Chapter 7. Starting Dual Antenna System

The OW70L has the embedded dual antenna mediator function, which is used to instantly switch between two antenna systems. When one antenna loses line of sight to a satellite, the other antenna will immediately provide a fail-safe operation to maintain the highest levels of system performance and reliability. This ensures always-on broadband service by reducing the out of service time.

7.1 Configuration of Dual Antenna System

To use the Dual Antenna System, make sure the antenna system components are properly installed. Refer to **"6.2 Antenna System Configuration" on page 40** for more details.

7.2 Accessing LUI

To establish Dual Antenna System communication between the compound UT#1 (operate as the primary) and the compound UT#2 (operate as the secondary), follow the steps below.

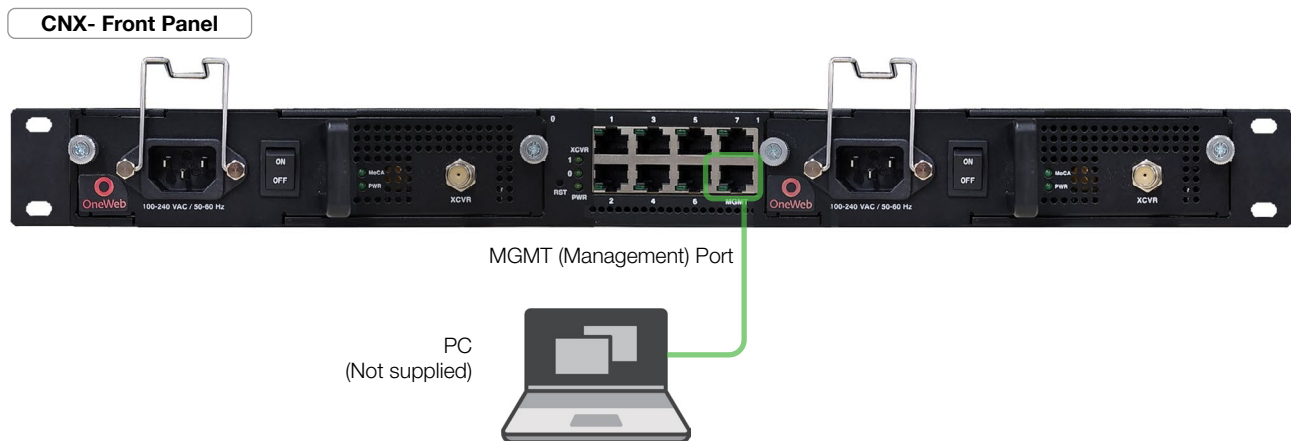Connect an ethernet cable from the **MGMT** (Management) port on the front panel of CNX to a LAN port of a PC.

Figure 16: Front Panel LAN Port Connection with CNX

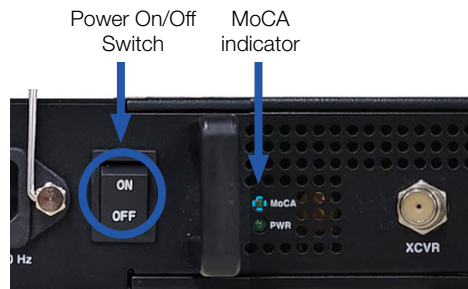## 7.2.1 Setting the Compound UT#2 (Secondary)

**First, the Compound UT#2 (Secondary) should be set and then set the Compound UT#1 (Primary).**

1. Turn on the UT#2's POWER switch on the front panel of the CNX, and then wait a few seconds for system startup. The MoCA indicator light on the CNX display will turn green.

> **NOTE**
>
> If the MoCA indicator does not turn on after five minutes during step 1, check the cable connection status and try to turn the CNX power off and on again.

2. Use the following IP address to access LUI page.

   *   **IP Address: 192.168.100.1 (Default)**

> **NOTE**
>
> The _**LUI**_ should be accessed by Chrome web browser when setting a CUC (Compound UT Controller) role.

3. Select **Install** on the navigation bar, and then go to the **Installation Navigation.**

4. Press **Back** or **Next** button on the Installation Navigation until the **Select Installation Role** reach.

5. Select **Compound UT#2 (Secondary)** on the **Select Installation Role** option to activate the function. Then click the **Submit** button to apply the settings to the system. LUI will automatically reboot.
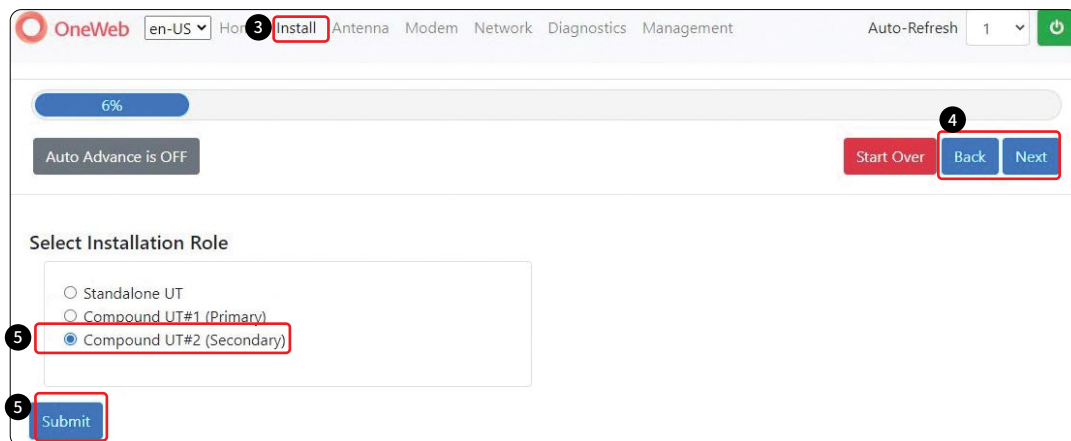
6. Try to access the LUI again using the changed **Compound UT#2 (Secondary)** ip adress (**192.168.100.10**).

7. Go to **Diagnostics** → **Compound UT Info** to verify the *Secondary* of CUC (Compound UT Controller) role on the Compound UT Info.
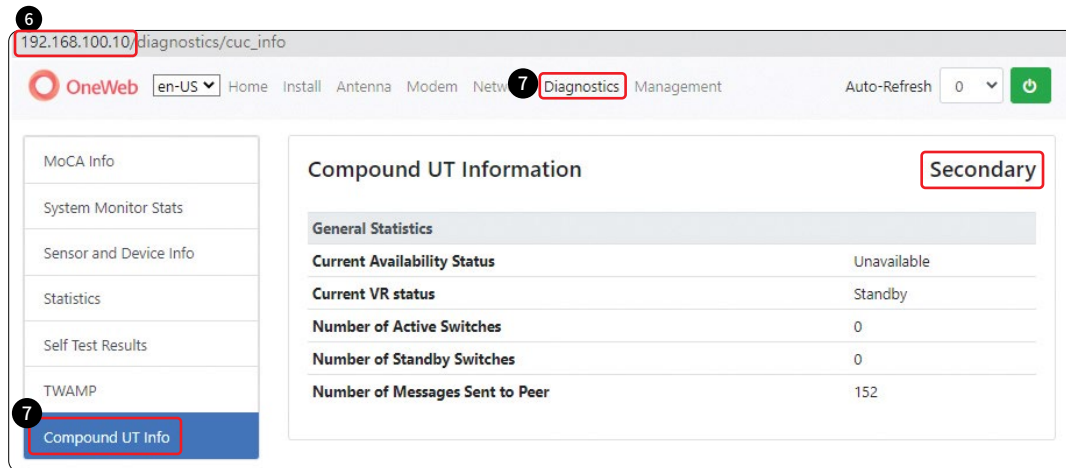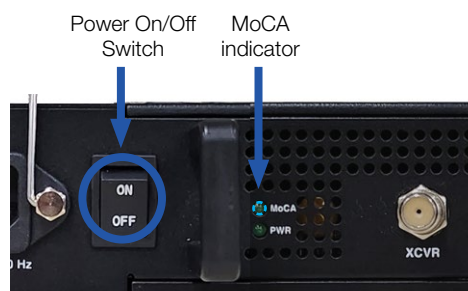

NOTE

If you cannot see "Compound UT Info" menu on "Diagnostics" in the 6 step, check the CUC role's setting and try to start the first process again.

7.2.2 Setting the Compound UT#1 (Primary)

The Compound UT#1 (Primary) should be set after setting the Compound UT#2 (Secondary).

1. Turn on the UT#1's POWER switch on the front panel of the CNX, and then wait a few seconds for system startup. The MoCA indicator light on the CNX display will turn green.

NOTE

If the MoCA indicator does not turn on after five minutes during step 1, check the cable connection status and try to turn the CNX power off and on again.

2. Use the following IP address to access LUI page.

   • **IP Address: 192.168.100.1 (Default)**

   NOTE

   The *LUI* should be accessed by Chrome web browser when setting a CUC (Compound UT Controller) role.

3. Select **Install** on the navigation bar, and then go to the **Installation Navigation.**

4. Press **Back** or **Next** button on the Installation Navigation until the **Select Installation Role** reach.

5. Select **Compound UT#1 (Primary)** on the **Select Installation Role** option to activate the function.
    Then click the **Submit** button to apply the settings to the system. LUI will automatically reboot and then
    display the Diagnostics page.

6. Go to **Diagnostics** → **Compound UT Info** to verify the *Primary* of CUC (Compound UT Controller) role
    on the Compound UT Info.

NOTE

If you cannot see "Compound UT Info" menu on "Diagnostics" in the 6 step, check the CUC role's setting
and try to start the first process again.

7.3 Starting Install Menu (Install Wizard)

The Install Wizard will guide you through the setup steps for the antenna system commissioning. We highly recommend using this wizard to complete the installation and commissioning of the system. After accessing LUI main page, go to the **Install** menu on the navigation bar and perform the wizard.

The LUI Installation page serves as the front end for installation.

✓ **Initial Install Page**

The first page of the installation process is a splash screen that states that the UT has not yet been installed. To proceed with the installation to the next step, click on **Start Installation**.

On the right are three buttons:

• **Start Over** button: Brings you back to the first step of the installation.

• **Back** button: Steps one step back in the installation.

• **Next** button: Advances to the next step in the installation.
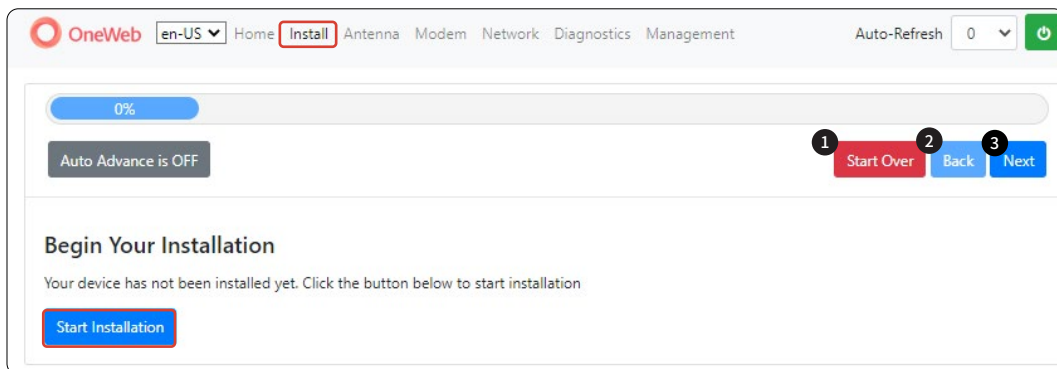
✓ **Step 1: Upload Software Bundle**

The Upload Software Bundle page displays the current software versions running on each component.
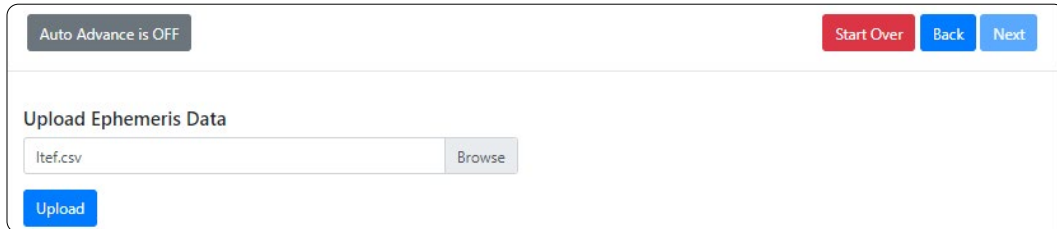
When uplading a software budle, the software mode should be factory. (Refer to **"8.9.2 Switch UT Software" on page 94** for more details.)

1. Clicking on the empty text box or the **Browse** button allows the upload of a Software Bundle.

2. Until a bundle has been uploaded, the **Upload** button is greyed out. If the upload is not successful, a status error message will be displayed.
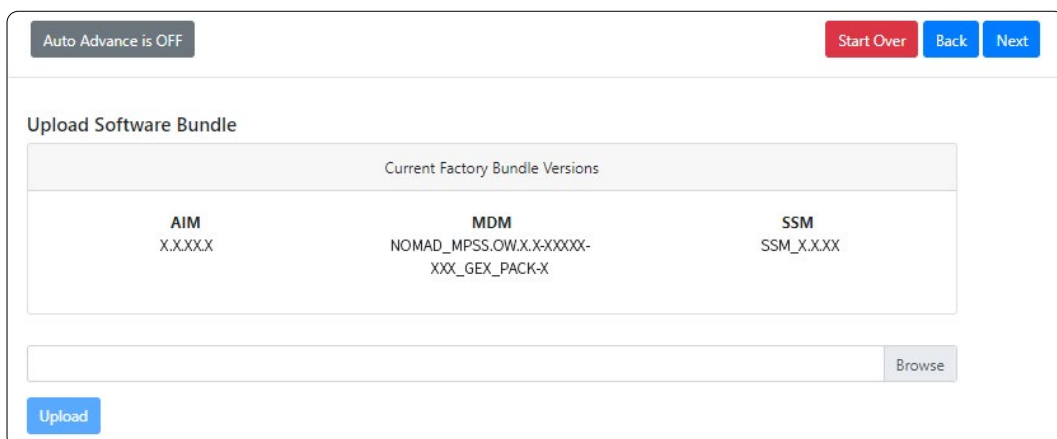
✓ Step 2: Upload Ephemeris Data

The Upload Ephemeris Data page is a simple file upload page. Simply click on the empty text box or the **Browse** button to upload an Ephemeris file. Until a file has been uploaded, the upload button is greyed out. Upon a successful upload, a success status message will be displayed, and the state can be advanced. Click on **Next**.
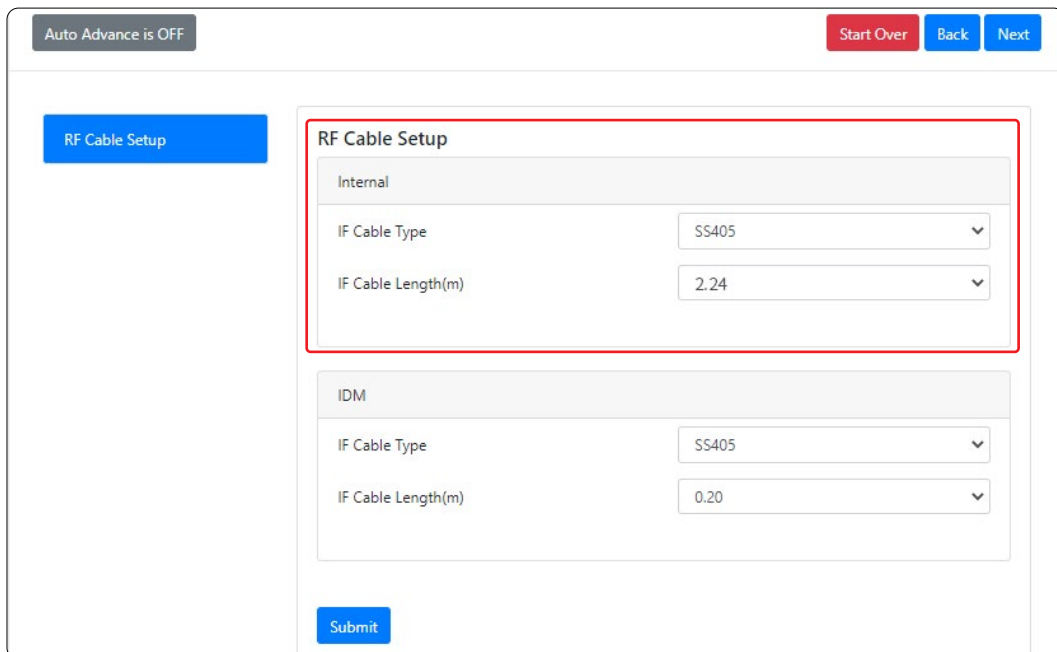

NOTE

What is Ephemeris Data?

Ephemeris Data contains current information about the orbits of the satellites in the OneWeb constellation. The User Terminal uses ephemeris data to determine the positions of the satellites in the sky at any given time.

Remark: Every 30days, this data file is updated. Once the User Terminal is commissioned this will be updated automatically.
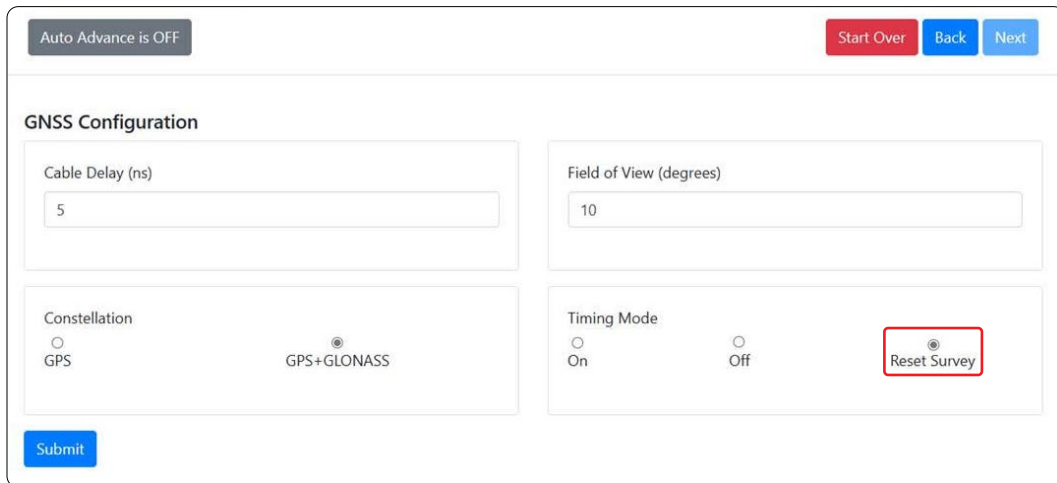
✓ Step 3: RF Cable Setup

The **IF Cable Type** and **IF Cable Length(m)** on the Internal is pre-set with a default value depending on the RF cable. Make sure that is the same with the following default values. Click the **Next** button to go to the next step.

• **IF Cable type : SS405**
• **IF Cable Length(m) : 2.24**

✓ Step 4: GNSS Configuration

Make sure the **Timing Mode** is **Reset Survey** when the **GNSS Configuration** page is appeared. Click the **Next** button to go to the next step.
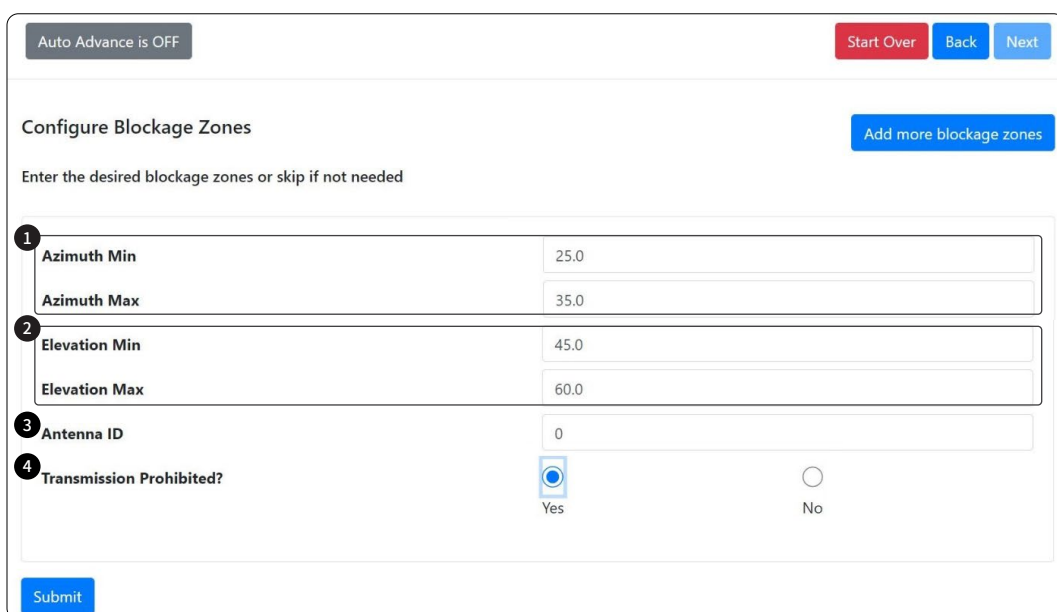
✓ Step 5: Configure Blockage Zones

It is optional to set up the blockage zones for the system. Each antenna can be configured up to 10 blockage zones with transmission muted. Click the **Add more blockage zones** to configure additional blockage zones.

- Azimuth Min/ Max : The Azimuth Min is the relative azimuth angle where the blockage starts, and the Azimuth Max is the relative azimuth where the blockage ends (Range: 0 ~ 360).

- Elevation Min/Max: The Elevation Min/Max is the elevation angle where the blockage is set (Range: 0 ~ 90). The blockage is activated below the elevation angle.

- Antenna ID: Enter the value of 0.

- Transmission prohibited? : Set whether to activate a TX mute or not (Yes/No).
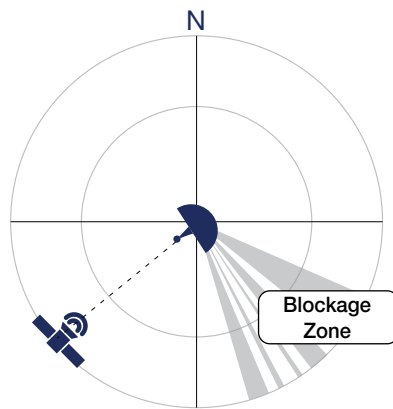
Click the **Submit** button to apply the settings to the system.

NOTE

- When setting a blockage zone, both "Blockage zones" and "No transmit zones" should be considered.
  - Blockage zones : Zones where obstructions can inhibit or degrade satellite communication
  - No transmit zones : Areas where transmit power is potentially dangerous for persons

Blockage Zone with no-transmit zones,
azimuth (example)
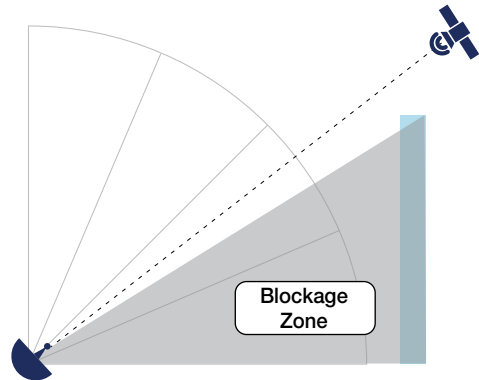
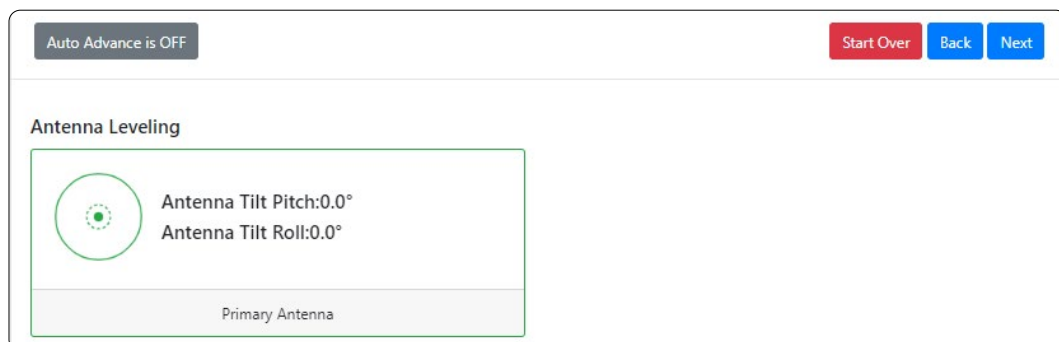Blockage Zone with no-transmit zones,
Elevation (example)

- If Blockage zone is set, you can see the status at **LUI** > **Antenna** > **Blockage Zones** menu.

- To get a blockage zone value, you should install the **Theodolite** application on an iOS device. Intellian recommends using the **Theodolite** application.

✓ **Step 6: Antenna Levelling**

Click the **Next** button to go to the next step.

✓ Step 7: Autonomous States

Autonomous states all display a progress bar of its progress. The following states require no action from the user aside from proceeding to the next state. All installation state is displayed, or some installation status is displayed underneath the progress bar.
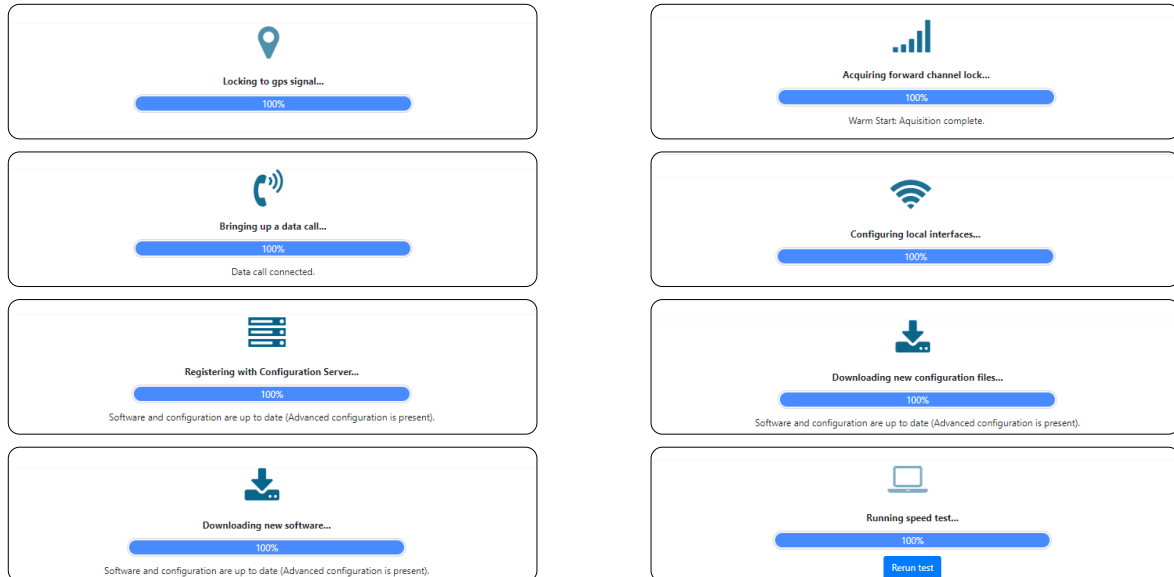
✓ Step 8: Installation Complete & Result

The configuration result is displayed. Toggle activation button to the right position on each result row to see the results.

This completes the steps of the wizard.
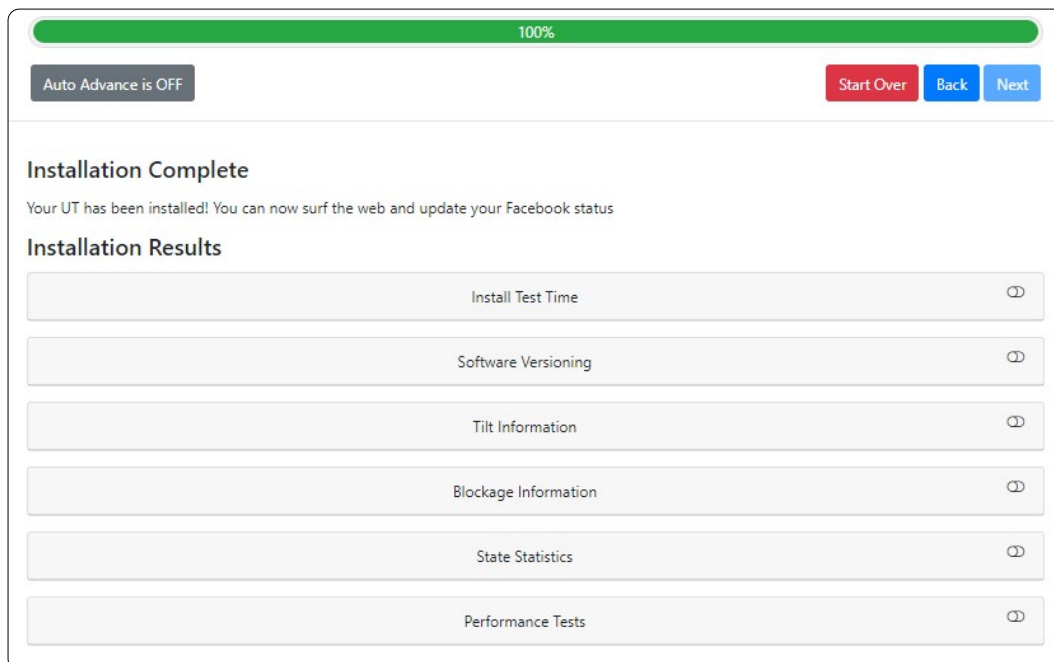
7.4 Monitoring Dual Antenna System

You should monitor the performance of the dual system via LUI. To monitor the dual system, position two windows side-by-side and then access LUI using ip address for each compound UT.

Compound UT#1
(Primary)

Compound UT#2
(Secondary)
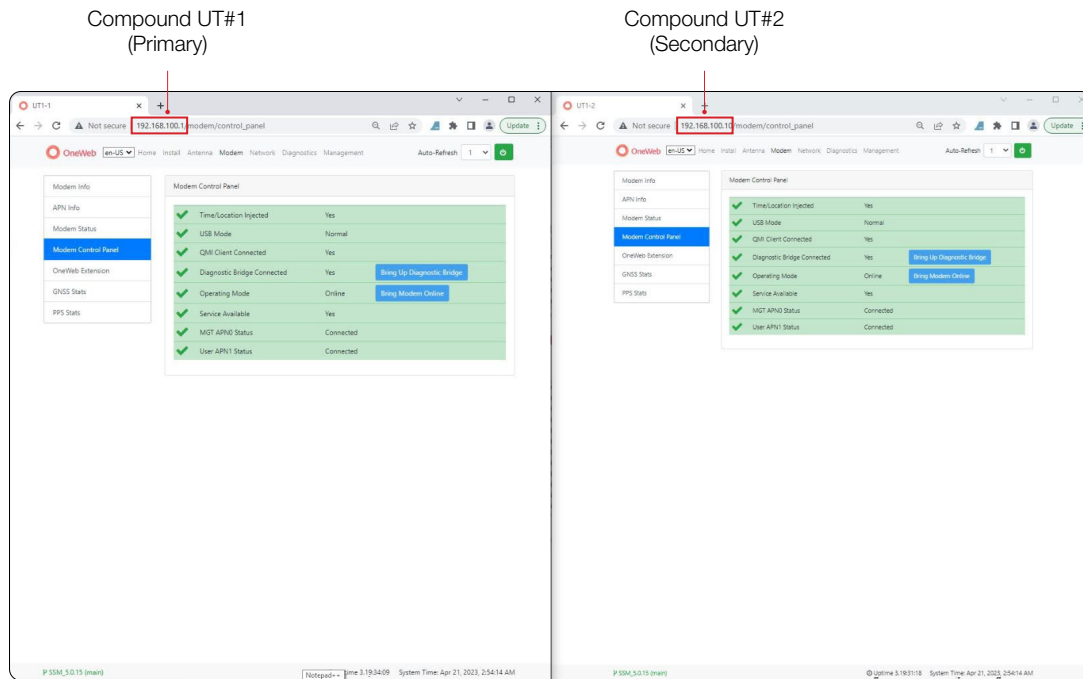
Chapter 8. Using Local User Interface (LUI)

8.1 Introduction

With the embedded Using Local User Interface (LUI) software, the antenna can be monitored, controlled, and diagnosed remotely through a web browser. It saves time and cost generated by maintenance activities such as operating firmware upgrades, tracking parameter resets, and system diagnosis, etc.

8.2 Turning On System

The antenna has to be connected to the CNX and powered up in order to access the webpage.

The CNX should be connected to a power adapter before connecting between the antenna and CNX.

8.3 Accessing Webpage

8.3.1 TCP/IP Connection through LAN Port

The network is automatically configured by DHCP with no additional PC IP configuration.

1. Connect an Ethernet cable from the **MGMT** (Management) Port on the front panel of CNX to a LAN Port of a PC. The Data MoCA indicator will turn Green if CNX is connected.

2. Enter the IP address into your web browser's address bar to log in to the Local User Interface (LUI).
   - **Compound UT#2 (Secondary): 192.168.100.10**
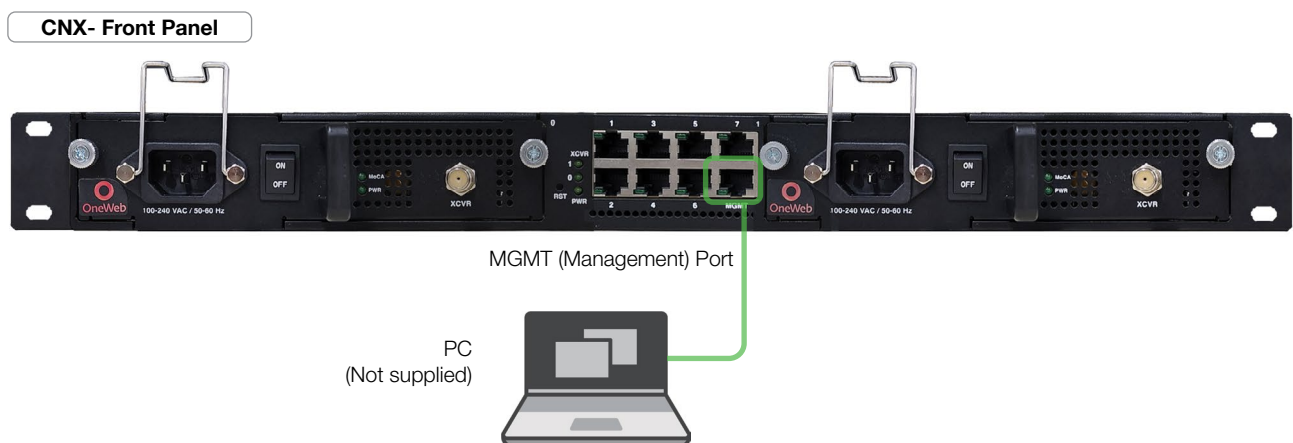   - **Compound UT#1 (Primary): 192.168.100.1**

Figure 17: Front Panel LAN Port Connection with CNX

NOTE

To access the LUI, you should set the CUC (Compound UT Controller) role. Refer to the **"7.2 Accessing LUI" on page 46** for more details.

8.4 Webpage Layout

Once you log in, the following information and menus are displayed.

8.4.1 Navigation bar

The navigation bar as shown below is the antenna way being able to navigate the LUI. The navigation bar is persistent across all LUI pages.
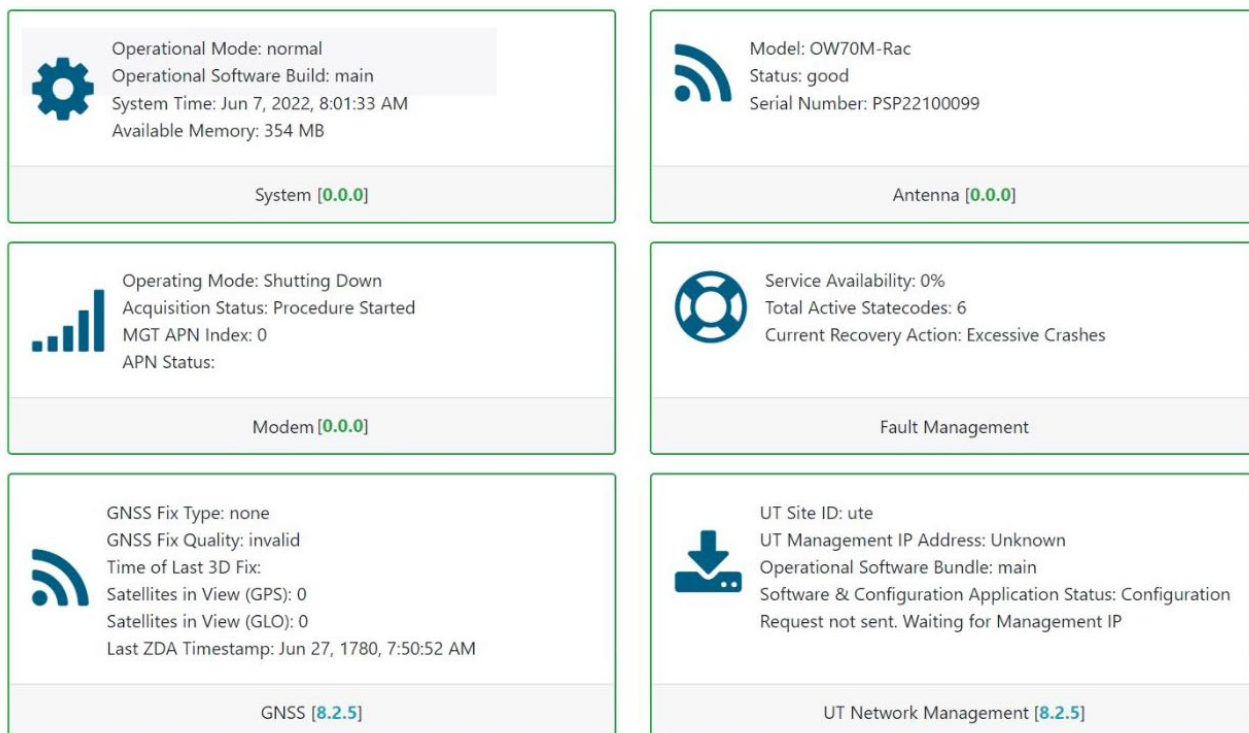

No.	Item	Description
①	Logo	This is the banner that displays the branding logo. Clicking on the logo on any given page will return the LUI to the homepage.
②	Language Drop Down Menu	The language drop-down menu lists all supported languages. Picking a language from the drop-down menu will change all text to the specified language immediately.
③	Navigation Items	These are the navigation items on the navigation bar. Clicking on a section will take you to a different part of the LUI. The sections are as follow: • Home: The homepage of the LUI displays a high-level overview of most components via a card layout. • Install: Guides the user through the installation process. More information on the installation process can be found in the **"7.3 Starting Install Menu (Install Wizard)" on page 50**. • Antenna: Displays Antenna Information such firmware version, configuration and status. • Modem: Displays Modem Information (IMSI, IMEI, Manufacturer, Software Version, etc.), Modem Status (Call Status, Operating mode, etc.), OneWeb Extension Statistics, and GNSS Statistics. • Network: Displays statistics for all the network interfaces on the SSM such as the CNX interface, MGT interface, and WAN interface. • Diagnostics: Contains most of the SSM related statistics and configuration. Displays information such as the UT Status, Sensor Information, Host Processor Logs, and Event Logs. • Management: Displays UT Network Management Information such as SDL Information and UCR Statistics.
④	Auto-Refresh	This is the auto-refresh drop-down. Choosing an interval other than 0 will, refresh the display, fetch the data again at the specified interval.
⑤	Reboot	This is the reboot button. Clicking this button will trigger an SSM reset. While the SSM is rebooting, the reboot button turns from green to red. Upon successful reboot, the LUI will automatically refresh the page and the reboot button will go back to being green.

8.4.2 Home Page

The home page consists of several cards that display a high-level overview of certain components such as the UT System, Antenna, or UT Network Management. Each card has a border that, depending on the status of the subsystem, changes color.

- Green: The system is behaving as normal.

- Orange: The system might cause errors. You should take precautions to prevent the occurrence of the errors or any situation.

- Red : The system is abnormal or incorrect (Error). In this case, follow the steps below.
  a. Check the state code on each card.
  b. Download the antenna logs. (Diagnostics → Host Processor Logs → download all)
  c. Check the cable connection status. If the cable connection is incorrect, try to connect a cable again.
  d. Click the reboot button on the navigation bar, and then turn the CNX power off and on again.
  e. If the same state code error(red) persists after rebooting, you should contact Intellian Technical Support for assistance.

Clicking on a card will take you to the webpage where you can find more detailed information about the subsystem.

Operational Mode: normal Operational Software Build: main System Time: Jun 7, 2022, 8:01:33 AM Available Memory: 354 MB System [0.0.0]	Model: OW70M-Rac Status: good Serial Number: PSP22100099 Antenna [0.0.0]
Operating Mode: Shutting Down Acquisition Status: Procedure Started MGT APN Index: 0 APN Status: Modem [0.0.0]	Service Availability: 0% Total Active Statecodes: 6 Current Recovery Action: Excessive Crashes Fault Management
GNSS Fix Type: none GNSS Fix Quality: invalid Time of Last 3D Fix: Satellites in View (GPS): 0 Satellites in View (GLO): 0 Last ZDA Timestamp: Jun 27, 1780, 7:50:52 AM GNSS [8.2.5]	UT Site ID: ute UT Management IP Address: Unknown Operational Software Bundle: main Software & Configuration Application Status: Configuration Request not sent. Waiting for Management IP UT Network Management [8.2.5]

8.4.3 Footer

The footer, like the navigation bar, is persistent throughout all LUI pages. The footer contains two pieces of information: one on the left and one on the right.

The current software version that is running on the Host Processor is displayed on the left. The operational software mode follows the software version. The text on the footer changes color depending on the operational software mode.

- Green: The operational software mode is main.

- Red: The operational software mode is factory. There are two ways to change the factory mode to main mode.

  - Set all managed components to false and reboot

    a. Go to Diagnostics → Configuration and search the term "manage".

    b. Click the word true in the value column to make the checkbox appear for each of the values not currently displaying false. Uncheck the checkboxes for each.

    c. Click Save and Reload.

    d. Ensure that the values remain false. Any changed values will be highlighted in red.

    e. Click the reboot button on the navigation bar to reboot. The reboot will take a few minutes.

    f. Ensure that all the changed items are now showing false in the value column.

  - Switch to the Factory Partition

    a. Go to Management → Switch UT Software.

    b. Select main, and then click Submit.

Clicking on this will take you to the **UT Status** section of the Diagnostics page.

The system uptime is displayed on the right. It displays how much time has passed since the last reboot. The format is days:hours:minutes:seconds.
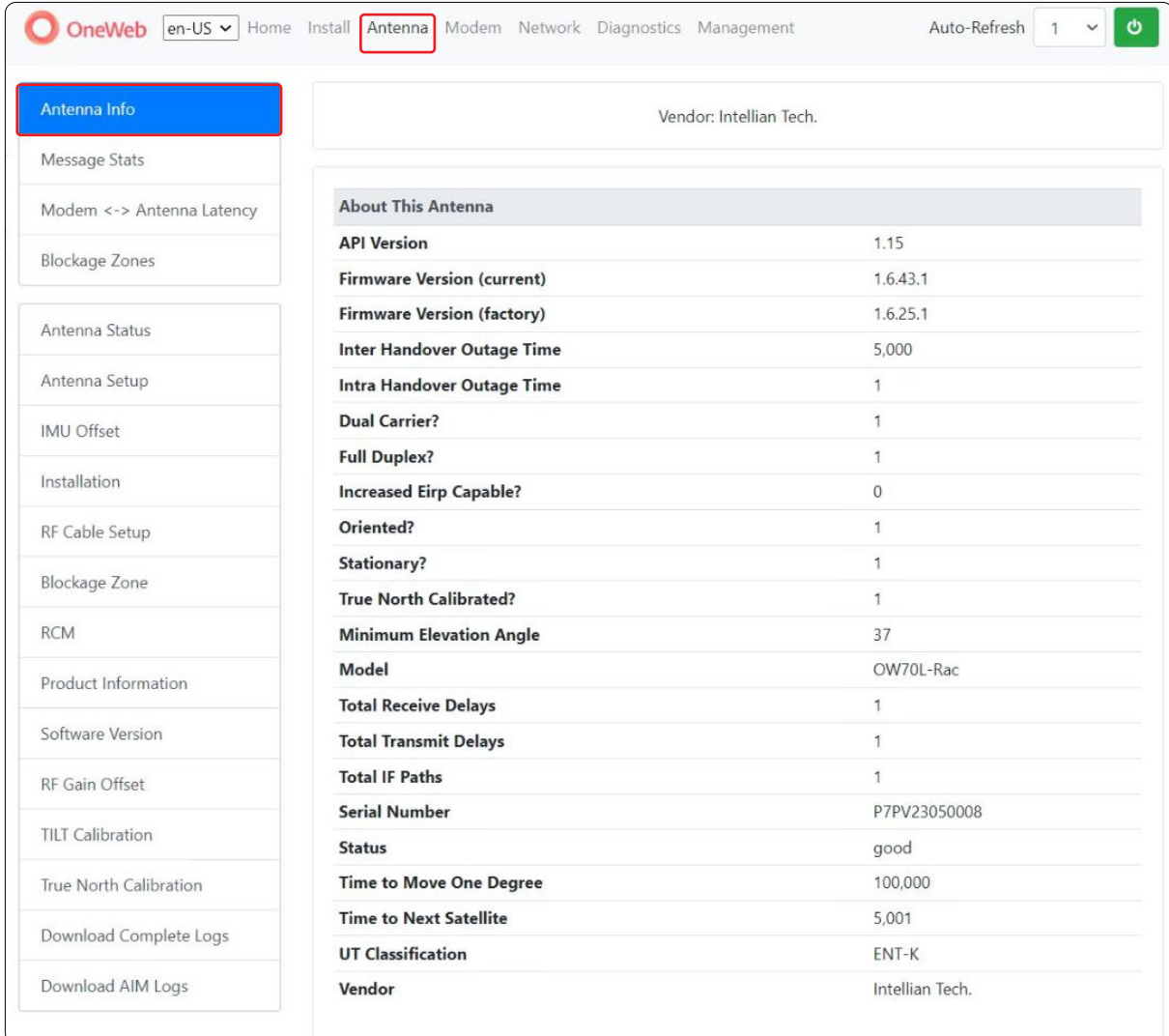
⑂ SSM_3.2.0.62 (main)   ⏱ Uptime 1:23:45:55

8.5 Antenna

This menu sets and displays the Antenna Info, Massage stats, Modem↔Antenna Latency, Blockage zones, Antenna status, Antenna Setup, Sensor Offset, RF cable setup, RCM, Product Information, Software Version, RF Gain Offset, True North Calibration, Download Complete Logs and Download AIM Logs.

8.5.1 Antenna Info

Displays the antenna information.

8.5.2 Massage stats

Provides the tables of a variety of information at once.

- Clear Status: Click the **Clear status** button to clear the shown page.

8.5.3 Modem ↔ Antenna Latency

Displays the latency between modem and antenna.

- Reset Max Latencies: Resets the maximum latencies.

8.5.4 Blockage zones

Antenna Info						
Message Stats	**Antenna ID**	**Azimuth Min**	**Azimuth Max**	**Elevation Min**	**Elevation Max**	**Transmission Prohibited?**
Modem <-> Antenna Latency	0	0	0	0	0	false
Blockage Zones						

Displays the set blockage zones.

8.5.5 Antenna status

Antenna Info			Antenna Status	
Message Stats	**Primary**	**Status**	**Initialized**	True
Modem <-> Antenna Latency			**Mode**	Track
Blockage Zones			**Motion Mode**	Warm Start Home
			Track ID	49021313
Antenna Status			**Satellite ID**	385
Antenna Setup			**True North Pointing Status**	Completed
IMU Offset			**Blockage Detected**	False
Installation			**Homing Enabled**	True
RF Cable Setup		**Current Position**	**Azimuth**	19.56
Blockage Zone			**Elevation**	80.39
RCM			**Cross Level**	0.40
Product Information		**Target Position**	**Azimuth**	19.45
Software Version			**Elevation**	80.34
RF Gain Offset			**Cross Level**	0.27
		Sensor Information	**Temperature**	44.20

Displays the antenna status, position and sensor information.

8.5.6 Antenna Setup

Antenna Info
Message Stats
Modem <-> Antenna Latency
Blockage Zones
Antenna Status
Antenna Setup
IMU Offset
Installation
RF Cable Setup
Blockage Zone
RCM
Product Information
Software Version
RF Gain Offset
TILT Calibration
True North Calibration
Download Complete Logs
Download AIM Logs

Antenna Setup

1 True North Pointing

Run Pt Assist at Every Reboot	False
Threshold Time	90.00
Ex Threshold Time	30.00

2 Coarse Search

Maximum Elevation	80.00
Range	10.00
Step	1.20
Stop Condition	3.00

3 Fine Search

Start Condition	2.00
Maximum Elevation	60.00
BFS	True

4 Primary True North Offset

Azimuth	-2.18
Elevation	-0.57
BFS Azimuth	-1.17
BFS Elevation	-0.15

5 Debug Log Level

Log Flags	0x7077
Download Log Duration	8.00
P-Log Interval	100.00

6 Mis-point Alarm

| Threshold Count | 10.00 |

Submit

Set the antenna. Click the **Submit** button to apply the settings to the system.

①	True North Pointing	Set the TN calibration. • Run Pt Assist at Every Reboot : Run the Pt assist at every reboot. Choose the False / True from the drop-down list. • Threshold Time: Indicates a time that enters the Extended Pointing Assistant. (Default: 90 minutes) • Ex Threshold Time: Indicates a time that takes antenna to complete one cycle for Extended Pointing Assistant.
②	Coarse Search	Set the current antenna elevation, range, step and stop condition. Searches the satellite signal from around the target angle. • Maximum Elevation: Set the completion condition for coarse search. If the SINR is higher than the stop condition and the antenna EL angle is lower than max. EL, the coarse search will be completed. • Range: Set the search range. • Step: Set the search step. • Stop Condition: If the SINR is receive more than the stop condition value, the stop condition will be completed.
③	Fine Search	Set the current antenna elevation and BFS (Background Fine Search). Searches the target satellite with the azimuth full scan (360°). • Start Condition: Set the SINR threshold value to start the fine search. • Maximum Elevation: Set the completion condition for fine search. If the SINR is stable and the antenna EL angle is lower than max. EL, the fine search will be completed. • BFS (Background Fine Search): Choose whether to use the function (False / True) after TN calibration is completed.
④	Primary True North offset	For setting the True North Offset, you need to select a satellite which is trackable in satellite information. When the antenna tracks the selected satellite, true north offset can be calculated. • Azimuth: Indicates how azimuth is far from the true north when the TN calibration is completed. • Elevation: Indicates how elevation is far from the satellite when the TN calibration is completed. • BFS Azimuth: Indicates the fine-tuning value from the azimuth value. • BFS Elevation: Indicates the fine-tuning value from the elevation value.
⑤	Debug Log Level	Set the debug log level. • Log Flags: Sets how detailed the logs are to be displayed. • Download Log Duration: Set the date range for which you want to download files. • P-Log Interval: Set the P-Log interval
⑥	Mis-Point Alarm	If the miss point maintains for more than setting time(sec), it will report the Mis-Point Alarm. • Threshold Time: Set the current threshold timeout (sec).

8.5.7 IMU Offset

The tilt values of the elevation and cross-level axes were calibrated to the optimal condition at the factory prior to shipment. ***The values should not be arbitrarily changed.***

①	External IMU Sensor	Displays the reflector sensor value. • Tilt EL Offset : Displays the tilt EL offset value. • Tilt EL Offset : Displays the tilt CL offset value.
②	Internal IMU Sensor	Displays the calibrated value for main sensor. • Tilt EL Offset : Displays the tilt EL offset value. • Tilt EL Offset : Displays the tilt CL offset value.

8.5.8 Installation

Displays the installation roll.

8.5.9 RF cable setup

The **IF Cable Type** and **IF Cable Length(m)** on the Internal is pre-set with a default value depending on the RF cable. Make sure that is the same with the following default values. ***The values should not be arbitrarily changed.***

- IF Cable type : Displays the cable type (**SS405**).

- IF Cable Length(m) : Displays the cable length (**2.24**).

8.5.10 Blockage zone

Displays the set blockage zones.

8.5.11 RCM

Displays the current RCM status (DSA Table(Primary Tx/Rx), Connection (Status), Product Information (Vendor, Model, Serial Number) Tx/ Rx status (Frequency, Attenuator, Temperature, TX or RX, KEYLINE, PLL Lock, , LO Lock).

8.5.12 Product Information

Displays the product information (Part Number, Serial Number).

8.5.13 Software Version

RCM		Software Version	
Product Information	Primary	Factory	1.6.25.1
Software Version		SYS0	1.6.38.1
		SYS1	1.6.40.1
RF Gain Offset		Current Partition	SYS1
True North Calibration		PCU Version	1.6.40
Download Complete Logs			

Displays the software version. (Factory, SYS0, SYS1, Current Partition, PCU version)

8.5.14 RF Gain Offset

Antenna Info	RF Gain Offset	
Message Stats	Primary	
Modem <-> Antenna Latency	❶ Transmit	
Blockage Zones	Channel 1	0.00
	Channel 2	0.00
Antenna Status	Channel 3	0.00
Antenna Setup	Channel 4	0.00
Sensor Offset		
Installation	❷ Receive	
RF Cable Setup	Channel 1	0.00
Blockage Zone	Channel 2	0.00
RCM	Channel 3	0.00
Product Information	Channel 4	0.00
Software Version	Channel 5	0.00
RF Gain Offset	Channel 6	0.00
True North Calibration	Channel 7	0.00
Download Complete Logs	Channel 8	0.00
Download AIM Logs		

Updates the RF gain values in real time.

①	Transmit	To increase or decrease TX gain, enter the values. • Channel: Adjust the Tx gain values for each channel.
②	Receive	To increase or decrease Rx gain, enter the values. • Channel: Adjust the Rx gain values for each channel.

8.5.15 TILT Calibration

Sets the tilt calibration.

- Select Antenna: Select the antenna you want to execute the tilt calibration.

- TILT Calibration Action: Select whether to start the tilt calibration or delete the setting value.

8.5.16 True North Calibration

Set the TN calibration.

- Pointing Assist Control: Choose the **Start** from the drop-down list to run the true north calibration an then click the **Submit** button.

8.5.17 Download Complete Logs

Click the Download button to download the complete log.

8.5.18 Download AIM Logs
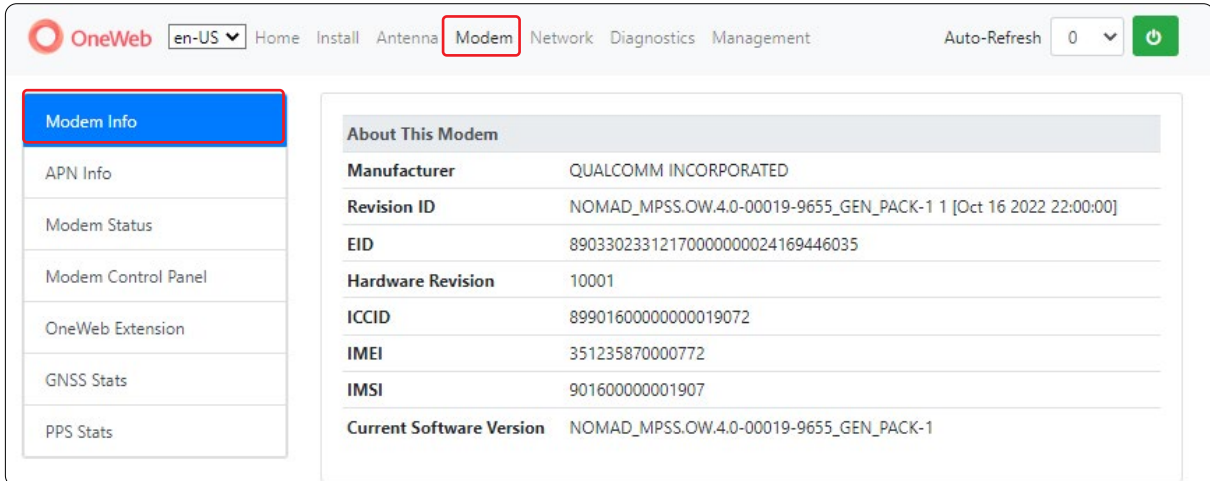
Click the Download button to download the AIM log.

8.6 Modem

This menu sets and displays the Modem Info, APN Info, Modem status, Modem Control Panel, OneWeb Extension, GNSS status, PPS status.
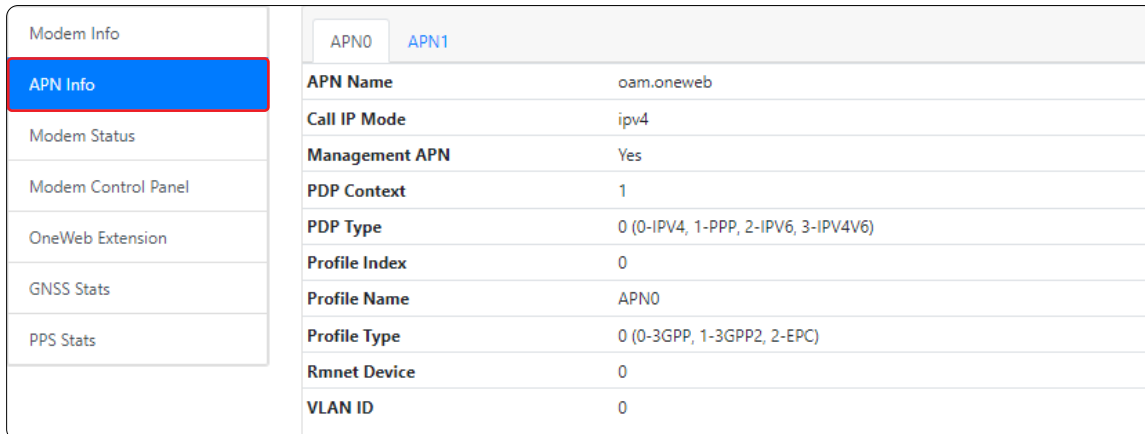
8.6.1 Antenna Info

Displays the modem information.

8.6.2 APN Info

Displays the APN0/1 information.

8.6.3 Modem status

Displays the modem status.

①	Modem status	Displays the current modem status.
②	QMI Errors	Displays the current modem error.

8.6.4 Modem Control Panel

The color shows the modem status.(Green: The modem is behaving as normal./Red: The modem is abnormal or incorrect (Error).)

- Bring Up Diagnostic Bridge: Try to connect the diagnostic bridge to check the modem status.

- Bring Modem Online: Converts the modem to online status.

8.6.5 OneWeb Extension

Make sure of the satellite connection status. (satellite signal, tracking etc.)

①	Request / Response	Displays the request and response for the SSM. • Clear Status: Click the **Clear status** button to clear the shown page.
②	Indication	Displays the tracking progress.
③	Faults	Displays the tracking faults.

8.6.6 GNSS Status

Modem Info
APN Info
Modem Status
Modem Control Panel
OneWeb Extension
GNSS Stats
PPS Stats

Clear Stats   Click here to see your current location...

GNSS Receiver Info

Manufacturer	Jackson Labs
Model	Micro-JLT
Software Version	0.71

Generic Sentence Counts

Bad NMEA sentences	0
Invalid serial lines	5
Missed NMEA sentences	520
Proprietary NMEA sentences	12,772
Total NMEA sentences	153,262
Unsupported NMEA sentences	0
NMEA sentences withheld from modem	2

Individual Sentence Counts

GGA	12,789
GLL	12,789
GSA (GPS/SBAS)	12,789
Empty GSA (no satellites tracked)	0
GSA (Galileo)	0
GSA (GLONASS)	12,789
GSV (GLONASS)	12,789
GSV (GPS)	12,789
PJLTV	12,789
RMC	0
VTG	12,802
ZDA	12,804

NMEA Data

Altitude	90.099998M
DGPS Age	nan
Time of First 3D Fix	2023-06-27T02:34:10.000000Z
SSM Uptime at First 3D Fix	137.220001
Fix Quality	GPS fix (SPS)
Fix Type	3D
HDOP (from GGA)	1.100000
GLL Status	active
HDOP (from GSA)	1.100000
GSA Mode	auto
Height Above Mean Sea Level	21.900000M
Hour Offset	0
Time of Last 3D Fix	2023-06-27T06:07:34.000000Z
Latitude	37.082298
Longitude	127.099060
Minute Offset	0

PDOP	1.900000
Number of Satellites Tracked	10
Number of GLONASS Satellites in View	5
Number of GPS Satellites in View	11
Timestamp	2023-06-27T06:07:52.000000Z
VDOP	1.600000

GPS/SBAS Satellites Tracked

5	6	7	9	13	19	20	0	0	0	0	0

GLONASS Satellites Tracked

68	69	83	0	0	0	0	0	0	0	0	0

GNSS Configuration

SCPI commands sent

*IDN?	1
GPS:FOV	1
GPS:GPGGA	1
GPS:GPGLL	1
GPS:GPGSA	1
GPS:GPGSV	1
GPS:GPRMC	1
GPS:GPVTG	1
GPS:GPZDA	1
GPS:PJLTV	1
GPS:POWGPS	1
GPS:POWTLV	1
GPS:PTNLRGPS	1
GPS:REF:ADEL	1
GPS:SYSTem:SELect	1
GPS:TMODe	1
SYST:COMM:SER:ECHO	1
SYST:COMM:SER:PRO	1

Displays the GNSS status.

• Clear Status: Click the **Clear status** button to clear the shown page.

①	GNSS Receiver Info	Displays the GNSS receiver information.
②	GNSS Sentence Counts	Displays the GNSS sentence counts.
③	Individual Sentence Counts	Displays the individual sentence counts .
④	NMEA Data	Displays the GNSS information. (Altitude, time, latitude, longitude etc.)
⑤	GPS/SBA Satellite Tracked	Displays the GPS satellite information in tracking.

⑥	GLONASS Satellite Tracked	Displays the GLO satellite information in tracking.
⑦	GNSS Configuration	This function is not supported for the model.
⑧	SCPI commands sent	Displays the SCPI commands information is set to the EGR module.

8.6.7 PPS status

Modem Info	PPS Stats	
APN Info	Consecutive Pulses Missed	0
Modem Status	Consecutive Pulses Received	1376
Modem Control Panel	Missed Pulse Count	117
OneWeb Extension	Pulse Count	1376
GNSS Stats	PPS Statecode	0.0.0
PPS Stats		

Displays the PPS status.

8.7 Network

This menu sets and displays the Network info, Packet Graphs .

8.7.1 Network info

Displays the modem information. (CNX Interface, Antenna Interface, Management Interface, WAN0, MoCA Interface)

8.7.2 Packet Graphs
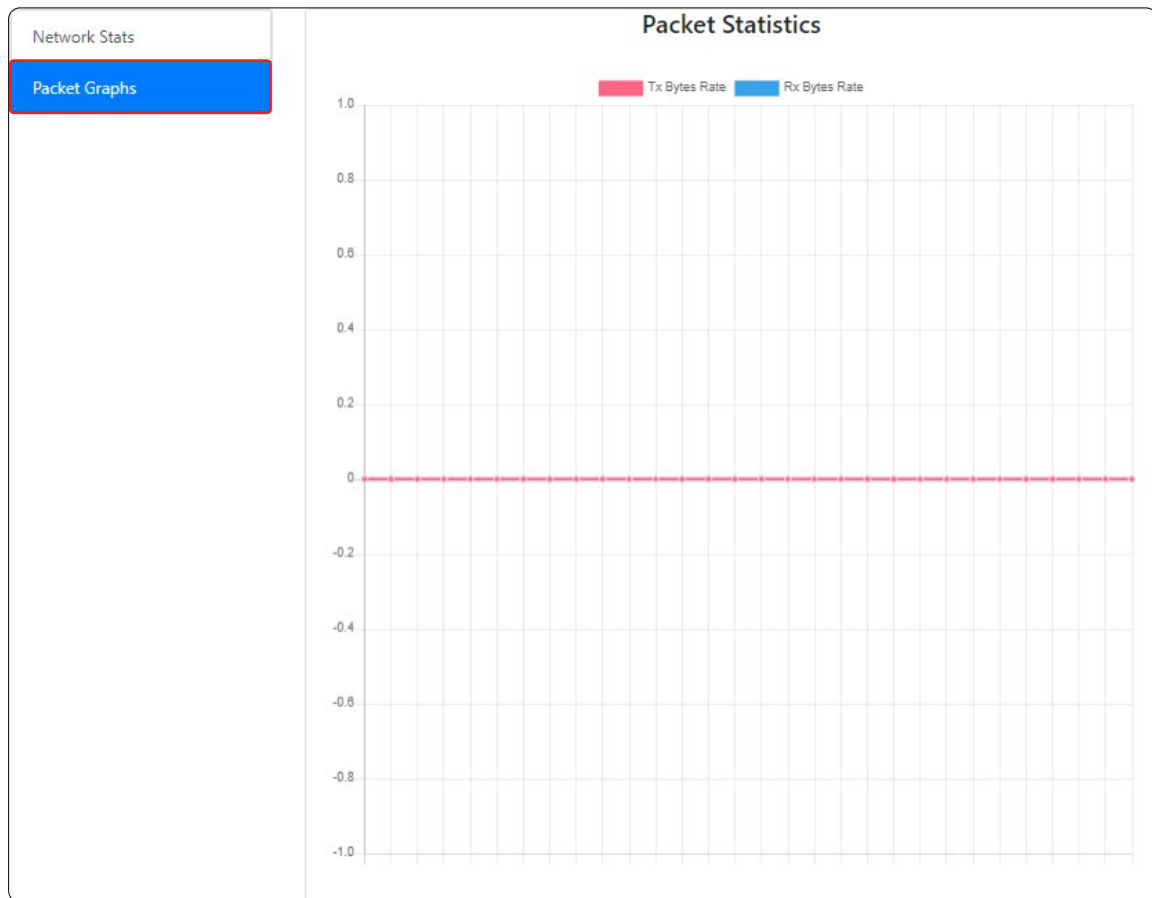
Measures an input Rx/Tx signal frequency within the full frequency range, and displays the information on the Graph. The display of the pocket statistics has the amplitude displayed on the vertical axis.

8.8 Diagnostic

This menu sets and displays the UT status, Host Processor Logs, Event Logs, UT Configuration, UT Advanced Configuration, Fault Management, CNX Manager, MoCA Info, System Monitor status, Sensor and Device Info, Statistics, Self Test Results, TWAMP.

8.8.1 UT status

Displays the UT status.

①	UT Info	Displays the Platform type, SSM serial number and UT Serial number
②	Restart Panel	Resets the antenna, modem, GNSS, CNX, MoCA. Click each button to reset them.
③	Feature Status	Displays the feature status.
④	UT components software report	Displays the software report.

8.8.2 Host Processor Logs

Download the host processor logs. Choose the desired logs from the drop-down list and then click the submit button.

- Download All : Click the **Download All** button to download the all logs.

- Filter by regex or string: Displays the logs filtering by regex or string.

8.8.3 Event Logs

Download or reload the event logs.

- Reload: Click the **Reload** button to reload the event logs.

- Reboot Events: Click the **Reboot Events** button to reboot the host controller.

- Download CSV: Click the **Download CSV** button to download the CSV.

- Clear Events: Click the Clear Events button to clear the host controller logs.

8.8.4 UT Configuration

UT Status	UT Configuration			
Host Processor Logs	Save Reload			
Event Logs	Filter by regex or string			
Configuration	**Group**	**Name**	**Value**	**Source**
Advanced Configuration	temp	log_level	error	cfg_default.json
Fault Management	temp	log_location	/var/log/temp.log	cfg_default.json
CNX Manager	temp	log_num_backups	0	cfg_default.json
MoCA Info	temp	log_size_kb	10	cfg_default.json
System Monitor Stats	mm	cache_eid	true	cfg_default.json
Sensor and Device Info	mm	cache_iccid	true	cfg_default.json
Statistics	mm	cache_imei	true	cfg_default.json
Self Test Results	mm	cache_imsi	true	cfg_default.json
TWAMP	mm	log_level	debug	cfg_ces.json
	mm	log_location	/var/log/mm.log	cfg_default.json
	mm	log_num_backups	0	cfg_default.json
	mm	log_size_kb	3000	cfg_ces.json
	mm	lte_rsrp_delta_tenths_db	10	cfg_default.json
	mm	lte_rssi_delta_tenths_db	10	cfg_default.json
	mm	lte_snr_delta_tenths_db	10	cfg_default.json
	mm	modem_heartbeat_timeout_s	5	cfg_default.json
	mm	modem_qmi_timeout_ms	300000	cfg_default.json

Displays the UT Configuration.

• Save: Click the **Save** button to save the UT Configurations.

• Reload: Click the **Reload** button to reload the UT Configurations.

8.8.5 UT Advanced Configuration

Display the UT advanced configuration.

• Reload: Click the Reload button to reload the UT advanced configuration.

①	CNX Interface	Displays the CNX interface. • Interface Name: Displays the interface name. • Interface IPv4 Address : Enter the ip address. • Interface Address Mask: Choose the subnet mask from the drop-down list. • Enable DHCP: Select the checkbox to activate the DHCP. • DHCP Start address: Enter the DHCP start address. • DHCP End address: Enter the DHCP end address. • Compound UT Peer IPv4 Address: Displays the IP address of Peer CUC. If the UT is configured as Primary, it will show the IP address of secondary CUC.
②	Antenna Interface	Displays the antenna interface. • Interface Name: Displays the interface name. • Interface IPv4 Address : Displays the ip address. • Interface Address Mask: Displays the subnet mask

8.8.6 Fault Management

UT Status	Current Active Statecodes	Current Recovery Actions
Host Processor Logs	4.12.1	Clear Modem Faults
Event Logs	14.4.1	
Configuration	4.2.2	
Advanced Configuration	4.9.2	
Fault Management	4.14.3	
CNX Manager	7.13.3	
MoCA Info	0.0.0	
System Monitor Stats		
Sensor and Device Info		
Statistics		
Self Test Results		
TWAMP		

Active Restrictions / Votes

Availability: 0%

0.0.0   10.1.1   3.1.1   3.3.2   4.12.1   5.4.3   8.4.5

Per Statecode Statistics

Statecode	Total Seconds Spent	Total Transitions
0.0.0	0	0
10.1.1	16	14
14.4.1	13,238	14
3.1.1	60	5
3.3.2	37	1
5.4.3	0	1
8.4.5	0	1

Ephemeris Backup and Restoration Statistics	
Master Modem Ephemeris Saved Count	4
Backup Modem Ephemeris Saved Count	4
OneWeb Ephemeris Saved Count	1
Last Master Modem Ephemeris Saved Time	2023-06-27T03:06:48Z
Last Backup Modem Ephemeris Saved Time	2023-06-27T03:06:48Z
Last OneWeb Ephemeris Saved Time	2023-06-27T02:38:12Z
Modem Ephemeris Restore Count	0
OneWeb Ephemeris Restore Count	0
Last Modem Ephemeris Restore Time	n/a
Last OneWeb Ephemeris Restore Time	n/a

Displays the fault status.

8.8.7 CNX Manager

Displays the CNX information.

①	CNX Information	Displays the CNX information.
②	Diagnostic Data	Displays the diagnostic result.

8.8.8 MoCA Info

UT Status	
Host Processor Logs	
Event Logs	
Configuration	
Advanced Configuration	
Fault Management	
CNX Manager	
MoCA Info	
System Monitor Stats	
Sensor and Device Info	
Statistics	
Self Test Results	
TWAMP	

MoCA Information

Link Status	Up
MoCA Version	2.0
Driver Version	3.11.18
SoC Version	21.2
Link Up Time	1742 seconds
Up Time	1750 seconds
Beacon Channel	550 MHz

Displays the MoCA information.

8.8.9 System Monitor status

	Heartbeat Count	Heartbeat Fail	Consecutive Restarts	Total Restarts
tfw	57	0	0	0
moca	57	0	0	0
faultman	0	0	0	0
fm_perf	0	0	0	0
stats_collector	0	0	0	0
amu	57	0	0	0
sigstablemon	0	0	0	0
tempmon	0	0	0	0
sdl	57	0	0	0
gnssmon	57	0	0	0
amc	0	0	0	0
cnx	0	0	0	0
component_upgrade	57	0	0	0
ppsmon	0	0	0	0

Watchdog Status: Enabled   Watchdog Count: 353   Clear Stats

Sidebar: UT Status, Host Processor Logs, Event Logs, Configuration, Advanced Configuration, Fault Management, CNX Manager, MoCA Info, System Monitor Stats, Sensor and Device Info, Statistics, Self Test Results, TWAMP

Displays the system monitor status

• Clear Status: Click the **Clear status** button to clear the shown page.

8.8.10 System Monitor status

UT Status		
Host Processor Logs	Available Memory: 333MB	Total Memory: 463MB
Event Logs		

Board Level Status		Temperature Sensor Information	
DDM Power	OK	DC-DC Converter Module	29.9 °C
DDM Aux Power	OFF	RF-LMM	26.0 °C
DC-DC Power for GigE	OK	Host Processor Reference Clock	29.0 °C
DC-DC Power for MoCA	OK	Host Processor Core	30.0 °C
CNX Data Path	MoCA		

Left navigation menu:
- UT Status
- Host Processor Logs
- Event Logs
- Configuration
- Advanced Configuration
- Fault Management
- CNX Manager
- MoCA Info
- System Monitor Stats
- Sensor and Device Info
- Statistics
- Self Test Results
- TWAMP

Board Level Status

DDM Power	OK
DDM Aux Power	OFF
DC-DC Power for GigE	OK
DC-DC Power for MoCA	OK
CNX Data Path	MoCA

PLL Status

38.4MHz PLL	N/A
25.0MHz PLL	Locked

RF-LMM Status

RF-LMM Power	OK
RF-LMM TX0 ON Signal	N/A
RF-LMM TX1 ON Signal	N/A

RF-LMM 25MHz Clock

Tx0 RF Path	Enabled
Tx1 RF Path	Enabled

AIM Status

AIM Power	OFF

Temperature Sensor Information

DC-DC Converter Module	29.9 °C
RF-LMM	26.0 °C
Host Processor Reference Clock	29.0 °C
Host Processor Core	30.0 °C

eMMC Info

mmcblk2	3.7G
mmcblk2boot0	4M
mmcblk2boot1	4M

Displays the sensor/device information. The color shows the sensor/device status.

- White: The modem is behaving as normal.
- Yellow: The system might cause errors.
- Red: The modem is abnormal or incorrect (Error).

8.8.11 System Monitor status

UT Status	**Statistics**	
Host Processor Logs	**Upload Metrics**	
Event Logs	Mar 7, 2023, 10:24:06 AM	Mar 7, 2023, 9:23:50 AM
Configuration	Mar 7, 2023, 8:23:35 AM	Mar 7, 2023, 7:23:20 AM
Advanced Configuration	Mar 7, 2023, 6:23:05 AM	Mar 7, 2023, 5:22:49 AM
Fault Management	Mar 7, 2023, 4:22:34 AM	Mar 7, 2023, 3:22:19 AM
CNX Manager	Mar 7, 2023, 2:22:04 AM	Mar 7, 2023, 1:21:49 AM
MoCA Info	Mar 7, 2023, 12:21:34 AM	Mar 6, 2023, 11:21:20 PM
System Monitor Stats	Mar 6, 2023, 10:21:06 PM	Mar 6, 2023, 9:20:51 PM
Sensor and Device Info	Mar 6, 2023, 8:20:36 PM	Mar 6, 2023, 7:20:22 PM
Statistics	Mar 6, 2023, 6:20:07 PM	Mar 6, 2023, 5:19:52 PM
Self Test Results	Mar 6, 2023, 4:19:37 PM	Mar 6, 2023, 3:19:23 PM
TWAMP	Mar 6, 2023, 2:15:10 PM	Mar 6, 2023, 1:14:57 PM
	Mar 6, 2023, 12:14:43 PM	Mar 6, 2023, 11:14:31 AM

Checks the antenna status periodically and displays on the page. To activate the function, set the **Update_ Statistics** value to true on configuration.

• Upload Metrics: Upload the status information to OneWeb server.

8.8.12 Self Test Results

UT Status	**Self Test Overall Result** : pass
Host Processor Logs	
Event Logs	**Self Test Sub-test Results**
Configuration	**25MHz PLL Successfully Programmed** — true
Advanced Configuration	**38MHz PLL Successfully Programmed** — true
Fault Management	**SSM Software Image (current)** — SSM_5.0.15
CNX Manager	**BSP Version (current)** — SSM_BSP_4.0.15
MoCA Info	**DDR Size (bytes)** — 536,870,912
System Monitor Stats	**eMMC Size (bytes)** — 3,909,091,328
Sensor and Device Info	**MMC Test Passed?** — true
Statistics	**RAM Test Passed?** — true
Self Test Results	
TWAMP	**AIM Result : PASS**

Antenna Power on Self Test Results Subsection (Master main board)

FLASH	Pass
GPIO_0	Pass
GPIO_1	Pass
GPIO_2	Pass
SDRAM	Pass

CNX Result : NOT AVAILABLE

Run the self test to check the AIM/CNX status.

8.8.13 TWAMP

Sets the network test function by entering the required parameters.

- Server IPv4 Address: Enter the server IPv4 address.
- Server Port: Enter the server port.
- Inter-Packet Interval(m):Enter the inter-packet interval(m).
- Number of Packets: Enter the number of packets.
- Start: Click the Start button to start the TWAMP.

8.8.14 Compound UT Information

UT Status

Host Processor Logs

Event Logs

Configuration

Advanced Configuration

Fault Management

CNX Manager

MoCA Info

System Monitor Stats

Sensor and Device Info

Statistics

Self Test Results

TWAMP

Compound UT Info

Compound UT Information   Primary

① Received Messages ⓘ

Blockage Prediction Request	1,854
Cancel Track Request	927
Data Service Available	88
Intersatellite Handover Complete	18
Intersatellite Handover Pending	23
Peer Message	17,596
Reset Modem Recovery Action	3
Soft Reset AIM Recovery Action	3
Track Advisory Request	928
Tune RX Channel Request	924

② Path Usability Updates ⓘ

Cancel Track Request	927
Data Service Available	88
Intersatellite Handover Complete	18
Intersatellite Handover Pending	22
Peer Message	17,596
Track Advisory Request	928
Tune RX Channel Request	924

③ General Statistics

Current Availability Status	Unavailable
Current VR status	Standby
Number of Active Switches	48
Number of Standby Switches	48
Number of Messages Sent to Peer	13956

④ Compound Data Path Availability Statistics

Cumulative Availability	0:02:32:11 (days,hours,minutes,seconds)
Availability Percent	67%
Cumulative Unavailability	0:01:16:31 (days,hours,minutes,seconds)

⑤ Compound Data Path Availability Events

GPS Time (week,microseconds)	VR status	Downtime (days,hours,minutes,seconds)
2023-06-27 05:52:36.374735 (2268,193956374735)	Primary (Unavailable)	
2023-06-27 05:52:36.374823 (2268,193956374823)	Secondary	0:00:00:00.000088
2023-06-27 05:56:01.867721 (2268,194161867721)	Primary	
2023-06-27 06:12:50.245027 (2268,195170245027)	Secondary (Unavailable)	

⑥ Service Availability Statistics

Cumulative Availability	0:02:23:44 (days,hours,minutes,seconds)
Availability Percent	63%
Cumulative Unavailability	0:01:25:33 (days,hours,minutes,seconds)

⑦ Service Availability Events

GPS Time (week,microseconds)	Availability Status	Downtime (days,hours,minutes,seconds)
2023-06-27 05:27:05.737025 (2268,192425737025)	Available	0:00:00:16.503215
2023-06-27 05:30:18.685734 (2268,192618685734)	Unavailable	
2023-06-27 05:30:36.351210 (2268,192636351210)	Available	0:00:00:17.665476

Displays the primary-secondary antennas information.

①	Received Message	Displays the message information used for tracking satellites (Track message etc.).
②	Path Usability Update	Displays the path usability update.
③	General Statistics	Displays the information about Oneweb network connection.
④	Compound Data Path Avaiability Statistics	Displays the information about the primary-secondary handover and Oneweb network available.
⑤	Compound Data Path Availability Events	
⑥	Service Availability Statistics	Displays the information about Oneweb network connection or disconnection statics.
⑦	Service Availability Events	Displays the statistics of corresponding CUC.

8.9 Management

This menu sets and displays the Management Status and Switch UT Software.

8.9.1 Management Status

Displays the management status.

- Clear Status: Click the **Clear status** button to clear the shown page.

8.9.2 Switch UT Software

Software mode can be switched to factory or main. Click the **Submit** button to apply the settings to the system.

Chapter 9. Specification

9.1 Technical Specification

9.1.1 RF Specification

Item	Specification
Rx Frequency	Rx : 10.7 – 12.7 GHz
Rx Gain (Wthout Radome)	Rx: 36.0 dBi
G/T (@ 11.8 GHz, @ >30deg. EL)	12.2 dB/K
Tx Frequency	Tx: 14.0 – 14.5 GHz
Tx Gain (Without Radome)	Tx: 38.4dBi
EIRP	33.6 dBW / 20 MHz (single carrier) 36.6 dBW / 40 MHz (dual carrier)
Cross pol Isolation	Min 15 dB
Polarization	Rx: RHCP, Tx: LHCP

9.1.2 System Specification

Item		Specification
Platform		Three Axis: Azimuth, Elevation, Cross-level
Positioning		3-axis Control: Azimuth, Elevation, Cross-Level
Pedestal Motion Range	Azimuth	-300° to +300°
	Elevation	-59° to +59° from zenith (FOV -53° to +53°)
	Cross-Level	-10° to +10°
Power Consumption		Primary 1 : 87 W Max Primary 2 : 87 W Max
CNX Input Power		100-240 VAC, 50 ~ 60 Hz (Enterprise)
DC Power to Transceiver		Current 1.6A Max @ 40-60V, 56V nominal
GNSS Receiver	GPS L1 Frequency	1574.397 – 1576.443 MHz
	GLONASS Frequency	1597.5515 – 1605.886 MHz
	Communication Protocol	NMEA 0183
	Reference Clock Frequency	38.4 MHz sinusoidal reference clock output to the SSM
	Supply Voltage	Min. 5.2 ~ Max. 5.8V
	Power Consumption	Max. 8 W
	Antenna Power Interface	Min. 3 ~ Max. 5V
	Surge Protection	Max. 2 kV
	Connections	SMA

Item	Specification
Digital Signals	Tx-ON : LVDS
	Rx-ON : LVDS
	Frequency Reference: LVDS
	Reset: LVDS
Ant. Monitor, Control Interface	Ethernet, 10/100 Base T
RF Cable	RG6(30m) or RG11(100m)
Heater Power Consumption	Max. 200W
Ethernet Cable	CAT5 (CNX to User terminal)

9.1.3 Mechanical Specification

Item	Specification
Radome Height	770 mm (30.3")
Radome Diameter	Ø845 mm (33.3")
Reflector Size	73 cm (28.7")
Radome Color	White
Antenna Safety Gap	15 mm
Antenna Weight	< 34 kg with Radome & OHM

9.1.4 Package Specification

Item			Specification
Antenna Package	Single stack	Size	910 mm x 910 mm x 1070 mm (L x W x H)
		Weight	Approx. 66 kg (Antenna+Package +OHM)
			Approx. 64 kg (Antenna+Package)
	Double stack	Size	910 mm x 910 mm x 2140 mm (L x W x H)
		Weight	Approx. 132 kg (Antenna+ Package+OHM)
			Approx. 128 kg (Antenna+Package)
CNX Package	Size		576 mm x 381 mm x 140 mm
	Weight		6.3 kg (2.6 lbs)

※ Package size may change with design revisions

Unit: mm

Single stack

Double stack
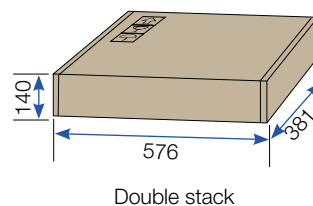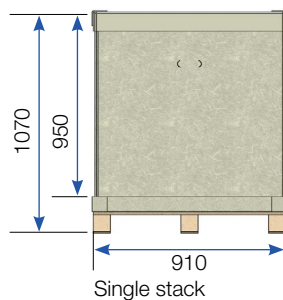
9.2 Customer Network Exchange (CNX) Specification

Item	Specification
Size (W x D x H)	442 mm x 250 mm x 44.4 mm (17.4" x 9.8" x 1.7")
Weight	5.1kg (11.2 lbs)
Transceiver Interface	Eight GigE RJ-45 Ethernet(1 Management Port)
Encryption	MoCA 2.0 E-band (400-700MHz)
AC Input Voltage	AC 100V ~ 240V/50Hz ~ 60Hz
Operating Power	Max. 30 W
Output Voltage	Nom. 56V
Output Power	Max. 250W
LEDs	**PWR:** • Operational: Solid GREEN • Off: No power
	MoCA • Operational: Solid GREEN (CNX-SSM MoCA connected) • Off : CNX-SSM not connected

9.3 Environmental Specification

Item	Specification
Operational Temperature	- 40°C to + 55°C (w/ optional heating device) - 25°C to + 55°C (w/o heating device)
Survival Temperature	-40°C to +80°C
Storage Temperature	-40°C to +85°C
Storage Environment	ETSI EN 300 019 Class 1.1
Operational Temperature (CNX)	-40°C ~ +55°C
Operational Humidity	Relative humidity range of 10% to 100% non-condensing in accordance with IEC60068-2-78 for a period of 96 hours.
Non-operational Humidity	IEC 60068-2-78 Method Db for a period of 4 hours
Operational Vibration	IEC 60068-2-64, .001 - .02 PSD, slope +12, 5 to 10 Hz .02 PSD, slope 0, 10 to 50 Hz .02 - .001 PSD, slope -12, 50 to 100 Hz
Non-operational Vibration	IEC 60721-3-4, Class 4M3 3.0 mm peak (+/- 1.5) (2-9 Hz) 5 m/s2 (9-200 Hz) IEC 60068-2-6 with test duration of 5 sweeps per each of the 3 axes.
Operational Shock	IEC 60068-2-27
Non-operational Shock	IEC 60068-2-27
Weather Tightness	IP66 per IEC 60529
Lightning Protection	IEC 61000-4-5 Class 4
Hail Impact	ASTM E822
Operating Wind Resistance	80 km/hr (50 mph)

Item	Specification
Lightening	IEC 61000-4-2 (ESD) IEC 61000-4-4 (EFT) IEC 61000-4-5 (Surge)

* Wind Load: N is weight expression unit: newton and kgf is 9.80665N

Chapter 10. Warranty

Subject to the terms and conditions set forth in this Intellian Standard Global Warranty, the Agreement and/or any other terms and conditions agreed upon by Distribution partners and Intellian, Intellian satellite antenna products are warranted against defects in parts and workmanship for a period of one (1) year in respect of defects in parts and for a period of one (1) year in respect of the factory labor.

Warranty Time Period: Warranty periods commence from the date of shipment from an Intellian facility.

If installation occurs within six months of the date of shipment from an Intellian facility then Intellian will extend the duration of the warranty by the number of days between shipment and installation of the terminal. If installation occurs on or after six months of the date of shipment then the duration of the warranty will not be extended.

This Warranty shall be void for any Product which has been subjected to **"Intellian Standard Global Warranty"**.

Warranty Claim Procedure: Information on Intellian's warranty policy and coverage can be found on the Intellian Partner Portal. Intellian's warranty policy aims to reimburse Distribution partners for a reasonable percentage of costs and time that would be incurred when repairing an Intellian system. Intellian's warranty policy does not cover any other costs including those incurred by Distribution partners to support End Users.

To submit a Warranty Claim with Intellian. Please follow the directions in **"Intellian Standard Global Warranty"**.

Chapter 11. Appendix

11.1 Pre-Installation Checklist

This pre-installation checklist describes important considerations before installing the UT. It must be completed by the certified installer to install in a safe location. Please fill out the general information below.

Date of Survey:

Date of Install (If different from installation date):

<u>*Installer Information*</u>

- Company Name:
- Installer's Name:
- Contact Phone Number:
- Address:
- Email:

<u>*Customer Information*</u>

- Organization Name:
- Customer Name:
- Phone Number:
- Address:
- Email:
- Site Location (Lat / Long.):
- UT Type Being Installed (w. CNX):

The following checklist is to be completed by the Installer.

Building / Site checklist

Check Item	Result
The proposed antenna mount type is checked. (Roof Mount / Ground Mount / Ground Level Pole Mount / Pole Mount Bolted to Wall / Custom Mount / Etc.)	(Fill out)
The location of the site is checked. (Urban / Semi-urban / Rural / Remote)	(Fill out)
The building external wall composition is checked. (If mounted on the building)	Yes / No / N/A
The line-of-sight of the antenna is checked for radiation safety.	Yes / No / N/A
The safety from unauthorized access is checked.	Yes / No / N/A
The roof space/floor space availability based on mount type is checked.	Yes / No / N/A
The roof/soil composition based on mount type is checked.	Yes / No / N/A
The lightning protection availability is checked.	Yes / No / N/A

Expected Obstructions / Possible Interference checklist

Check Item	Result
The field of view to satellite constellation is checked.	Yes / No / N/A
The no interference with RF transmitters is checked.	Yes / No / N/A
The no interference by high voltage lines, power cables, and telephone cables is checked.	Yes / No / N/A
The no other possible sources of interference are checked.	Yes / No / N/A
The map of no obstruction is checked. (Also updated into UT configuration as an array of AZ, EL coordinates.)	Yes / No / N/A

11.2 Tightening Torque Specification

This table shows the recommended values of tightening torques.

Bolt Size	Tightening Torque (N m)
M2	0.5
M2.5	1
M3	1.5
M4	3
M5	6
M6	12
M8	27
M10	50
M12	85
M14	130
M16	200

11.3 Checking separately sold items

Refer to separately sold items list below table.

Accessory Kit

Part Number	Part Description
OW-NPM-Kit	None-Penetrating Mount Kit
OW-GB-1050-Kit	Ground Braid Kit

Accessories

Part Number	Part Description
OW-TK-1008	Toolkit, Compression Connector
OW-CIK-1010	Connector Installation Kit
OW-RG11-1009	1000' Reel RG11 Cable, Solid Copper Conductor
OW-LS-1002-OW70	UT Lifting Strap for OW70L-D
OW-NPM-1012-RM	NP Mount
OW-NPM-1013-ATP	NP Adjustable Top Plate (2EA)
OW-NPM-1014-RM	NP Rubber Mat
OW-GB-1053	Grounding Braid (1EA)
OW-GB-1054-M58	M5 X 8 Screw for GB (25EA)
OW-GB-1055-FW	Flat Washer for GB (100EA)
OW-GB-1056-TLW	Tooth Lock Washer for GB (100EA)
OP-T1B0	CNX-T
OP-T1C0	CNX-E
OW-CNX-1057-PA	CNX Power Adapter (250W)

11.4 Important Notice of Waterproofing Connector

11.4.1 Introduction

During antenna installation, it is important to ensure that once the cable is connected to the antenna, proper waterproofing of the connector must b e done with a self-amalgamating tape.
If you need any assistance, please contact Intellian Technical Support (support@intelliantech.com).

11.4.2 Outline of Taping

Self-amalgamating tape comes with a protective, plastic peel-away layer that allows the tape to rolled and shipped. To waterproof a connector, you need to begin by peeling away a portion of this protective plastic layer and then start wrapping the tape around it.

11.4.3 Procedure

1. Connect the cable to the connector to be fully secured.

⚠ CAUTION
- DO NOT over-tighten the connector, nuts, or screws when mounting the antenna to prevent any damage.
- DO NOT leave any cables loosen and non-fixed, especially for those installed outside of the antenna.

2. Apply tape over the connetor.
   It is important to wrap the cable onto itself and the best practice is to wrap the tape over itself by 50%, meaning that once you wrap your first layer your second layer should overlap over half of the first layer, and so on. This ensures that you get a strong bond between the different layers of tape that properly adhere to one another.

3. Ensure that the entire RF connector is taped up as shown the picture right.

⚠ WARNING
- Note that you cannot use ordinary electrical tape to waterproof the RF connector.
  Only self-amalgamating tape is able to waterproof the connector properly.
- Failure to do so will result in rust and corrosion to the cable and its connector and this might end up damaging the antenna.