



Exhibit 10 – Parts List/Tune –up Information

**SpectraPoint Wireless LLC
Customer Premises Equipment Roof Unit 2.0**

FCC ID: NNSRTU2000-00

Model Number: RTU2000-28-3

Information Provided in this Exhibit:

Assembly Drawing – Page 2

Assembly Parts List Expanded View – Page 3 is an expanded view of the parts list from the Assembly drawing of page 2

Product Information Primer – Pages 4-11. There are no tune- up procedures for the hardware device itself. During installation, the hardware is positioned for best signal transmission and reception as well as proper polarization. The Product Information Primer supplies information for installation and adjustment.

1	EA	3216165-001		LBL,WARNING RF EXPOSURE	15
8	EA	8001402-001	STL,JS500	SCR,TORX TPR PF T10,6-32 X .375	14
2	EA	8000300-101	410 SST	WSHR,LK,INT,.384ID,.692OD,.040THK,SST	13
1	EA	8001150-002		CAP,F-TYPE,CHAIN,O-RING	12
3	EA	8001391-002		O-RING,.426ID,.070THK,CONSIL-A 895	11
5	EA	8000458-006		SCR,SHH,4-40 X .625 SEMS	10
2	EA	8000458-004		SCR,SHH,4-40 X .500 SEMS	9
2	EA	8000458-002		SCR,SHH,4-40 X .312 SEMS,SST	8
3	EA	8001308-001		NUT,JAM,3/8-32 X 1/16	7
1	EA	3214978-005		LBL,GEN CERT,USA	6
1	EA	3214979-002		LBL,GEN CERT,RF I/O REMEC	5
1	EA	3215383-002		LBL, SAFETY, UL, US AND CANADA	4
1	EA	3219692-001		O-RING,EMI,CPE ANTENNA	3
1	EA	3215360-901		ASSY,PCB,RUE,360 BP,BTP,AGC	2
1	EA	3215389-002		SUB-ASSY,DISH,AGC,FILTERED	1
-001 QTY	UM	PART NUMBER	MATERIAL / VENDOR PN	DESCRIPTION	FIND NO.

LIST OF MATERIALS

MATERIAL:	DRAWN BY	DATE	SpectraPoint WIRELESS, LLC. Richardson, TX		
	B. Dahl	28-Dec-99			
	ENGINEER	DATE	ASSY,RTU,FILTER,360 BP, CPE ANTENNA		
	J. Cummings	28-Dec-99			
FINISH:	CM	DATE	SIZE	DWG NO.	REV
	L. Hanna	06-Jan-00	D	3215391	B
			SCALE: 1.000		SHEET 1 OF 2

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A

SpectraPoint 2000 Rooftop Unit (RTU)

Model No. RTU2000-28-3

Product Information Primer

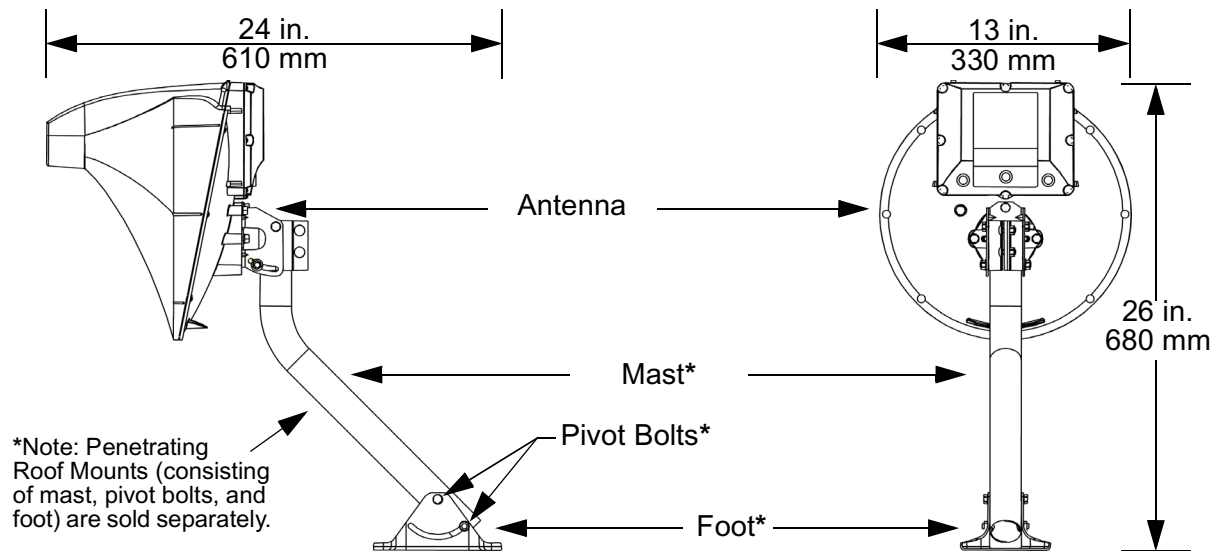


Figure 1. RTU Dimensions

The RTU integrated antenna and radio frequency (RF) transceiver provides wireless transmission and reception capabilities in the 28-GHz frequency region. Received signals are down converted from the 28 GHz band to the Intermediate Frequency (IF) L-Band and are sent to the NIU. IF signals from the NIU are up converted and transmitted over-the-air on the 28-GHz band. Model RTU2000-28-3 does not require a pilot tone.

The RTU consists of an antenna with radome, housing, and electronics including a down-converter/IF strip and an upconverter/transmitter. RTU polarization is set during installation to match the polarization of the Base station.

The RTU connects to the Network Interface Unit (NIU) through two cables: the transmit cable and the receiver/power cable. Refer to the Installation section of the applicable CPE Equipment Manual for more detailed instructions on the installation of the RTU.

An Installation Worksheet or similar installation order provides site-specific parameters. A sample Installation Worksheet is provided in Appendix A of the *CPE Equipment Manual* Installation section.

The equipment required to install the NIU is listed in the CPE Installation Tools and Supplies table in the *CPE Equipment Manual* Installation section.



Warning!

The RTU installation and cabling must meet national and local codes. A properly installed grounding wire must be attached to the RTU.

RTU Equipment Parts

Part	Model Number
SP2000 Rooftop Unit, NA-A Band Plan, Version 2.0 Each of the models listed above include the following parts: • RTU antenna assembly with electronics card • Antenna mount clamp bracket • Product Information Primer (PIP), SP2000 Series RTU Items purchased separately: • Non-Penetrating Roof Mount • Penetrating Roof Mount • Wall Mount Note: Ten Cinder Blocks or similar ballast are required for the Non-Penetrating Roof Mount. The Cinder Blocks are not provided and must be obtained locally. Cinder Block size: 400 mm x 200 mm x 100 mm (16 in x 8 in x 4 in.)	RTU-2000-28-3 3215974 MNT-RTU-NR MNT-RTU-PR MNT-RTU-WL

RTU Specifications

Operating Voltage & Power RTU-2000-28-3:	+9.0 to +15.0 V DC
Transmission Power:	100 mW nominal
Diameter:	330 mm (13 in)
Depth:	300 mm (12 in)
Weight:	3.6 kg (8 lb) for RTU only (does not include mounting components)
Operational Temperature Range:	–40° to +55° C (–40° to +131° F) ambient

Installing the RTU



Warning!

Verify that the RTU mounting location will not interfere with power lines or utility wires that carry dangerous voltage. Contact with the wires can result in severe injury or death.

Installing a Non-Penetrating Roof Mount

1. Place the metal frame on a rubber mat where you plan to place the antenna.
2. Connect the 31.75 mm (1-1/4-in) Schedule 40 metal pole to the frame using the angle supports.

Note: The Schedule 40 metal pole has a 31.75 mm (1-1/4-in) inside diameter and 42.16 mm (1.66-in) outside diameter.

3. Use 10 concrete blocks 400 x 200 x 100 mm (16 x 8 x 4 in) in two rows of five to anchor the frame.
4. See [“Mounting the RTU Antenna”](#) on the opposite page.

Attaching the Mount Foot to Wood-Frame, Cinder Block, Concrete, or Brick

1. Use a level to align the mount foot plate vertically, or parallel to any incline.

2. Secure the mount foot into a sturdy surface to provide a secure base for the mount.
 - a) When mounting the foot to solid wood construction, use six 8 mm (5/16-in.) diameter, 25 mm (1-in.) long hex lag screws.
 - b) For hollow wall or roof construction, align the foot so bolts or screws through the center holes will penetrate a stud or rafter whenever possible (see [Figure 2](#)). Use two 8 mm (5/16-in.) diameter x 38 mm (1.5-in.) long lag screws for the center holes. When a stud or rafter cannot be found, fasten the mount foot with four 8 mm (5/16-in.) diameter x 76 mm (3-in.) long round head toggle bolts.
 - c) When attaching the mount foot to cinder block, concrete, or brick, drill two 13 mm (1/2-in.) diameter holes in the surface for the outside holes on each side of the foot. Insert four 8 mm (5/16-in.) diameter x 38 mm (1.5-in.) long concrete anchors.
3. Seal the holes with caulk, RTV or roof sealer to prevent leaks.

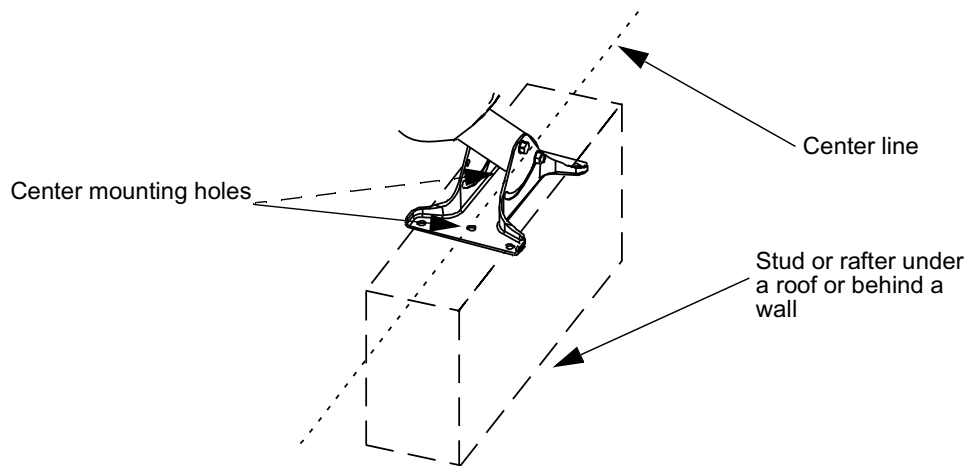


Figure 2. Mount Foot Mounting

Attaching the Mast to the Foot

1. Position the mast (see [Figure 1](#)) so the pivot bolt holes align with the hole and slot on the foot.
2. Align the mast so the top part of the mast is vertical (see [Figure 5](#)).
3. Insert the two mount foot pivot bolts and tighten (see [Figure 2](#)).

Mounting the RTU Antenna

1. Check the CPE Installation Worksheet to determine the antenna polarization setting for the particular customer site.
2. For horizontal polarization, attach the antenna clamp on the RTU antenna so the letter “H” is to the right of the backplate as shown [Figure 3](#). For vertical polarization, attach the antenna clamp on the RTU antenna so the letter “V” is to the right of the backplate.

***Note:** The antenna electronics package should be located at the top when the antenna is set for vertical polarization and at the side when set for horizontal polarization.*

3. Hold the antenna assembly in place and fasten the post clamp nuts (see [Figure 4](#)).
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Setting the Horizontal or Vertical Polarization

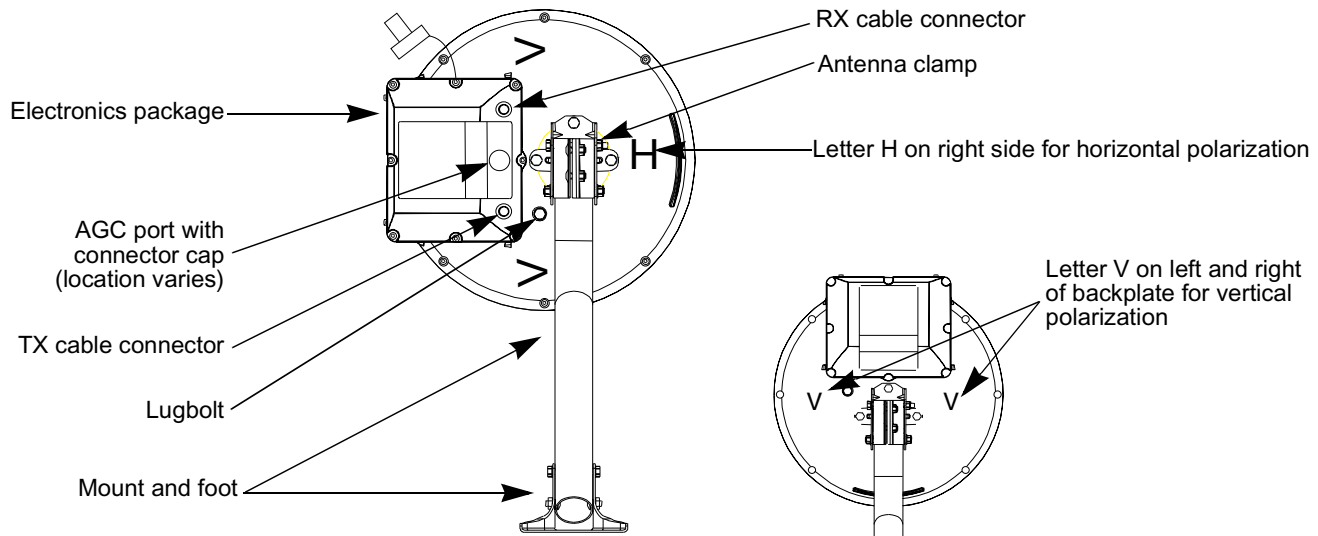


Figure 3. Antenna Polarization (Rear View)

4. Place a level on top of the electronics package to ensure that the electronic package is horizontally level. Loosen the antenna attachment bolts, the pivot bolt and elevation adjustment bolt enough to allow the antenna to be moved.
5. Adjust the azimuth and rotate the antenna towards the Node. Fine tune the alignment by sighting the Node using the grooves in the antenna exterior surface. Make sure the electronic package remains horizontally level.
6. Tighten all bolts enough to keep the antenna from slipping.

***Note:** Final mechanical alignment will be made when all the RTU cables are connected and the power from the NIU is turned on.*

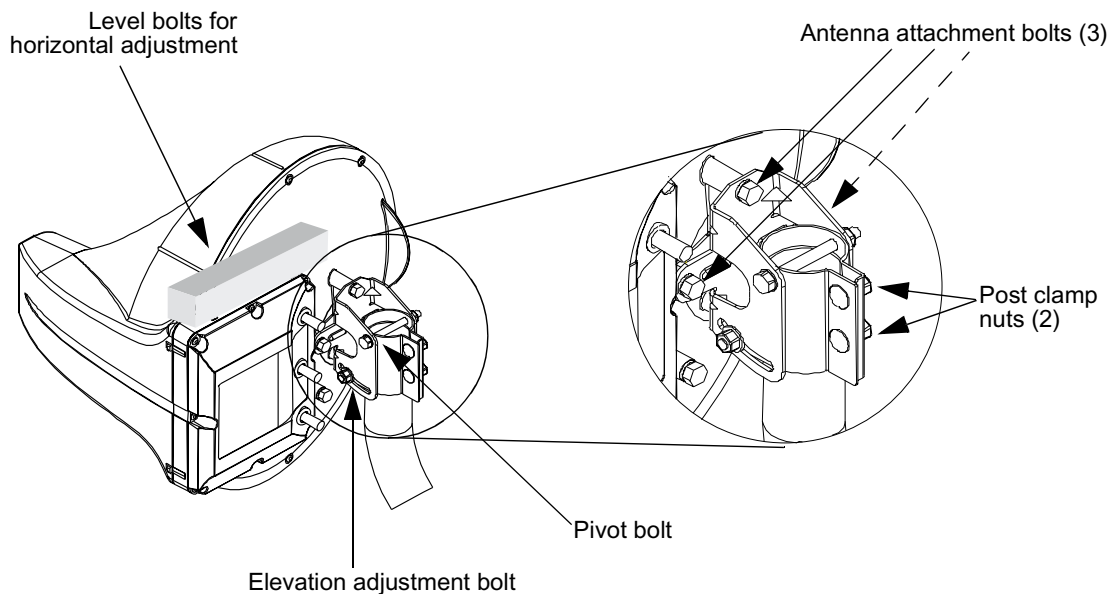


Figure 4. Fine-Tuning the Antenna Physical Adjustment

Installing the Antenna Grounding Wire



Warning!

- 1) The ground wire must be located at least 1.8 m (6 feet) away from lightning rods, or antennas should be bonded to the lightning protection system.
- 2) Prior to attaching the ground wire, apply a non-oxidizing agent, such as “NO-OX”, to both mating surfaces.
- 3) The antenna lightning ground wire must be 5 mm² (#10 AWG) copper wire or larger.
- 4) Ground wires from the antenna and ground block may run inside the building, but they must be grounded at the nearest accessible location.
- 5) Ground wire for lightning protection must be taken from the CPE to earth ground in as straight a line as practicable.

RTU Grounding Variations

If an RTU is mounted to a platform attached to the main building lightning protection system, attach a lightning ground wire from the lugbolt on the antenna (see [Figure 3](#)) to the RTU foot.

If an RTU is mounted to a platform that is NOT attached to the main building lightning protection system, connect the lightning grounding wire to the antenna lugbolt (see [Figure 3](#)) and then to the grounding rod outside the building at ground level.

Routing the Coaxial Cables



Warning!

The RTU must be visually aligned to the Node before coaxial cables are connected and power is applied to the NIU. This prevent unnecessary exposure to RF radiation and DC voltage in the cables.

1. For cable runs less than 61 m (200 ft) use RG-11 cable. RG-6 cable may be used for runs less than 46 m (150 ft). Use Commscope 5786 for RG-6 cable, Commscope 5918 for RG-11 cable or equivalent. The center conductor supplies DC power. The RG-6 cable selected must have solid copper-center conductor instead of a copper-plated steel center conductor.
 2. Route the two antenna cables from the RTU to the point the cable enters the building. Allow extra cable for drip loops and leave enough slack in the cable to rotate the RTU assembly and align it with another Node, should that become necessary.
 3. Mark both ends of one cable “TX” and the ends of the other cable “RX”.
 4. Route RG-6 cables up through the mast and the top of the post clamp at the top (see [Figure 5](#)). Route RG-11 cables along the outside of the mast and secure with tie wraps.
 5. Mount a grounding block at the point of building entry according to the manufacturer's instructions.
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Attaching the Cable to the Mount

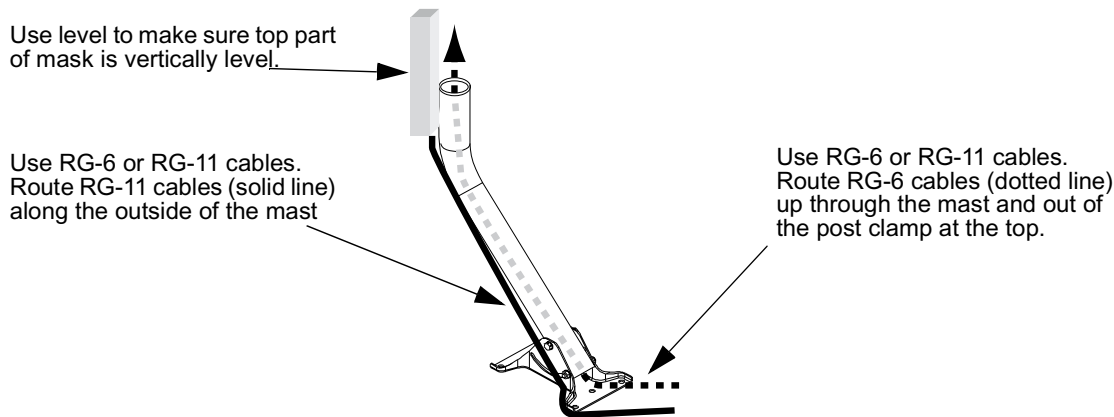


Figure 5. Mount Cable Routing



Attention

Do not install grounding block on vertical runs. Install the grounding block on horizontal portion of the cable run to prevent water from entering the connectors.

6. For RG-6 cables, install Gilbert GF-US-6 or equivalent heavy duty “F” connectors with seal rings. For RG-11 cables, install RG-11 Gilbert GAF-US-11 or equivalent heavy duty “F” connectors with seal rings. Use the preparation tool and compression tool recommended by manufacture. Use dielectric grease where the cable crimps to the connector and on the mating portion of the connector as required.

Note: Use of inexpensive “F” connectors will reduce the reliability of the installation.

7. Attach the cables to the grounding block with drip loops as shown in Figure 6. Use a torque of 271 N-cm (24 in-lbs).

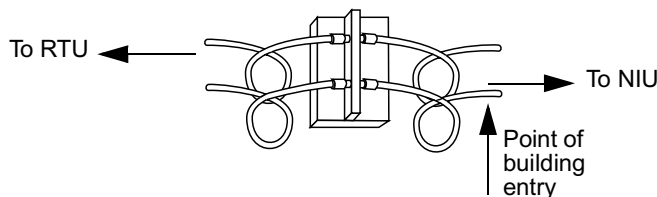


Figure 6. Grounding Block with Drip Loops

Routing Cables from the Grounding Block to the NIU

1. Route the two antenna cables from the Ground Block to the NIU using the same type of cable in the previous procedure. Allow extra cable for drip loops.
2. Mark both ends one cable “TX” and ends of the other cable “RX”.
3. As described in steps 6 and 7 of the previous procedure, install heavy duty “F” connectors and attach the cables to the grounding block.

Connecting the RX Coaxial Cable to the RTU and the NIU



Warning!

The RX cable carries DC power which under some circumstances is sufficient to cause injury. Stay in back of the transmitter antenna when the transmitter is connected to limit body exposure to RF radiation.



Attention

Never connect the RX cable to the TX port or the TX cable to the RX port. The DC power in RX cable could damage the RTU electronics if connected to the TX port.

1. Disconnect power to the NIU.
2. Connect the RX coaxial cable to the RX port on the RTU. Use a torque of 271 N-cm (24 in-lbs)

Note: Do not connect the TX cable at this time.

Electronic Alignment of the RTU Antenna

1. The NIU should be installed and powered up before final alignment of the RTU. Refer to the NIU Product Information Primer (PIP).
2. Disconnect the connector cap from the AGC port (see [Figure 7](#)).
3. Connect the DVM to the AGC port using the AGC test port cable (see [Figure 7](#)).
4. Verify that the RX cable from the NIU is connected to the RTU.
5. Connect the red lead (signal) banana plug from the AGC port to the (+) DVM jack, and the black lead (shield) banana plug to the (–) DVM jack.

Note: The measured value should be between 1 V and 5 V DC.

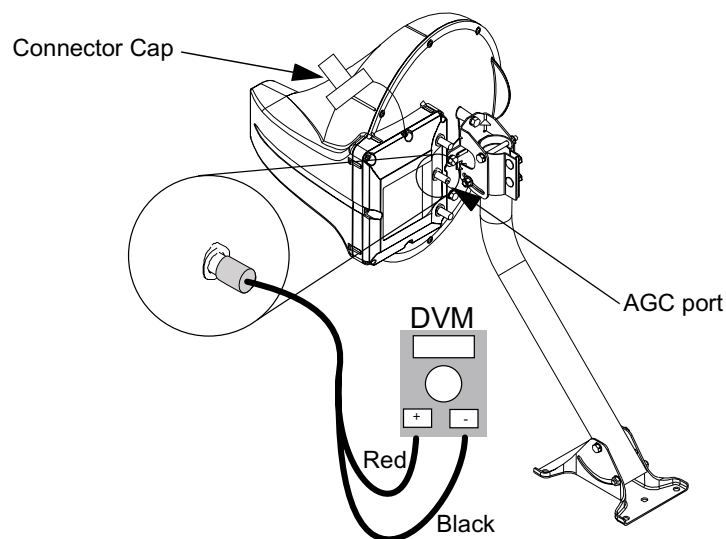


Figure 7. Elevation and Azimuth Adjustment with DVM



Warning!

Stay in back of the transmitter antenna when the transmitter is connected to limit body exposure to RF radiation.

6. Holding the antenna assembly from the rear, loosen the elevation adjustment bolt (see [Figure 4](#)).
7. Slowly raise and lower the antenna.
8. As the antenna is moved through the optimum elevation, the voltage will decrease and then increase.
9. Set the alignment where the AGC voltage is at a minimum.
10. Lightly tighten the elevation adjustment bolt and the pivot bolt.
11. Slowly turn the antenna to the left and right.
12. To adjust the azimuth, loosen the post clamp nuts (see [Figure 4](#)).
13. As the antenna is moved through the optimum azimuth, the voltage will decrease and then increase.
14. Set the alignment where the AGC voltage is at a minimum.
15. Repeat the elevation adjustment steps 6 through 9.
16. Tighten the post clamp nuts, elevation adjustment bolt, and pivot bolt.
17. Disconnect the DVM and test port cable, and reconnect the connector cap to the AGC port.

***Note:** When installation is complete, insert this Product Information Primer into the CPE Equipment Manual behind the Inserts tab.*

18. Recheck all bolts for tightness.
19. Connect the coaxial cable marked TX from the grounding block to the TX port on the RTU. Use a torque of 271 N-cm (24 in-lbs)



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