant power connection circuits. A view of the power connectors is shown below. In this case, only the primary circuit has a power connector:

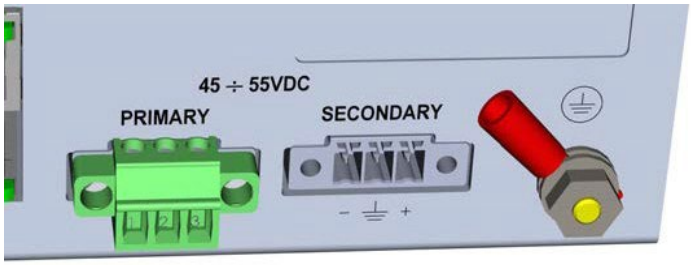
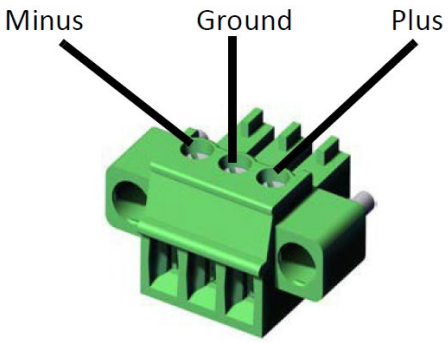


Figure 21: IDU-H power connectors and grounding lug.

- For direct DC connection: The connectors are 3 pin in line female, with polarities (left to right) minus, ground, plus, as shown:



- For AC connection: AC/DC adapter (power supply) is available from RADWIN

Use only a DC adapter / power supply approved according to IEC/EN/UL 60950-1 or 62368-1 with rated output voltage of 46-55VDC and rated current of 4A max.

Ground the unit with a 14 AWG wire before applying power.

IDU-S and IDU-SI

RADWIN IDU-S and IDU-SI are high performance, fully managed PoE switches with 1GbE, 2.5GbE and 10GbE interfaces. These switches are compatible with most of RADWIN radios, and also support standard POE 802.3bt (up to 90W).

For a full description on how to install and use IDU-S or IDU-SI, see the User Guides on Radwin Portal.

Waterproofing

Protect all outdoor connections[1] from rain, dust, moisture and salt by taping the cable/gland connection with an appropriate sealant tape. We recommend using ScotchTM 23 splicing tape or similar.

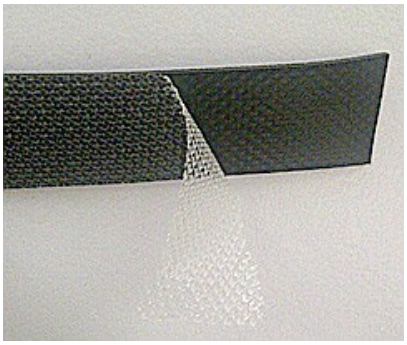


Figure 22: Sealant tape

Add tape as shown below.

Figure 23: Applying sealant tape to an external connection

Activate Base Station

Connect to HBS unit

Go to **HBS configurations -> Air interface -> Change band**

1) For worldwide products (JET-AIR, JET-AIR DUO) select country before activating the base station.

   In the “Installation country” tab:

   a. If there is GPS reception, the country is automatically selected.

   b. If there is no GPS reception, choose the country in which your device is installed.

2) In the carrier 1 / 2 tab, check the selected frequency band

3) If required - select a different band and press Save. The device will restart.

4) Repeat band selection for the 2nd carrier (if required / applicable).

In the home page, select **Activate** (for dual-carrier HBS, there are two Activate buttons for Carrier 1 or 2)

1) Enter **System** parameters: Sector ID, Sector Name and Location. Click Next.

2) Select **Radio** parameters: operating channels and channel bandwidth. Click Next.

3) Enter **Antenna** and TX parameters. Click Activate.

4) Repeat the above for the 2nd carrier (if required / applicable).

Activate and align Subscriber Unit

Activation / RSS Monitoring

Make sure the base station is activated (check with the NOC).

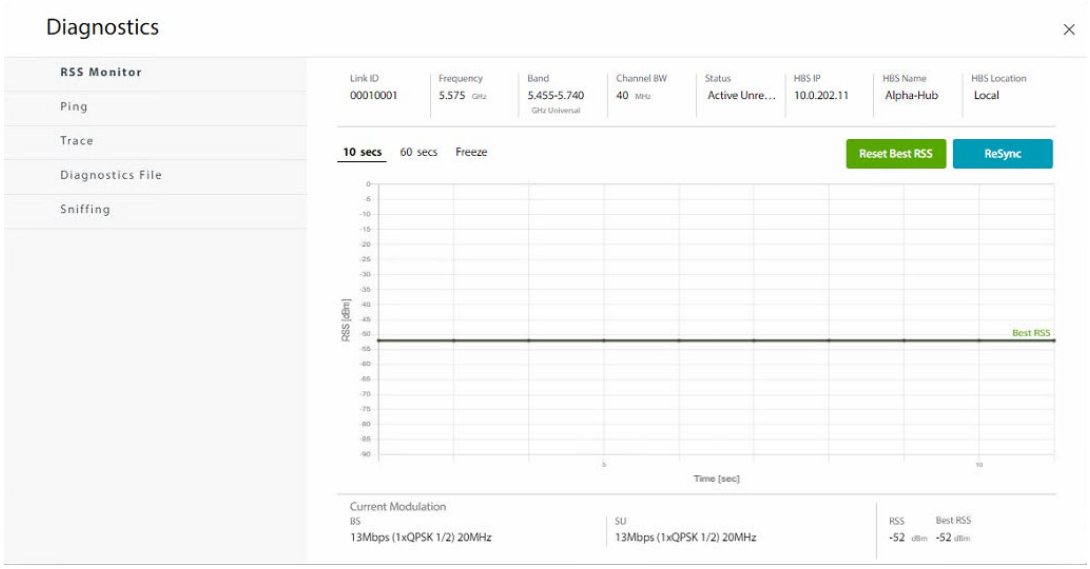
Point the subscriber unit (or its external antenna) in the general direction of the base station.

When using WINTouch app -

1) Make sure mobile device is close enough (up to ~15-20 meters) to the subscriber unit
2) Operate the WINTouch application, and follow its instructions

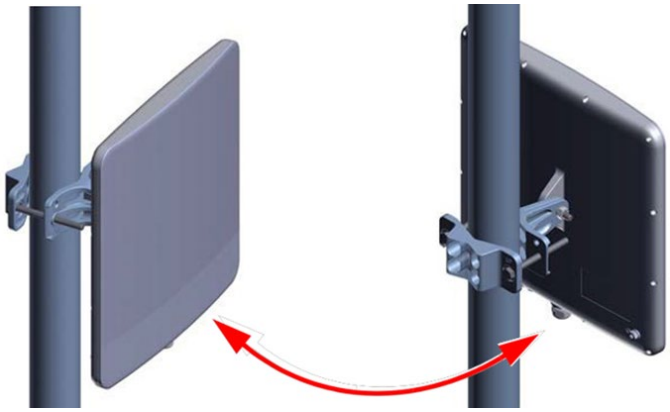
When using Web UI:

1) Connect to the SU via Ethernet or WIFI (see Accessing Web UI for details)
2) Activate transmission (click **Operations -> Activate**)
3) Access **Diagnostics** -> **RSS Monitor** for accurate alignment based on real-time RSS graph

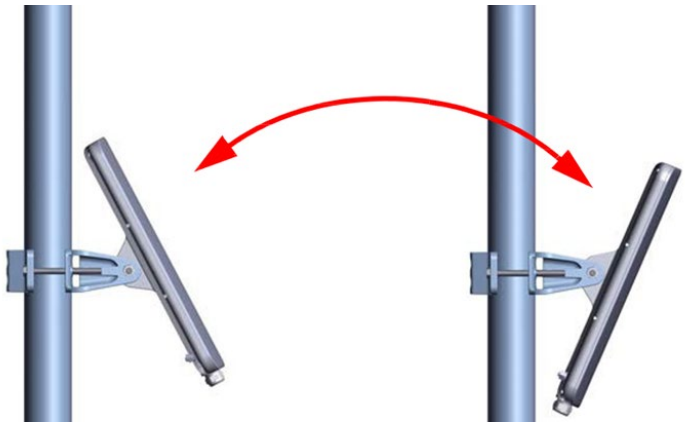


Aligning SU AIR, SU PRO or Alpha-PRO Integrated

1. Loosen pole bracket bolts for azimuth alignment



2. Loosen ODU bolt for elevation alignment



3. Secure all bolts once alignment is done

Safety Practices and Provisions

Scope of this Chapter

This chapter describes various safety practices.

Preventing Overexposure to RF Energy

To protect against overexposure to RF energy, install the radio units so as to provide and maintain minimal separation distances from all persons.

When the system is operational, avoid standing directly in front of the antenna. Strong RF fields are present when the transmitter is on. The radio unit must not be deployed in a location where it is possible for people to stand or walk inadvertently in front of the antenna.

Grounding

All RADWIN products should be grounded during operation. In addition:

- All ODUs should be grounded by a wire with diameter of at least 14 AWG.
- The ground lug on an IDU series switch should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider.
- Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Further, you should -

- Always make the ground connection first and disconnect it last
- Never connect telecommunication cables to ungrounded equipment
- Ensure that all other cables are disconnected before disconnecting the ground

Protection against Lightning

The use of lightning protection is dependent on regulatory and end user requirements. All RADWIN outdoor units are designed with surge limiting circuits to minimize the risk of damage due to lightning strikes. RADWIN recommends the use of additional surge arrestor devices to protect the equipment from nearby lightning strikes.

General

- It is recommended that installation of outdoor units be contracted to a professional installer.
- Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.
- Use extreme care when installing antennas near power lines.
- Use extreme care when working at heights.
- When using an AC power source for RADWIN devices, always use the AC power adapter supplied by RADWIN.
- Use the right tools!
- Do not mount an radio unit upside down or horizontally. Doing this may void you product warranty.

EMC and Safety compliance

RADWIN equipment complies with EMC and Safety standards. Please refer to WINPro datasheet of the specific model for regulation and compliance details.

Appendix A. Power over Ethernet

A.1 POE Compatibility

The table below shows compatibility matrix between POE sources and ODUs.

Legend

[+]	Recommended POE source
[Incl]	Included in the ODU package
+	Supported POE source
(D.G.)	Supports Dying gasp
(24V)	Supported only when POE unit DC input voltage is 24V
-	Not supported

POE sources					ODU models						
Part Number	Nominal input voltage	IDU ports	Output power	Output voltage	JET PRO, JET AIR, NEO, MS Int.	MS Conn.	JET DUO, NEO DUO, JET AIR DUO	5000L	SU PRO, Alpha PRO	SU AIR	SU ECO
Indoor AC POE											
RW-9921-400x	100-240V AC		56W	55V	[+]	[+]	[+]	[+]	[+] (D.G)	+	-
RW-9921-102x	100-240V AC		24W	24V	-	-	-	+	[Incl]	[Incl]	[Incl]
Indoor DC POE											
RW-9921-2069	10-60V DC		35W	55V	[+]	[+]	-	[+]	[+] (D.G)	[+]	-
RW-9921-2059	10-60V DC		35W	55V	[+]	[+]	-	[+]	[+] (D.G)	[+]	-
RW-9921-1059	20-60V DC		55W	55V	+	+	[+]	+	+ (D.G.)	+	-
RW-9921-1049	20-60V DC		55W	55V	+	+	[+]	+	+ (D.G.)	+	-
RW-9921-1039	24-57V		24W	24-57V	-	-	-	+	+	+	+ (24V)
Outdoor AC POE											
RW-9921-008x	100-240V AC		35W	55V	[+]	[+]	-	[+]	[+] (D.G)	[+]	-
Outdoor DC POE											
RW-9921-0110	10-60V DC		35W	55V	[+]	[+]	-	[+]	[+] (D.G)	[+]	-
IDU-H											
RW-7301-2006	44-57V DC	1-6	30W	55V	+	+	-	+	+	+	-
IDU-S											
RW-7401-6006	44-57V DC	1-4	90W	55V	[+]	[+]	[+]	[+]	[+]	[+]	-
		5-6	90W	55V	[+]	[+]	[+]	[+]	[+]	[+]	-
IDU-SI											
RW-7400-8008	44-57V DC	1-4	90W	55V	[+]	[+]	[+]	[+]	[+]	[+]	-
		5-8	90W	55V	[+]	[+]	[+]	[+]	[+]	[+]	-
Standard POE											
802.3at/bt					802.3bt Class 6 (60W)*	802.3at Class 4 (30W)	802.3bt Class 6 (60W)*	-	-	-	-

*** HW versions with 802.3bt support**

Please refer to the following list of hardware versions which support 802.3bt Class 6 standard POE sources:

JET PRO: HW ver **330J**

JET AIR: HW ver **120D**

MS HBS INT: HW ver **411M**

JET DUO 5+3 GHz: HW ver **113D**

JET DUO 5 GHz: HW ver **311D**

JET AIR DUO: HW ver **122D**

A.2 POE Pinout for 2-pair POE

RADWIN 24W / 35W POE units and IDU-H are using the following pinout:

Function	Pin
Data TxRx A	1
Data TxRx A	2
Data TxRx B	3
Data TxRx B	6
Data TxRx C & Power(+)	4
Data TxRx C & Power(+)	5
Data TxRx D & Power(-)	7
Data TxRx D & Power(-)	8

A.3 POE Pinout for 4-pair POE

RADWIN 55W/56W POE units, IDU-S and IDU-SI are using the following pinout:

Function	Pin
Data TxRx A & Power(+)	1
Data TxRx A & Power(+)	2
Data TxRx B & Power(-)	3
Data TxRx B & Power(-)	6
Data TxRx C & Power(+)	4
Data TxRx C & Power(+)	5
Data TxRx D & Power(-)	7
Data TxRx D & Power(-)	8

Appendix B. About Antennas

B.1 Scope of this Appendix

This appendix provides some basic information and considerations regarding antennas and what you need to take into account when configuring antenna parameters.

B.2 Antenna Issues

The choice of Tx Power, antenna gain and cable loss (between the radio and the antenna) determines the EIRP and is affected by such considerations as radio limitations and regulatory restrictions.

Before proceeding to antenna installation details, the following background information should be considered:

B.2.1 About Single and Dual Antennas

Each RADWIN radio is actually made of two radio transceivers (radios). The radios make use of algorithms that utilize both Spatial Multiplexing (also called MIMO) and Diversity resulting in enhanced capacity, range and link availability. The number of antennas (i.e. radios) used is determined by user configuration and by automatic system decisions, explained below.

B.2.2 Dual Antennas at the HBS and an SU

When using dual antennas at both sites (single bipolar antenna or two mo-unipolar antennas) you can choose between Spatial Multiplexing Mode and Diversity Mode.

Spatial Multiplexing Mode

Under this mode, the system doubles the link capacity. At the same time, it keeps the same rate and modulation per radio as was used with single antenna, thus increasing capacity, range and availability.

For example with a dual antenna RADWIN 5000 can transmit at modulation of 64QAM and

FEC of 5/6 and get an air rate of 130 Mbps, compared to 65 Mbps with single antenna.

To work in this mode, each antenna port must be connected to an antenna, the RSS level in both receivers should be balanced and a minimal separation between the antennas must be maintained. (For example, by using dual polarization antennas a cross polarization separation is attained).

Upon selecting Antenna Type as Dual, RADWIN 5000 automatically selects this mode and doubles the air rates.

RADWIN Manager indicates a case of unbalanced RSS between the two antennas in the HBS panels.

Diversity Mode

Diversity Mode uses two antennas to improve the quality and reliability of the link. Often, there is not a clear line-of-sight (LOS) between transmitter and receiver. Instead the signal is reflected along multiple paths before finally being received.

Each such “bounce” can introduce phase shifts, time delays, attenuations, and even distortions that can destructively interfere with one another at the aperture of the receiving antenna. Antenna diversity is especially effective at mitigating these multi-path situations.

This is because multiple antennas afford a receiver several recordings of the same signal. Each antenna will be exposed to a different interference environment. Thus, if one antenna is undergoing a deep fade, it is likely that another has a sufficient signal. Collectively such a system can provide a robust link.

Antenna diversity requires antenna separation which is possible by using a dual-polarization antenna or by two spatially separated antennas.

Use Diversity instead of Spatial Multiplexing in the following situations:

- When the system cannot operate in Spatial Multiplexing Mode
- When one of the receivers has high interference compared to the second receiver (i.e. the system is “unbalanced”)
- When you achieve higher capacity in Diversity Mode than in Spatial Multiplexing Mode
- When high robustness is of importance and the capacity of Diversity Mode is sufficient (up to 25 Mbps full duplex)

B.2.3 Single Antennas at Both Sites

By selecting a single antenna at the HBS and SU, the ODUs operate with a single radio that is connected to the ANT 1 connector. The second radio is automatically shut down.

B.2.4 Single at One Site, Dual Antennas at the Other

In this mode one of the sites uses the ODU with a single antenna while the other site uses the ODU with a dual antenna.

The advantages in this mode in comparison to using a single antenna in both sites are doubled total Tx Power and additional polarization and/or space diversity (depending on the polarization of installed antennas).

B.3 Considerations for Changing Antenna Parameters

Let:

max Available Tx Power denote the maximum Tx Power practically available from an ODU. (It appears as Tx Power per Radio.)

maxRegEIRP denote the maximum EIRP available by regulation. It will be determined by three factors:

- per band/regulation
- per channel bandwidth
- antenna gain

maxRegTxPower denote the maximum regulatory Tx Power for the equipment, also having regard the above three points.

Then, the following relationship must be satisfied:

maxAvailableTxPowe r ≤ min(maxRegEIRP

– AntennaGain + CableLoss, max RegTxPower) ... (*)

The Tx Power (per radio) indicates the power of each radio inside the ODU and is used for Link Budget Calculations. The Tx Power (System) shows the total transmission power of the ODU and is used to calculate the EIRP according to regulations.

The inequality (*) above is always satisfied by the system in accordance with the relevant regulation.

The Max EIRP level will be automatically set according to the selected band and regulation.

The precise relationship between the items in inequality (*) is as follows: Required Tx Power (per radio) will be adjusted down to the lesser of the value entered and maxAvailableTxPower

- Tx Power (system) is maxAvailableTxPower + 3 (for 2 radios)
- Max EIRP is maxRegEIRP.
- EIRP is maxAvailableTx Power + Antenna Gain - Cable Loss

Appendix C. Terminology

Term	Description
ACS	Automatic Channel Selection. Option that instructs the radio to choose which frequency to use. Enabling or disabling this option has various ramifications as shown in the documentation.
ATPC	Automatic Transmit Power Control
BE	Best Effort: A level of priority for traffic in which users receive dynamic resource allocation according to overall demand. They are not guaranteed resources. See also CIR.
BS	Base Station: a radio that can transmit and receive to more than one point. See also HBS
CIR	Committed Information Rate: A level of priority for traffic in which users receive a guaranteed percentage of resources in addition to dynamic resources if available.
CPE	Customer Premises Equipment
DBA	Dynamic Bandwidth Allocation: a method that allocates bandwidth between the various users of that same bandwidth in the network.
DFS	Dynamic Frequency Selection: Those products that have DFS enabled ensure that no radar signal is present in the selected frequency channel within the band being used. If a radar signal is detected, that frequency channel is evacuated and the product will not transmit on this channel.
DHCP	Dynamic Host Configuration Protocol: a protocol that automatically assigns IP addresses and other network configuration parameters.
Diversity	A technique by which the reliability of a radio link is increased using multiple transmitting and receiving antennas, transmitting the same signal on all antennas.
Downlink	Data traffic from an HBS to an HSU
EIRP	Equivalent (or Effective) Isotropically Radiated Power: The power that an antenna must emit to produce the peak power density in the direction of maximum antenna gain.
FAA	Federal Aviation Administration. A U.S. federal office that manages aviation regulations throughout the United States.
Fixed (HSU)	A “fixed” HSU remains in one location, as contrasted with a nomadic or mobile HSU, which does not remain in one location.
GHSS	GPS Hub Site Synchronization
GNSS	Global Navigation Satellite System (such as GPS, Glonass, etc.)
HBS	High capacity Base Station. Same as a BS
HSC	Hub Sync Client: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.

Term	Description
HSM	Hub Sync Master: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.
HSU	High capacity Subscriber Unit. Same as an SU
IGMP	Internet Group Management Protocol
MD5	Message digest algorithm: an authentication type for SNMPv3 connections.
MIMO	Multiple In, Multiple Out. A technique by which the capacity of a radio link is increased using multiple transmitting and receiving antennas, transmitting a different signal on all antennas.
MIR	Maximum Information Rate
Nomadic (HSU)	A “nomadic” HSU move from location to location but can only provide service when it is stationary.
ODU	Outdoor Unit: a generic term for any radio, can usually be exchanged for HBS or HSU.
PN	Part number
PPPoE	Point-to-Point Protocol over Ethernet
PtMP	Point to Multi-Point: link from an HBS to several HSUs
PtP	Point to Point
RADIUS	Remote Authentication Dial-In User Service
RSS	Radio Signal Strength
QAM	Quadrature Amplitude Modulation is the name of a family of digital modulation methods and a related family of analog modulation methods widely used in modern telecommunications to transmit information.
QoS	Quality of Service
SBM	Smart Bandwidth Management
Sector	A group of radios that consists of one HBS and several HSUs that communicate with the HBS.
SHA1	Secure hash algorithm: an authentication type for SNMPv3 connections.
SLA	Service Level Agreement - the basic agreement between the service provider and its customer regarding certain aspects of the service provided. For example, what should be the data rate, throughput, jitter of the line, who should pay what fees, the mean time between failure (MTBF) of the equipment, and so forth
SU	Subscriber Unit: a radio that can transmit and receive to one point. See also HSU
TCO	Total Cost of Ownership
TDWR	Terminal Doppler Weather Radar: a type of radar station used in the U.S. and other countries for weather reporting. If a radio unit is installed close enough to one of these stations, the FCC requires that certain actions must be taken on the part of the customer. Regulations in other countries varies.

Term	Description
Uplink	Data traffic from an HSU to an HBS
WI	Web Interface: web-based application that provides simple configuration capabilities for the radio units.
WW	World-wide

Appendix D. Certified Antennas

For Deployment in US/Canada

Radio devices that bear the following FCC/IC IDs refer to Table 10 to Table 13 below:

Contains FCC ID: Q3K- 5XACMOLD Contains IC: 5100A- 5XACMOD

Only the antennas shown in the tables below or antennas of the same type with lower gain are approved for use in this system. The antennas must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below.

This radio transmitter “Contains IC: 5100A-5XACMOD” has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of all antennas is 50 Ohm.

Table 1: Frequency Band 5725-5850 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Integrated	Flat DP BS	11.0	120°	25	26
RW-9061-5004	Flat DP BS	11.0	120°	25	26
Integrated	Flat DP BS	12.0	95°	25	29
Integrated	Flat DP BS	13.0	90°	25	32
RW-9061-5001	Flat DP BS	14.0	90°	25	36
RW-9061-5002	Flat DP BS	15.5	60°	25	43
Integrated	Flat DP	16.0	35°	25	45
Integrated	Flat DP	16.5	35°	25	48
RW-9613-4960	Flat DP	23.0	8°	25	100
Integrated	Flat DP	23.5	8°	25	107
RW-9622-5001	Flat DP	29.0	5°	25	200
RW-9401-5002	Shark Fin SP	12.5	50°	25	30
RW-9721-5158	Dish DP	28.0	5.5°	25	178
RW-9732-4958	Dish DP	32.0	4°	25	314

Table 2: Frequency Bands 5250-5350 MHz and 5470-5725 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Integrated	Flat DP BS	11.0	120°	16	20
RW-9061-5004	Flat DP BS	11.0	120°	16	20
Integrated	Flat DP BS	12.0	95°	15	20
Integrated	Flat DP BS	13.0	90°	14	20
RW-9061-5001	Flat DP BS	14.0	90°	13	20
RW-9061-5002	Flat DP BS	15.5	60°	11.5	20
Integrated	Flat DP	16.0	35°	11	20
Integrated	Flat DP	16.5	35°	10.5	20
RW-9613-4960	Flat DP	23.0	8°	4	20
Integrated	Flat DP	23.5	8°	3.5	20
RW-9622-5001	Flat DP	29.0	5°	-2	20
RW-9401-5002	Shark Fin SP	12.5	50°	14.5	20
RW-9721-5158	Dish DP	28.0	5.5°	-1	20
RW-9732-4958	Dish DP	32.0	4°	-5	20

Table 3: Frequency Bands 5150-5250 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Integrated	Flat DP BS	11.0	120°	22	20
RW-9061-5004	Flat DP BS	11.0	120°	22	20
Integrated	Flat DP BS	12.0	95°	21	20
Integrated	Flat DP BS	13.0	90°	18	20
RW-9061-5001	Flat DP BS	14.0	90°	18	20
RW-9061-5002	Flat DP BS	15.5	60°	18	20
Integrated	Flat DP	16.0	35°	24	40
Integrated	Flat DP	16.0	35°	24	40

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
RW-9613-4960	Flat DP	23.0	8°	25	100
Integrated	Flat DP	23.5	8°	25	107
RW-9622-5001	Flat DP	29.0	5°	22	142
RW-9401-5002	Shark Fin SP	12.5	50°	21	20
RW-9721-5158	Dish DP	28.0	5.5°	19	90
RW-9732-4958	Dish DP	32.0	4°	19	142

Table 4: Frequency Bands 4940-4990 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Integrated	Flat DP BS	11.0	120°	25	26
RW-9061-5004	Flat DP BS	11.0	120°	25	26
Integrated	Flat DP BS	12.0	95°	25	29
Integrated	Flat DP BS	13.0	90°	25	32
RW-9061-5001	Flat DP BS	14.0	90°	25	36
RW-9061-5002	Flat DP BS	15.0	60°	25	40
Integrated	Flat DP	14.0	35°	25	36
Integrated	Flat DP	16.0	35°	25	45
RW-9613-4960	Flat DP	23.0	8°	25	100
Integrated	Flat DP	21.0	8°	25	80
RW-9622-5001	Flat DP	29.0	5°	25	200
RW-9401-5002	Shark Fin SP	12.5	50°	25	30
RW-9721-5158	Dish DP	28.0	5.5°	25	178
RW-9732-4958	Dish DP	30.0	4°	25	225

JET PRO

The RADWIN 5000 JET PRO bears the following FCC/IC IDs on the label, and refer to Table 19 to Table 22 below:

FCC ID: Q3K-BFJET5XT40 IC: 5100A-BFJET5XT40

This radio transmitter “IC: 5100A-BFJET5XT40” has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. Input impedance of all antennas is 50 Ohm.

The RADWIN 5000 JET PRO must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 5: Frequency Band 5725-5850 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	9.4°	13	96
Floodlight	11.0	60°	22	96

Table 6: Frequency Bands 5250-5350 MHz and 5470-5725 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	9.4°	7	20
Floodlight	11.0	60°	16	20

Table 7: Frequency Bands 5150-5250 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	9.4°	13	20
Floodlight	11.0	60°	13	20

Table 8: Frequency Bands 4940-4990 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	17.0	9.4°	21	55
Floodlight	8.0	60°	21	55

JET DUO (5.x/3.x GHz)

The JET-DUO (5.x/3.x GHz) bears the following FCC/IC IDs on the label, and refer to Table 23 - Table 25 below:

FCC ID: Q3K-JETDB5X3X IC: 5100A-JETDB5X3X

This radio transmitter “IC: 5100A-JETDB5X3X” has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of all antennas is 50 Ohm.

The JET-DUO (5.x/3.x GHz) must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 9: Frequency Band 5730-5845 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	12°	13	32
Sharp	19.0	16°	14	32
Floodlight	11.0	85°	22	32

Table 10: Frequency Band 5150-5250 MHz (FCC only)

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	12°	13	30
Sharp	19.0	16°	14	30
Floodlight	11.0	85°	22	30

Table 11: Frequency Band 3650-3700 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	17.0	17°	27	55
Floodlight	9.0	70°	27	55

JET DUO (5.x/5.x GHz)

The JET-DUO 5.x/5.x GHz bears the following FCC/IC IDs on the label, and refer to Table 26 to Table 27 below:

FCC ID: Q3K-JETDC5X5X IC: 5100A-JETDC5X5X

This radio transmitter “IC: 5100A-JETDC5X5X” has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of all antennas is 50 Ohm.

The JET-DUO 5.x/5.x GHz must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 12: Frequency Band 5725-5850 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	19.0	19°	14	20
Floodlight	9.0	80°	24	20

Table 13: Frequency Band 5150-5250 MHz (FCC only)

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	17.0	18°	16	20
Floodlight	7.0	80°	26	20

MultiSector HBS

The MultiSector Base Station bears the following FCC/IC IDs on the label, and refer to Table 28 below:

Contains FCC ID: Q3K-5XACMODMS Contains IC: 5100A-5XACMODMS

This radio transmitter ”Contains IC: 5100A-5XACMODMS” has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of all antennas is 50 Ohm.

The MultiSector Base Station must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 14: Frequency Band 5725-5850 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)[a]	Min. Safe Distance (cm)
Integrated	Flat DP BS	13.0	90 °	20	20
RW-9061-5001	Flat DP BS	14.0	90°	19	20
RW-9061-5002	Flat DP BS	15.0	60°	18	20
RW-9061-5004	Flat DP BS	11.0	120 °	22	20
RW-9061-5010	Flat DP BS	13.0	90°	20	20
RW-9105-4958	Flat DP	16.0	20°	27	25
RW-9105-5158	Flat DP	19.0	17°	27	35
RW-9613-4960	Flat DP	23.0	10°	27	56
RW-9622-5001	Flat DP	28.0	5°	27	100
RW-9921-5158	Dish DP	28.0	5.6°	27	100
RW-9732-4958	Dish DP	32.0	4°	27	160

[a] Values refer to non-overlapping deployment scenario

Table 15: Frequency Band 5150-5250 MHz (FCC Only)

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Integrated	Flat DP BS	13.0	90°	20	20
RW-9061-5001	Flat DP BS	14.0	90°	19	20

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
RW-9061-5002	Flat DP BS	15.0	60°	18	20
RW-9061-5004	Flat DP BS	11.0	120 °	22	20
RW-9061-5010	Flat DP BS	13.0	90°	20	20
RW-9105-4958	Flat DP	16.0	20°	27	25
RW-9105-5158	Flat DP	19.0	17°	27	35
RW-9613-4960	Flat DP	23.0	10°	27	56
RW-9622-5001	Flat DP	28.0	5°	22	57
RW-9721-5158	Dish DP	28.0	5.6 °	22	57
RW-9732-4958	Dish DP	32.0	4°	18	57

SU AIR, SU PRO

The SU Integrated and SU Connectorized units bear the following FCC/IC IDs on the label. Refer to the Tables below:

Contains FCC ID: Q3K-5XSUALMOD Contains IC: 5100A-5XSUALMOD

This radio transmitter "Contains IC: 5100A-5XSUALMOD" has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of all antennas is 50 Ohm.

The SU Integrated and SU Connectorized units must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 16: Frequency Band 5725-5850 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9105-5159	Flat DP	13	30°	25.0	32
RW-9105-4958	Flat DP	16	20°	22.0	32
Integrated	Flat DP	22	10°	23.0	71
RW-9613-4960	Flat DP	23	10°	22.0	71
RW-9622-5001	Flat DP	28	5°	11.0	36

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9721-5158	Dish DP	28	5.5°	14.0	51
RW-9732-4958	Dish DP	32	4°	10.0	51

Table 17: Frequency Band 5150-5250 MHz (FCC Only)

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9105-5159	Flat DP	13	30°	26	36
RW-9105-4958	Flat DP	16	20°	20	26
Integrated	Flat DP	22	10°	19	45
RW-9613-4960	Flat DP	23	10°	19	51
RW-9622-5001	Flat DP	28	5°	12	40
RW-9721-5158	Dish DP	28	5.5°	11	36
RW-9732-4958	Dish DP	32	4°	7	36

Table 18: Frequency Band 5250-5350 and 5470-5725 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9105-5159	Flat DP	13	30°	14	20
RW-9105-4958	Flat DP	16	20°	11	20
Integrated	Flat DP	22	10°	5	20
RW-9613-4960	Flat DP	23	10°	4	20

NEO and NEO DUO

The NEO and NEO DUO units bear the following FCC/IC IDs on the label. Refer to the Tables below:

FCC ID: Q3K-NEO5X IC: 5100A-NEO5X

This radio transmitters "IC: 5100A-NEO5X" and “IC: 5100A-JA496G" have been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The input impedance of the antenna is 50 Ohm.

The NEO and NEO DUO units must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below.

The Tx power values are given for single carrier configuration (NEO). In dual carrier configuration (NEO DUO), when operating in the same band, the Tx power will be reduced by 3 dB to keep compliance with the regulation limits

Table 19: Frequency Band 5725-5850 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated	Beamforming BS	17	30°	16	20

Table 20: Frequency Band 5150-5250 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated	Beamforming BS	16	30°	17	20

Table 21: Frequency Band 5725-5850 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated	Beamforming BS	16	30°	11	20

For Deployment in EU member states

Table 22: Safety Distances for RADWIN 5000 ETSI Products

Frequency Band [GHz]	Antenna gain [dBi]	Min. Safety Distance [cm]
5.8/5.3/5.4/2.4	All gains	20
3.5	17	69

JET PRO, JET-DUO (5.x/3.x GHz), and JET-DUO 5.x/5.x GHz

The RADWIN 5000 JET PRO, JET-DUO (5.x/3.x GHz), and JET-DUO 5.x/5.x GHz must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 23: Frequency Band 5470-5725 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	9.4	7	20
Floodlight	11.0	60	16	20

Table 24: Frequency Band 5725-5875 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	20.0	9.4	13	20
Floodlight	11.0	60	22	20

Table 25: Frequency Band 3400-3800 MHz

Operating Form	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min. Safe Distance (cm)
Uniform	17.0	17	30	81
Floodlight	9.0	70	30	32

The SU Integrated must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

Table 26: Frequency Band 5725-5875 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9401-5007	Omni	10	360°	23.0	20
RW-9105-5159	Flat DP	13	30°	20.0	20
RW-9105-4958	Flat DP	16	20°	17.0	20
Integrated	Flat DP	22	10°	11.0	20
RW-9613-4960	Flat DP	23	10°	10.0	20

Table 27: Frequency Band 5470-5725 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9401-5007	Omni	10	360°	17	20
RW-9105-5159	Flat DP	13	30°	14	20
RW-9105-4958	Flat DP	16	20°	11	20
Integrated	Flat DP	22	10°	5	20
RW-9613-4960	Flat DP	23	10°	4	20

NEO, NEO DUO, JET AIR, JET-AIR DUO

The NEO, NEO DUO, JET AIR & JET-AIR DUO must be installed so as to provide a minimum separation distance from bystanders as specified in the tables below:

The Tx power values are given for single carrier configuration (NEO/JET-AIR). In dual carrier configuration (NEO DUO/JET-AIR DUO), when operating in the same band, the Tx power will be reduced by 3 dB to keep compliance with the regulation limits

Table 28: Frequency Band 5725-5875 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated NEO	Beamforming BS	17	30°	16	20
Integrated JET AIR	Beamforming BS	19	16°	14	20

Table 29: Frequency Band 5470-5725 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated NEO	Beamforming BS	16	30°	11	20
Integrated JET AIR	Beamforming BS	18	17°	9.0	20

The MultiSector Base Station must be installed so as to provide a minimum separation distance from bystanders as specified in the table below:

Table 30: Frequency Band: 5725-5875 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated	Flat DP BS	13.0	90°	20.0	20
RW-9061-5001	Flat DP BS	14.0	90°	19.0	20
RW-9061-5002	Flat DP BS	15.0	60°	18.0	20
RW-9061-5004	Flat DP BS	11.0	120°	22.0	20
RW-9061-5010	Flat DP BS	13.0	90°	20.0	20
RW-9105-4958	Flat DP	16.0	20°	17.0	20

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
RW-9105-5158	Flat DP	19.0	17°	14.0	20
RW-9613-4960	Flat DP	23.0	10°	10.0	20
RW-9622-5001	Flat DP	28.0	5°	5.0	20
RW-9721-5158	Dish DP	28.0	5.6°	5.0	20
RW-9732-4958	Dish DP	32.0	4°	1.0	20

Table 31: Frequency Band 5470-5725 MHz

Cat. No.	Type	Gain (dBi)	Dir BW	Tx Power per chain (dBm)	Min Safe Distance (cm)
Integrated	Flat DP BS	13.0	90°	14.0	20
RW-9061-5001	Flat DP BS	14.0	90°	13.0	20
RW-9061-5002	Flat DP BS	15.0	60°	12.0	20
RW-9061-5004	Flat DP BS	11.0	120°	16.0	20
RW-9061-5010	Flat DP BS	13.0	90°	14.0	20
RW-9105-4958	Flat DP	16.0	20°	11.0	20
RW-9105-5158	Flat DP	19.0	17°	8.0	20
RW-9613-4960	Flat DP	23.0	10°	4.0	20
RW-9622-5001	Flat DP	28.0	5°	-1.0	20
RW-9721-5158	Dish DP	28.0	5.6°	-1.0	20
RW-9732-4958	Dish DP	32.0	4°	-5.0	20

Appendix E. Regulatory Compliance

General Note

This system has achieved Type Approval in various countries around the world. This means that the system has been tested against various local technical regulations and found to comply. The frequency bands in which the system operates may be “unlicensed” and in these bands, the system can be used provided it does not cause interference.

For information on the restrictions on putting the device into service please contact your national telecommunication authorities.

FCC/ISED - Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure

For the safety of the general public it is recommended to keep a minimum safe distance from radiating antennas according to the table below:

Pour la sécurité du grand public, il est recommandé de respecter une distance de sécurité minimale par rapport aux antennes rayonnantes, conformément au tableau ci-dessous:

FCC Identifier	IC Identifier	Band (GHz)	Safe Distance (cm)	
			U.S.	Canada
Contains FCC ID: Q3K-5XACMOLD	Contains IC: 5100A-5XACMOD	5.1[a]; 4.9-5.8	310	314
Contains FCC ID: Q3K-5XACMODMS	Contains IC: 5100A-5XACMODMS	5.1[a], 5.8	160	160
FCC ID: Q3K-BFJET5X	IC: 5100A-BFJET5X	5.1[a]; 4.9-5.8	94.38	96
FCC ID: Q3K-JETDB5X3X	N/A	3.6; 5.1[a]; 5.8	55	N/A
FCC ID: Q3K-5XACULC-X	IC: 5100A-5XACULCX	2.4; 5.1[a];	110	115

FCC Identifier	IC Identifier	Band (GHz)	Safe Distance (cm)	
			U.S.	Canada
		4.9-5.8		
FCC ID: Q3K-5XACULCHG	IC: 5100A-5XACULCHG	2.4; 5.1[a]; 5.2[b], 5.4-5.8	70	70
FCC ID: Q3K-JETDC5X5X	IC: 5100A-JETDC5X5X	5.1[a], 5.3, 5.4, 5.8	20	20
Contains FCC ID: Q3K-5XACMODMS	Contains IC: 5100A-5XACMODMS	5.1[a], 5.8	160	160
Contains FCC ID: Q3K-5XSUALMOD	Contains IC: 5100A-5XACMODMS	5.1[a], 5.2, 5.4, 5.8	80	80
FCC ID: Q3K-NEO5X FCC ID: Q3K-JA496G	IC: 5100A-NEO5X IC: 5100A-JA496G	5.1[a], 5.2, 5.4, 5.8	20	20

[a] FCC Only

It is the responsibility of the installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only those antennas certified with the product are used. The use of any antenna other than those certified with the product is expressly forbidden by FCC rules 47 CFR part 15.204.

It is the responsibility of the installer to ensure that when configuring the radio in the United States (or where FCC rules apply), the Tx power is set according to the values for which the product is certified. The use of Tx power values other than those, for which the product is certified, is expressly forbidden by FCC rules 47 CFR part 15.204.

Indoor Units comply with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) These devices may not cause harmful interference.

(2) These devices must accept any interference received, including interference that may cause undesired operation.

Outdoor units and antennas should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void the product warranty and may expose the end user or the service provider to legal and financial liabilities. Resellers or distributors of this equipment are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas. The installer should configure the output power level of antennas according to country regulations and antenna type.

Les unités extérieures et les antennes doivent être installées UNIQUEMENT par des les professionnels de l'installation qui connaissent le bâtiment et la sécurité locaux codes et, le cas échéant, sont autorisés par les autorités compétentes autorités de réglementation gouvernementales. Ne pas le faire peut annuler le produit garantie et peut exposer l'utilisateur final ou le fournisseur de services à des passifs financiers. Les revendeurs ou distributeurs de cet équipement ne sont pas responsable des blessures, des dommages ou de la violation de la réglementation installation d'unités extérieures ou d'antennes. L'installateur doit configurer le niveau de puissance de sortie des antennes selon les réglementations du pays et type d'antenne.

- Where Outdoor units are configurable by software to Tx power val- ues other than those for which the product is certified, it is the responsibility of the Professional Installer to restrict the Tx power to the certified limits.
- This product was tested with special accessories - indoor unit (IDU or PoE), FTP CAT-5e shielded cable with sealing gasket, 14 AWG ground- ing cable - which must be used with the unit to ensure compliance.

The system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden. The radio must be installed and used in strict accordance with the manufacturer's instructions as described in this guide. Any other installation or use of the product violates FCC Part 15 regulations.

Le système doit être professionnellement installé pour assurer la conformité avec Certification de la partie 15 Il est de la responsabilité de l'opérateur et de l'installateur professionnel que seuls les systèmes certifiés sont déployés aux États-Unis. L'utilisation du système dans toute autre combinaison (p.antennes transmettant la même information) est expressément interdite. La radio doit être installée et utilisée en stricte conformité avec les instructions du fabricant décrites dans ce guide. Toute autre installation ou utilisation du produit enfreint les règlements de l'ISDE règlements.

It is the responsibility of the installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only those antennas certified with the product are used. The use of any antenna other than those certified with the product is expressly forbidden by FCC rules 47 CFR part 15.204. A list of approved external antennas can be found in the Certified Antennas appendix.

Le système doit être professionnellement installé pour assurer la conformité avec Certification de la partie 15 Il est de la responsabilité de l'opérateur et de l'installateur professionnel que seuls les systèmes certifiés sont déployés aux États-Unis. L'utilisation du système dans toute autre combinaison (p. antennes transmettant la même information) est expressément interdite. Il est de la responsabilité de l'installateur de s'assurer que lors de l'utilisation du kits d'antenne extérieure aux États- Unis (ou lorsque les règles de la FCC s'appliquent), seulement les antennes certifiées avec le produit sont utilisées. L'utilisation de tout l'antenne autre que celles certifiées avec le produit est expressément interdite par les règlements ISED. Une liste d'antennes externes approuvées peut se trouve à l'annexe Antennes Certifiées.

It is the responsibility of the operator and professional installer to ensure that when configuring the radio in the United States (or where FCC rules apply), the Tx power is set according to the values for which the product is certified. The use of Tx power values other than those, for which the product is certified, is expressly for bidden by FCC rules 47 CFR part 15.204.

Il est de la responsabilité de l'opérateur et de l'installateur professionnel que lors de la configuration de la radio au Canada (ou lorsque les règles canadiennes appliquer), la puissance Tx est définie en fonction des valeurs pour lesquelles le produit est agréé. L'utilisation de valeurs de puissance Tx autres que celles pour lesquelles le produit est certifié, est expressément interdit par les règlements de l'ISDE.

It is the responsibility of the installer to ensure that Sector and Base Station radios operating in the band 5150-5250 MHz are installed so that the antennas do not exceed 21 dBm EIRP at any elevation angle above 30 degrees as measured from the horizon, as required by FCC rule 47 CFR Part 15.407 (a)(1)(i).

In Canada Radio Local Area Network Devices Operating in the 5150-5250 MHz Frequency Band may only be allowed following licensing process.

Au Canada, les appareils du réseau local radio fonctionnant dans la bande de fréquences 5150-5250 MHz ne peuvent être autorisés qu'après un processus d'attribution de licence.

Under regulatory environments supporting other than FCC/ISED rules: Where Outdoor units are configurable by software to Tx power values other than those for which the product is certified, it is the responsibility of the Professional Installer to restrict the Tx power to the certified limits.

This product was tested with special accessories indoor unit (IDU or PoE), FTP CAT-5e shielded cable with sealing gasket, 14 AWG grounding cable - which must be used with the unit to ensure compliance.

Dans des environnements réglementaires prenant en charge d'autres règles que celles de la FCC / ISDE: Où les unités extérieures sont configurables par logiciel aux valeurs de puissance Tx autres que ceux pour lesquels le produit est certifié, c'est le la responsabilité de l'installateur professionnel de restreindre la puissance Tx à les limites certifiées.

Ce produit a été testé avec des accessoires spéciaux - unité intérieure (UDI ou PoE), câble blindé FTP CAT-5e avec joint d'étanchéité, mise à la terre 14 AWG câble - qui doit être utilisé avec l'unité pour assurer la conformité.

Dans des environnements réglementaires prenant en charge d'autres règles que celles de la FCC / ISDE: Où les unités extérieures sont configurables par logiciel aux valeurs de puissance Tx autres que ceux pour lesquels le produit est certifié, c'est le la responsabilité de l'installateur professionnel de restreindre la puissance Tx à les limites certifiées.

Ce produit a été testé avec des accessoires spéciaux - unité intérieure (UDI ou PoE), câble blindé FTP CAT-5e avec joint d'étanchéité, mise à la terre 14 AWG câble - qui doit être utilisé avec l'unité pour assurer la conformité.

Dans des environnements réglementaires prenant en charge d'autres règles que celles de la FCC / ISDE: Où les unités extérieures sont configurables par logiciel aux valeurs de puissance Tx autres que ceux pour lesquels le produit est certifié, c'est le la responsabilité de l'installateur professionnel de restreindre la puissance Tx à les limites certifiées.

Ce produit a été testé avec des accessoires spéciaux - unité intérieure (UDI ou PoE), câble blindé FTP CAT-5e avec joint d'étanchéité, mise à la terre 14 AWG câble - qui doit être utilisé avec l'unité pour assurer la conformité.

Radio devices using external antennas operating in the 5250-5350 MHz and 5470-5725 MHz bands must comply with the EIRP limits as specified in the Certified Antennas appendix.

Appareils radio utilisant des antennes externes fonctionnant dans les bandes 5250-5350 MHz et 5470-5725 MHz seront conformes ala EIRP limites iniquees à l'annexe Antennes Certifiées.

Radio devices using external antennas operating in the 5725-5850 MHz band must comply with the EIRP limits as specified in the Certified Antennas appendix for point-to-point and point-to-multipoint operation.

Appareils radio utilisant des antennes externes fonctionnant dans la bande 5725-5850 MHz seront conformes ala EIRP limites iniquees à l'annexe Antennes Certifiées pour un fonctionnement point a point et non point a point.

Radio devices shall be so installed to have worst-case tilt angle to remain compliant with the PIRE elevation mask requirement set forth in RSS-247 Section 6.2.2(3).

Appareils de radio doivent etre installes de maniere a avoir l'angle d'inclinaison du pire poir rester conforme a la PIRE exigence de masque d'elevation selon la RSS-247 Sec tion 6.2.2(3).

Radio devices operating in the 3650-3700 MHz band must comply with the output power limits as specified in Certified Antennas.

Installers are advised to consider high-power radars allocation as priority users of the bands 5250-5350 MHz and 5470-5725 MHz and that these radars could cause interference and/or damage to the radio devices.

Les installateurs sont invites a envisager de radars a haute puissance allocation que les utilisateurs prioritaires des bandes 5250-5350 MHz - 5470-5725 MHz et que ces radars pourraient causer interferences et /ou endommager les appareils de radio.

The radio devices in this manual have been approved by Industry Canada to operate with the antenna types listed in the Certified Antennas appendix with the maximum permissible gain and required antenna impedance for each antenna type indicated.

Antenna types not included in this list, having a gain greater than the maximum gain indicate for that type, are strictly prohibited for use with this device.

Les appareils de radio dans ce manuel ont ete approuves par Industrie Canada pour fonctionner avec les types d'antenne enumeries à l'annexe Antennes Certifiées avec le gain maximal admissible et l'impedance d'antenne requise pour chaque type d'antenne indique.

Types d'antennes non inclus dans cette liste, ayant un gain superieur au gain maximum indique pour ce type, sont strictement interdics pur une utilisation avec cet appareil.

Radio devices subject to RSS-247 issue 2 shall not be capable of transmitting in the band 5600-5650 MHz.

Dispositifs radio soumis a la delivrance RS-247 2 ne sont pas capables de transmettre dans la bande 5600-5650 MHz.

Base stations operating in the 3650-3700 MHz band may not be located within 150 km of any grandfathered satellite earth station operating in the 3650-3700 MHz band. The coordinates of these stations are available at http://www.fcc.gov/ib/sd/3650/.

Base stations operating in the 3650-3700 MHz band may not be located within 80 km of the following Federal Government radio location facilities:

- St. Inigoes, MD - 38° 10' N., 76°, 23' W
- Pensacola, FL - 30° 21' 28" N., 87°, 16' 26" W
- Pascagoula, MS - 30° 22' N, 88° 29'

Licensees installing equipment in the 3650-3700 MHz band should determine if there are any nearby U.S. Federal Government radar systems that could affect their operations. Information regarding the location and operational characteristics of the radar systems operating adjacent to this band are provided in NTIA TR-99-361.

Requests for base station locations closer than 80 km to the U.S. Federal Government radio location facilities listed above will only be approved upon successful coordination by the Commission with NTIA through the Frequency Assignment Subcommittee of the Interdepartmental Radio Advisory Committee.

Fixed devices operating in the 3650-3700 MHz band generally must be located at least 8 kilometers from the U.S./Canada or U.S./Mexico border if the antenna of that device looks within the 160° sector away from the border. Fixed devices must be located at least 56 kilometers from each border if the antenna looks within the 200° sector towards the border.

Fixed devices may be located nearer to the U.S./Canada or U.S./Mexico border than specified above only if the Commission is able to coordinate such use with Canada or Mexico, as appropriate.

Licensees in the 3650-3700 MHz band must comply with the requirements of current and future agreements with Canada and Mexico regarding operation in U.S./Canada and U.S./ Mexico border areas.

Canadian Emission Requirements for Indoor Units

This Class B digital apparatus complies with Canadian ISED-003.

Cet appareil numeique de la classe B est conforme a la norme NMB-003 du Canada.

EU – Compliance

CE

Warning

Radio transmitters operating in the EU need to comply the RE-DIRECTIVE 2014/53/EU, EMC Directive 2014/30/EU, Low Voltage Directive 2014/35/EU.

The 5.8 GHz products are suitable for use in, and comply with the Broadband Wireless Access System (WAS). It is a Class 2 device and uses operating frequencies that are not harmonized throughout the EU member states. The operator is responsible for obtaining any national licenses required to operate this product and these must be obtained before using the product in any particular country.

All RADWIN products that operate in the 5.8 GHz band comply with the requirements of the harmonized standard ETSI EN 302 502 and the ECC RECOMMENDATION (06)04.

The 3.5 GHz band complies with the standard ETSI EN 302 326-2 V1.2.2 and draft standard ETSI EN 302 326-2 V dft 0.0.2 (20016-11). The operator is responsible for obtaining any national licenses required to operate this product and these must be obtained before using the product in any particular country.

Restrictions on the use of 5.8 GHz Band in EU member states

BE	EL	LT	PT	BG	ES
LU	RO	CZ	FR	HU	SI
DK	HR	SK	DE	IT	UL
NL	CY	AT	SE	IE	LV
PL	UK(NI)				

Restrictions on the use of 3.5 GHz Band in EU member states

BE	HR	LT	HU
EE	UK(NI)	FR	NL

China MII

Operation of the equipment is only allowed under China MII 5.8GHz band regulation configuration with EIRP limited to 33 dBm (2 Watt).

India

Operation of the equipment is only allowed under MTCTE certification and Equipment Type Approval (ETA)

Brazil

The equipment will operate only in the frequency bands 5470 - 5725 MHz and 5725 - 5850

MHz. The software version to be sold in Brazil with blocking is from version 4.6. The power supplies presented in this user manual are not sold with this product.

O equipamento irá operar apenas nas faixas de frequências 5470 - 5725 MHz e 5725 - 5850 MHz. A versão do software a ser comercializado no Brasil com bloqueio é a partir da versão 4.6.

As fontes de alimentação apresentadas neste manual não serão comercizliadas junto com este produto.

Norway and Sweden

Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing - and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Norway

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr - og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel- TV nettet

Sweden

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV ät gal- vanisk isolator finnas mellan utrustningen och kabel-TV nätet.

Unregulated

In countries where the radio is not regulated the equipment can be operated in any regulation configuration, best results will be obtained using Universal regulation configuration.

Safety Practices

Applicable requirements of National Electrical Code (NEC), NFPA 70; and the National Electrical Safety Code, ANSI/IEEE C2, must be considered during installation.

1. A Primary Protector is not required to protect the exposed wiring as long as the exposed wiring length is limited to less than or equal to 140 feet, and instructions are provided to avoid exposure of wiring to accidental contact with lightning and power conductors in accordance with NEC Sections 725-54 (c) and 800-30. In all other cases, an appropriate Listed Primary Protector must be provided. Refer to Articles 800 and 810 of the NEC for details.
2. For protection of ODU against direct lightning strikes, appropriate requirements of NFPA 780 should be considered in addition to NEC.
3. For Canada, appropriate requirements of the CEC 22.1 including Section 60 and additional requirements of CAN/CSA-B72 must be considered as applicable.
4. Only UL Listed parts and components will be used for installation. Use UL Listed devices having an environmental rating equal to or better than the enclosure rating to close all unfilled openings.
5. Use min. 14 AWG external protective earthing conductor.
6. Earth the antenna coax shield to the building earth or mast.

Appendix F. Revision History

	Cat. No.	Date	Description
1.	DQ0193780/0.1 System Release 4.9	Feb, 2017	• Initial release
2.	DQ0193770/0.2 System Release 4.9.15	Jun, 2017	• Turbo Gain antenna description added (See Connecting SU PRO/AIR EMB Units to Antennas on page **Error! Bookmark not defined.**) • Regulatory comment added (see Regulatory Compliance)
3.	DQ0193770/0.3 System Release 4.9.17	Sep, 2017	• External antenna added for SU/PRO Air (See Connecting SU PRO/AIR EMB Units to Antennas on page **Error! Bookmark not defined.** and See External antenna on page **Error! Bookmark not defined.**) • Description for attaching cables for the Turbo Gain antenna modified (See Connecting SU PRO/AIR EMB Units to Antennas on page **Error! Bookmark not defined.**)
4.	DQ0193770/0.4 System Release 4.9.20	Nov, 2017	• Description added for sealing tape when installing Turbo Gain antenna on SU/PRO Air units (See Connecting SU PRO/AIR EMB Units to Antennas on page **Error! Bookmark not defined.**)
5.	DQ0193770/0.6 System Release 4.9.35	Feb, 2018	New product: JET-DUO 3/5 GHz: • Has two frequency bands (3.x and 5.x) • Uses a larger, integrated antenna than that of the JET platform (See JET, JET-DUO 3/5 GHz, NEO, JET-AIR, SU Connectorized, and MultiSector Base Station Integrated Units on page **Error! Bookmark not defined.**) • Uses the second input port on the JET platform as an SFP port (See JET-DUO 3/5 GHz, JET AIR, JET PRO, JET-AIR DUO and NEO DUO Units on page 46) SHA-1 encryption Best HBS for nomadic
6.	DQ0193770/0.7 System Release 4.9.60	Sep, 2018	• New product: the SU Integrated: Similar to the SU PRO/ AIR EMB, but with increased sensitivity due to a larger, integrated antenna. • Link Quality Indication: sends a trap if the throughput of the link is below a certain threshold . • Ability to send reports to a Syslog Server. • Broadcast and Multicast flooding protection can be configured separately.

7.	DQ0193770/0.8 System Release 4.9.34/60	Jan, 2019	• DUO has full dual carrier capability, and is managed using its own web-based user interface • The DUO feature set is based on Release 4.9.30 • Other products have the same features as in Release 4.9.60
8.	DQ0193770/0.9 System Release 4.9.70	Apr, 2019	• Bridge table • Secured access (Network ID)
9.	DQ0193770/1.0 System Release 4.9.75	Aug, 2019	• New product: SU PRO INT 3.x • New Web UI for SU PRO/AIR EMB and SU Integrated • Web UI for LFF and SFF removed • Support for RADIUS user authentication • Additional diagnostic tools (iPerf loopback and TCP/IP sniffing) • Option for HTTPS restricted only log in
10.	DQ0193770/1.1 System Release 4.9.75	Jan, 2020	• LPU on a wall removed
11.	DQ0193770/1.2 System Release 4.9.80	Mar, 2020	• New products: • JET-DUO 3/5 GHz 5 GHz (5.x GHz & 5.x GHz) • JET AIR/PRO (5.x GHz single-carrier unit) • JET PRO (3.5 GHz single-carrier unit)
12.	DQ0193770/1.3 System Release 4.9.80	Apr, 2020	• Regulatory updates for JET-DUO 3/5 GHz 5 GHz (5.x GHz & 5.x GHz) for ETSI
13.	DQ0266070/A.00 System Release 5.0.50	Jun, 2020	• Added to WebUI configuration: • RADIUS AAA functions • 802.1x authentication • Nomadic functionality • Utilization feature • Quality detection feature • Bridge table • DHCP (Option 82)
14.	DQ0266070/A.01 System Release 5.0.50	Jun, 2020	• Added certified antenna: 5250-5350 MHz and 5470-5725 MHz

15.	DQ0266070/B.00 System Release 5.0.70	Jul, 2020	• New product: MultiSector base station
16.	DQ0266070/B.01 System Release 5.0.70	Sep, 2020	• Regulatory updates, DFS mentioned,
17.	DQ0266070/B.02 System Release 5.0.70	Sep, 2020	• Name aligned: MultiSector Integrated Base Station
18.	DQ0266070/B.03 System Release 5.0.70	Oct, 2020	• MultiSector Connectorized Base Station
19.	DQ0266070/B.04 System Release 5.0.70	Oct, 2020	• Regulatory updates and mounting for MS connectorized corrections.
20.	DQ0266070/B.05 System Release 5.0.70	Oct, 2020	• Regulatory updates
21.	DQ0266070/B.06 System Release 5.0.70	Dec, 2020	• Grounding cable size adjusted
22.	DQ0266070/B.07 System Release 5.1.10	May, 2021	• SU Connectorized, NEO and NEO DUO included
23.	Document version 23	July, 2023	• Removed old Jet Air product (legacy) and added a new Jet Air and Jet Air DUO product with a 4th generation beamforming antenna • Removed chapter “what’s new in this version” • Removed document refence number • Removed SU functional descriptions • Remove “Prepare tools” chapter • Added chapter “Worldwide single PN products” • Changed document version to be independent of SW release versions
24.	Document version 24	July, 2024	• Revised document structure • Removed EOL products • New Products: SU ECO and Alpha PRO • Added POE compatibility table • Content corrections

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