Mobile Collection Hardware System

Vehicle Preparation and Hardware Installation Guide

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16 February 2021

815-0207-00 REV 001

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1 Before You Begin

Mobile meter readers should use this document to install and operate the MC3 and MC4 family of Mobile Collection hardware systems. This family includes the Mobile Collector radio models MC4Max, MC4Pro, MC4Core, MC3 and MC3Lite. For detailed information on the system, its components, and system administration and maintenance, see the *Mobile Collection Administration Guide*.

This document also includes vehicle preparation, which includes installing the integrated antenna, power cables, and, if appropriate, attaching the necessary GPS cables. Unqualified personnel should *not* prepare a vehicle for the Mobile Collection system.

Important Safety and Compliance Information

This section provides important information for your safety and product compliance.

USA- FCC Part 15 Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and

- This device must accept any interference received, including interference that may cause undesirable operation.

This device must be installed to provide a separation distance of at least 20 centimeters (7.9 inches) from all persons to be compliant with regulatory RF exposure.

USA- FCC Class B-Part 15

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 or TV technician for help.

Modifications and Repairs

To ensure system performance, this device and antenna shall not be changed or modified without the express approval of Itron. Per FCC rules, unapproved modifications or operation beyond or in conflict with these instructions for use could void the user's authority to operate the equipment.

Canada- ISED Compliance

Compliance Statement Canada	Déclaration de Conformité
This device complies with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, (2) this device must accept any interference, including interference that may cause undesired operation of the device. Under Innovation, Science and Economic Development Canada (ISED) regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.	Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, (2) l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RF Exposure (FCC/ISED)

This equipment complies with radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.	Cet équipement est conforme aux limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement do it être installé et utilisé à distance minimum de 20 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec tout autre antenne ou transmetteur.

Professional Installation

These antennas are intended for professional installation by the integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this antenna.

Electromagnetic Compatibility

⚠️ **Caution:** Use only approved accessories with this equipment. All cables must be high quality, shielded, correctly terminated, and normally restricted to 2 meters in length. Unapproved modifications or operation beyond or in conflict with these use instructions may void the authority's authorization to operate the equipment.

Supported Vehicle Information

Itron's Mobile Collection systems are designed for use in land mobile vehicles such as cars, trucks, and vans conforming to U.S. Department of Transportation standards. Use of any Mobile Collection system in an aircraft is not supported by Itron nor certified for transmitting by the Federal Aviation Administration and/or Transport Canada. Consult your local Aviation Authority for additional guidance.

⚠️ **Warning!** Do not visually monitor or physically adjust the Mobile Collection system while driving. While driving, rely on the beeps produced when meter data is collected to indicate proper system operation. Visually monitoring or adjusting the Mobile Collection system while driving will divert your attention from your safe driving responsibilities. Attention to driving is your primary responsibility, along with following all the applicable driving regulations.

Mobile Collector Antenna Specifications

This section provides the specifications for the Mobile Collector antennas.

⚠️ **Caution:** The Mobile Collection system is designed to operate with the antennas listed here. Antennas not listed here are strictly prohibited for use with the Mobile Collection system. The required antenna impedance is 50 ohms.

Specification	915 MHz Mobile Antenna	Mobile Antenna Mount with GPS Antenna	915 MHz Side-Looker Antenna (MC4Max, MC4Pro, and MC3 only)
Itron part number	MSE-0122-002	CBA-0334-001 or CBA-0335-001	SUB-0275-001
Frequency range	908-958 MHz	1574-1576 MHz	902-928 MHz
Maximum gain	5 dBi	3 dBi	9.1 dBi
Polarization	Vertical Omnidirectional	Right-Hand Circular	Linear Directional
Impedance	50 ohms	50 ohms	50 ohms
Termination	1-1/8"-18 thread mount	SMA male (GPS) TNC male (Mobile)	TNC male
Overall dimensions	26.5" L x 1.43" D	2.25" x 4.25" x 1.25"	8.8" x 8.1" x 1.6"

Innovation, Science, and Economic Development Canada (ISED) Conformity

This radio transmitter has been approved by Innovation, Science and Economic Development Canada (ISED) to operate with the antenna types listed previously 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 indicated for that type, are strictly prohibited for use with this device.	Le présent émetteur radio est conforme aux CNR d'Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessus et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

New in this Revision

The following information has been added or revised in this version of the documentation.

New Information

- Updated information for MC4Max, MC4Pro, and MC4Core Mobile Collection systems

Documentation Conventions

The following documentation conventions are used:

Convention	Example
Computer (indicates laptop or tablet)	The computer is one of the hardware components.
Keypresses are in bold.	Press **Enter** when complete.
Hypertext links are in blue.	support.itron.com

⚠️ **Caution:** This type of note warns the user that failure to heed the information in the note could result in loss of data. Be sure to carefully read a Caution note and heed the advice/instructions.

⚠️ **Warning!** This type of note is used to warn of potential physical harm to the user or hardware. It is critical that you pay strict attention to Warning notes, read the information carefully, and heed the advice, instructions.

💡 **Tip:** This type of note provides the user with extra hints/tips to make a task easier to perform or a concept easier to understand.

Note: This type of note supplies generic information to the user. The information could be ignored and the user could still continue with a task without suffering any adverse consequences.

2 Vehicle Preparation

When you use a vehicle with Mobile Collection, there are specific changes to the vehicle that are required to accommodate the antenna and power. This section provides information on how to perform those changes.

> ⚠️ **Warning!** The following procedures must be performed by a qualified professional installer with the appropriate tools, knowledge, and experience to ensure safe installation in accordance with these instructions and all applicable safety standards. Installation by unqualified personnel voids all warranties for the installed products and associated components, and may subject the installer, operator, or others to hazardous conditions leading to injury or death.

Tools and Materials Needed

You need the following tools and materials to prepare a vehicle for the Mobile Collection system.

Tools	Materials
Drill and drill bit set	DC power supply cable
De-burring file	Integrated antenna package
Crescent wrench	Permanent antenna mounting package
Pliers	Silicone sealant
Cutting, stripping, and crimping tools for 12V wire and coax cable	

Vehicle Preparation Tasks

Vehicle preparation includes the following tasks. Perform the tasks in the order presented.

Task	Action	See...
1	Install the power supply cable.	Installing the Power Supply Cable on page 11
2	Install the integrated antenna. This is broken into sub-tasks.	Installing the Integrated Antenna on page 11

Power Supply Cable Installation

The unterminated end of the DC power supply cable connects to the vehicle's electrical system and remains in the vehicle. This is done so that you can easily connect and disconnect the Mobile

Collector to the other end. The following shows the unterminated end of the power supply cable.
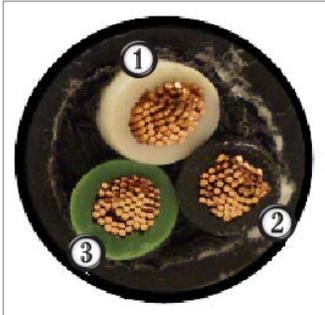
ID	Component
1	White wire
2	Black wire
3	Green wire

Installing the Power Supply Cable

1. Select a location in the vehicle for the connector end of the cable so that it reaches the cable that connects to the Mobile Collector. An extension cable is available from Itron, if needed.

2. Route the unterminated end of the cable to the voltage and grounding sites in the vehicle.

> ⚠️ **Caution:** Do not route the cable where it can become abraded or damaged, such as under the carpet in high traffic areas, over sharp edges, near hot engine components, near brake or clutch linkages, or where it can be exposed to oil or other corrosive liquids.

3. If necessary, trim wires to a suitable length.

4. Connect the white wire (1) to a spare fuse in the vehicle's fuse panel that has a rating of at least 15 ampere and receives power that is not turned on or off with the vehicle's ignition (unswitched).

5. Connect the black wire (2) directly to the vehicle's chassis ground.

6. Connect the green wire (3) to a spare fuse in the vehicle's fuse panel that has a rating of at least one ampere and receives power that is turned on with the vehicle's ignition set to accessories (switched).

Installing the Integrated Antenna

Installation of the integrated antenna includes the following tasks. Perform the tasks in the order presented.

Task	Action	See...
1	Select a location of the antenna on the vehicle.	Selecting an Antenna Location on the Vehicle on page 12 Connecting Side-Looker Antennas to the MC4Max, MC4Pro, or MC3 on page 36
2	Install the antenna mounting base.	Antenna Mounting Base Installation on page 13
3	Connect the antenna to the mounting base.	Antenna and Antenna Mounting Base Connection on page 14

Selecting an Antenna Location on the Vehicle

The integrated antenna remains installed on the vehicle. The manufacturer's instructions, which ship with the antenna components, are summarized in the following procedures. Itron recommends consulting the antenna manufacturer's instructions in addition to this installation guide.

Location selection criteria include the following.

- Access from inside the vehicle to the exterior antenna mounting location is usually required. If the vehicle has a headliner, remove nearby trim pieces or even a dome light to gain access to the mounting location.

- Install the antenna at least 12 inches (30 inches recommended) from any other antennas or metal structures on the vehicle's roof that could disrupt communication with endpoints. If you are also using side-looker antennas with the MC4Max, MC4Pro, or MC3, the side-looker antennas must be mounted directly in line with and at least 12 inches in front of or behind the integrated antenna. See Connecting Side-Looker Antennas to the MC4Max, MC4Pro, or MC3 on page 36.

- Select a location on the vehicle's roof that has as flat a surface as possible. The metal of the roof must be 0.02–0.04 inches thick.

- The location should be no more than one inch deep and at least 2.5 inches in diameter to properly security the antenna base.

- To meet RF exposure safety requirements, the antenna must be installed a minimum of 21.7 inches (55 centimeters) from where any bystanders may be located.

- The diameter of the ground plane at the antenna base should be at least three feet for best performance. Ideally, the ground plane should be a minimum of three times the wavelength being received. For example, a 900MHz signal, having a 13-inch wavelength, should have a ground plane of 39 inches.

Note: Itron recommends that you do not trim, shorten, or secure any cabling until you are confident of its routing.

Antenna Mounting Base Installation

The following diagram shows the parts of the integrated antenna base.
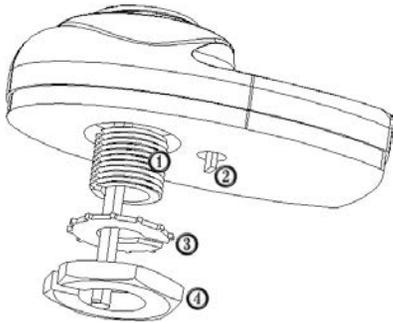
ID	Component
1	Mounting stud
2	Locating tab
3	Washer
4	Hex nut

Installing the RF Antenna Cable and Mounting Base

1. At your selected location, cut a 0.75 (3/4) inch hole in the mounting surface for the mounting stud to pass through.

2. Cut a 0.218 (7/32) inch hole that is 0.85 inches from the center of the first hole for the locating tab.
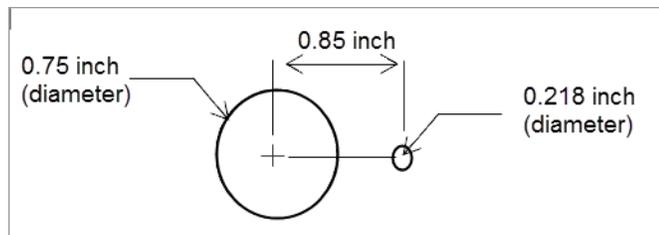
3. Clean the mounting surface and bottom of the antenna.

4. Feed the cables through the large hole and route to desired locations inside the vehicle: Mobile Collector mounting location and, if applicable, the GPS receiver location.

5. Apply a bead of silicone sealant around both holes.

6. Position the antenna on the mounting surface, inserting the mounting stud through the large hole and the locating tab in the small hole.

7. From under the mounting surface (inside the vehicle), slide the washer on the mounting stud and screw on the hex nut.

8. Tighten the hex nut until the gasket on the base of the antenna compresses to 50% of its original thickness.

9. Complete cable routing in the vehicle and secure the cables.

10. See .

Antenna and Antenna Mounting Base Connection

Now you must connect the antenna to the antenna mounting base.

Connecting the Antenna to the Antenna Mounting Base

1. Place the antenna gasket on the antenna mounting base. The gasket is shipped in a plastic bag with the antenna.

2. Press the antenna onto the thread nut of the antenna mounting base.

3. Rotate the antenna clockwise until it is firmly in place.

3 Mobile Collection Component Installation

The MC3 and MC4 families of Mobile Collectors are two versions of the Mobile Collection system for electric, gas, water, and other providers. They offer advanced radio technology for unsurpassed performance, along with a sophisticated mapping application utilizing GPS technology that provides a visual indication of endpoint location. This section provides directions on installing the components of the Mobile Collection system.

Pre-Installation Requirements

Before installing the Mobile Collection system components as outlined in this document, be sure that the following pre-installation requirements are complete:

- The Mobile Collection vehicle is prepared following the information in the Vehicle Preparation on page 10.

- If using the pedestal option, ensure that you have already ordered and installed the pedestal base per the manufacturer's installation instructions for your vehicle.

   Note: A variety of bases (not included in the Mobile Collection installation package) are available for use with the connector to address specific characteristics of different vehicle makes and models. For details, contact any of the following:

   - Gamber-Johnson at www.gamberjohnson.com

   - Havis Products at customers.havis.com

   - Ram Mounting Systems at www.rammount.com.

   Itron has no liability or obligation due to an incorrect installation or any installation that does not follow the procedures included in this document. Itron is also not liable for any third-party equipment installed by the customer.

   ⚠️ **Caution:** Itron strongly recommends disabling the passenger-side air bag when the Mobile Collection system is installed. The force of the air bag deploying can damage the laptop, radio, or other components of the system.

   ⚠️ **Danger!** Install the Mobile Collection system in the vehicle as described in this document and those listed above. Failure to do so could lead to injury or death from unsecured components during a collision.

Mobile Collection Hardware Kit

Your Mobile Collection hardware kit arrives in a cardboard shipping box. The Mobile Collector radio unit is packaged in a smaller reusable shipping box with foam inserts. You can save this

Itron-tested shipping box and use it to safely return the radio unit to Itron in case of future maintenance or repair needs.

The following items are included in the shipping box.

- Mobile Collector radio: Includes a mounting harness and straps for installing the system in your vehicle.

- Mobile Collector Sled or Pedestal: The sled installs in the vehicle's passenger seat and is secured with the vehicle's seat belt. The pedestal solution is installed on the pedestal you purchased separately for your vehicle.

- Mobile Collection vehicle dock: The vehicle dock (for a laptop or tablet), power cables, and communication cables attach to the sled or pedestal solution.

> **Note:** The vehicle dock is not included if you selected the "No Laptop" option.

- Cables: Connects the Mobile Collector radio and the Mobile Collection vehicle dock to the junction box.

- USB cable: Comes attached to the dock and attaches to the Mobile Collection computer. Provides communication between the Mobile Collection computer and the Mobile Collector radio.

> **Note:** Do not disconnect the USB cable from the vehicle dock.

- Power junction box: Attaches to the sled or to a pedestal mount. Provides power to the Mobile Collection computer, Mobile Collector radio, and optional equipment. The junction box must be installed prior to first use. For more information, see Junction Box on page 18.

- Omni-directional antenna: Attaches to the top of the vehicle and receives endpoint transmissions.

The following parts arrive separately:

- **Side-Looker antenna**: Optional side-looking, roof-mounted antenna system attaches to the top of the vehicle and receives endpoint transmissions. Available for the MC4Max, MC4Pro, and MC3 only.

- Mobile Collection software: Instructions for installing the Mobile Collection software are provided.

- Mobile Collection computer (laptop or tablet): Runs the Mobile Collection software to collect reads (if ordered).

- Rugged shipping container: Comes with wheels and handle (if ordered).

Installing the Mobile Collection Components

Mobile Collection component installation includes the following tasks. Perform the tasks in the order presented.

Task	Action	See...
1	Install the junction box on the vehicle dock	Junction Box on page 18
2	Ensure that the sled is installed correctly.	Mobile Collector Sled on page 17
3	Mount the Mobile Collector radio on the seat back.	Mounting the Mobile Collector Radio in the Vehicle on page 27
4	Attach and lock the Mobile Collection computer to the vehicle dock	Vehicle Docks on page 19
5	Connect the Mobile Collection computer to the Mobile Collector radio.	Connecting Power to the Mobile Collection Vehicle Dock on page 33
6	Connect power to the Mobile Collection junction box.	Connecting Power to the Mobile Collector Radio on page 34
7	Connect data cables to the Mobile Collection system.	Connecting the GPS and Data Cables on page 38

Mobile Collector Sled

For portable mounting, the Mobile Collector sled is used to securely fasten the Mobile Collection computer in the vehicle. It is placed on the passenger seat and secured with the vehicle seat belt.

> **Note:** Read the Mobile Collector Sled Installation Guide (815-0203) to learn how to correctly install the sled in your vehicle. It is found in a plastic sleeve on the underside of the sled.

The Mobile Collection vehicle dock attaches to the sled and serves as a locking base and provides power and communications to the computer. There are different docks available depending the computer used.

A power junction box ships in the Mobile Collection hardware kit. Attach this power junction box to the sled. When attached, the junction box on the sled should face the passenger side door of the vehicle.

Install the sled on the passenger seat before mounting the Mobile Collector radio. You must install the sled and secure it with the vehicle seat belt.

The sled components are shown on the sled below.

ID	Item	Description
1	Mobile Collector sled	Attaches to the vehicle passenger seat with the seat belt.
2	Mobile Collection vehicle dock	Attaches to the Mobile Collection computer and provides a secure base for the computer while in the vehicle.
3	Junction box	Provides power to the various Mobile Collection components. Attach the junction box prior to first use.

Junction Box

The junction box distributes power from the vehicle to the Mobile Collector radio and Mobile Collection computer.

Install the junction box on the sled or pedestal mount before you install the Mobile Collection system for the first time. The junction box must always remain attached to the sled or pedestal.

Installing the Junction Box

1. Remove the junction box from the Mobile Collection hardware kit.

2. Locate the sled or pedestal mount on which you are installing the junction box. In the following example, a sled is used.

3. Use a Phillips screwdriver to remove the two screws holding the junction box bracket in

place.

4. Slide one end of the junction box into position over the bracket that is still attached. Be sure to orient the junction box according to the label on the sled or pedestal. The bracket fits into the recessed edge on the junction box.

5. Insert the other bracket (the one you removed) into the junction box, making sure that both screw holes are visible through the bracket.

6. Insert and tighten both screws to secure the junction box to the sled or pedestal.

Vehicle Docks

Use the Mobile Collection vehicle dock to secure the Mobile Collection computer to either the sled or a pedestal mount in your vehicle. The vehicle dock provides power and communication connections between the Mobile Collection computer and Mobile Collector radio. There are three types of vehicle docks, depending on your computer:

- The FZ-G1 (10") tablet dock
- The FZ-M1 (7") tablet dock
- The CF-33 laptop dock

Computer Dock Description

FZ-G1 Tablet Dock

The FZ-G1 (10") tablet dock comes with a tilt-swivel base that allows you to position the tablet for viewing when not driving. It comes pre-attached to the sled. For more information, see Tilting and Swiveling the Dock on page 25. The FZ-G1 tablet may be used with any Mobile Collection system.

ID	Description
1	Barrel lock
2	Latch handle
3	Latch hook
4	Docking connector and ground pins

FZ-M1 Tablet Dock

The FZ-M1 (7") tablet dock is for mounting on a customer-supplied pedestal. The FZ-M1 tablet is used with the MC3Lite only.

ID	Description
1	Barrel lock
2	Latch handle
3	Latch hook
4	Docking connector and ground pins

CF-33 Laptop Dock

The CF-33 laptop dock comes with a tilt-swivel base that allows you to position the laptop for viewing when not driving. It comes pre-attached to the sled. For more information, see Tilting

. The CF-33 laptop may be used with any Mobile Collection system.

ID	Description
1	Barrel lock
2	Latch handle
3	Latch hook
4	Docking connector and ground pins

Attaching a Tablet to the Vehicle Dock

1. Ensure the dock is unlatched by pulling the latch handle down.

2. Holding the tablet in landscape position, angle the bottom of the tablet towards the dock's connectors.

3. Gently push the tablet into the dock's connector and ground pins. Slowly lower the tablet to the dock ensuring that the tablet's connectors and the dock's connectors are aligned.
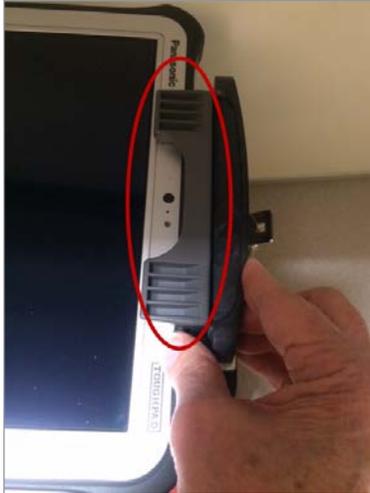

4. Once seated, pull the latch handle up until it snaps in place over the front of the tablet.

    Note: The latch handle moves the latch hook into place over the front of the tablet.

5. When the latch hook is on the top of the tablet, the tablet is now securely latched to the dock.

6. Best practice is to now lock the tablet in place. See .

Attaching a Laptop to the Vehicle Dock

1. Ensure the dock is unlatched by observing that the latch button on the front of the dock is recessed.

2. Holding the laptop at the top, angle the front edge of the laptop into the dock toward the latch button.

3. Slowly lower the back of the laptop onto the dock, ensuring that the laptop connectors and the dock connectors are aligned. The back of the laptop and the two dock latch hooks should look like this:

4. Gently push the back of the laptop down onto the dock until the latch hooks snap into place over the rear of the laptop.

5. When the latch hooks are engaged the latch button on the front of the dock will move into the latched position.

6. Best practice is to now lock the laptop in place. See Locking and Unlocking the Dock on page 24.

Locking and Unlocking the Dock

When a tablet or laptop computer is attached to its dock, the dock must be locked to properly secure the computer.

1. Lock the dock by inserting the dock key into the dock lock and turning it clockwise until the lock is in the locked position.

2. Unlock the dock by inserting the dock key into the dock lock and turning it counterclockwise until the lock is in the unlocked position.

Tilting and Swiveling the Dock

The tilt and swivel mechanisms operate the similarly on tablet and laptop docks. A tablet dock is shown below as an example.

Tilt

- Rotate the tilt handle towards the bottom end of the sled to loosen the tablet dock.

- Tilt the tablet dock to the desired position. Rotate the tilt handle towards the top end of the sled to tighten the tablet dock in the desired position.

Swivel

When the sled and tablet dock are in a vehicle, the tablet dock can only swivel towards the driver, up to 90 degrees. The swivel hardware is located where the tablet dock attaches to the sled (see the following illustration).

- Grasp the tablet dock with both hands. Firmly rotate the dock towards the driver until you reach the desired position. To prevent the tablet dock from moving during its use, the swivel mechanism is tight, thus it may be hard to swivel.

Mounting the Mobile Collector Radio in the Vehicle

The Mobile Collector radio is mounted in a harness with clips so that it can attach to either a bucket or bench seat in a vehicle. The Mobile Collector radio is shipped in its harness with the straps set up for a bucket seat. The bench straps are included with the radio.

If you are using a sled in either the bucket or bench-style seat arrangement, you must attach the Mobile Collector radio high enough on the seat-back to leave room for the sled and Mobile Collection computer to fit on the seat beneath the radio.

- **Sled Systems**- Mount the Mobile Collector radio high enough on the seat back (as shown in the following example) so the sled and Mobile Collection computer fit beneath the radio on the seat.

- **Pedestal Systems**- The Mobile Collector radio can be attached to the lower portion of the

seat, as shown below.

Mounting the Mobile Collector Radio on a Bucket Seat

1. Position the harnessed Mobile Collector radio so that the unit's connectors and handle face towards the passenger-side door when mounted to either the front or the back of the passenger seat.

2. Extend the mounting straps from the driver-facing side of the vehicle mount (1), wrap them around the seat back, and buckle them to the opposite side of the vehicle mount (2).

3. Tighten the straps until the radio is secure against the seat-back.

Vehicle Sled

The Mobile Collector radio rides in a harness that attaches to a bucket or bench-style passenger seat. The Mobile Collector sled is equipped with a dock for the computer and a junction box for power connectors. The junction box must be attached to the sled prior to use. The sled should be mounted on the seat before the radio is attached. The Mobile Collector radio must be mounted high enough on the seat so that the right-side ports on the Mobile Collector computer are accessible.

Vehicle Sled Parts

The following example illustration shows an MC4Core radio and sled components installed in a vehicle. Other Mobile Collection system installations would be similar.

ID	Item	Description
1	Mobile Collector radio	Contains components necessary for collecting mobile reads, such as the processors, receivers, and GPS equipment.
2	Vehicle dock	Provides a communication link between the Mobile Collection computer and the Mobile Collector radio. Also provides power to the computer.
3	Computer	The Mobile Collection computer attaches to the vehicle dock.
4	Junction box	Receives power from the vehicle and distributes it to the Mobile Collector radio, the Mobile Collection computer, and optional equipment.
5	Sled	Attaches to the passenger seat of a vehicle and secures the Mobile Collection computer and the dock in place. **Warning**: A properly installed sled is vital to ensure your safety while collecting reads.

Mobile Collector Radio Connections

The top of the Mobile Collector radio contains the power and communications connectors, as well as a fabric and rubber handle used to carry the radio.
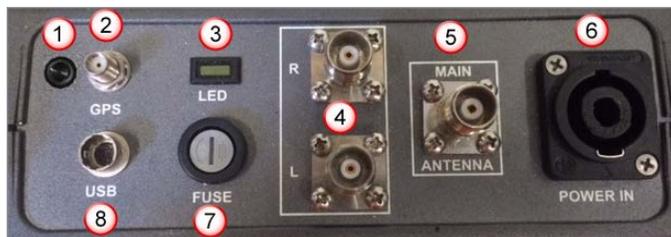
MC4Core and MC3Lite Connectors

The connections on the MC4Core and MC3Lite radios include the following.

ID	Connector	Description
1	GPS LED indicator	An LED that indicates the status of the GPS antenna. ■ A lit LED indicates that the GPS antenna is operating properly. ■ An unlit LED indicates that the GPS antenna is not operating properly and should be serviced. For more information, see Connecting the GPS and Data Cables on page 38.
2	Power indicator	An LED that turns on when the MC4Core or MC3Lite is receiving power. ■ A solid LED indicates that the power is on and the radio is connected to the Mobile Collection computer via the USB cable. ■ A flashing LED indicates the power is on, but the radio is not connected to the Mobile Collection computer via the USB cable.
3	USB	Connects the Mobile Collection computer to the Mobile Collector radio.
4	Main antenna	Connector for the roof-mounted omni-directional antenna cable.
5	Vehicle power	Input that receives the connector running to the vehicle power source to provide power to the the Mobile Collector radio. In addition to wiring the power cable directly to the vehicle, a 12V auxiliary power cable is available. Itron recommends the use of the permanent solution for better power sourcing. Caution: When using the auxiliary power cable, always disconnect this cable from the power source when not in use. Failure to do so could result in a dead vehicle battery.
6	Fuse holder	Holder that accepts standard automotive 12V (15amp) AGC fuses (1 included) to protect internal circuitry from power surges by the vehicle.
7	GPS antenna connector	Connects the the Mobile Collector radio to the roof-mounted GPS antenna.

MC4Max, MC4Pro, and MC3 Connectors

The connections on the MC4Max, MC4Pro, and MC3 radios include the following.

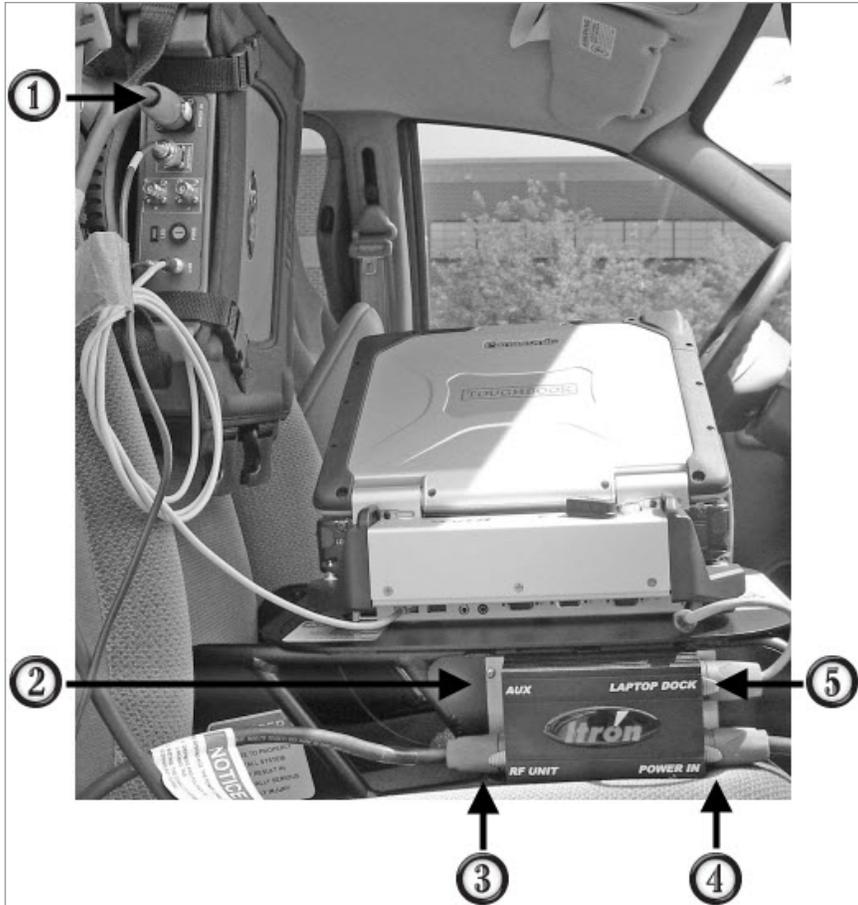| ID	Connector	Description
1	GPS LED indicator	An LED that indicates the status of the GPS antenna. ■ A lit LED indicates that the GPS antenna is operating properly. ■ An unlit LED indicates that the GPS antenna is not operating properly and should be serviced. For more information, see Connecting the GPS and Data Cables on page 38.
2	GPS antenna connector	Connects the Mobile Collector radio to the roof-mounted GPS antenna.
3	Power indicator	An LED that turns on when the MC4Max, MC4Pro, or MC3 is receiving power. ■ A solid LED indicates that the power is on and the radio is connected to the Mobile Collection computer via the USB cable. ■ A flashing LED indicates the power is on, but the radio is not connected to the Mobile Collection computer via the USB cable.
4	Side-looker antennas	Extra connectors for the optional side-looking, roof-mounted antennas. Do not use these connectors for the main MC4Max, MC4Pro, or MC3 antenna.
5	Main antenna	Connector for the roof-mounted omni-directional antenna cable.
6	Vehicle power	Input that receives the connector running to the vehicle power source to provide power to the Mobile Collector radio. In addition to wiring the power cable directly to the vehicle, a 12V auxiliary power cable is available. Itron recommends the use of the permanent solution for better power sourcing. Caution: When using the auxiliary power cable, always disconnect this cable from the power source when not in use. Failure to do so could result in a dead vehicle battery.
7	Fuse holder	Holder that accepts standard automotive 12V (15amp) AGC fuses (1 included) to protect internal circuitry from power surges by the vehicle.
8	USB	Connects the Mobile Collection computer to the Mobile Collector radio.

Connecting the Power Cables

Power to the Mobile Collection components is distributed through the junction box on the side of the sled. There are three power cables that must be connected.

- Vehicle power to the junction box
- Junction box to the Mobile Collection vehicle dock
- Junction box to the Mobile Collector radio

Mobile Collection does not use the auxiliary (AUX) outlet.

The following example shows an MC3 radio and sled for a laptop with all the power cables connected.

ID	Connection (Label)	Description
1	Power in to Mobile Collector radio (POWER IN)	Power receptacle on Mobile Collector radio.
2	Auxiliary outlet (AUX)	Mobile Collection no longer uses the auxiliary outlet.
3	Power out to Mobile Collector radio (RF UNIT)	Connection from junction box to Mobile Collector radio.

ID	Connection (Label)	Description
4	Power in from vehicle (POWER IN)	Power source input from the vehicle's battery. This connection is hard-wired to the vehicle battery.
5	Power out to the dock (LAPTOP DOCK)	Connection from junction box to the vehicle dock. The vehicle dock secures the Mobile Collection computer in place while you drive a route, and provides power and communication connections for the computer. The vehicle dock is attached to either a sled or pedestal mount in the vehicle (a sled is pictured in this example). Note: Although this is labeled LAPTOP DOCK, it is used for both a laptop dock and a tablet dock.

Connecting the Vehicle Power to the Sled

1. Plug the vehicle power cable into the POWER IN receptacle on the junction box that is either mounted on the sled or the pedestal.

> 💡 **Tip:** To remove the cable, pull the silver tab on the power cable back. Twist the connector so the silver tab lines up with the labeling on the junction box and release the tab to unlock it. Then gently pull back on the connector to remove it.

2. The other end of the power cable can be hard-wired to the vehicle battery as described in Installing the Power Supply Cable on page 11. It can also be plugged into the 12v power supply.
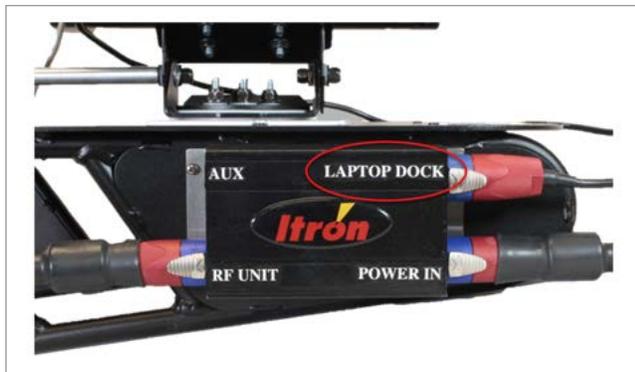

Connecting Power to the Mobile Collection Vehicle Dock

> **Note:** The computer power supply, input cable, and USB cable come pre-attached to the dock.

- If needed, plug the red and blue end of the cable into the LAPTOP DOCK receptacle on the junction box.

> **Tip:** To remove the cable, pull the silver tab on the power cable back. Twist the connector so the silver tab lines up with the labeling on the junction box and release the tab to unlock it. Then gently pull back on the connector to remove it.

Connecting Power to the Mobile Collector Radio

1. Plug one end of the Input power cable (CBA-0269-001) into the RF UNIT receptacle on the junction box.

> **Tip:** To remove the cable, pull the silver tab on the power cable back. Twist the connector so the silver tab lines up with the labeling on the junction box, and release the tab to unlock it. Then gently pull back on the connector to remove it.

2. Plug the other end into the power in receptacle on the radio.

Connecting the Antenna

The omni-directional RF antenna has either a fixed-base that is permanently attached to the vehicle or a magnetic base that can be attached to and removed from the vehicle as necessary.

When deciding where to mount the antenna, consider the following:

- Choose a flat area on the vehicle's roof, where the metal of the roof is 0.02-0.04 inches thick.
- Install the antenna a minimum of 12 inches (recommended 30 inches) from any other antennas or metal structures on the vehicle's roof that could disrupt communication with endpoints.
- To meet RF exposure safety requirements, the antenna must be installed 7.9 inches (20 cm) from where any bystanders might be.

Connecting the Antenna to the Mobile Collector Radio

As seen in the following graphics, connect the omni-directional RF antenna cable to the MAIN ANTENNA connector on the MC4Core or MC3Lite (top), or MC4Max, MC4Pro, or MC3 (bottom). Be sure to properly tighten the connector. A loose connection can lead to poor radio and read performance.
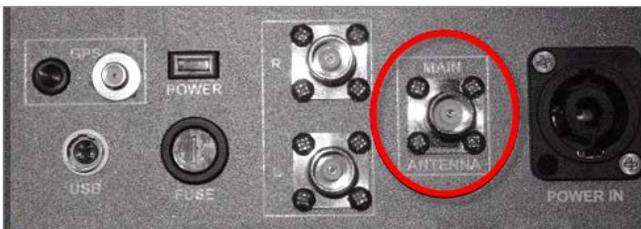
> **Note:** Antenna cables from previous Mobile Collection systems might not be compatible with the connector on your new Mobile Collector radio. Install the omni-directional antenna that is provided with your new Mobile Collection system. If needed, a type N to TNC adapter (part number CON-0419-001) can be ordered from Itron. Contact Itron Customer Service at 1-877-487-6602.

Connecting Side-Looker Antennas to the MC4Max, MC4Pro, or MC3

The MC4Max, MC4Pro, and MC3 radios support an additional set of antennas placed on top of the vehicle. These side-looker antennas help to gather additional reads from endpoints that can be read from either side of the vehicle at longer distances.

The side-looker antennas are an optional component of the more advanced Mobile Collection systems that can help improve read coverage in certain situations. Two additional antennas are connected to one antenna base, which is then installed on the vehicle. For more information contact your Itron representative.

Side-looker antennas attach to the top of the vehicle with several strong magnets. If your vehicle has a fiberglass top, the antennas do not bond securely to the vehicle. Itron does not recommend the use of side-looker antennas with fiberglass-topped vehicles.

Connecting a Side-Looker Antenna to the Vehicle

1. Mount the side-looker antennas (2) on top of the vehicle with the antenna panels facing to the left and right of the vehicle. The side-looker antennas must be mounted directly in line with and at least 12 inches in front of or behind the primary RF omni-directional antenna (1).

   Note: Do not separate the individual antennas from the side-looker antenna base.

2. Route the antenna cables into the vehicle, taking care not to pinch or damage them.

> ⚠️ **Warning!** When installing the antenna, take care to arrange all cables so they will not be accidentally snagged, disconnected, or damaged by users during day-to-day operations.

3. On the MC4Max, MC4Pro, or MC3 radio, inside the vehicle, remove the caps to expose the side-looker antenna ports, identified by R and L.
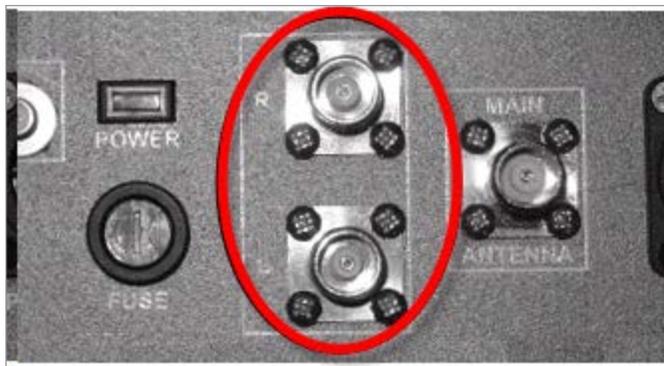
4. Connect the side-looker antenna cables to their respective R (right) and L (left) antenna

inputs on the radio.

Connecting the GPS and Data Cables

GPS and meter data is received and transferred between the Mobile Collector radio and the Mobile Collection computer through a USB cable connecting the vehicle dock to the radio.

Data Cables Connections Table

The following picture shows an MC3 Mobile Collection system (with a laptop secured in a laptop dock) with all the data cables connected to their respective components.

ID	Connection (Label)	Description
1	RF radio antenna (MAIN ANTENNA)	RF radio antenna connection on Mobile Collector radio. Receives endpoint signals.
2	GPS antenna (GPS)	GPS antenna connection to Mobile Collector radio. Receives GPS signal for vehicle location and tracking.
3	USB data cable (USB)	USB data output from Mobile Collector radio. GPS and meter data is transferred from the radio to the computer through this cable.
4	USB data cable (⬸)	USB data input on the vehicle dock. Data from the Mobile Collector radio is transferred to the Mobile Collection software running on the Mobile Collection computer.

Connecting the USB Data Cable to the Radio

1. Ensure that the rectangular end of the USB data cable is inserted into the Mobile Collection vehicle dock USB port.

   Note: The USB cable is connected to the vehicle dock at the factory and is secured with a cable tie. Do not remove this cable tie or unplug the USB cable from the vehicle dock. The cable tie helps ensure a secure connection and should never be disconnected.

2. Plug the round end of the USB cable connector into the USB-labeled receptacle on the Mobile Collector radio.

Connecting the GPS Antenna Cable

Attach the GPS antenna cable from the roof antenna to the connector on the Mobile Collector radio labeled GPS.

Note: When powered on, the LED indicator is lit to indicate that the GPS antenna is functioning properly. If the LED indicator is not lit, disconnect and reattach the cable to the GPS antenna connector. If the LED indicator is lit, continue installing your Mobile Collection system. If the LED indicator remains unlit, contact Itron support.

Removing the Mobile Collection System

At some point, you may need to remove the Mobile Collection system from the vehicle. This consists of two tasks.

Task	Action	See...
1	Shut down and remove the Mobile Collection computer from the vehicle dock.	Removing the Mobile Collection Computer from the Vehicle Dock on page 41
2	Disconnect the cables within the vehicle. Leave the	Disconnecting the Cables on page 41

Task	Action	See...
	cables in the vehicle for the next installation of the system	

Removing the Mobile Collection Computer from the Vehicle Dock

1. In the Mobile Interface application, stop processing reads, complete and export all routes, and shut down all open applications. Consult your application software documentation.

2. Shut down the Mobile Collection computer by selecting Start > Shut Down.

3. Close the Mobile Collection laptop if using one.

> ⚠️ **Caution:** Ensure that you shut down and properly power off the Mobile Collection computer before going any further. Damage can occur to the computer or the vehicle dock if the computer is removed while powered on.

4. Turn off the vehicle.

5. Disconnect any cables attached directly to the Mobile Collection computer.

6. Unlock the Mobile Collection computer from its dock. See Locking and Unlocking the Dock on page 24.

7. Gently lift the Mobile Collection computer up and away from its dock.

Disconnecting the Cables

1. Before beginning, ensure that you have shut down and removed the Mobile Collection computer from the vehicle dock. See Removing the Mobile Collection Computer from the Vehicle Dock on page 41.

2. Unplug the cables from the Mobile Collector radio.

3. Unplug all the cables from the Mobile Collection vehicle dock except the USB cable.

4. Unplug the cables from the sled or pedestal junction box.

5. Release the mounting clips on the Mobile Collector radio harness and remove the radio.

6. Unbuckle the seat belt securing the sled to the passenger seat and remove the sled from the vehicle.

4 Mobile Collector System Maintenance

Regularly perform these basic maintenance procedures to ensure optimal performance of your Mobile Collection hardware system.

Inspecting Antenna Connectors and Cables

The connections and cables to the radio typically experience the most wear. Many customers remove the radio on a daily basis. Removing and installing the connectors daily can cause the cable and connector to begin separating. This is considered normal wear and tear.

The coax cables (used in the magnetic mount base) can be damaged if they are accidentally pinched in a window or door jamb. Any damage to the coax cables or the connectors leads to decreased read performance and transmitter failures due to high reflected power.

Create a regular maintenance schedule and inspect the following.

- Coax cables.
  - Ensure the cable is not loose from the connector.
  - Inspect for hard kinks or bends in the cable, which can cause an electrical short.
  - Inspect for cuts or nicks in the cable.
- Coax shield. Do not expose the shield at the connector or anywhere along the cable.
- Connector. The center pin of the connector should not be recessed or pushed into the connector housing.

Replace the entire antenna base if the cables or connectors are damaged. Contact Itron Support Service if you need any assistance.

Antenna Base and Whip Inspection

The antenna whip is the radiating element that both transmits and receives the signals for the Mobile Collection System. The whip attaches to a base. The base is either mounted through the roof of the vehicle or is a magnet mount. Moisture can build up between the base and the whip. This moisture buildup leads to oxidation and corrosion on the threads and contacts, which results in a loss of signal quality. Evidence of moisture buildup (oxidation) is usually light and hazy in

appearance. The appearance of darker areas or spots indicates a more severe condition which may lead to corrosion.

Inspecting the Antenna Base and Whip

1. Create a maintenance schedule and look for the following.

   - Oxidation, corrosion, and dirt on the antenna base.

   - Oxidation, corrosion, and dirt in or on the whip.

   - Missing or damaged contact element in the whip.

   - Loose or damaged coax cable at the antenna base.

   - Missing or damaged O-ring gasket.

2. Use a good contact cleaner to clean the area if oxidation or corrosion is found. Follow-up with a good conductive protectant. Contact Itron Support Service if you need any assistance.

3. Periodically check that both set screws are tight by trying to rotate the whip in the spring, and by twisting and rocking the spring on the load coil. If the whip is loose, loosen the top set screw enough to ensure that the whip is fully seated in the spring, then tighten the set screw. If the spring is loose, ensure that the spring is seated flush on the load coil and tighten the bottom set screw.

Cleaning the Antenna

Regular cleaning is recommended to maintain both the performance and the appearance of your omni-directional RF antenna.

- Clean the antenna in the same manner as your vehicle. Apply a quality car wax to the antenna and base to help protect the finish and extend the life of the antenna.

Antenna Gasket Replacement

Inspect the gasket regularly to verify that it is intact, free from debris, and properly seals the antenna and base. To maintain the integrity and performance of the antenna, Itron recommends that you replace the gasket located in the antenna base minimally once a year.

For more information about ordering the gasket, log on to Itron Access or contact Itron Support Services at 1-877-487-6602. The replacement gasket part number is MSE-0210-001, which includes six gaskets.

Replacing the Antenna Gasket

1. Turn the antenna counter-clockwise to remove it from the base.

2. Remove the gasket (1) from the base (2).
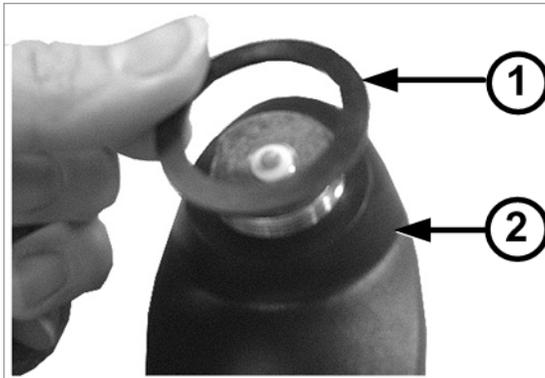
3. Place a new gasket on the base and push it firmly into place.

4. Ensure that the gasket is level with the antenna base to prevent pinching when the antenna is reconnected.

5. Reconnect the antenna to the base by turning it clockwise until it is firmly seated on the base.