NetComm

Installation Guide

IFWA-661 - Outdoor Wireless Antenna

Important Notice

This device, like any wireless device, operates using radio signals which cannot guarantee the transmission and reception of data in all conditions. While the delay or loss of signal is rare, you should not rely solely on any wireless device for emergency communications or otherwise use the device in situations where the interruption of data connectivity could lead to death, personal injury, property damage, data loss, or other loss. NetComm Wireless accepts no responsibility for any loss or damage resulting from errors or delays in transmission or reception, or the failure of the NetComm Wireless IFWA-661 Outdoor Wireless Antenna to transmit or receive such data.

Safety and Hazards

Warning – Do not connect or disconnect cables or devices to or from the SIM card tray or Ethernet port in hazardous locations such as those in which flammable gases or vapours may be present, but normally are confined within closed systems; are prevented from accumulating by adequate ventilation; or the location is adjacent to a location from which ignitable concentrations might occasionally be communicated.

Copyright

NetComm Wireless Limited was acquired by Casa Systems, Inc. a Delaware company on 1 July 2019. The information contained herein is proprietary to Casa Systems, Inc. No part of this document may be translated, transcribed, reproduced, in any form, or by any means without prior written consent of Casa Systems, Inc.

Trademarks and registered trademarks are the property of NetComm Wireless Limited or their respective owners. Specifications are subject to change without notice. Images shown may vary slightly from the actual product.

Note – This document is subject to change without notice.

Document history

This document covers the following product:

NetComm Wireless IFWA-661 Outdoor Wireless Antenna

VER.	DOCUMENT DESCRIPTION	DATE
v1.0	Initial document release	September 20, 2019

Table i. - Document revision history

NetComm

Contents

Overview

Introduction

This document provides you with an overview of the installation process for the IFWA-661 Outdoor Wireless Antenna.

Target audience

This document is intended for system integrators or experienced hardware installers who understand telecommunications terminology and concepts.

Prerequisites

Before continuing with the installation of your IFWA-661 router, please confirm that you have:

- An electronic computing device with a working wireless network adapter and a web browser such as Internet Explorer®, Mozilla Firefox® or Google Chrome™.
- Read the entire Safety and product care section of this document and RF Exposure information.

Notation

The following symbols may be used in this document:

Note – This note contains useful information.

Important – This is important information that may require your attention.

Warning – This is a warning that may require immediate action in order to avoid damage or injury.

Product introduction

Product overview

Rural and regional homes and businesses, remote commercial sites and metropolitan fringe districts located beyond the reach of fixed line infrastructure rely on mobile networks to access broadband Internet.

Designed to optimise signal strength in weak signal areas, the Outdoor Wireless Antenna (OWA) is positioned on the exterior of the premises to overcome distance limitations and geographical obstructions and deliver high-speed LTE broadband connectivity to wired and wireless clients in the property via an indoor router.

Package contents

The NetComm Wireless IFWA-661 in-box contents include:

- 1 x NetComm Wireless IFWA-661 Outdoor Wireless Antenna (also referred to as the IFWA, OWA and OA).
- 1 x Assembled mount bracket and hardware compatible with all DIRECTV 2" mounts

Accessories used in this solution (packaged separately):

- 1 x Antenna Power Supply (POE-03) – used to power the OWA during normal operation
- 1 x Smart Antenna Tool – used to power and provide a wireless interface to the OWA during installation

If any of these items are missing or damaged, please contact NetComm Wireless Support immediately. The NetComm Wireless Support website can be found at: http://support.netcommwireless.com.

Physical dimensions and interfaces

Physical dimensions

Below is a list of the physical dimensions of the IFWA-661.

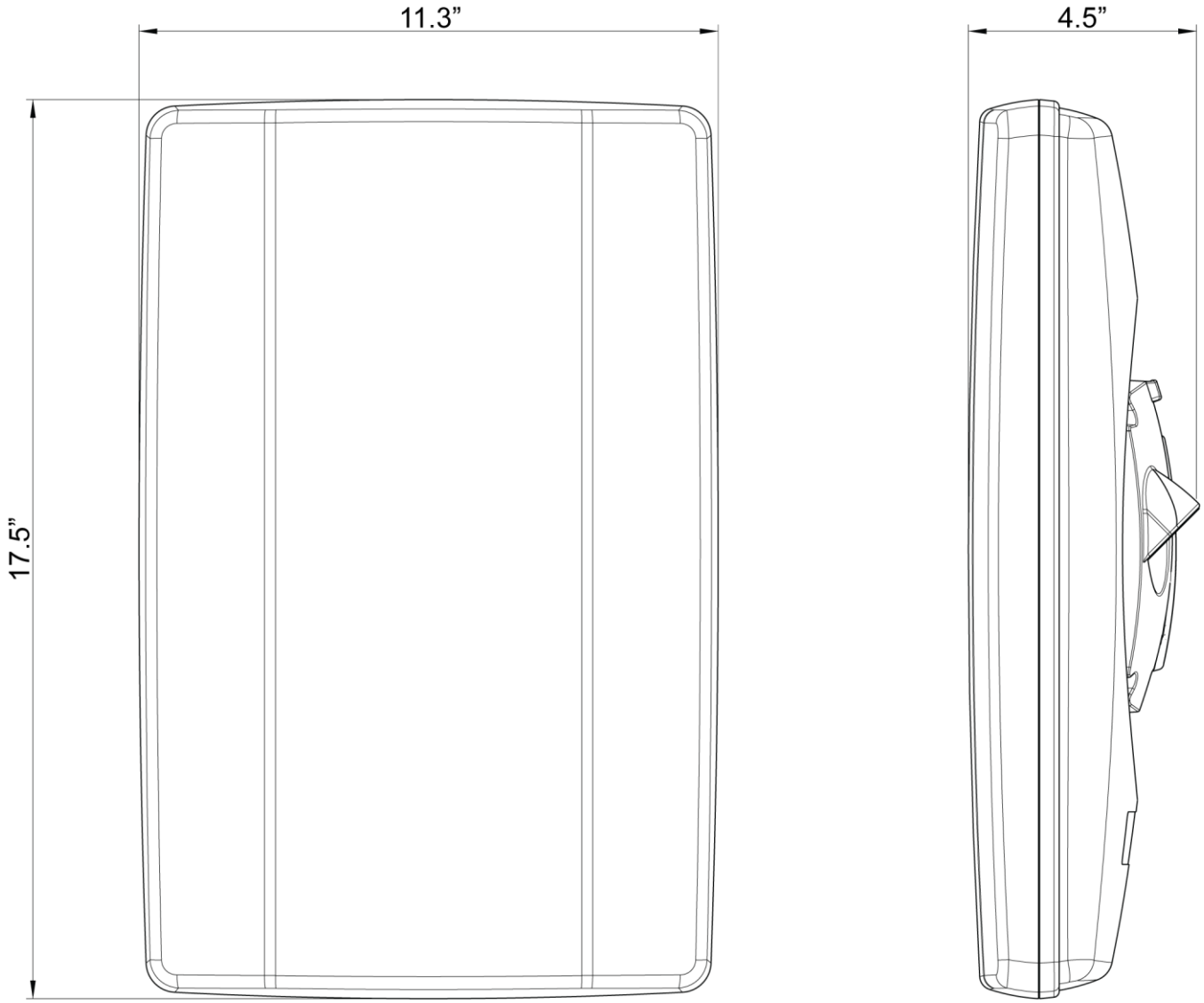


Figure 1 – IFWA-661 Outdoor Wireless Antenna Dimensions

IFWA-661 DIMENSIONS	
Length	17.5” (445 mm)
Width	11.3” (287 mm)
Height	4.5” (113 mm)
Weight	~5.7lbs (~2.59 kg)

Table 1 - Device Dimensions

Interfaces

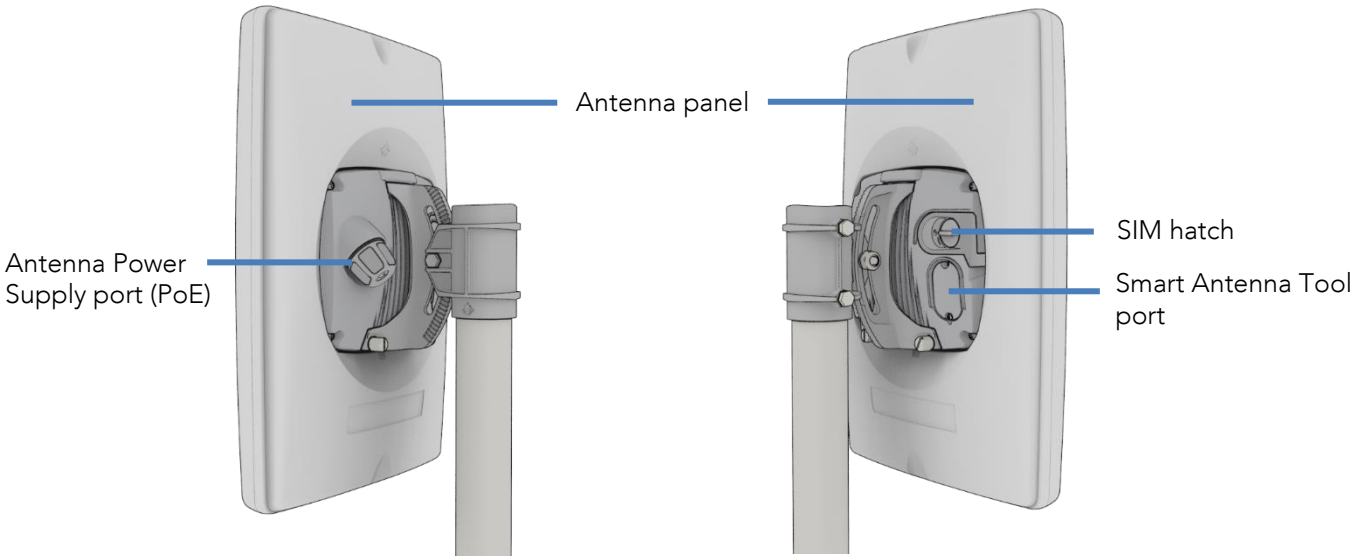


Figure 2 – Interfaces

ITEM	DESCRIPTION
Antenna panel	Includes 2 x pairs Cross polarised antennas and GPS antenna
Smart Antenna Tool port	Connect the Smart Antenna Tool here
SIM hatch	Open the hatch to insert SIM here
Antenna Power Supply port (PoE)	Provides power and data connectivity to the Outdoor Wireless Antenna with Ethernet cable

Table 2 – Interfaces

Installation considerations

As the Outdoor Wireless Antenna is aligned specifically for a property, please take note of the following when installing the equipment:

- After alignment, do not move, place anything in front of, or adjust the position of the Outdoor Wireless Antenna since this will likely have a negative impact on the signal quality and performance of the wireless service.
- Keep trees and branches away from the Outdoor Wireless Antenna.
- The equipment must be protected from running water, steam and excessive heat and must be installed according to the guidelines in this document.
- The Antenna Power Supply (POE-03) and Wi-Fi Gateway must be installed in a well-ventilated area and near a dedicated power outlet which allows easy visibility of the indicator lights.
- If an existing customer has carried out external construction work on the property, the antenna may need to be re-aligned to ensure the installation is still operating at peak performance.
- The Outdoor Wireless Antenna location is determined by radio frequency performance and it may not be possible to relocate the antenna when moving to a new property. It is advised that a site survey be conducted before initiating the installation process.

Installing the Outdoor Wireless Antenna

The image below illustrates a typical installation of the Outdoor Wireless Antenna.

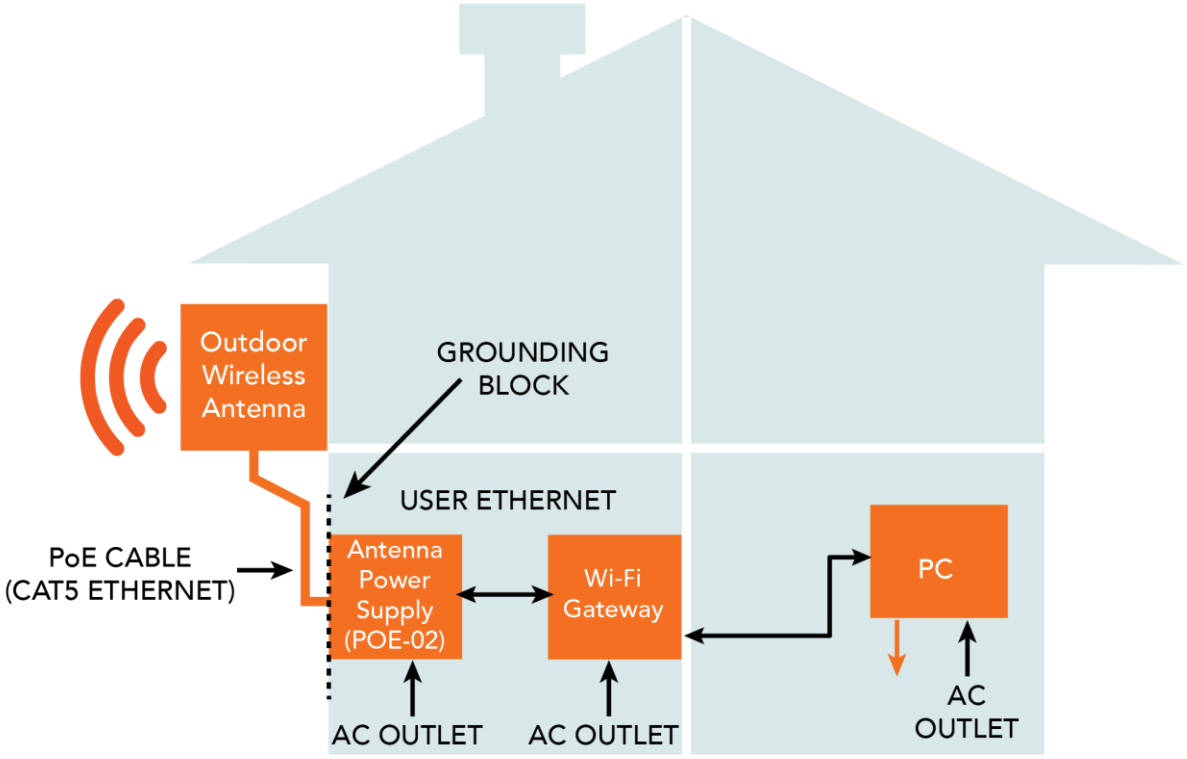


Figure 3 - Typical Outdoor Wireless Antenna Installation

Determining the best location for the Outdoor Wireless Antenna

Determining the best location for the Outdoor Wireless Antenna involves:

1. Performing a survey of the site using the Smart Antenna Tool.
2. Consulting the customer about mounting location, grounding and cable routing based on results of the RF test, aesthetics and any planned renovations to the property.

When selecting a location to mount the Outdoor Wireless Antenna, ensure that:

- lock of the desired cell and optimal signal level is achieved.
- the mounting position is unobtrusive and aesthetically pleasing where possible.
- the mount/antenna is not closer than three feet from other antenna equipment.
- the customer has obtained HOA approval for installation if required. This is the sole responsibility of the customer.

Where possible, avoid mounting the Outdoor Wireless Antenna so that it is aimed back over the roof of the property.

Assemble and attach the mounting bracket

Notes on mounting:

- Use a standard 13mm socket wrench for all bolts
- Tighten bolts to the following torque settings:
  - Captive radome mount bolts: 35 in-lbs
  - Angle pivot bolt: 65 in-lbs
  - Pipe clamp bolt: 80 in-lbs
- Do not over tighten bolts

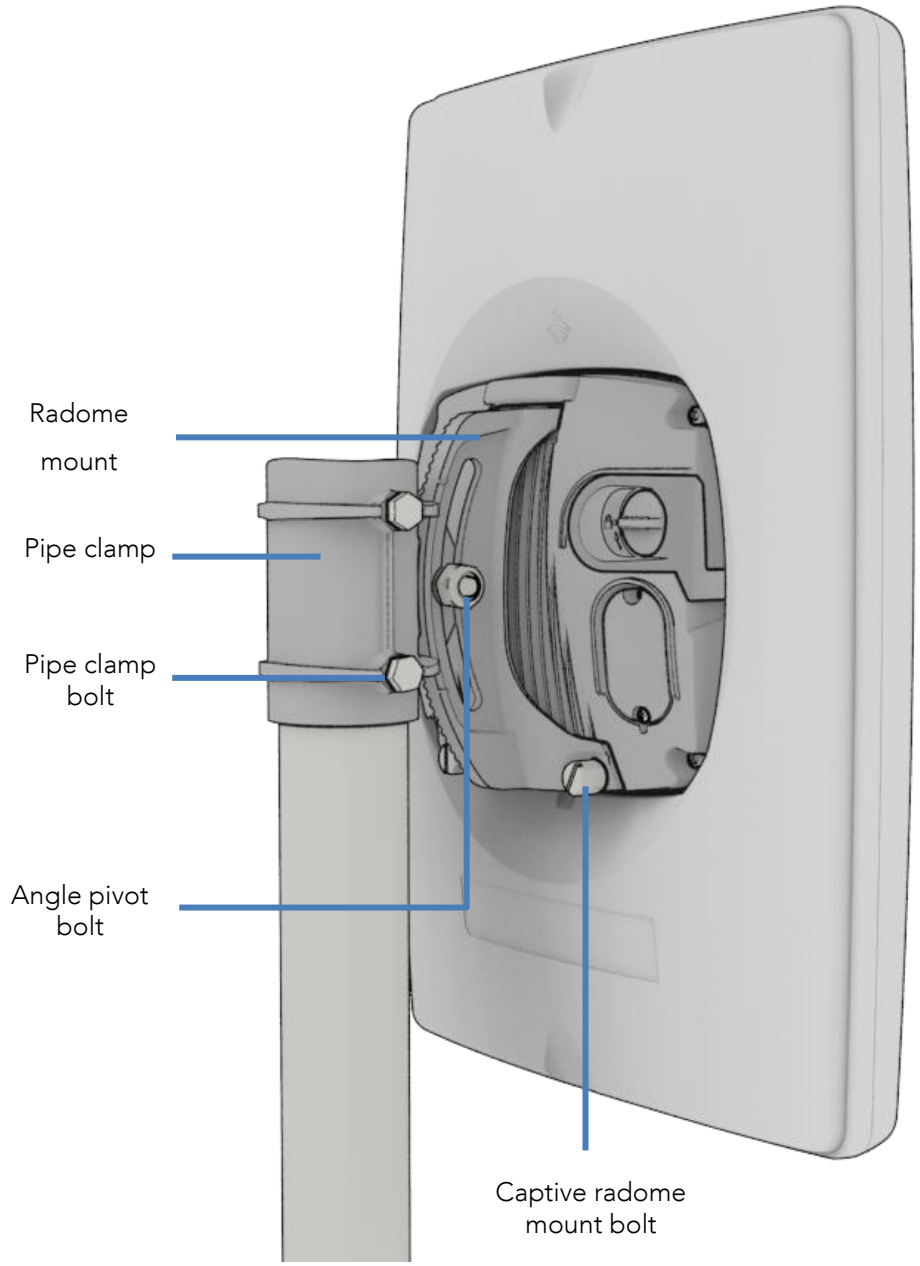


Figure 4 - IFWA-661 mounting bracket and bolts

Mounting bracket assembly

1 Attach the pipe clamp to the radome mount using the angle pivot bolt, nut and washer.

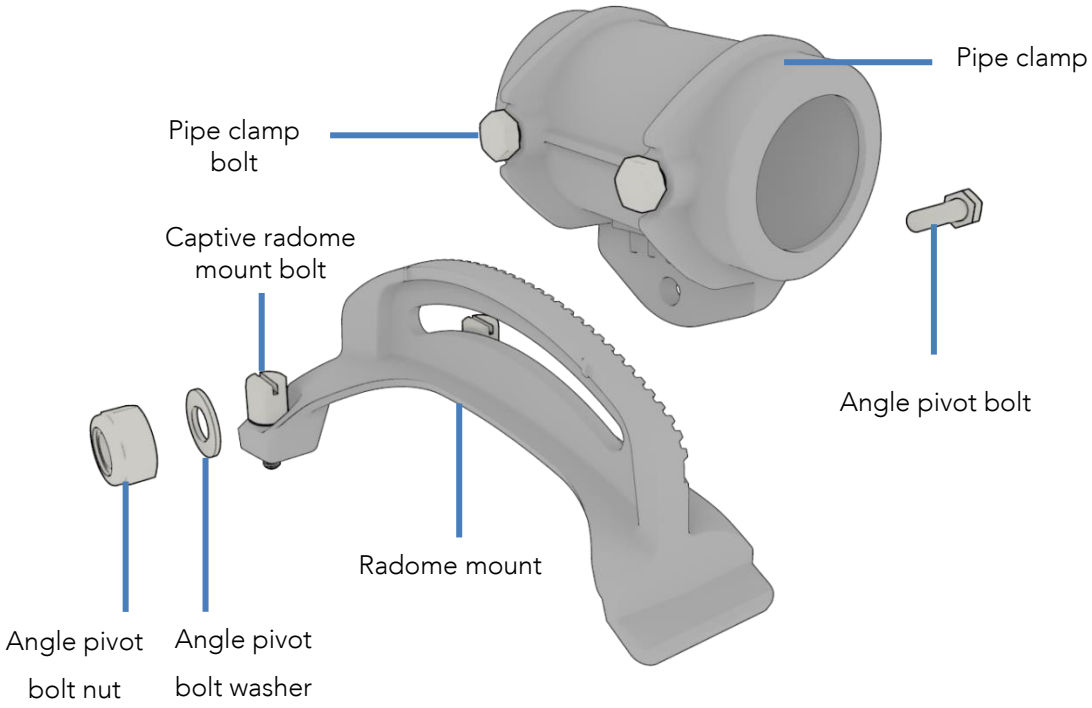


Figure 5 - Mounting bracket assembly

2 Attach the assembled mounting bracket to the antenna as shown below. Tighten the captive radome mount bolts to the torque settings described here.

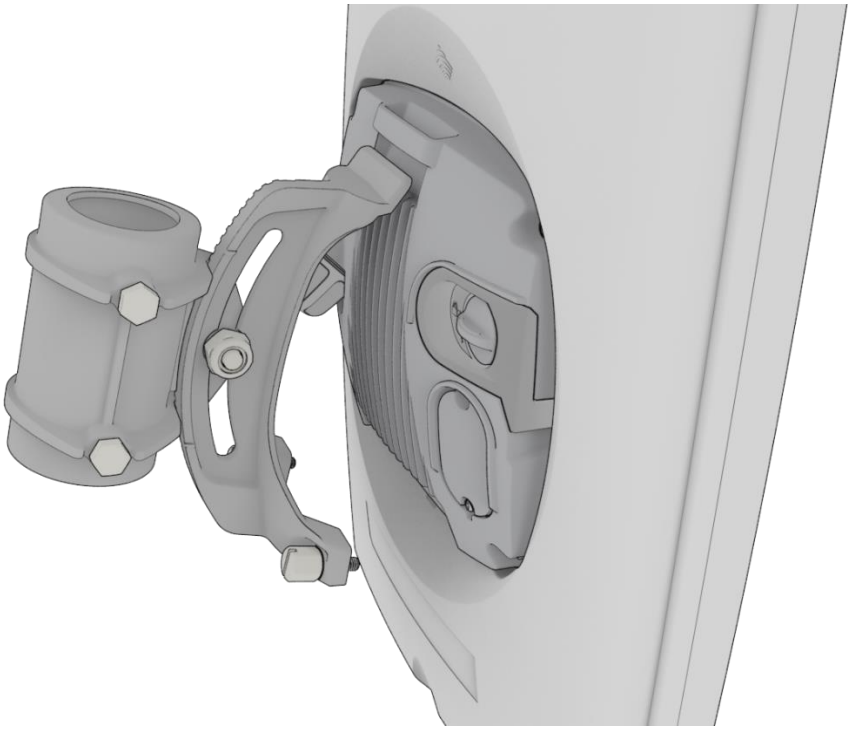


Figure 6 - Attaching the mounting bracket to the Outdoor Wireless Antenna

Connect the Smart Antenna Tool to the Outdoor Wireless Antenna

1 Turn the plug on the console port hatch counter-clockwise so that it is in the unlocked (vertical) position as shown in the image below.

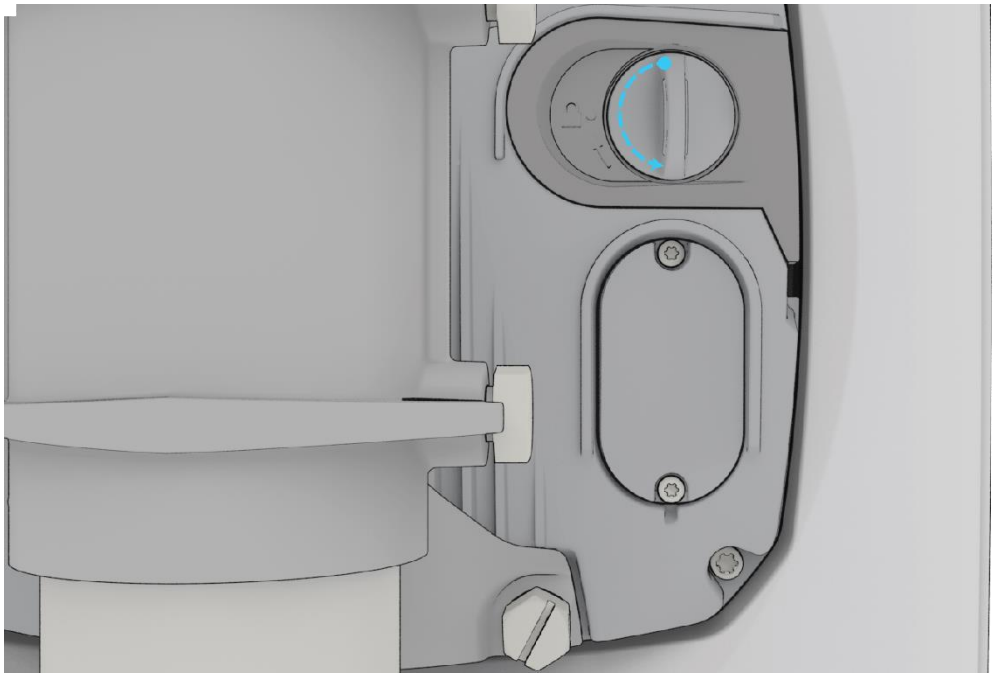


Figure 7 - Unlocking the console port hatch

2 Pull the plug out to reveal the console port.

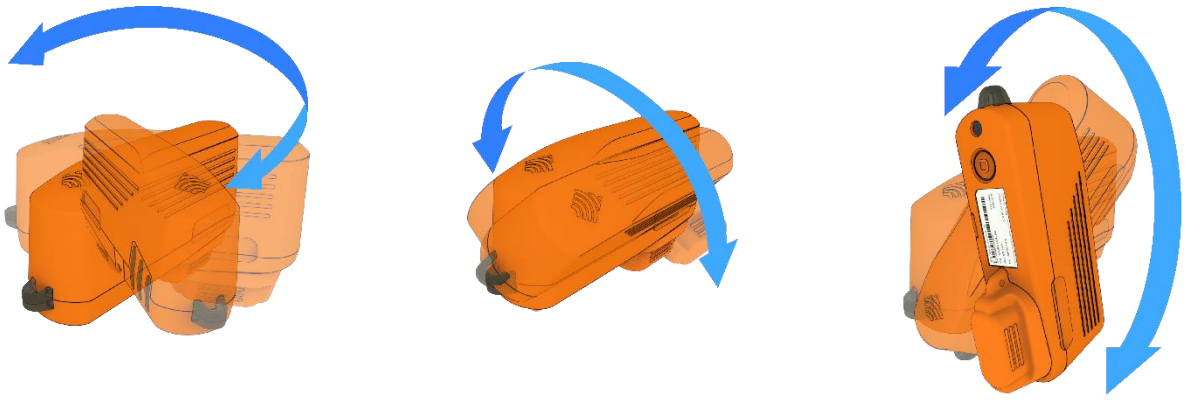
Figure 8 - Console port

3 Remove the cap from the head of the Smart Antenna Tool and insert it into the console port as shown in the picture below.

Figure 9 - Attached Smart Antenna Tool

Perform the site survey

Push the power button on the Smart Antenna Tool to turn it on. After a few seconds, the LEDs illuminate. On each start up, the Smart Antenna Tool LEDs flash both red and green twice a second, indicating that the compass requires calibrating. To calibrate the device, first isolate it from any magnetic field or metal structures (for example, vehicles, the antenna pole, power lines, etc) and then rotate the unit fully through all three axes. See the diagrams below.



The LEDs stop flashing when calibration has been performed successfully.

When the Smart Antenna Tool is connected to the OWA, it enters Cell scanning mode.

During cell scanning mode, the LED indicators display as below, depending on the status.

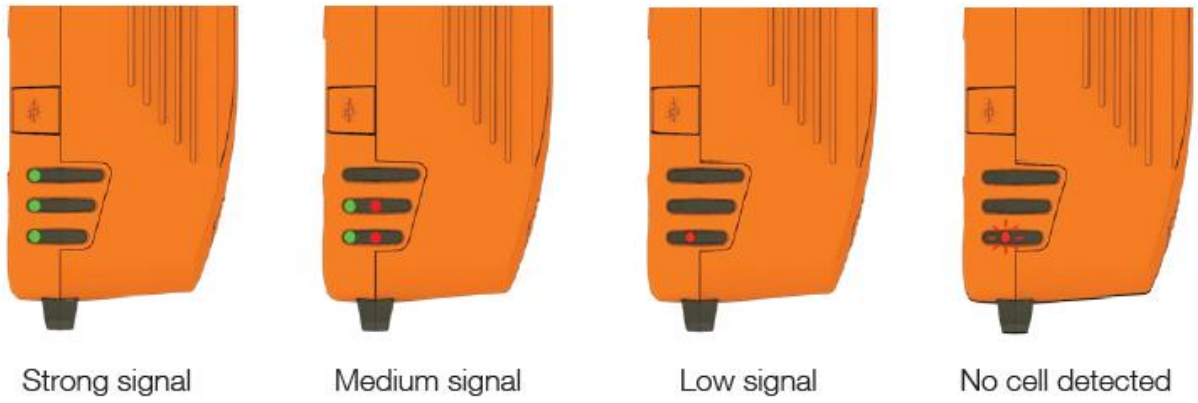


Figure 10 - Smart Antenna Tool LED statuses in cell scanning mode

Connect your wireless device (e.g. laptop/tablet/smartphone) to the SSID of the alignment tool. In a web browser, go to http://192.168.3.1 and use the alignment tool to estimate the best position for the Outdoor Wireless Antenna while you are on the ground. If the web user interface is not displayed, use http://192.168.3.1/data_entry.html

Install mount on roof top

When you have found the best spot to install the Outdoor Wireless Antenna, install the mount on the roof using appropriate materials.

Place the Outdoor Wireless Antenna on the pole

1 Assemble the Pipe Bracket to pole, pointing bracket in desired antenna direction. Secure the pipe clamp bolts

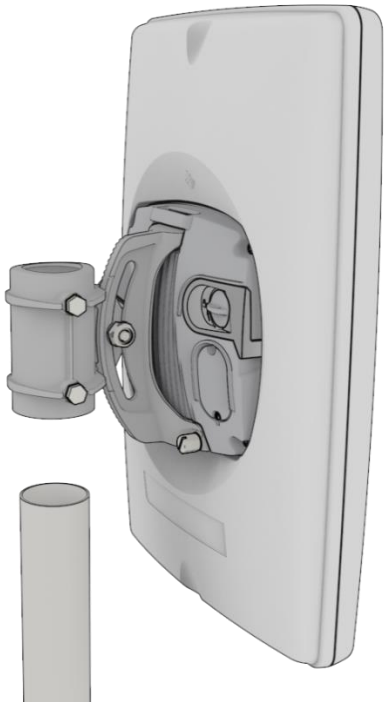


Figure 11 - Assembling pipe bracket to pole

2 Alternately tighten the top and bottom pipe clamp bolts to maintain even pressure on the pipe, to 80 in-lb.

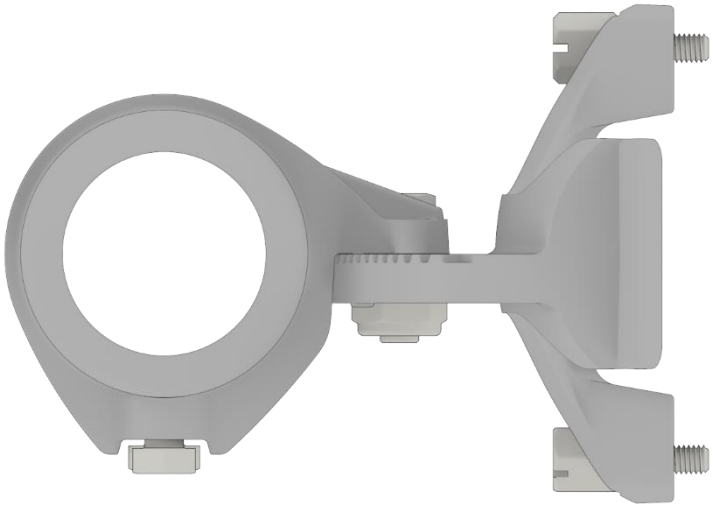


Figure 12 - Tightening pipe clamp bolts

Assemble the Outdoor Wireless Antenna Power supply weather seal

The Outdoor Wireless Antenna Power supply weather seal must be properly attached to prevent dust and water from entering the Outdoor Wireless Antenna's housing.

To connect Ethernet cable via the Power supply weather seal:

1 Unscrew the weather cap and remove the rubber gasket.

2 Separate the rubber seal and the ferrule.

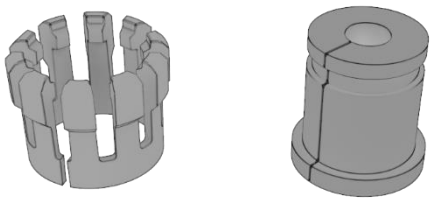


Figure 13 - Rubber seal and ferrule

3 Twist the neck for the seal counter-clockwise to remove it from the Outdoor Wireless Antenna. You should now have 5 pieces of the weather seal.

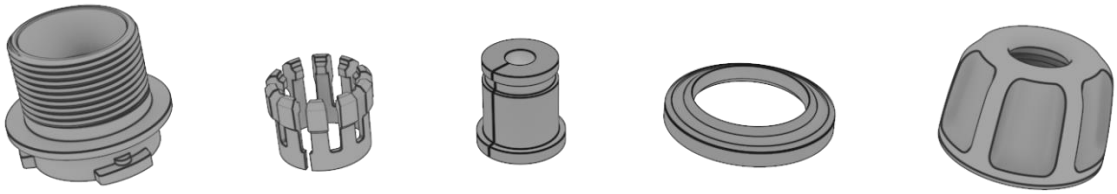


Figure 14 - Weather seal in five parts

4 Place the Ethernet cable through the nut first, as shown below.

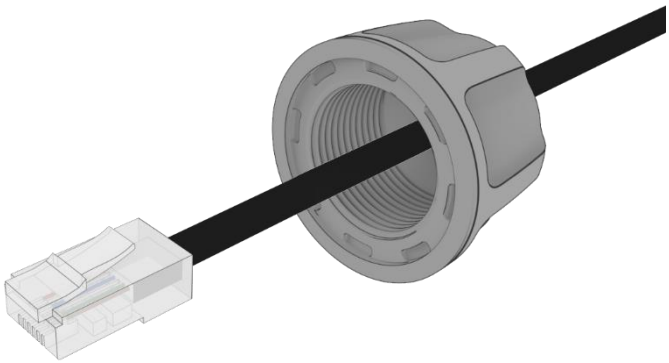


Figure 15 - Nut placed over Ethernet cable

5 Place the ferrule over the Ethernet cable as shown, making sure that the "teeth" are facing the nut.

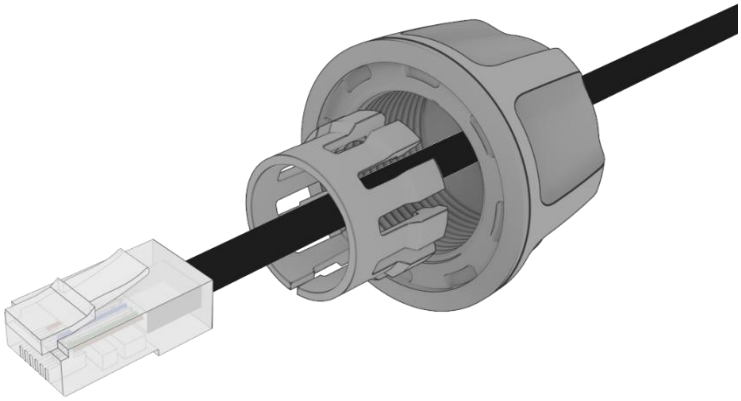


Figure 16 - Ferrule placed over Ethernet cable

6 Place the rubber seal over the Ethernet cable with the wide end toward the RJ45 plug. See the image below for the correct orientation.

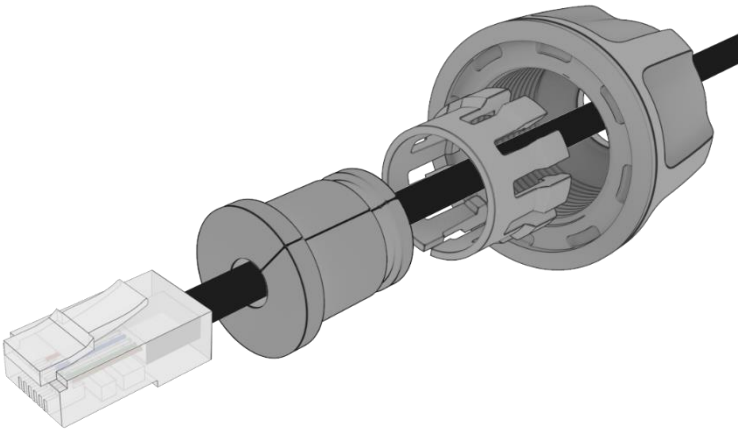


Figure 17 - Rubber seal placed over Ethernet cable

7 Push the ferrule over the rubber seal to prevent it from coming apart.

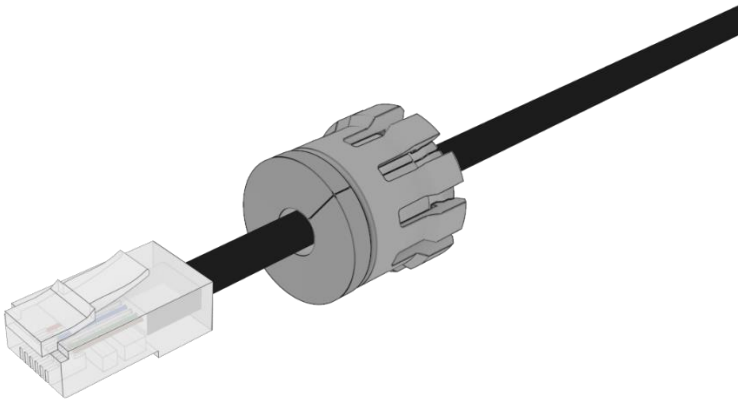


Figure 18 - Ferrule placed over rubber seal

8 Place the washer seal over the Ethernet cable as shown below. Ensure that the inside protruding lip is on the opposite side of the Ethernet plug.

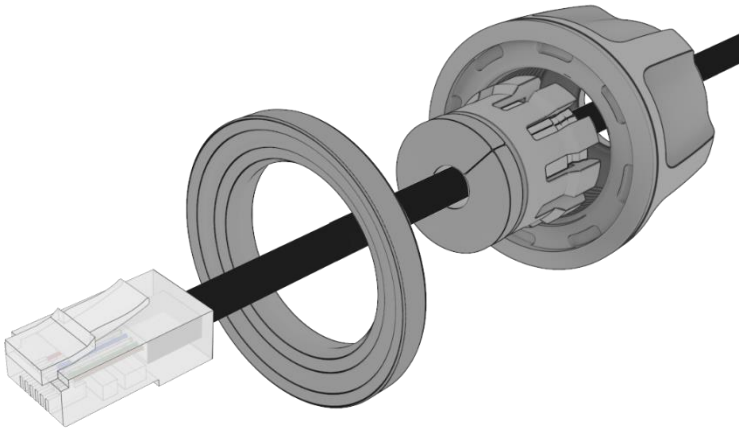


Figure 19 - Washer seal placed over Ethernet cable

9 Place the neck over the Ethernet cable as shown below.

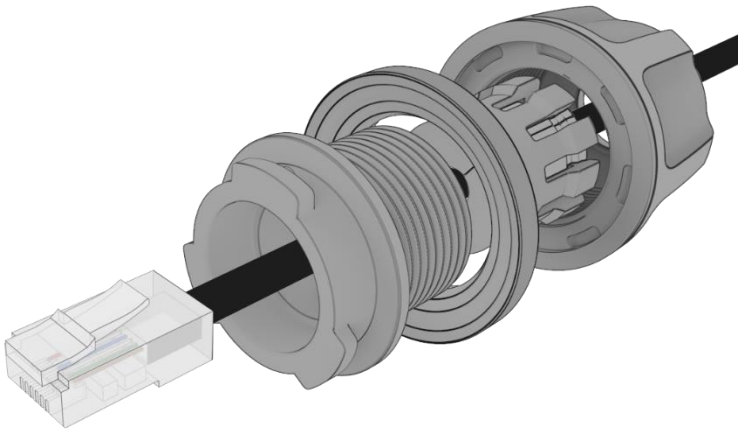


Figure 20 - Neck placed over Ethernet cable

10 Plug the Ethernet cable into the Ethernet port.

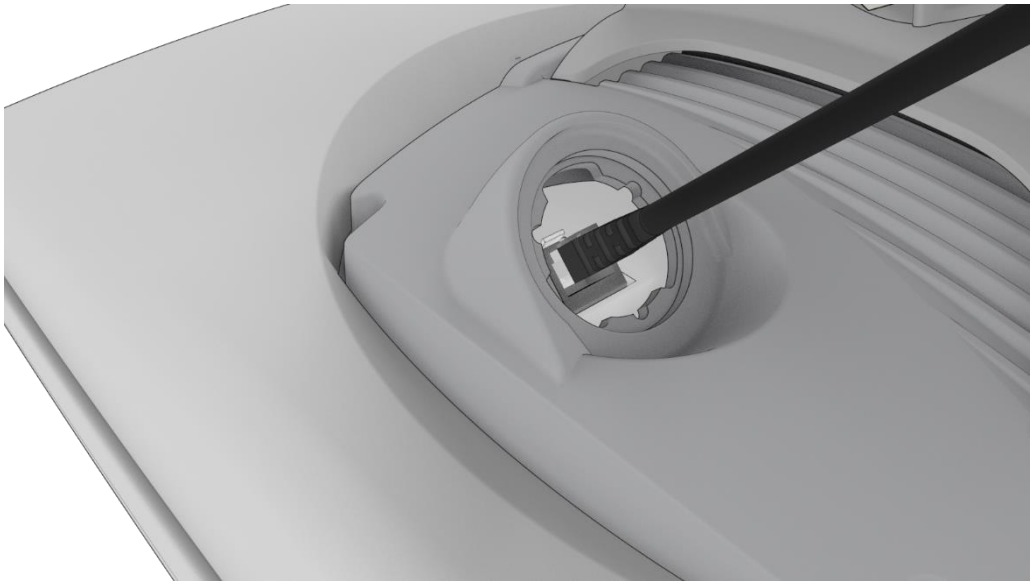


Figure 21 - Plugging in the Ethernet cable

11 Put the neck into the opening and turn the neck clockwise until it locks in place.

12 Push the rubber seal and ferrule into the neck then screw the nut on to the neck.

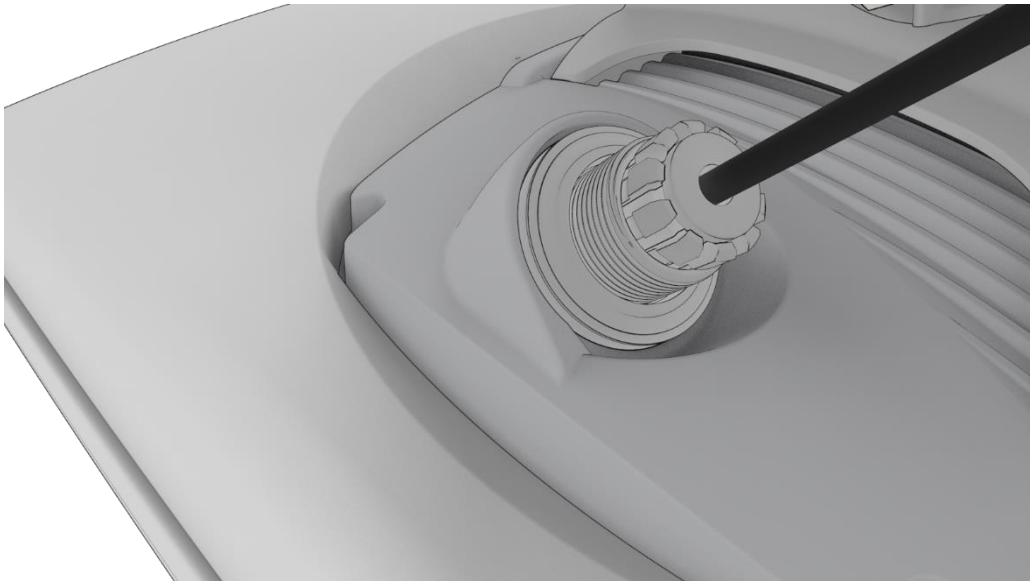


Figure 22 - Rubber seal and ferrule inserted into neck

13 Turn the nut clockwise to tighten it the washer seal against the housing. Continue turning the nut until completely assembled. This will allow the washer seal to grip the cable while also applying enough pressure to the washer seal to prevent dust and moisture entering the unit.

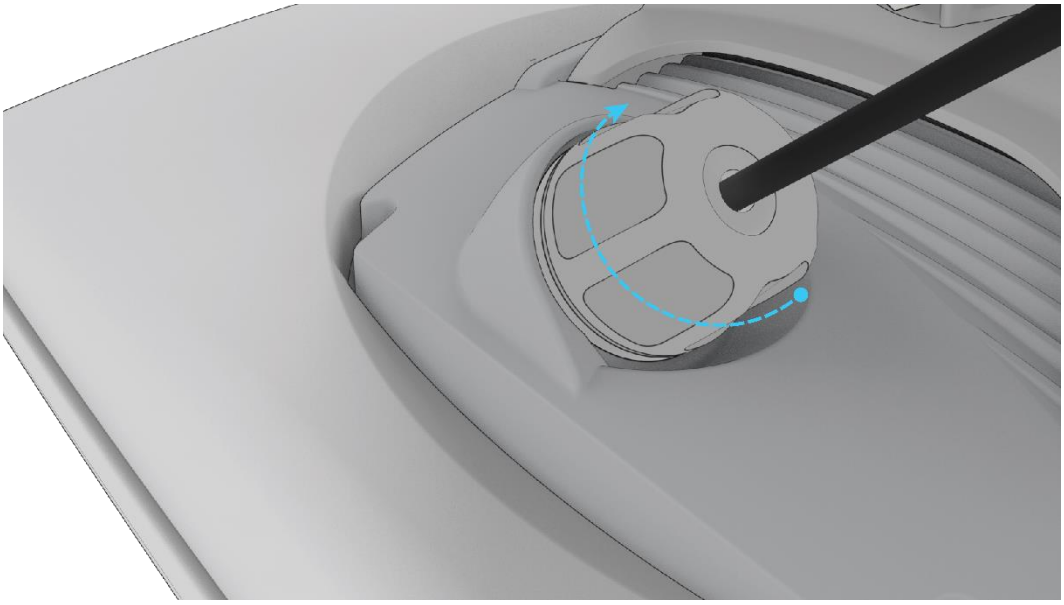


Figure 23 - Turning the nut clockwise

Aligning the Outdoor Wireless Antenna

Before proceeding with the installation of the IFWA-661, please ensure that the following steps have been taken:

- Perform an indoor site survey
- Capture the customer's signature
- Scan the antenna barcode to activate the unit
- Connect the Smart Antenna Tool to the antenna and power it on
- Connect your wireless device for alignment to the Smart Antenna Tool's wireless network
- Launch the wireless device's browser and navigate to the antenna's IP address

Process flow (subject to change)

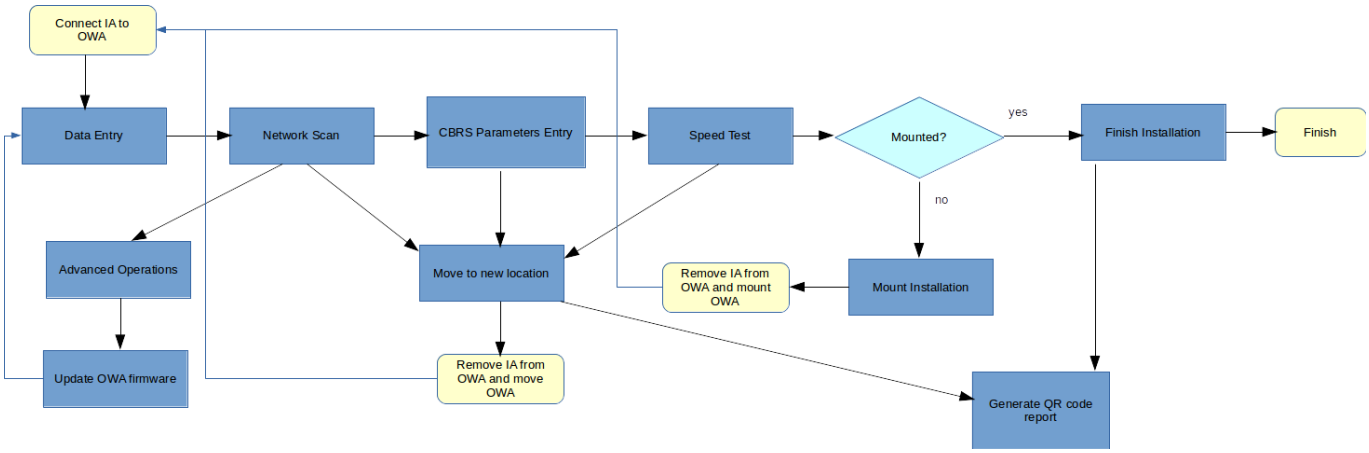
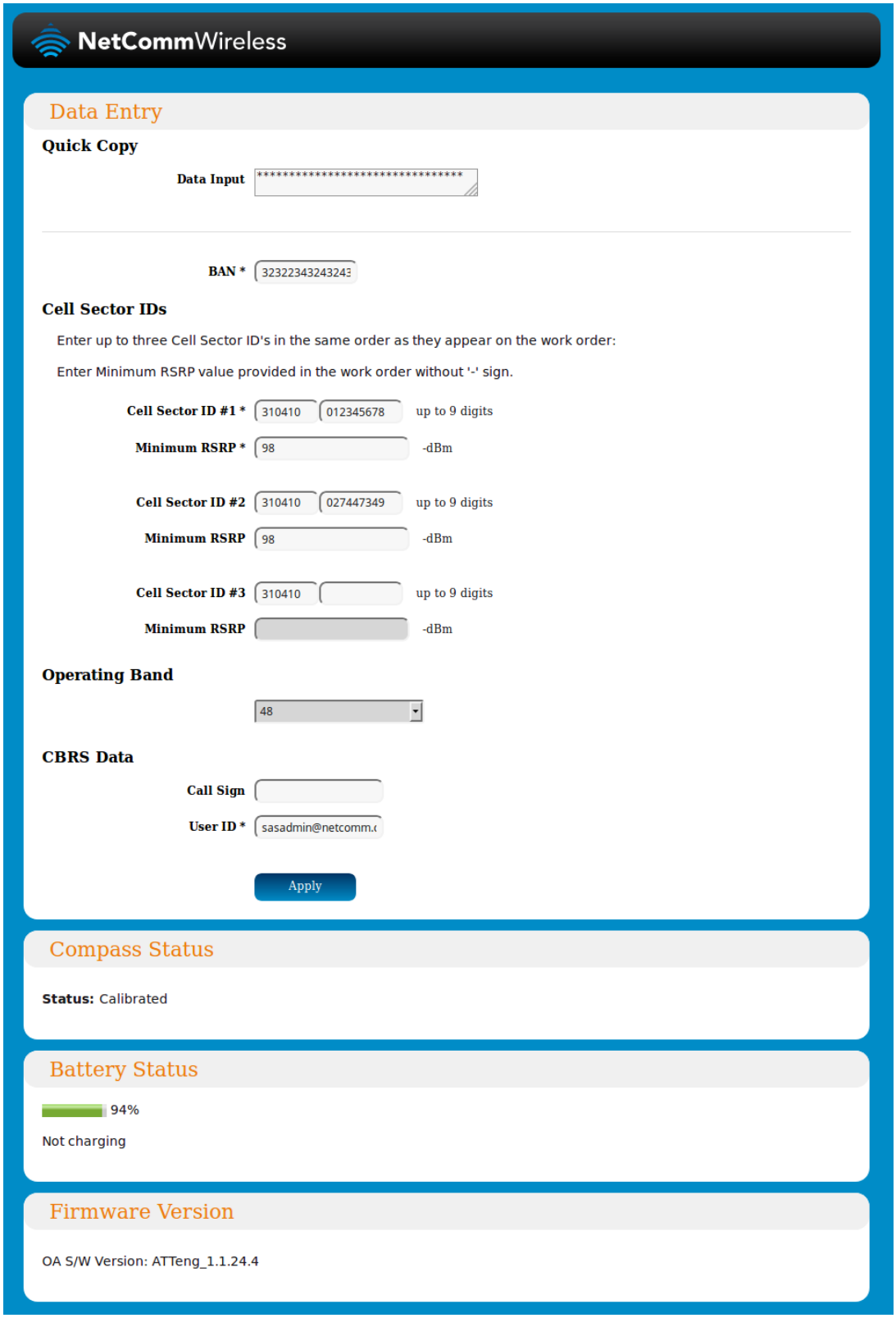


Figure 24 - Alignment process flow

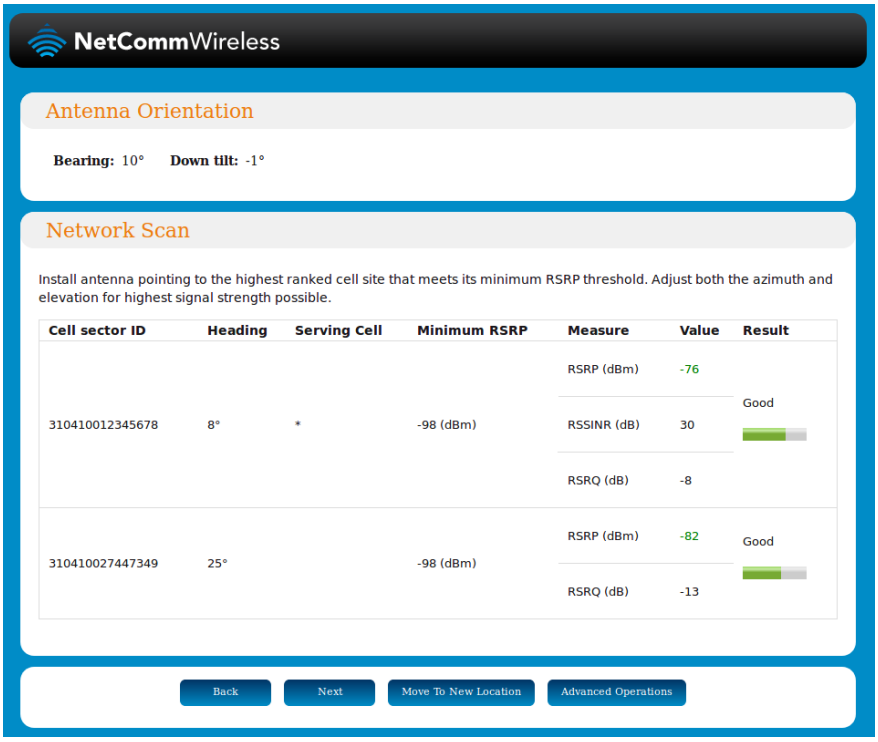
Process flow – User interface screens

Successful Installation

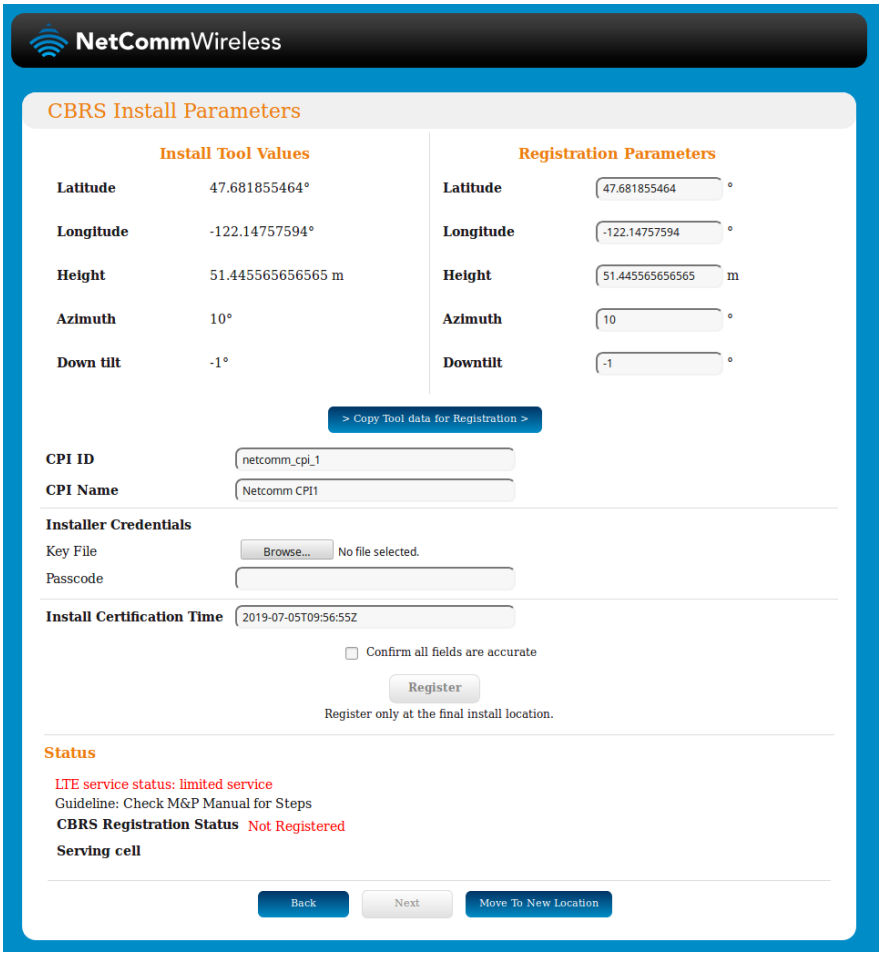
1. Data Entry Screen



2. Network Scan Screen



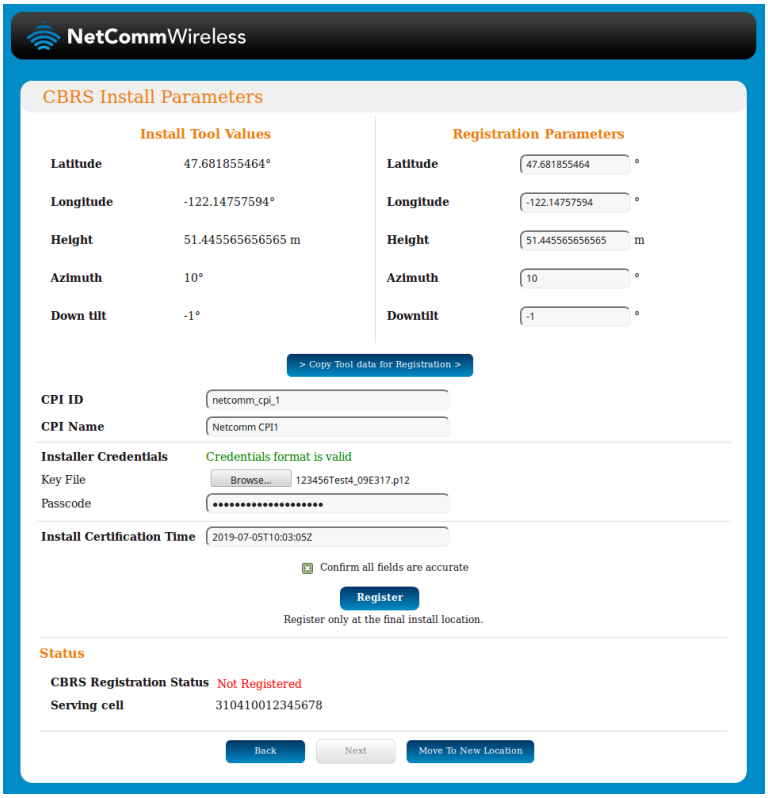
3. CBRS Install Parameters Screen - If LTE limited service or SIM card error, error status is shown along with a guideline.



CBRS Install Parameters Screen - If no error in LTE service and SIM card:

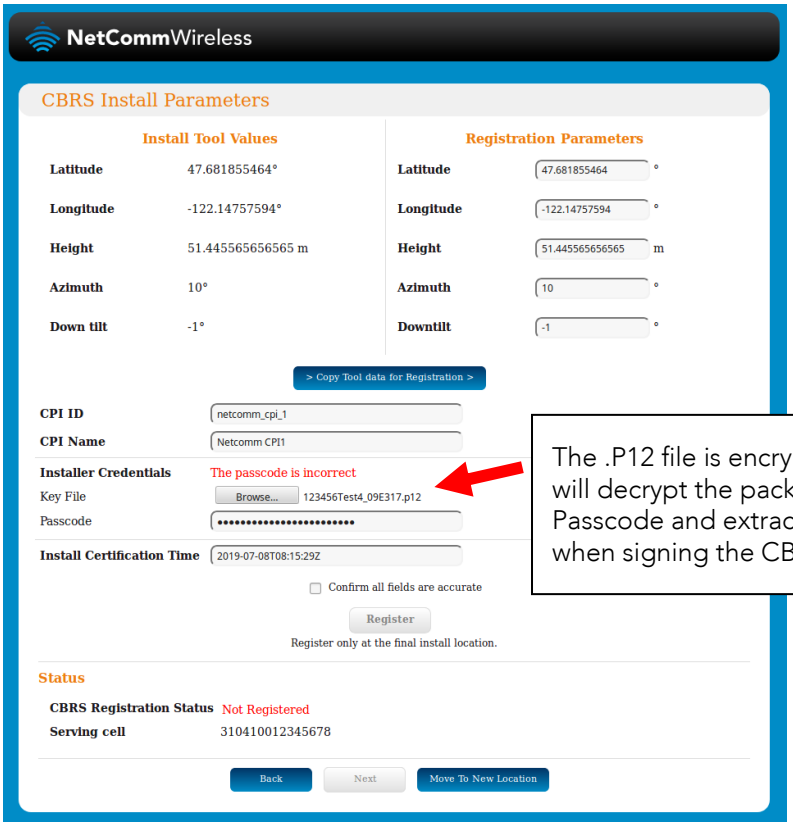
a) If CPI credential is provided in Quick Copy, installers are not asked to provide Key File and Pass-code

b) If the given key file and passcode are valid and correct:

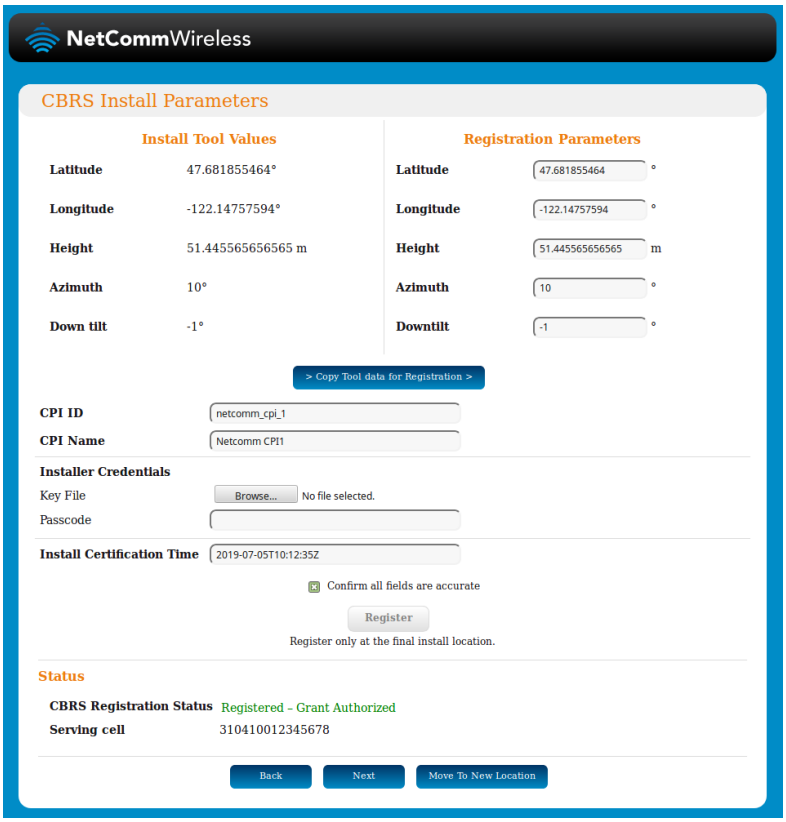


Note: If CPI credential is not provided in Quick Copy, the page show input fields for installers can provide Key File and Passcode.

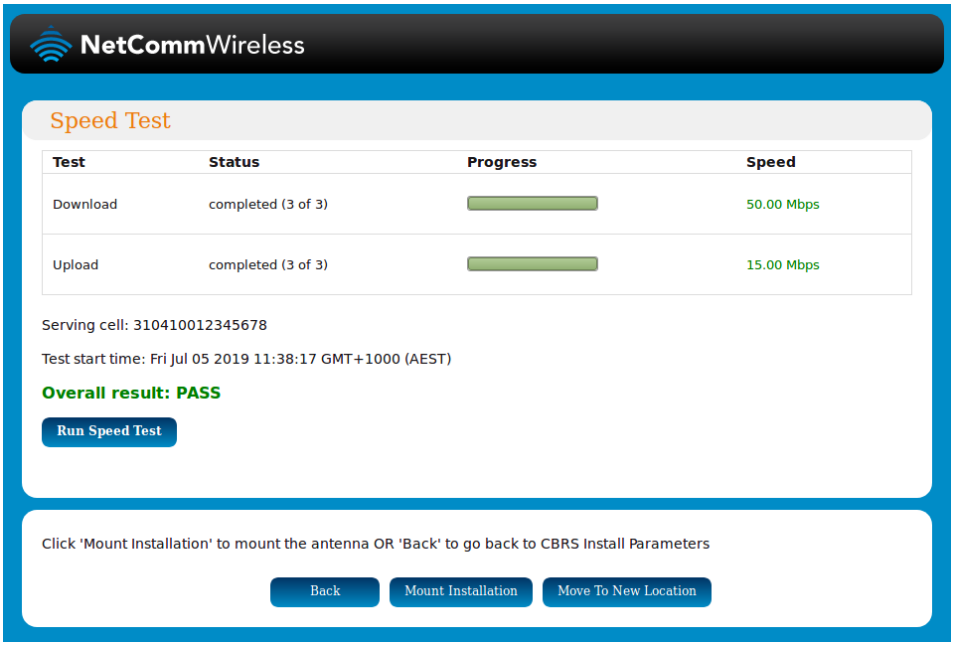
c) If either the given key file or passcode are invalid or incorrect, an indicator in red color is shown:



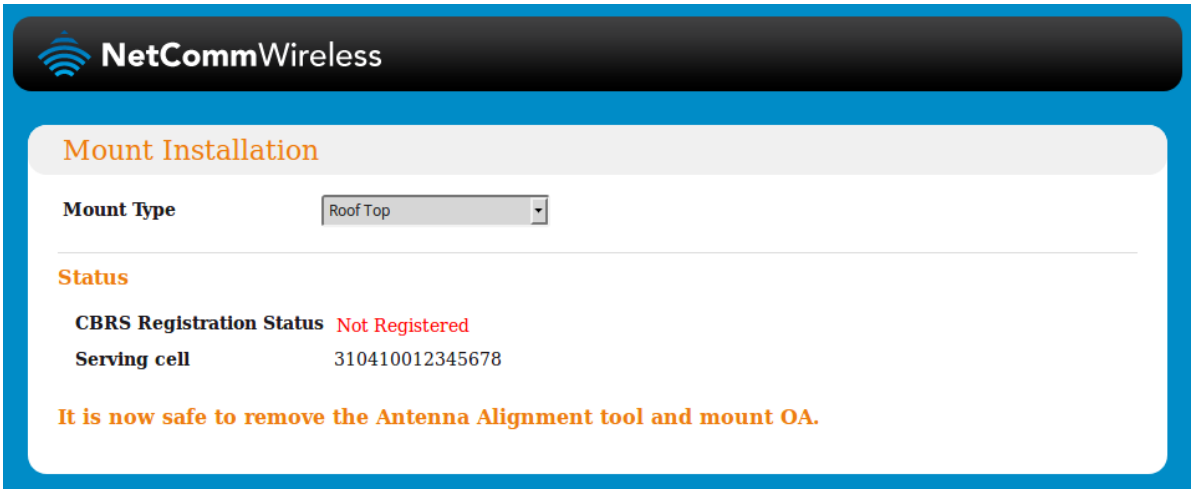
CBRS Install Parameters Screen (Successful Registration) - Installer can click on the button Register to trigger the CBRS Registration process.



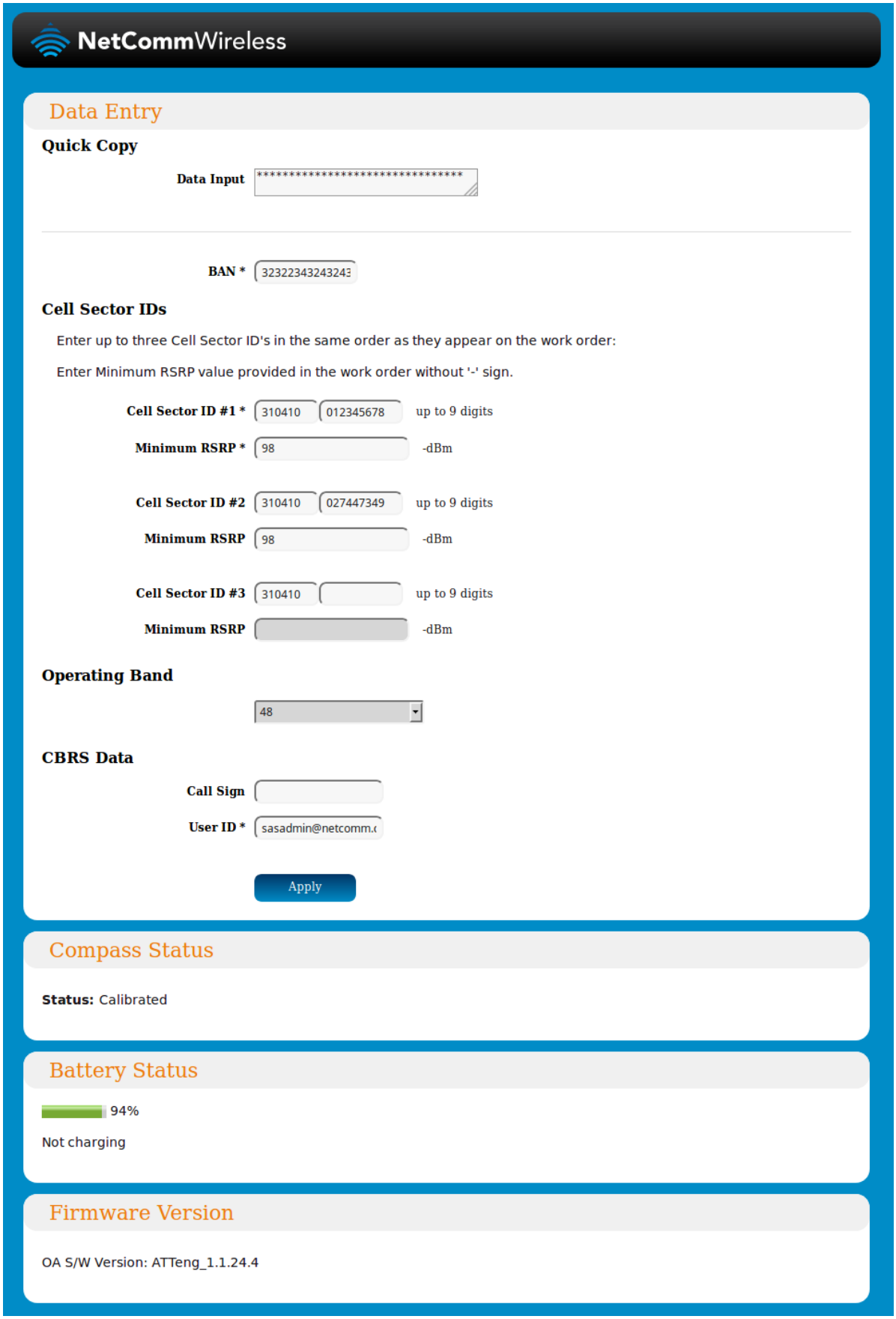
4. Speed Test (Success)



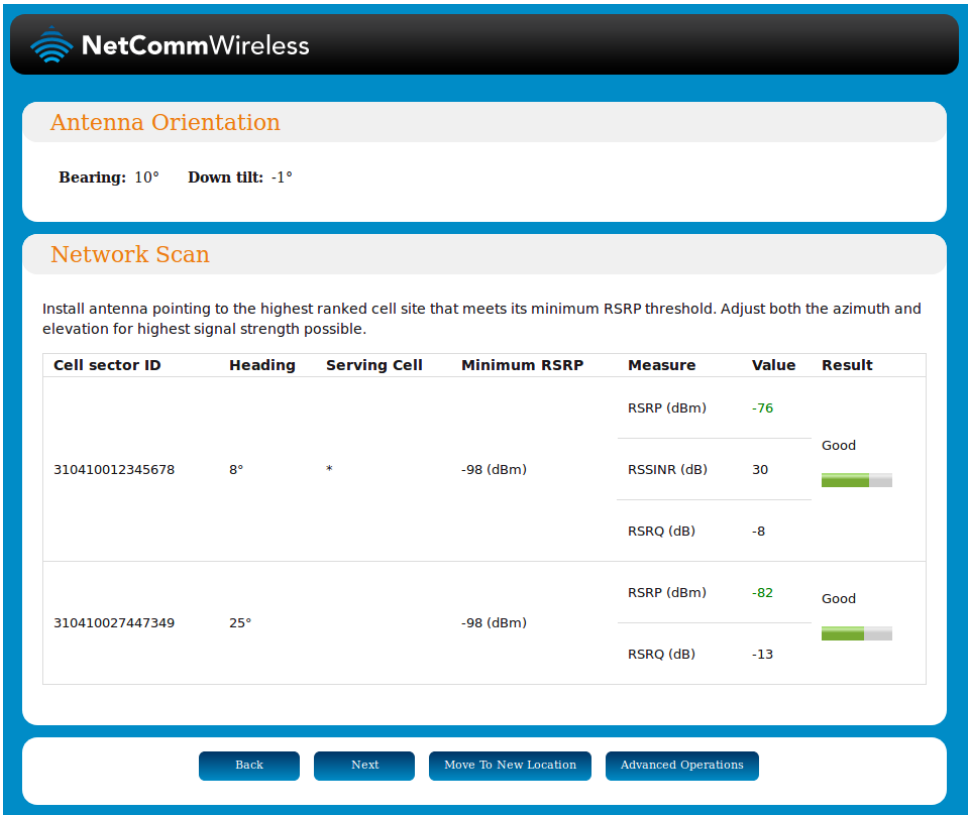
5. Mount Installation (Installer installs supporting hardware for antenna mounting)



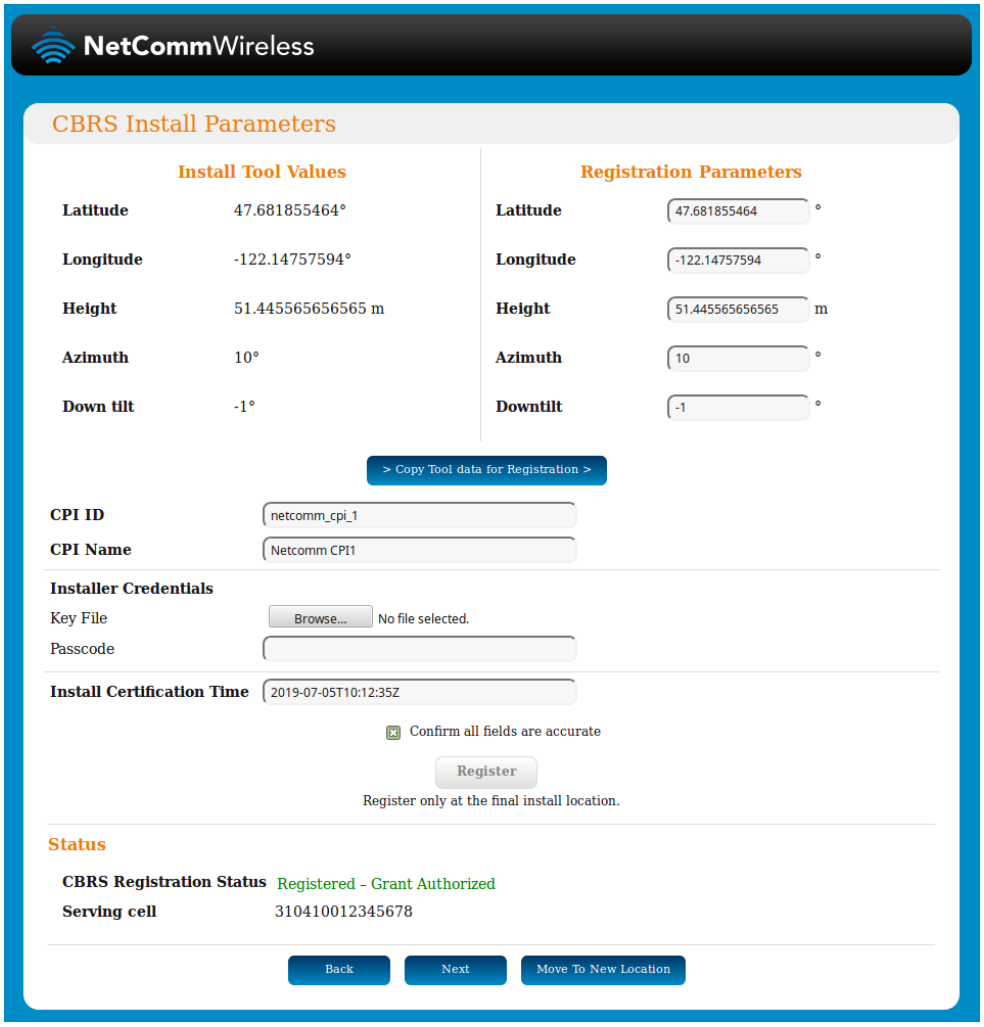
6. Data Entry Screen



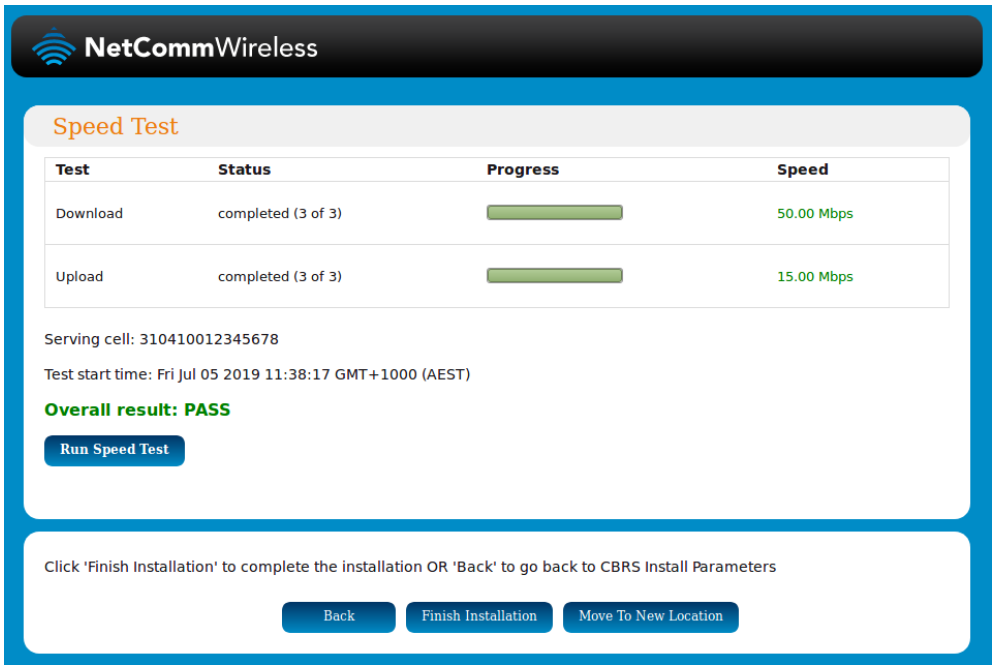
7. Network Scan Screen



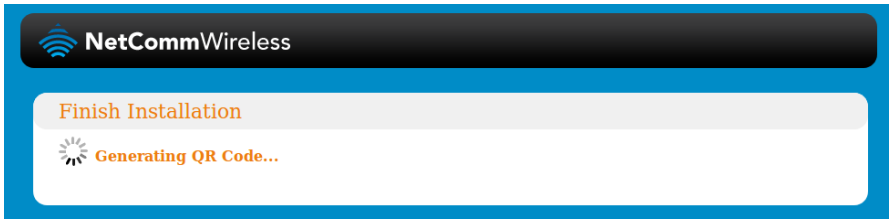
8. CBRS Install Screen (Successful Registration)

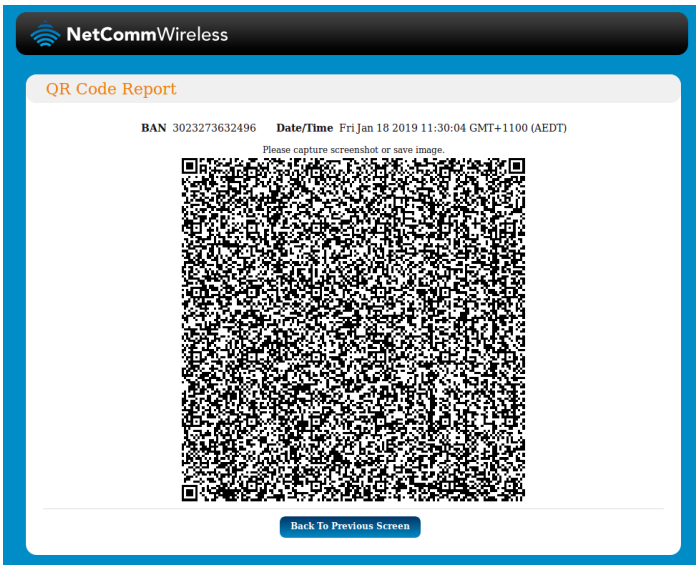


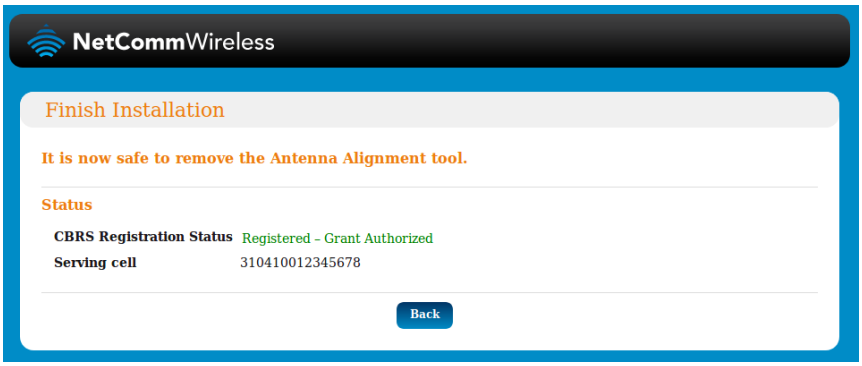
9. Speed Test (Success)



10. Finish Installation (QR Code Generation)

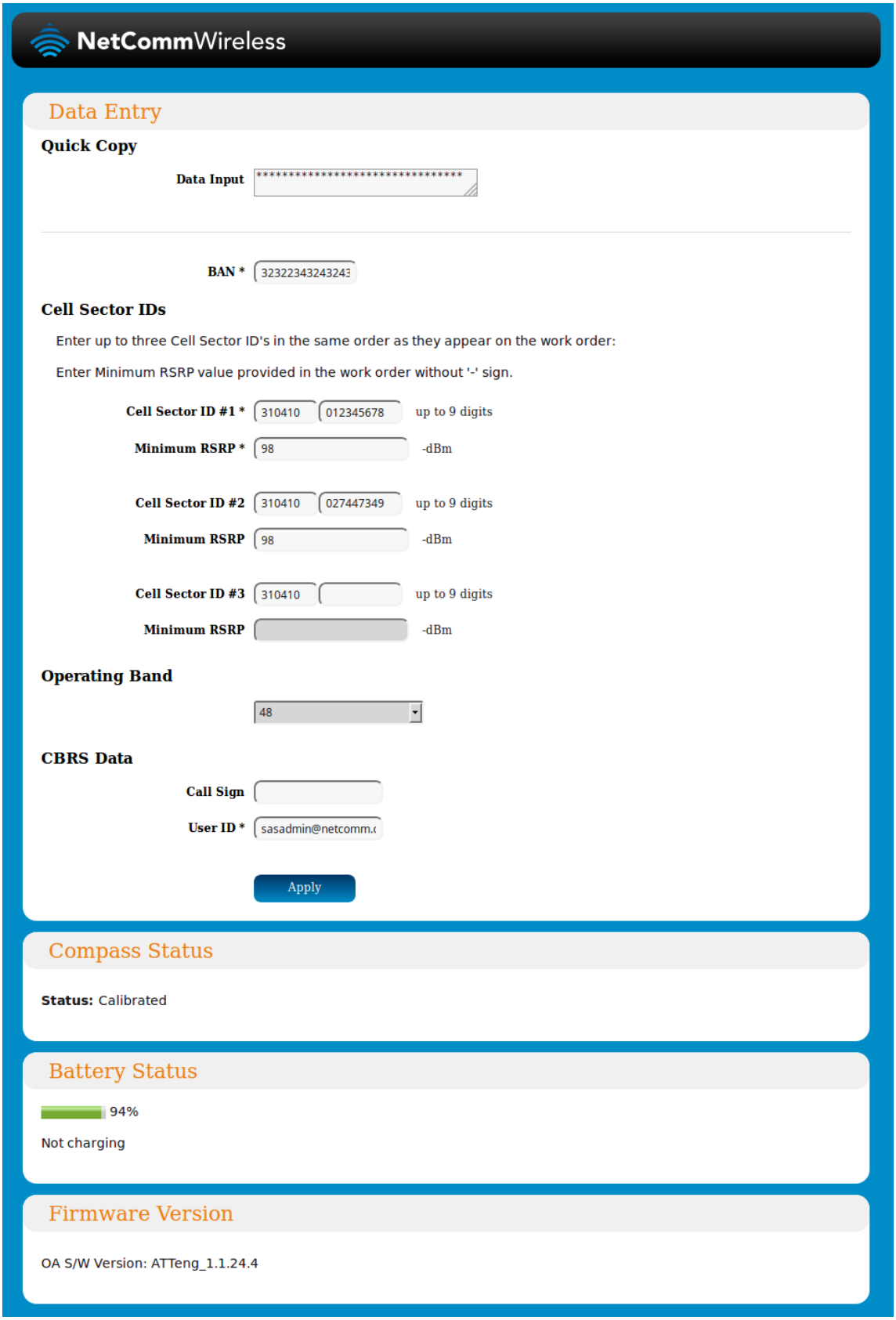




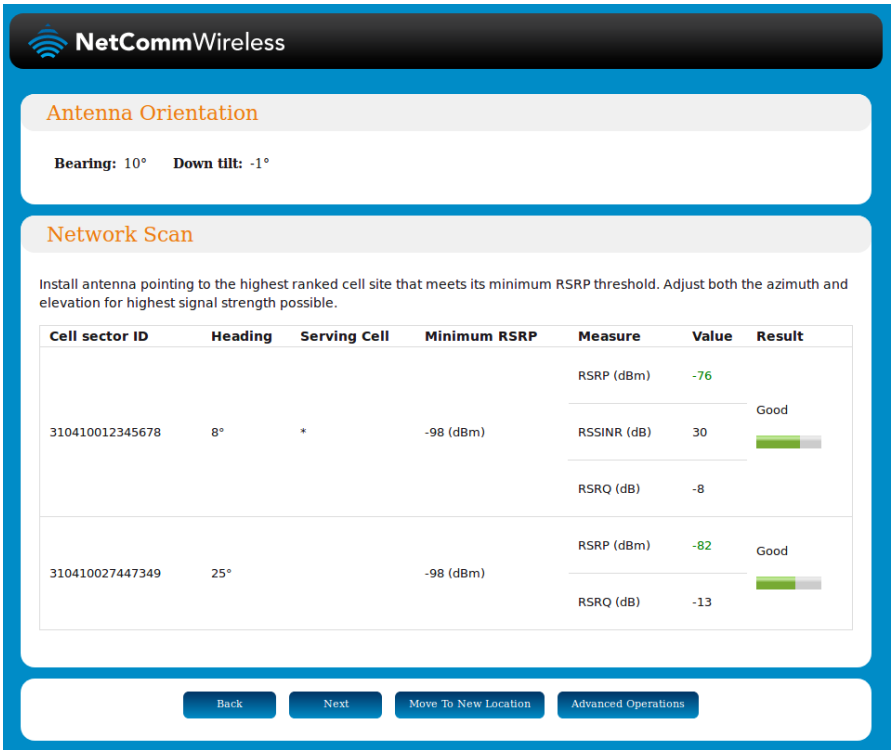


Site Survey with Failed Install Location

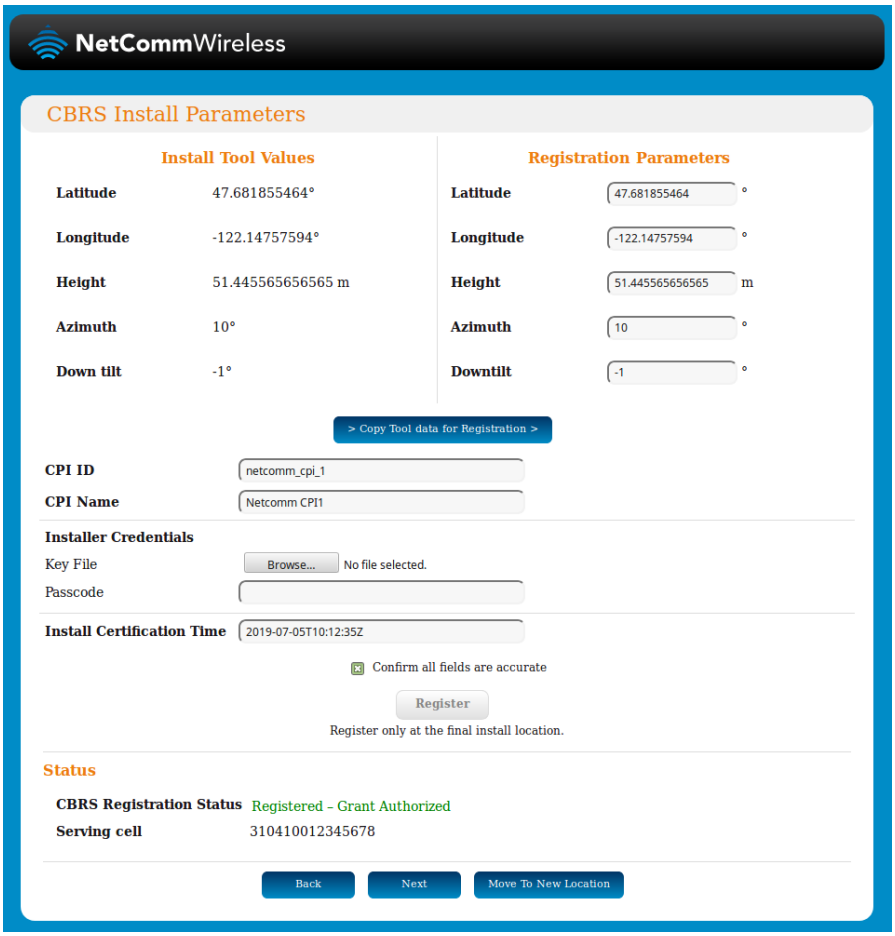
1. Data Entry Screen



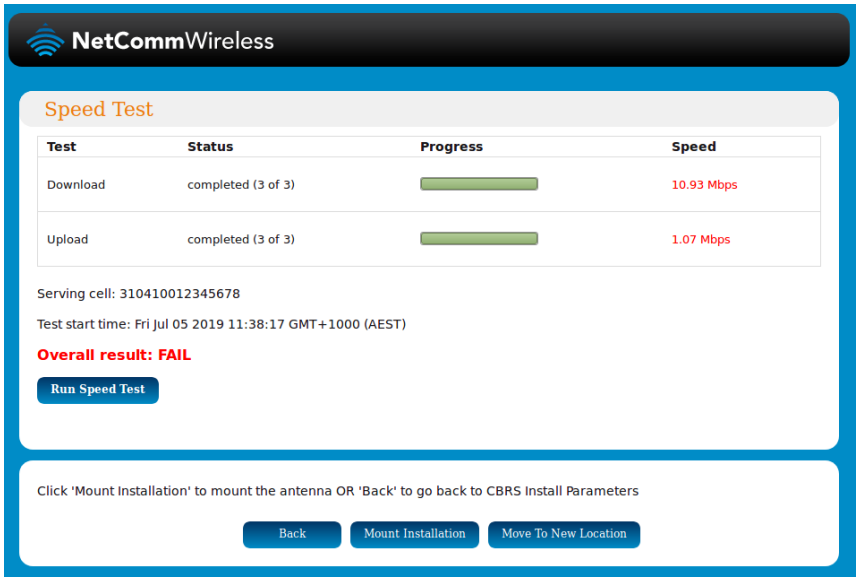
2. Network Scan Screen



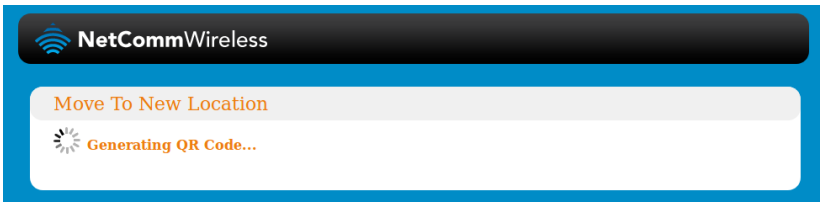
3. CBRS Install Screen (Successful Registration)

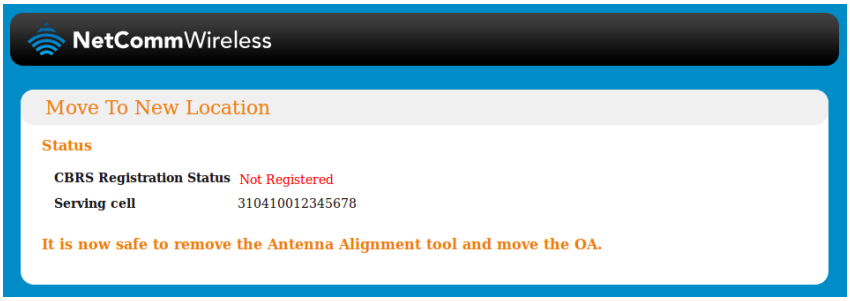


4. Speed Test (Fail)



5. Move to New Location (QR Code Generation)





Installation flow – Site survey

To find the correct position and orientation at site to install the antenna.

1. Data Entry
2. Network Scan
3. Move to New Location (Capturing QR Code)
4. QR Code Screen
5. Move to New Location

Installation flow - Post site survey

After confirming the installation position on site, including manual mounting of antenna, the following steps finalize the installation process.

1. Data Entry
2. Network Scan
3. CBRS Install
4. Speed Test
5. Physically mount the antenna
6. Data Entry (Some data retained)
7. Network Scan
8. CBRS Install
9. Speed Test
10. Finish Installation (Capturing QR Code)
11. QR Code Screen
12. Finish Installation

Data entry screen

1. Verify that the Smart Antenna Tool's battery charge level is above 20%.
2. Verify that the compass calibration is good.
3. Enter the following details:
    a. Customer BAN (from WFE)
    b. Cell Sector IDs (from WFE)
    c. Band Selection (Band 30 or Band 48)
    d. Call Sign (Optional)
    e. User ID (Required)
    f. Interference Grouping ID (Optional)

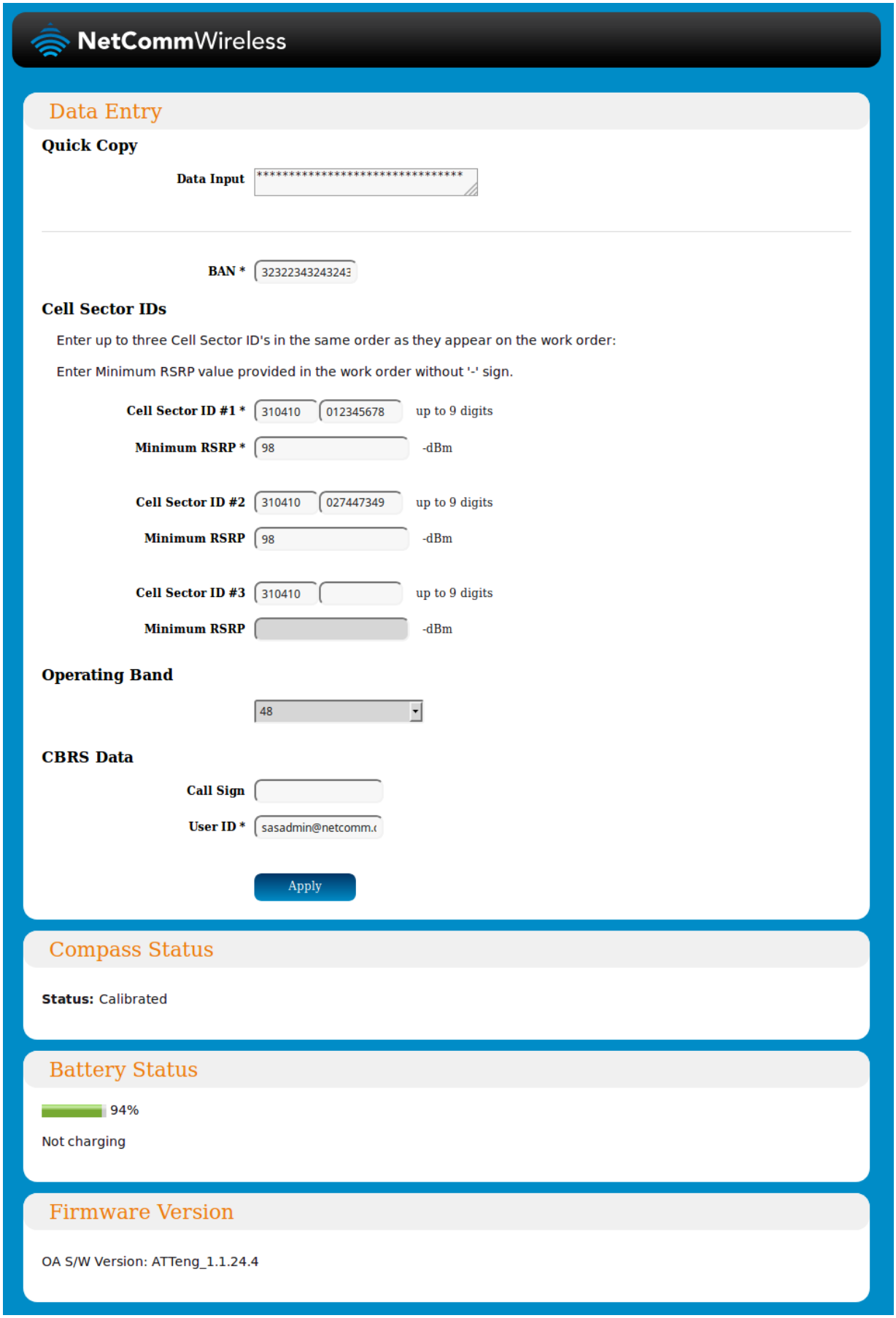


Figure 25 - Data entry screen

Note that until a selection is made using the Band Select drop down list, the antenna will not be scanning. Once the settings are applied, the device will start scanning on the targeted band and will connect. At the time of connection, any pending SIM OTA will occur.

Note also that if the unit was previously powered on and had gone through this page, all previous data will still be populated, but no network connectivity will occur on this page in case any data changes.

4 Click Apply to move to the next screen.

Network scan

1 Perform an outdoor survey to identify the best install location.

The network scan screen shows for Cell Sectors entered:

- Serving Cell Indicator
- Minimum Allowable RSRP
- Measured RSSINR
- Measured RSRQ
- Measured RSRP
- Indicator if the Cell is acceptable

This screen generates a tone, related to the strongest signal. The installer can use the device speaker or headphones to hear the tone.

At the top of the page, Azimuth and Downtilt of the current orientation are shown.

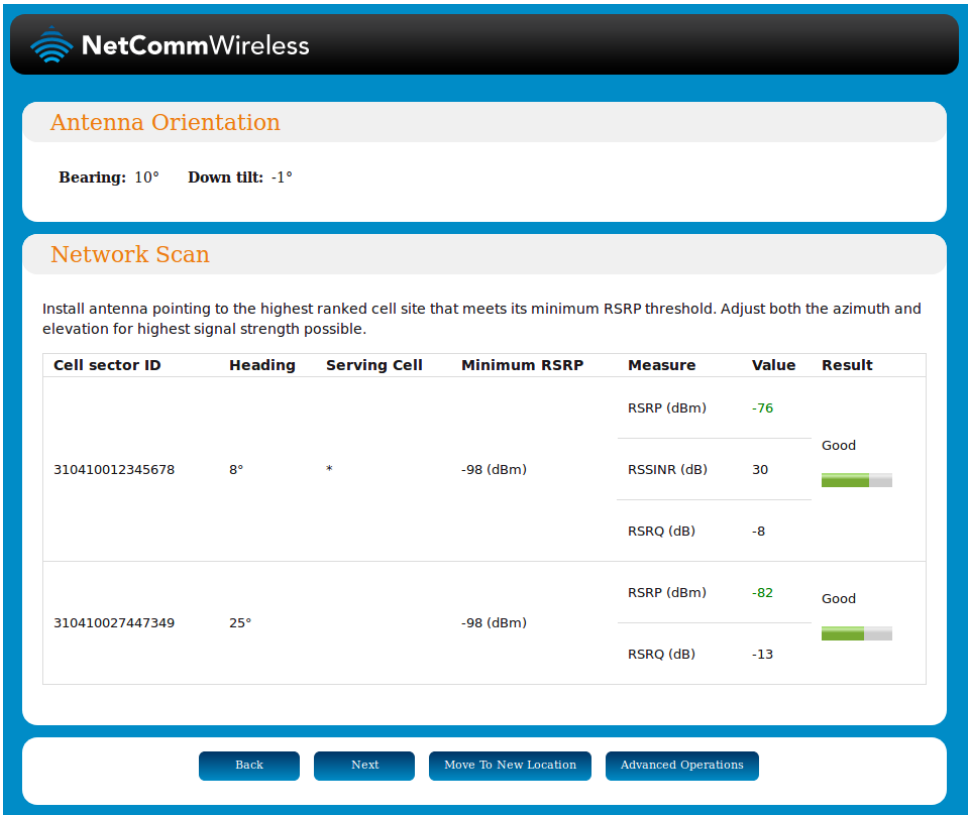


Figure 26 - Network scan screen

The installer has the option to proceed with the current signal results (using the **Next** button), try a new location (using the **Move to New Location** button) or perform **Advanced Operations**.

To proceed with current signal results, continue to CBRS Install Parameters page.

To try a new location, continue to the Move to New Location section.

To perform Advanced Operations, continue to the Advanced Operations section.

CBRS Install Parameters

CBRS screen shows for the installation parameters with two columns. The first column is what is current from the tool and the second is what can be used for Registration.

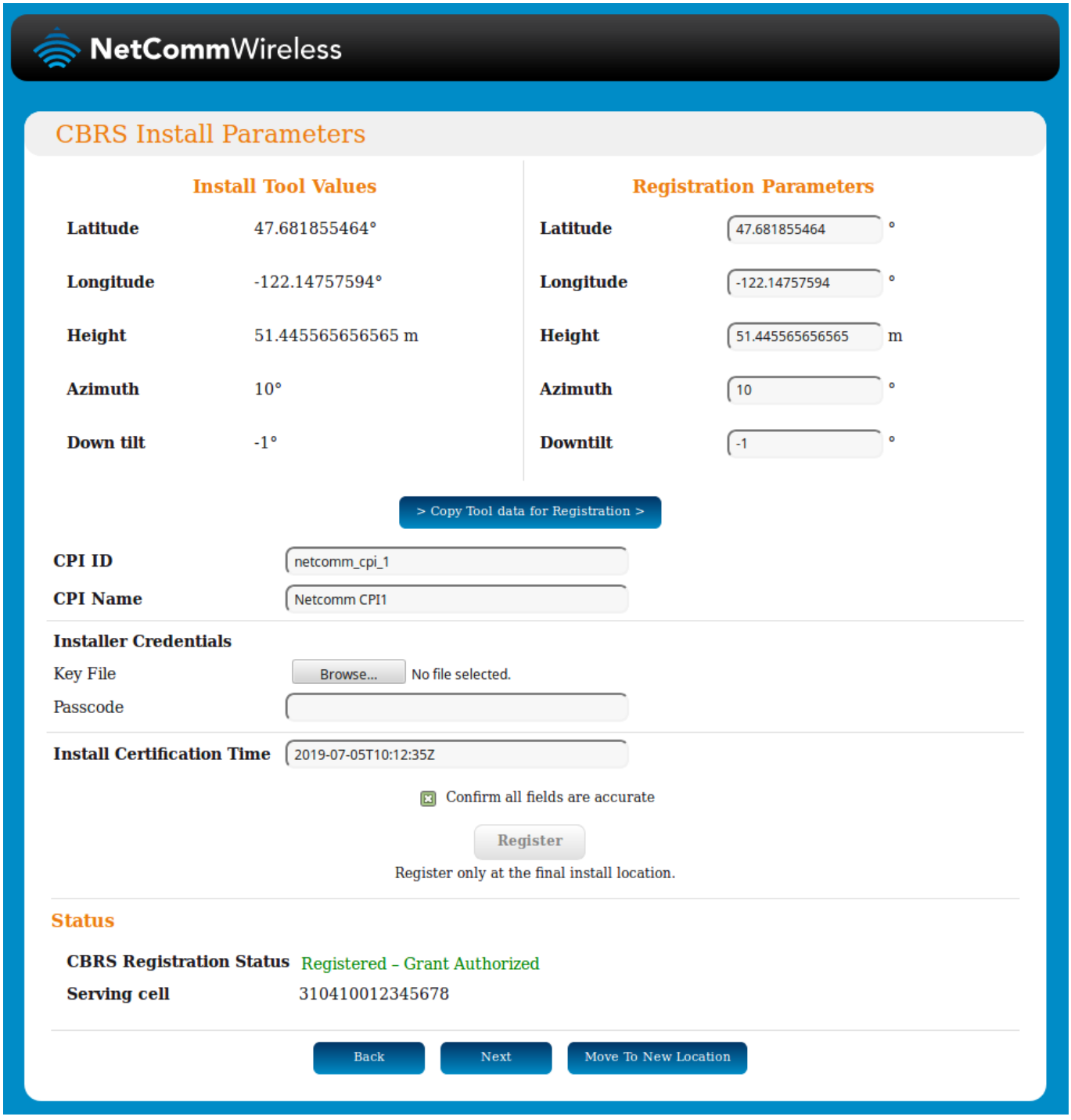


Figure 27 - CBRS Install Parameters

The first column is read-only and will continue to be updated throughout the Install procedure.

Installation parameters shown are:

- Latitude
- Longitude
- Height (Above Mean Sea Level – WGS84)
- Azimuth (with respect to True North, not magnetic north)
- Downtilt (when the antenna is mounted facing the horizon, the downtilt reading is zero. When it faces the ground, the reading is positive, otherwise it will display a negative reading.)

The Copy button provides the option to copy Smart Antenna Tool data to Registration side. The copy operation will overwrite any data in the Registration column. The fields in the Registration column are editable, in case any corrections need to be made by the installer.

The CPI certificate content field allows the installer to copy in a textual representation of their certificate (assumption is that this is also obtained from WFE, but could be from another source as this belongs to the installer). If the CPI Certificate was provided from the Quick Copy, text will be shown.

If the certificate is found to have good integrity, the screen displays "Certificate format is valid" in green. The Integrity check only indicates that the format is correct, it is not an indication that the certificate is valid.

The "Confirm all fields are accurate [ ]" checkbox is provided to prevent accidental acceptance of incorrect values.

There will be a Register button which is grayed out and shows color when:

- All Install Parameters are complete in the second column.
- The installer has checked off that all installation parameters are correct.
- The CPI certificate has been input.

The screen displays "Register only at the final install location." Under the Register button to inform the installer not to register unless this is the final installation location.

Status fields are provided for:

- CBRS Registration Status (Not Registered, Registering, Registered – Grant Pending, Registered – Grant Authorized)
- Serving cell

If Registration or Grant Authorization Fails, the installer will be shown the failure reason code.

If/When the device is Registered and Grant Authorized, then the "Next" button will show in blue and be clickable.

The Installer is given a button to "Move to new Location".

Speed Test

The Speed Test screen shows a Status, Progress and Speed for both Download and Upload tests.

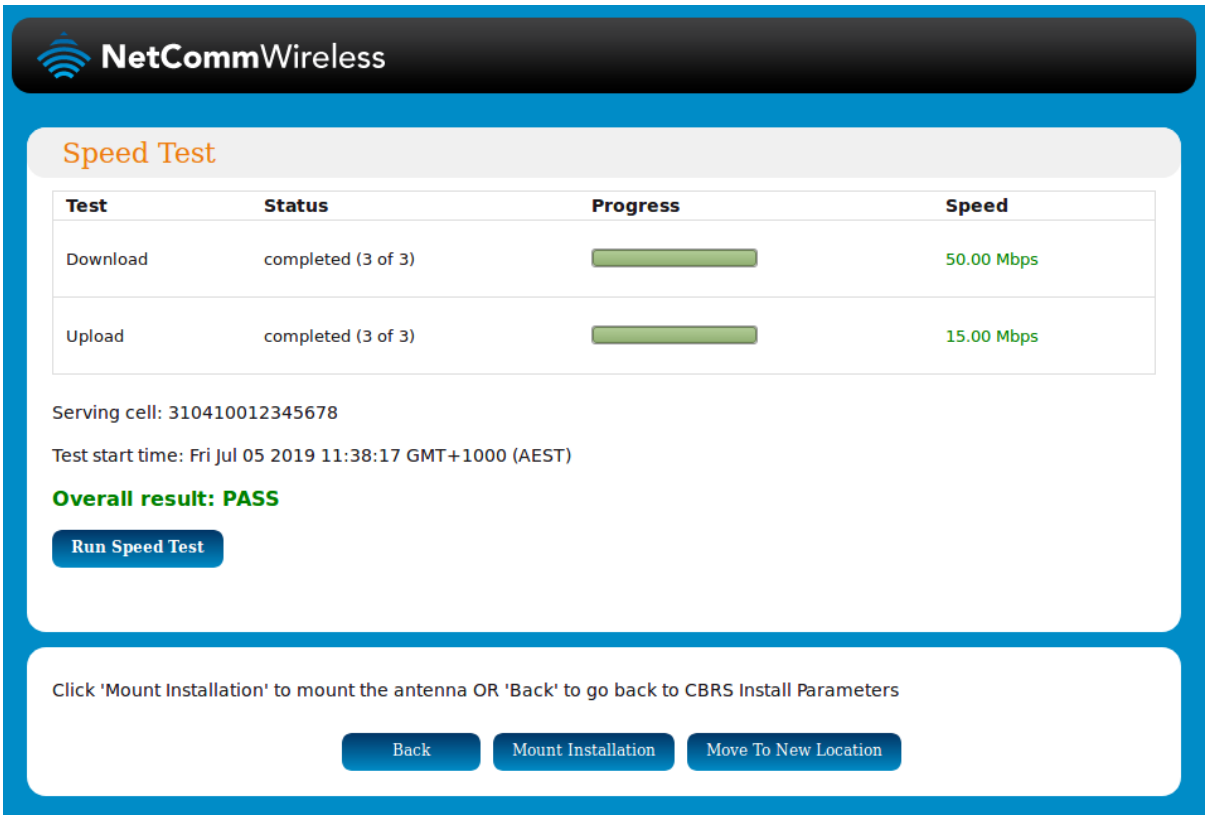


Figure 28 - Speed Test (if unmounted) screen

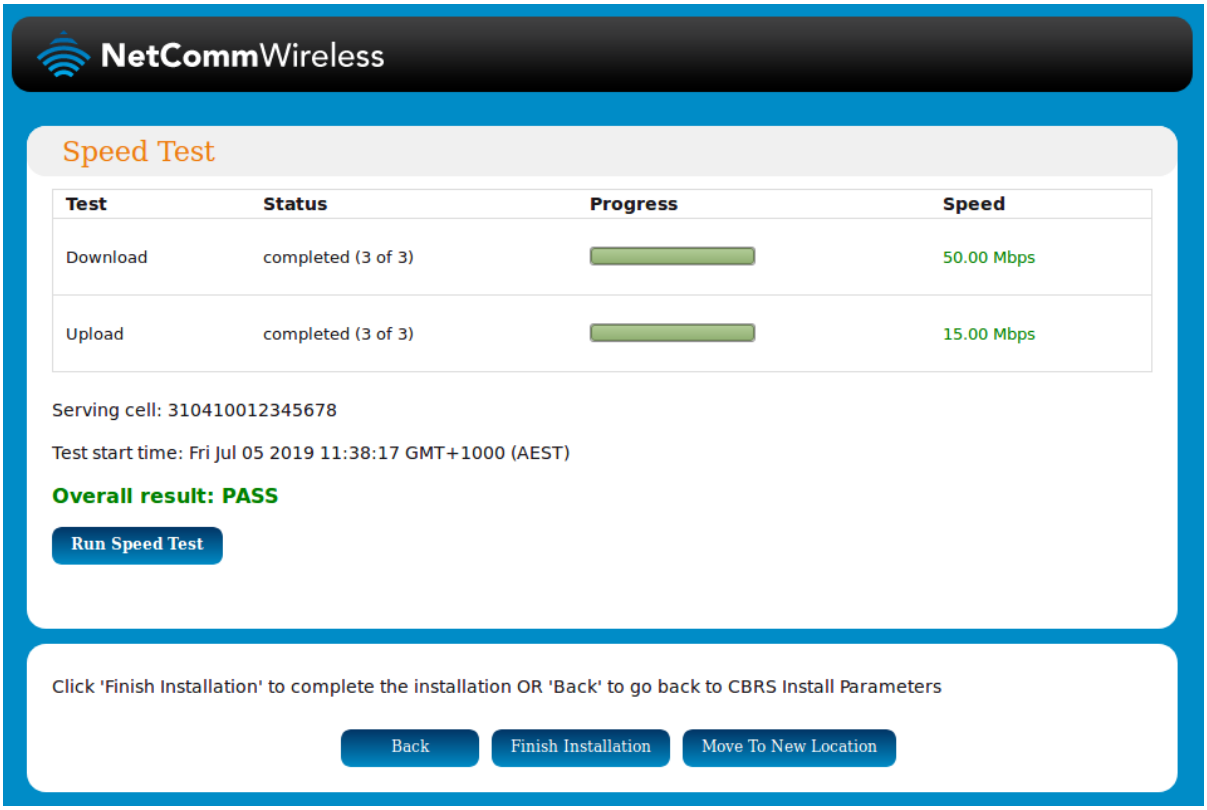


Figure 29 - Speed Test (if mounted) screen

Informational text fields for Serving Cell and Test start time are shown.

The installer can run a speed test by clicking the Run Speed Test.

When the Speed Test button is selected, the device will attempt three cycles of each download and upload, updating status, progress and throughput as the test progresses.

If the installer wishes to go back to the previous screen, they make click "Back".

If the device is not mounted*, then the prompt is shown for "Mount Unit".

If the device was not mounted* then the installer is shown a "Finish Installation" button.

In case the Speed Test does not meet expectations as installed, there will be a button to "Move to new Location".

*The Installation Flow will track whether the installer has gone through the Mount Unit flow.

Mount installation

Status fields are provided for:

- CBRS Registration Status (Not Registered, Registering, Registered)
- Serving cell

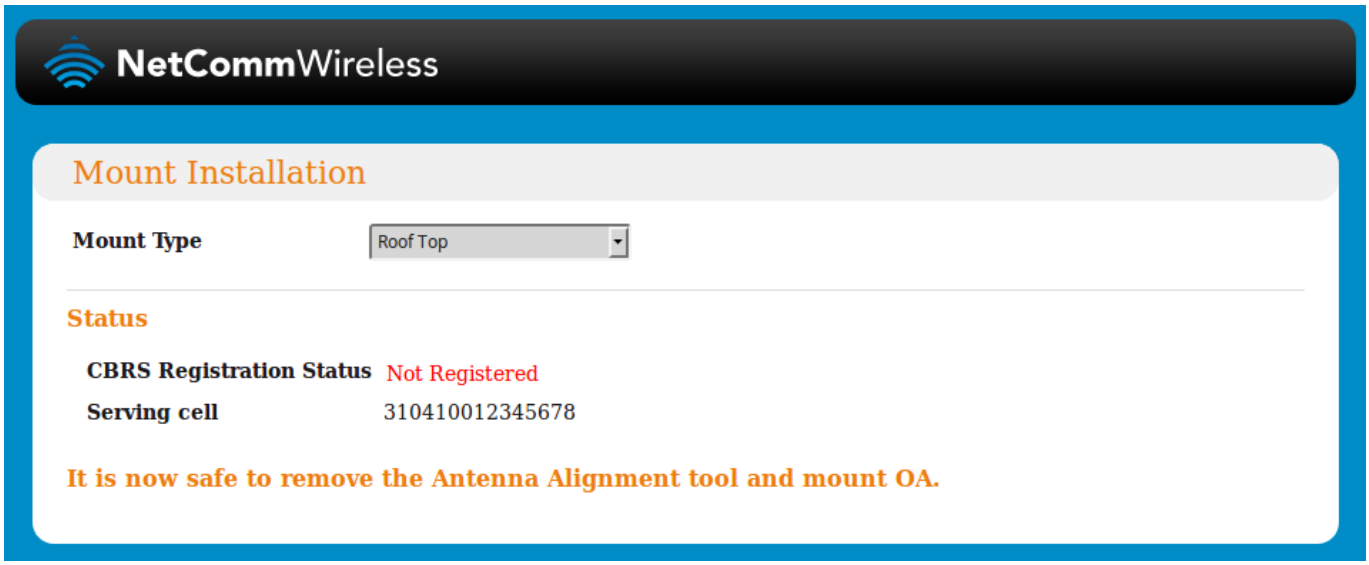


Figure 30 - Mount Installation screen

Upon entering the screen, the device will attempt CBRS Deregistration.

The installer will be prompted to enter the Mount Type [Roof top/Wall mount/pole Mount (selection/check box)]

If Deregistration is successful (or the deregistration times out), then the screen will be updated to show "It is now safe to remove the Smart Antenna Tool and mount OA".

The installer will power down the Smart Antenna Tool while the OA mount is installed.

After mount is in place, the installer will power on the Smart Antenna Tool and progress the screens through the Network Scan page.

Installer shall aim the OA at the desired location and loosely tighten all mounting bracket bolts.

Once the Speed Test is performed, the installer will finalize the installation.

Finish installation

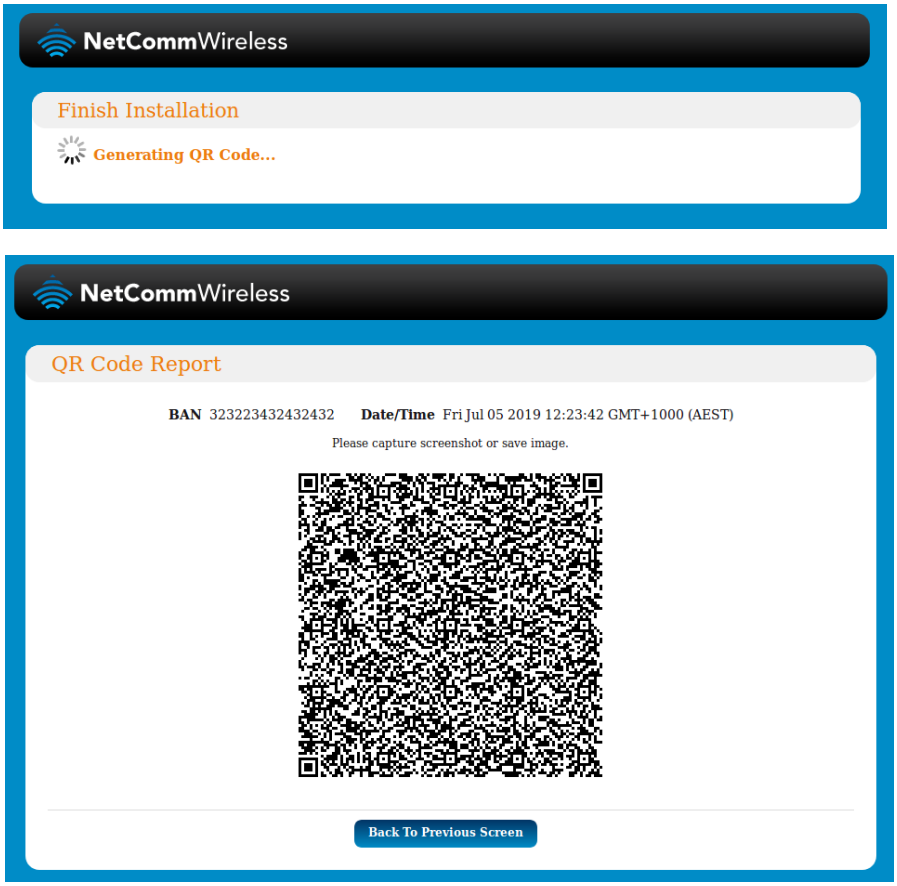


Figure 31 - Finish Installation

The Finish Installation screen displays status fields for:

- CBRS Registration Status (Not Registered, Registering, Registered – Grant Pending, Registered – Grant Authorized)
- Serving cell

Press and hold on the QR code below to save the image to your device. The filename of the saved file will contain the BAN and date.

The screen displays "It is now safe to remove the Smart Antenna Tool".

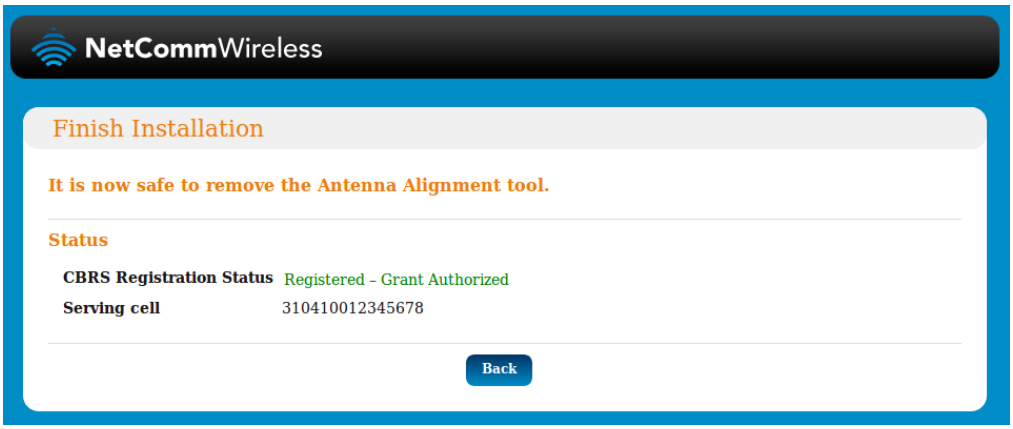


Figure 32 - QR Code Report screen

Advanced Operations

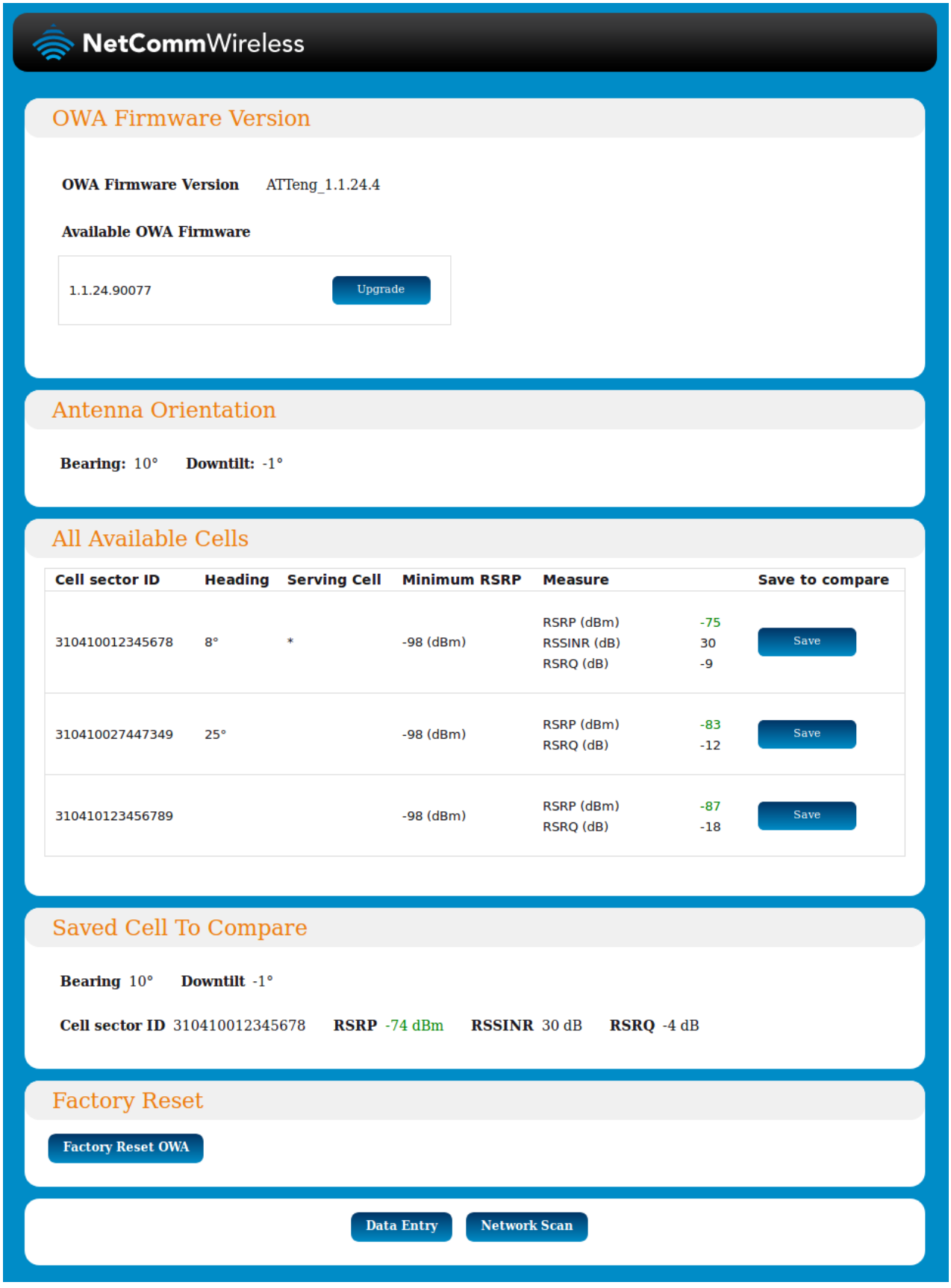


Figure 33 - Advanced Operations screen

If there is an updated version of OA firmware and/or OA screens, there will be an Update OWA Firmware button; otherwise, the button will be grayed out. Not yet available and subject to change.

Note that in some cases, new screens may require new APIs which would force an OA firmware update prior to a screen update being made available.

If the installer selects the Update Firmware button, then flow is transferred to the OA Update Screen.

Available Cell List (All cells will be shown)

- Cell ECGI (with asterisk indicating the serving cell)
- Minimum Allowable RSRP
- Measured RSRP
- Measured RSSINR
- Measured RSRQ
- Indicator if the Cell is Acceptable

This screen generates a tone, related to the strongest signal. The installer can use the device speaker or headphones to hear the tone.

Azimuth and Downtilt of the current orientation are shown.

The Save to compare column provides buttons to save a Cell to compare signal with. When locked, the screen will show the:

- Locked Azimuth
- Locked Downtilt
- Locked RSRP
- Locked RSSINR
- Locked RSRQ

Quick Copy

The Quick Copy field will be a method to reduce the number of times the installer needs to move between WFE screens and Installation screens (on the Smart Antenna Tool) and might even allow information to be cached in a paste buffer prior to installation, if mobile coverage is not available at the installation site. Items that are to be covered in the Quick Copy field are:

Install Parameters

- BAN
- Cell Sector IDs (various)
- Band Select (B30/B48)
- Installer ID (Optional)
- Installer Name (Optional)

Registration Parameters

- Call Sign
- User ID
- Interference Grouping
- Installer's CPI Certificate

OWA Update

To update OWA firmware without entering data into the Data Entry screen,

1. Navigate to http://192.168.3.1/advanced_operations.html. A list of firmware files that exist on the Smart Antenna Tool is displayed.
2. Next to the firmware version you want to install, click the "Upgrade" button. A screen displays the installation progress as the OWA firmware is upgraded.

The device will update firmware in the following order:

1. OWA Firmware, to latest
2. OWA Screens, to latest compatible with the OWA firmware executing in the unit.

While the update is in progress there is a notice not to remove the Smart Antenna Tool until the update is complete.

When the firmware or screens are updated, the unit and/or screens will reboot and the initial screen will be refreshed on the installer device.

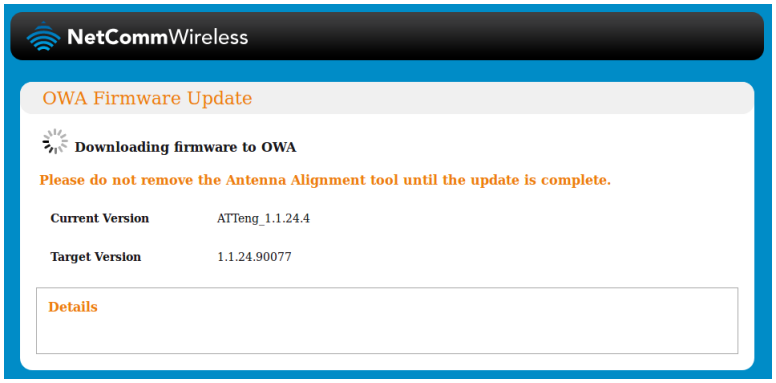


Figure 34 - OA Update screen

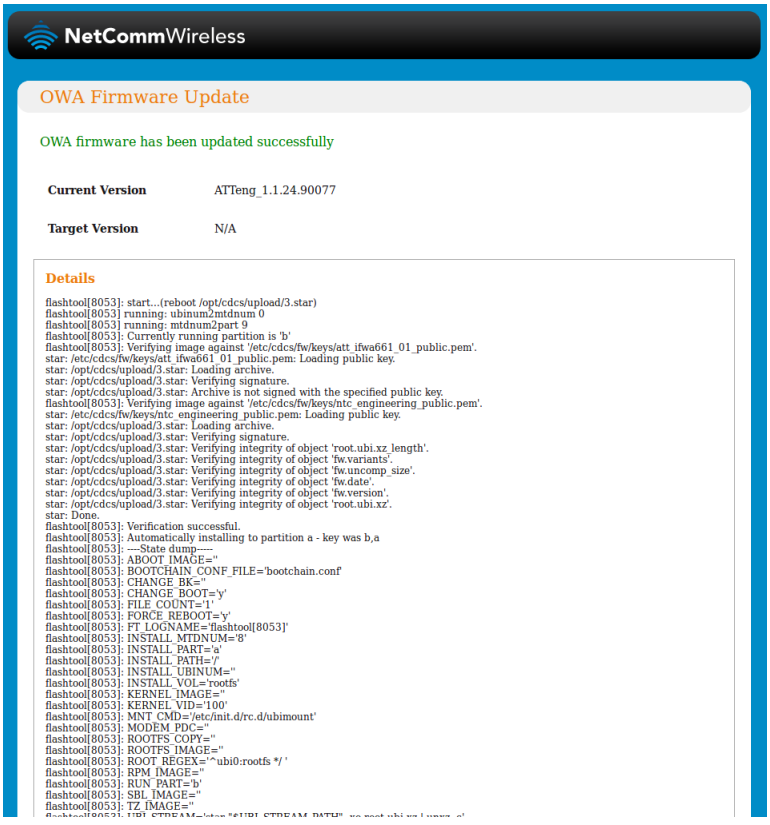


Figure 35 - OA Update complete screen

Move to New Location

Installer will be given the option to generate a QR Code.

Status fields are provided for:

- CBRS Registration Status (Not Registered, Registering, Registered)
- Serving cell

If the device had previously been *mounted, then the *mounted flag will be cleared.

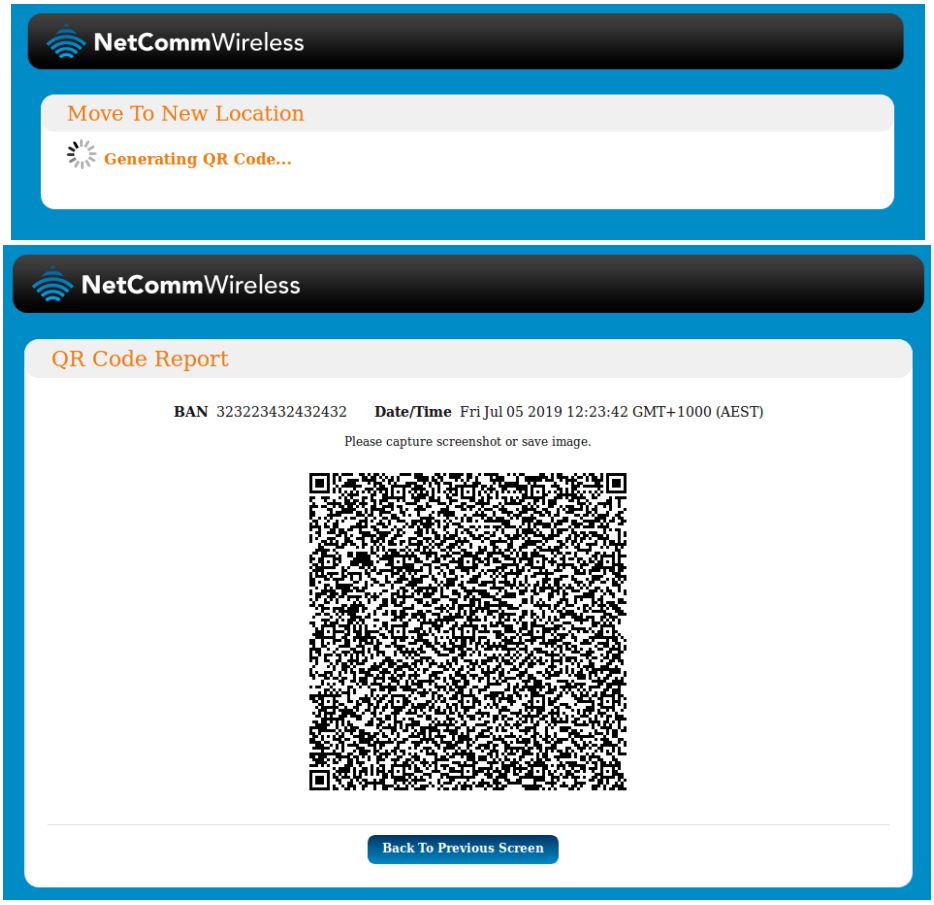
If the device was Registered upon entering the screen, it will attempt to Deregister.

If Deregistration is successful, then the screen will be updated to show "It is now safe to remove the Smart Antenna Tool and move the OWA".

If Deregistration is not successful after 45 seconds, then the device will stay "registered" and prompt for deregistration at the next power-cycle.

Press and hold on the QR code below to save the image to your device. The filename of the saved file will contain the BAN and date.

The screen will be updated to show "It is now safe to remove the Smart Antenna Tool and move the OWA".



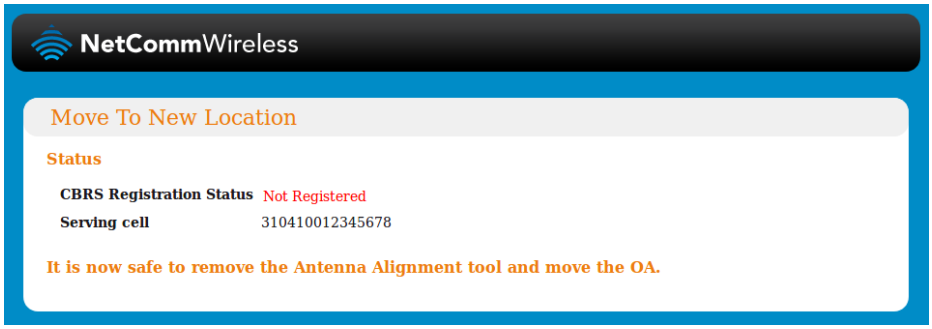


Figure 36 - Move to New Location screen

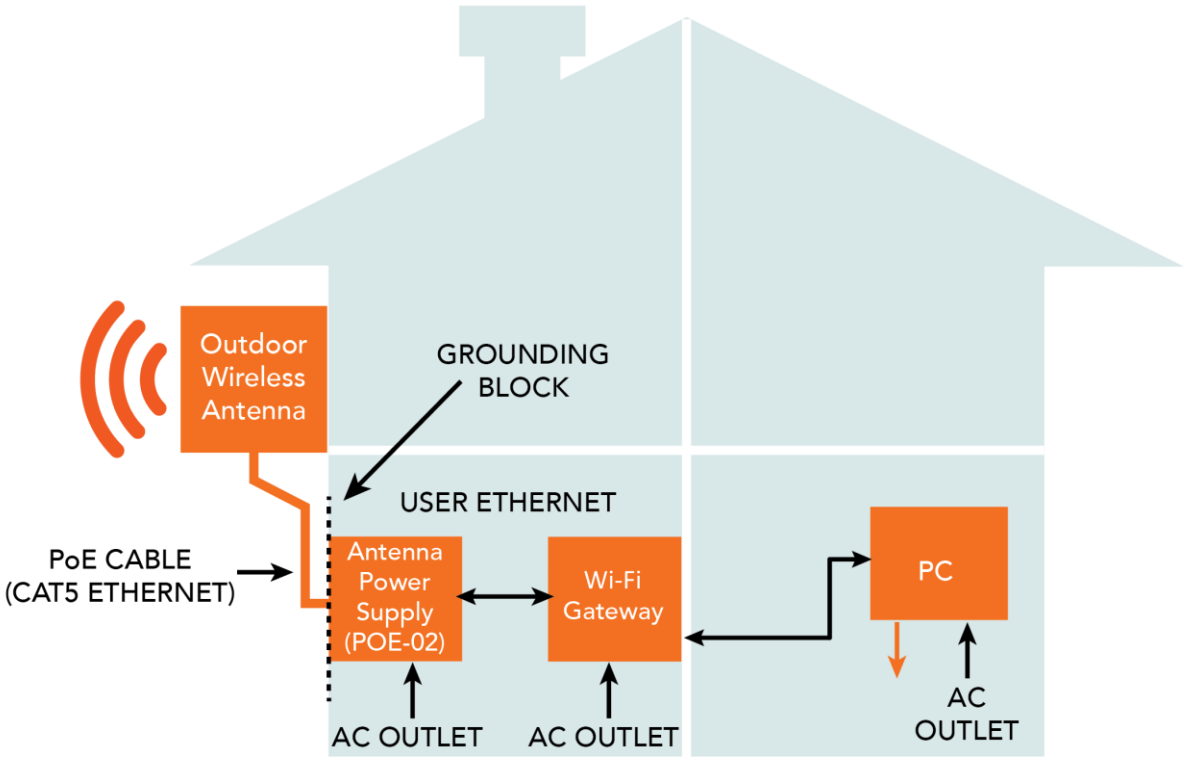
Post Install Activity

1. Fully tighten all mounting bracket bolts
2. Power off Smart Antenna Tool and remove from OWA
3. Install Ethernet cable from indoor location to OWA
4. Install and connect Antenna Power Supply
5. Turn on the Antenna Power Supply
6. Wait for WFE to indicate the OWA is connected
7. Install WiFi Gateway
8. Complete customer registration
9. Capture customer's signature for work completion.

Connecting the Outdoor Wireless Antenna

Grounding and power surges

The image below illustrates a typical installation scenario.



Note that the overall system can have multiple devices that are interconnected via Ethernet cables, and these devices can each have separate connections to the AC outlet and local grounds at different points throughout the home.

The OWA system is designed to block the surge current with potential surge paths protected with 6KV or 10KV isolation barriers. Any attempt to add grounds or grounded protectors to the system may actually weakens the surge resistance.

The PoE cable should be physically separated by at least three feet from any other cable, such as power cables or lightning down-conductors. This separation will help avoid unwanted coupling of surge transients onto the PoE cable.

Powering the Outdoor Wireless Antenna

Power over Ethernet (PoE) is a method of connecting network devices through Ethernet cable where power and data are passed along a single cable. It is therefore a convenient method of powering the Outdoor Wireless Antenna. The Antenna Power Supply provides Power over Ethernet to the Outdoor Wireless Antenna.

Note – The Outdoor Wireless Antenna Power supply is packaged and supplied separately.

To power the Outdoor Wireless Antenna:

1. The Ethernet cable connected to the Outdoor Wireless Antenna should terminate into an Ethernet wall jack that the technician installs in the home interior, then a separate Ethernet jumper cable is needed to run from the Ethernet wall jack to the Ethernet port labelled "WALL" on the Power supply.
2. Use another Ethernet cable (not included in the package) to connect the Wi-Fi Gateway to the "Router" port of the POE-03.
3. Connect the power cable to the POE-03 and then plug it in to an available wall socket. Examine the Power and ANTENNA LEDs of the POE-03 and compare them with the LED table below. When the POWER LED is red and ANTENNA LED is green, the Outdoor Wireless Antenna is correctly powered and connected.

POE-03 LED indicators

The table below describes the status of the POWER and ANTENNA LEDs on the PoE injector.

LED	STATUS	DESCRIPTION
POWER	Solid red	Antenna power supply is connected to AC power.
ANTENNA	Solid green	Antenna power supply is connected to AC power and the PoE "WALL" port is connected to the Outdoor Wireless Antenna.

Table 3 - POE-03 LED indicators

Acronyms

- CBRS - Citizens Broadband Radio Service.
- CBSD - Citizens Broadband radio Service Device (also known as the Outdoor Wireless Antenna)
- CBSD-ID - CBSD Identifier
- CGI - CBSD Group Identifier
- IA - Installation Assistant. Web pages running on OA served to Installation device (e.g. laptop)
- IFWA - Intelligent Fixed Wireless Antenna, also referred to as the OWA or OA
- Installation Device - The installer's laptop, tablet or mobile phone
- NGFW - Next Generation Fixed Wireless
- OA/OWA – Outdoor (Wireless) Antenna, also referred to as the IFWA.
- SAS - Spectrum Access System
- SIBS - System Information Blocks

Appendix

Inserting a SIM card

The IFWA-661 accepts SIM cards in Mini-SIM (3FF) format. Follow the instructions below to insert a SIM card.

1 On the back of the Outdoor Wireless Antenna, locate the SIM hatch. Using a T10 screwdriver, unscrew the two screws on the SIM hatch then remove the cover to reveal the SIM card slot.

Figure 37 - Removing screws from the SIM hatch

2 Swing the SIM card locking mechanism down to allow insertion of the SIM card.

Figure 38 – Opening the SIM locking mechanism

3 Place the SIM card onto the SIM card reader as shown in the picture below.

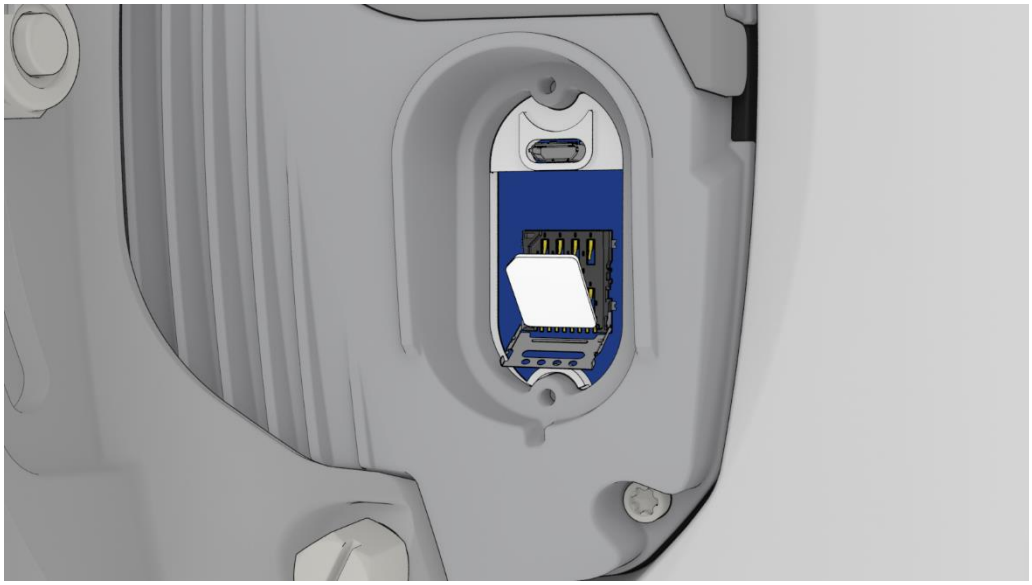


Figure 39 – Placing the SIM card onto the SIM card reader

4 While holding the SIM card onto the reader, swing the locking mechanism up and ensure that it clips into place to secure the SIM card.

Figure 40 - SIM card locked in place

5 Replace the SIM hatch and seal, insert the two screws and firmly hand tighten them using a T10 screwdriver.

Figure 41 - Replacing the SIM hatch

Using the Smart Antenna Tool

When not connected to an antenna, you can access the web user interface of the Smart Antenna Tool to perform administrative tasks such as uploading and managing OWA firmware files, upgrading the firmware of the Smart Antenna Tool and viewing system information and status details.

After powering on the Smart Antenna Tool and connecting to its SSID network, navigate to http://192.168.3.1 in your web browser. The log in screen is displayed.

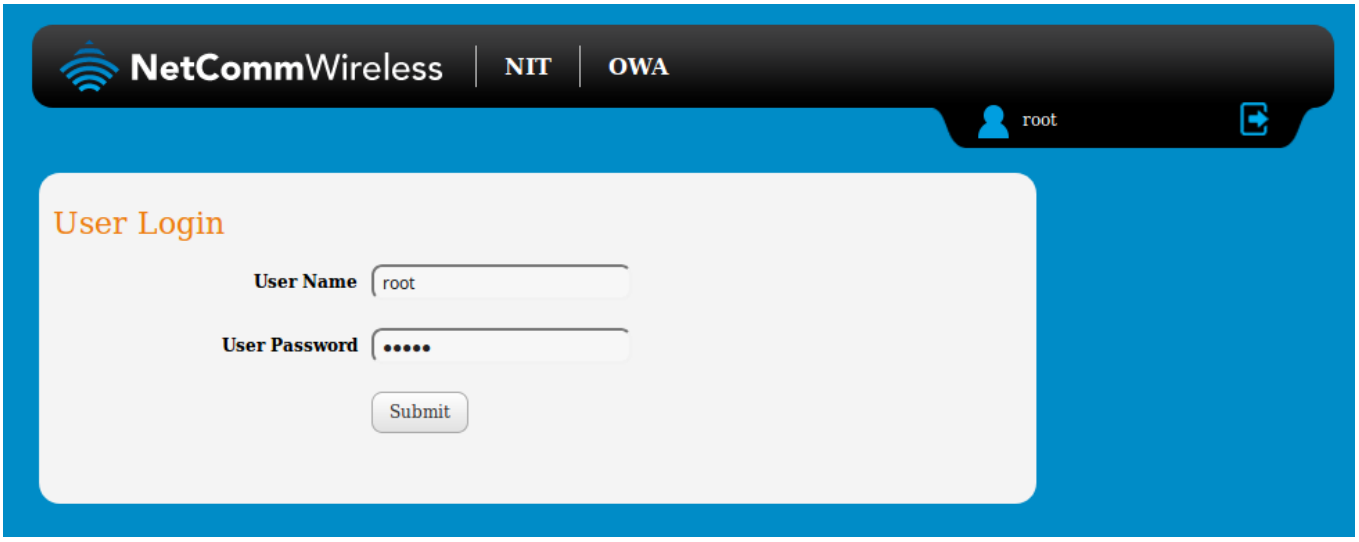


Figure 42 - Smart Antenna Tool log in screen

Log in with the appropriate credentials.

Uploading OWA firmware

From the top menu, select **OWA** and then **Upload** from the left-side menu.

Figure 43 - OWA firmwre upload screen

Select the **Choose a file** button then select the firmware file from your local machine. Select **Open**, then select the **Upload** button. The firmware is uploaded to the storage on the Smart Antenna Tool.

Viewing uploaded OWA firmware files

From the top menu, select **OWA** and then **Firmware** from the left-side menu. A list of uploaded OWA firmware file is displayed.

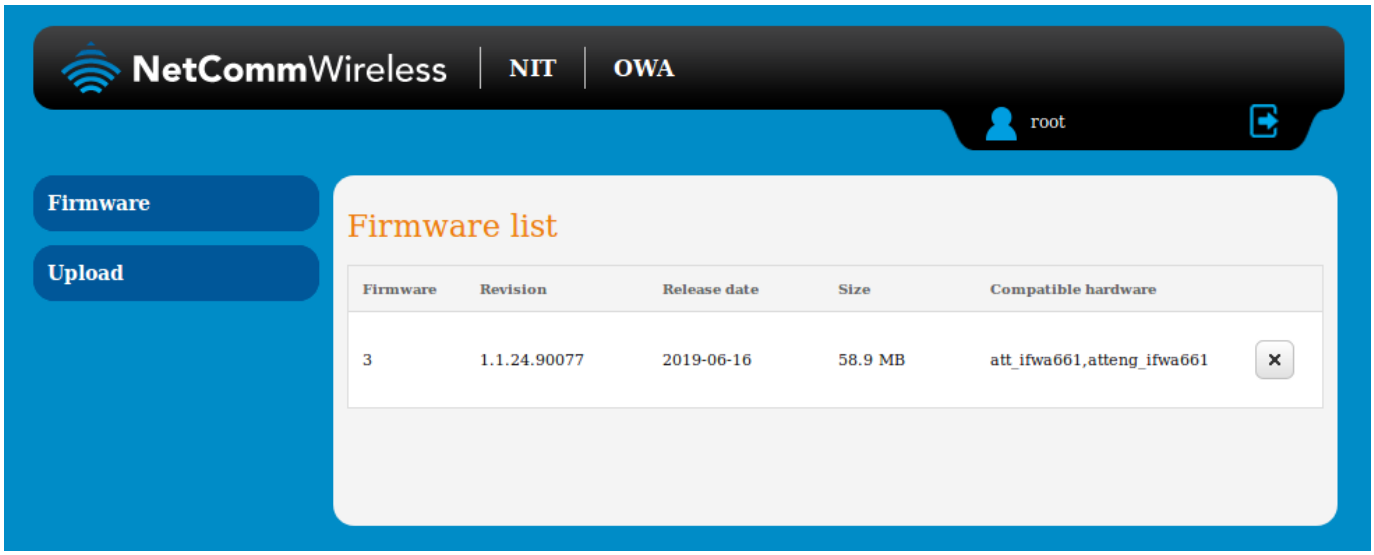


Figure 44 - OWA firmware file list

Upgrading the Smart Antenna Tool firmware

Before proceeding to upgrade the Smart Antenna Tool firmware, ensure that it is not connected to the OWA.

From the top menu, select **NIT** and then **Upgrade** from the left-side menu. Under the **Upgrade firmware** section, select the **Choose a file** button. Locate the Smart Antenna Tool firmware file on your computer, then select **Open.** Click on the **Upgrade** button. The Smart Antenna Tool's firmware is updated.

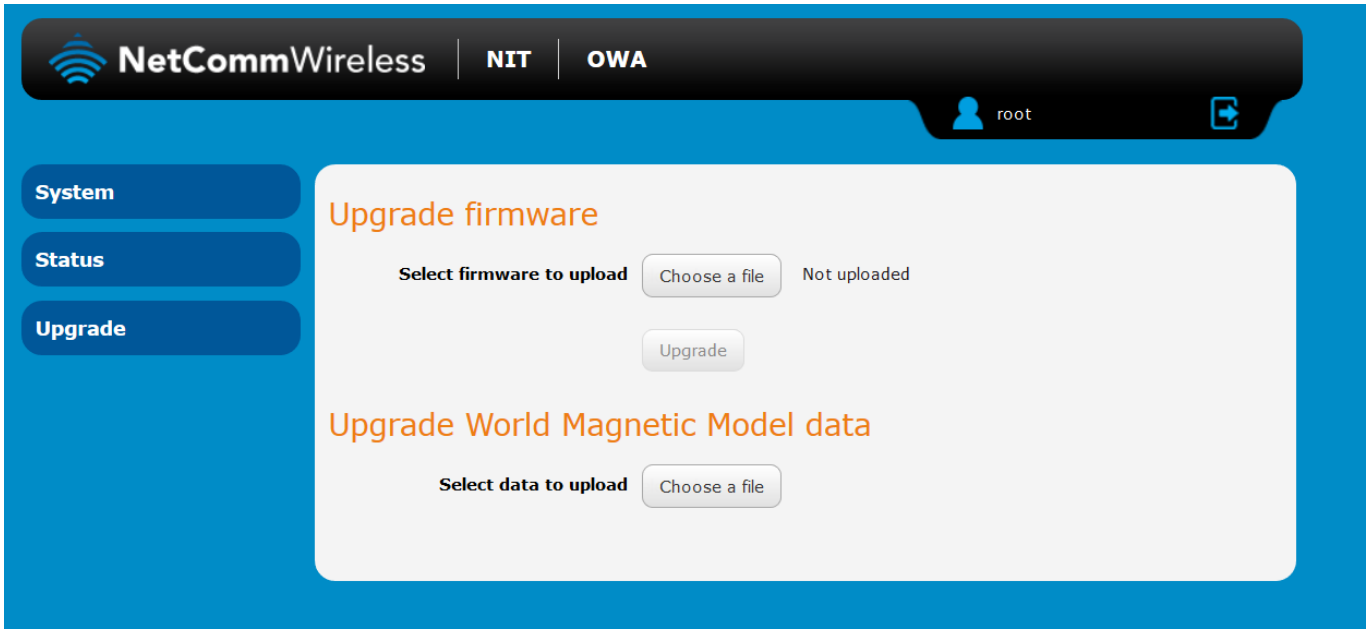


Figure 45 - Smart Antenna Tool firmware and Magnetic Model data upgrade screen

Upgrading the World Magnetic Model data

The World Magnetic Model data is used to calculate the offset from magnetic north to true north for the electronic compass to function correctly. This data is periodically updated by the National Oceanic and Atmospheric Administration and can be downloaded from https://www.ngdc.noaa.gov/geomag/WMM/soft.shtml

The Smart Antenna Tool will expect a coefficient file with a .COF extension, so files downloaded from the NOAA must be unarchived first.

To upgrade the World Magnetic Model data, under the **Upgrade World Magnetic Model data** section, select the **Choose a file** button, then locate the .COF file on your local machine and select **Open**.

Viewing System information

To view device-specific details about the Smart Antenna Tool, from the top menu, select **NIT** and then **System** from the left-side menu.

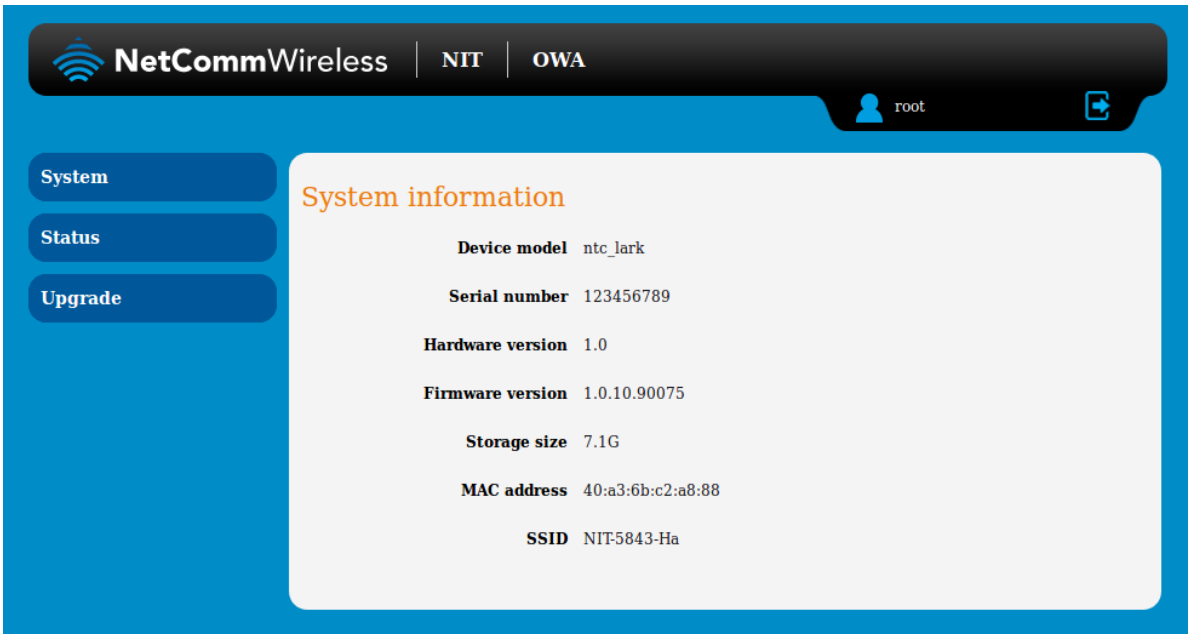


Figure 46 - System information screen

Viewing status

To view device status information, from the top menu, select **NIT** and then **Status** from the left-side menu.

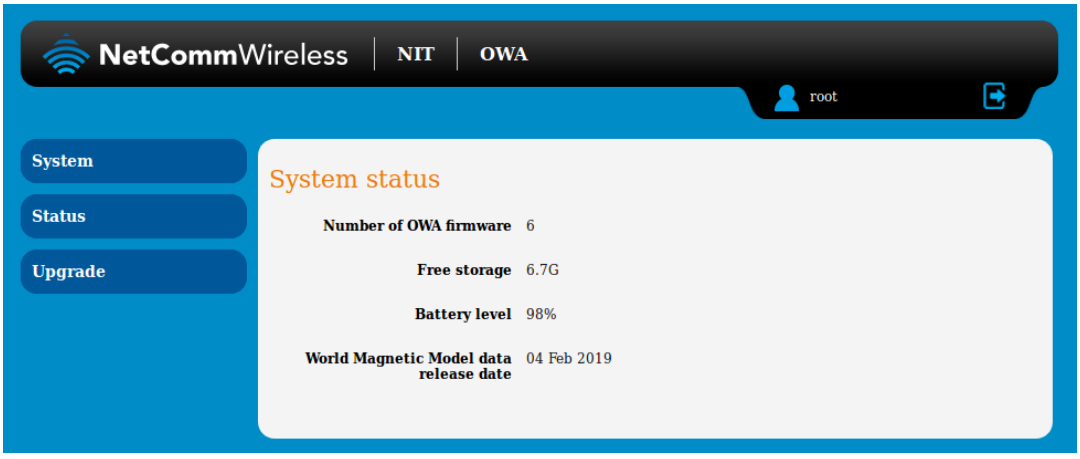


Figure 47 - Smart Antenna Tool Status screen

Quick Copy Items

- BAN
- Cell Sector IDs
- Band Select (B30 / B48)
- Call Sign
- User ID
- Interference Grouping
- Installer's CPI ID
- Installer's CPI Name
- Installer's CPI Certificate

Safety and product care

RF Exposure

Your device contains a transmitter and a receiver. When it is on, it receives and transmits RF energy. When you communicate with your device, the system handling your connection controls the power level at which your device transmits.

This device meets the government's requirements for exposure to radio waves.

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

This equipment complies with radio frequency (RF) exposure limits adopted by the Federal Communications Commission for an uncontrolled environment. This equipment should be installed and operated with minimum distance 1 foot between the radiator & your body.

FCC Statement

This device must be professionally installed. This device must be installed 20m removed from roadway or installed in locations where it can be shown that the ground power level of −44 dBm in the A or B blocks or −55 dBm in the C or D blocks will not be exceeded at the nearest road location.

FCC compliance

Federal Communications Commission Notice (United States): Before a wireless device model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure.

FCC regulations

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device 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 not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Electrical safety

Accessories

Only use approved accessories.

Do not connect with incompatible products or accessories.

Connection to a car

Seek professional advice when connecting a device interface to the vehicle electrical system.

Distraction

Operating machinery

Full attention must be given to operating the machinery in order to reduce the risk of an accident.

Product handling

You alone are responsible for how you use your device and any consequences of its use.

- Do not point the antenna at other people or yourself. Always maintain a separation distance of 1 foot from any part of your body and the front of the antenna. Use of your device is subject to safety measures designed to protect users and their environment.
- Do not expose your device or its accessories to open flames or lit tobacco products.
- Do not drop, throw or try to bend your device or its accessories.
- Do not use harsh chemicals, cleaning solvents, or aerosols to clean the device or its accessories.
- Do not paint your device or its accessories.
- Do not attempt to disassemble your device or its accessories, only authorised personnel must do so.
- Do not use or install this product in extremely hot or cold areas. Ensure that the device is installed in an area where the temperature is within the supported operating temperature range.
- Do not use your device in an enclosed environment or where heat dissipation is poor. Prolonged use in such space may cause excessive heat and raise ambient temperature, which will lead to automatic shutdown of your device or the disconnection of the mobile network connection for your safety. To use your device normally again after such shutdown, cool it in a well-ventilated place before turning it on.
- Please check local regulations for disposal of electronic products.
- Installation and configuration should be performed by trained personnel only.
- Do not use or install this product near water to avoid fire or shock hazard.
- Arrange power and Ethernet cables in a manner such that they are not likely to be stepped on or have items placed on them.
- Ensure that the voltage and rated current of the power source match the requirements of the device. Do not connect the device to an inappropriate power source.

Small children

Do not leave your device and its accessories within the reach of small children or allow them to play with it.

They could hurt themselves or others, or could accidentally damage the device.

Your device contains small parts with sharp edges that may cause an injury or which could become detached and create a choking hazard.

Emergency situations

This device, like any wireless device, operates using radio signals, which cannot guarantee connection in all conditions. Therefore, you must never rely solely on any wireless device for emergency communications.

Device heating

Your device may become warm during normal use.

Faulty and damaged products

Do not attempt to disassemble the device or its accessories.

Only qualified personnel must service or repair the device or its accessories.

If your device or its accessories have been submerged in water punctured or subjected to a severe fall, do not use until they have been checked at an authorized service centre.

Interference

Care must be taken when using the device in close proximity to personal medical devices, such as pacemakers and hearing aids.

Pacemakers

Pacemaker manufacturers recommend that a minimum separation of 15cm be maintained between a device and a pacemaker to avoid potential interference with the pacemaker.

Hearing aids

People with hearing aids or other cochlear implants may experience interfering noises when using wireless devices or when one is nearby.

The level of interference will depend on the type of hearing device and the distance from the interference source, increasing the separation between them may reduce the interference. You may also consult your hearing aid manufacturer to discuss alternatives.

Medical devices

Please consult your doctor and the device manufacturer to determine if operation of your device may interfere with the operation of your medical device.

Hospitals

Switch off your wireless device when requested to do so in hospitals, clinics or health care facilities. These requests are designed to prevent possible interference with sensitive medical equipment.

Interference in cars

Please note that because of possible interference to electronic equipment, some vehicle manufacturers forbid the use of devices in their vehicles unless an external antenna is included in the installation.

Explosive environments

Gas stations and explosive atmospheres

In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your device or other radio equipment.

Areas with potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

Blasting caps and areas

Turn off your device or wireless device when in a blasting area or in areas posted turn off “two-way radios” or “electronic devices” to avoid interfering with blasting operations.

Product Warranty

For warranty information please visit

http://support.netcommwireless.com/support/warranty