



v100E

1.05 m Ku-band
Maritime VSAT Antenna System

Installation & Operation User Guide

Serial number of the product

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This serial number will be required for all troubleshooting or service inquiries.



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Disclaimer

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Table of Contents

Chapter 1. Precautions	7
1.1 Warnings, Cautions, and Notes	7
1.2 General Precautions	7
Chapter 2. Certifications	8
Chapter 3. Introduction	11
3.1 Intellian v100E Introduction	11
3.2 Intellian v100E Features	11
Chapter 4. Planning Installation	12
4.1 Selecting Installation Site	12
4.1.1 Minimizing Satellite Blockage	12
4.1.2 Avoiding RF Interference	13
4.1.3 RF Hazard Precautions	13
4.2 System Package	15
4.2.1 Above Deck Unit (ADU)	15
4.2.2 Antenna Control Unit (ACU)	15
4.2.3 Packing List	16
4.3 System Cables (Customer Supplied)	17
4.3.1 Antenna RF Cable (Customer Supplied)	17
4.3.2 Gyrocompass Cable (Customer Furnished)	17
4.4 Unpacking System Package	18
Chapter 5. Installing Above Deck Unit (ADU)	20
5.1 Antenna Dimensions	20
5.2 Antenna Mounting Hole Pattern	22
5.3 Designing Mast (Example Only)	23
5.4 Routing RF Cable on Mast (Example Only)	25
5.5 Removing Antenna from Wooden Pallet	26
5.6 Placing Antenna Above Mast	27
5.7 Mounting Antenna on Mast	28
5.8 Connecting RF Cable to Antenna	30

Chapter 6. Installing Below Deck Unit (BDU)	33
6.1 Selecting BDU Installation Site	33
6.2 ACU Dimensions	33
6.3 Mounting ACU on 19-inch Rack	34
6.4 Antenna System Configuration	35
6.4.1 Single Antenna System Configuration	35
6.5 ACU Cable Connection	36
6.5.1 ACU Back Panel Connectors	36
6.5.2 ACU Connector Pinout Guide	36
6.5.3 Connecting Power to ACU	40
6.5.4 Connecting ACU to Antenna	40
6.5.5 Connecting ACU to Modem	41
6.5.6 Connecting ACU to Ship Gyrocompass	42
6.6 ACU to PC Communication Setup	43
6.6.1 TCP/IP Connection	43
6.6.2 USB Connection	43
Chapter 7. Operating Install Wizard	44
7.1 Turning On System	44
7.2 Accessing AptusNX	44
7.3 Modem Configuration	45
7.4 Starting Install Wizard	47
Chapter 8. Operating ACU	55
8.1 ACU Front Panel View	55
Chapter 9. Using AptusNX	56
9.1 Introduction	56
9.2 Accessing AptusNX for ACU	56
9.3 Main Page (Page Login)	57
9.4 Top Menus	58
9.5 Account Menu	59
9.5.1 Account	59
9.5.2 Registration	60
9.5.3 System	61
9.5.4 User Manager	62
9.6 Dashboard	63
9.6.1 How to Add & Remove Panels (Dashboard Setting)	63
9.6.2 How to Arrange Dashboard Layout	64
9.6.3 How to Use Shortcut Settings	65
9.7 Install Wizard	65
9.8 System Tools	66
9.8.1 Firmware Upgrade	66
9.8.2 iARM Upgrade	68
9.8.3 iARM Save & Reboot	70
9.8.4 Satellite Library	71
9.8.5 Graph	72
9.9 System Troubleshooting	73

9.9.1 Diagnosis	73
9.9.2 Antenna Log	75
9.9.3 Antenna Event Log	76
9.9.4 Support	76
9.10 System Setting	77
9.10.1 Ship Setting	77
9.10.2 Antenna Setting	79
9.10.3 Tracking Satellite Setting	82
9.10.4 Network Configuration	83
9.10.5 Modem/BUC Setting	85
9.10.6 Backup & Restore	88
Chapter 10. Specification	89
10.1 Technical Specification	89
10.2 Environmental Specification	90
Chapter 11. Warranty	91
Chapter 12. Appendix	92
12.1 Appendix A. Tightening Torque Specification	92
12.2 Appendix B. Important notice of waterproofing connector	93
12.2.1 Introduction	93
12.2.2 Outline of taping	93
12.2.3 Procedure	93

List of Figures

Chapter 4. Planning Installation	12
Figure 1: Elevation Limit of Obstacles	12
Figure 2: Potential RF Interference	13
Figure 3: Antenna focal line safety distance	14
Figure 4: Radome and Pedestal	15
Figure 5: Front Panel of ACU	15
Figure 6: Back Panel of ACU	15
Chapter 5. Installing Above Deck Unit (ADU)	20
Figure 7: Antenna Front View	20
Figure 8: Antenna Bottom View	21
Figure 9: Antenna Top View (Inside Radome)	21
Figure 10: Antenna Mounting Hole Template	22
Figure 11: Recommended Size of Mast	24
Figure 12: Routing Cable Through Outside of Mast	25
Figure 13: Installing Bolts for Antenna-Mast Assembly	28
Figure 14: Installing Sequence of Bolts	28
Figure 15: Routing RF Cable Inside Radome	32
Figure 16: RF Cable Connection to Power Switch Unit	32
Chapter 6. Installing Below Deck Unit (BDU)	33
Figure 17: ACU Dimensions	33
Figure 18: 19-inch Rack Mount ACU	34
Figure 19: Antenna System Configuration	35
Figure 20: ACU Back Panel Connectors	36
Figure 21: Connecting Power to ACU	40
Figure 22: ACU to Antenna Cable Connection	40
Figure 23: ACU to Modem Cable Connection	41
Figure 24: ACU to Ship Gyrocompass Cable Connection	42
Figure 25: NMEA 0183 Gyrocompass Cable Connection	42
Figure 26: Front Panel Management LAN Port Connection	43
Figure 27: Front Panel USB Port Connection	43
Chapter 8. Operating ACU	55
Figure 28: ACU Front Panel View	55

Chapter 1. Precautions

1.1 Warnings, Cautions, and Notes

WARNING, CAUTION, and NOTE statements are used throughout this manual to emphasize important and critical information. You must read these statements to help ensure safety and to prevent product damage. The statements are defined below.

	WARNING WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.
	NOTE A NOTE statement is used to notify people of installation, operation, programming, or maintenance information that is important, but not hazard-related.

1.2 General Precautions

Before you use the antenna, make sure that you have read and understood all safety requirements.

	THIS WAY UP Place the boxes/crates on the floor with the arrow pointing up.
	FRAGILE Since the Radome is fragile, handle it with care. Do not apply excessive pressure or shock. These may cause surface cracking or other damage.
	DO NOT STACK Do not stack boxes/crates as there is a risk boxes/crates may fall and be damaged.
	KEEP DRY - Always make sure the antenna is stored on a dry surface in a dry, well-ventilated area. - The antenna is designed to withstand a normal rain shower; however, water resistance cannot be guaranteed if the antenna is submerged.

* **DO NOT SHIP VIA RAIL:** Ensure not to ship any system via Rail.

* **DO NOT STORE THE ANTENNA WRAPPED IN A TARP, TENT, VINYL, AND OTHERS:**

To avoid damage to radome paint, do not use a cover on the radome. Using any type of cover may cause paint damage. Intellian radomes are designed to withstand exposure to rain, humidity, and sun/UV rays when assembled according to Intellian instructions, and when the supplied approved hardware and sealants are used. Under no circumstances should an Intellian radome be covered by any protective covering that adheres, bonds, or clings to the surface, whether by self-adhesion or tension.

Chapter 2. Certifications

FCC Declaration of Conformity

Intellian Technologies, manufactures of stabilized maritime VSAT antenna systems for satellite communication at sea, supplies stabilized maritime VSAT antenna systems to the satellite communication service providers for their ESV (Earth Station on Vessels) networks.

FCC §25.218 defines the provisions for blanket licensing of ESV antennas operation in the Ku-band. It defines the antennas radiation, and each article regulates the followings;

- §25.218 (f)(1): Regulation for Azimuth Direction & Co Polarization
- §25.218 (f)(2): Regulation for Other Direction & Co Polarization
- §25.218 (f)(3): Regulation for Cross Polarization

Intellian Technologies, Inc. declares that v80E complies with the threshold level as defined in §25.218(f)(1);, and declares that v80E is in accordance with all defined regulations from §25.218(f)(2) to §25.218(f)(3) at the below stated input power spectral density, with an N value of 1.

Product description	Intellian v100E, 1.05m Ku-band maritime VSAT antenna system
EIRP spectral density limit	-16.8 dBW/ 4KHz

Intellian Technologies, Inc. declares that the above antennas will automatically cease the transmission with a mute command to the modem within 100 milliseconds if the target satellite and the axis of the main lobe of the ESV antenna exceeds 0.5 degree and will not resume until such angle is less than or equal to 0.2 degree in accordance with the requirements of §25.228 (b) and §25.228 (c).

;-

Radiation pattern data is available upon request to verify the conformance.

Authority: Kevin Eom
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Signature: 

Date: March 27, 2020

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RED Declaration of Conformity (DoC)

We, Intellian Technologies, Inc. located at 18-7, Jinwisandan-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 17709, Korea declare under our sole responsibility that the product(s) described in the below to which this declaration relates is in conformity with the *essential requirements* and *other relevant requirements* of the Radio Equipment Directive (2014/53/EU).

Product Information:

Product Name(s):	Intellian v60E, 65cm Ku-band Maritime VSAT Antenna System Intellian v80E, 80cm Ku-band Maritime VSAT Antenna System Intellian v100E, 1.05m Ku-band Maritime VSAT Antenna System
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To provide the presumption of conformity in accordance to Annex III(encompassing Annex II) of Directive 2014/53/EU; the following harmonized standards and normative documents are those to which the product's conformance is declared, and by specific reference to the essential requirements of Article 3 of the Directive 2014/53/EU.

2014/53/EU Article	Standard(s) Applied in Full	Result
SAFETY (Art 3.1.a)	EN 62368-1	Pass
EMC (Art. 3.1.b)	EN 301 843-1	Pass
SPECTRUM (Art. 3.2)	EN 302 340	Pass

Supplementary Information:

Notified Body Involved: (Testing Organization)	DT&C Co., Ltd. 42, Yurim-ro, 154 beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do 17042, Korea
Technical/Compliance File Held by:	Intellian Technologies, Inc. 18-7, Jinwisandan-ro, Jinwi-myeon, Pyeongtaek-di, Gyeonggi-do 17709, Korea
Place and Date of issue:	Gyeonggi-do, Korea on 28 th of Feb. 2020

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UK-CA Declaration of Conformity

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Product Information:

Product Name(s):	Intellian v60E, 65cm Ku-Band Maritime VSAT Antenna System Intellian v80E 85cm Ku-band Maritime VSAT Antenna System Intellian v100E 105cm Ku-band Maritime VSAT Antenna System
Model Number(s):	VE-60-XXXX VE-80-XXXX VE-11-XXXX

To provide the presumption of conformity in accordance to Annex III(encompassing Annex II) of Directive 2014/53/EU; the following harmonized standards and normative documents are those to which the product's conformance is declared, and by specific reference to the essential requirements of Article 3 of the Directive 2014/53/EU.

2014/53/EU Article	Standard(s) Applied in Full	Result
SAFETY (Art 3.1.a)	EN 62368-1	Pass
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SPECTRUM (Art. 3.2)	EN 302 340	Pass

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Date: January 6, 2022

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Chapter 3. Introduction

3.1 Intellian v100E Introduction

Intellian v100E is a Ku-band 3-axis stabilized VSAT maritime antenna system. The v100E provides VSAT solutions for efficient RF performance with compact and light mechanical design. v100E is equipped with an RF module by a new mounting architecture. The stabilized 3-axial platform and quality approved pedestal design ensure reliable broadband communications for sailing vessels in oceans. The v100E is operator-friendly and easy to install with a single cable connection which combines Tx, Rx, and DC power cables. With the new radome design, the dome-on external single cable connection means that installers do not need to open the radome hatch during installation. Equipped with Intellian's next-generation Antenna Control Software AptusNX, the v100E antenna can be easily monitored and controlled.

3.2 Intellian v100E Features

Superior RF Performance

Intellian's advanced RF design technology delivers highly efficient performance with compact and light mechanical structure compared to other 1m class systems. The v100E has improved tracking precision and reliability in a compact and streamlined mechanical design. The v100E system is supplied with NJRC 6W BUC or Revgo 8W BUC.

Single Coaxial Antenna Cable

Combined Tx, Rx and DC power in a Single Cable solution, the v100E enables faster and reduced costs of installation. The single coaxial cable is connected through the cable gland on the base of radome.

Antenna Management Platform

Intellian's all-new integrated M&C platform AptusNX provides a responsive web user interface to manage and control the antenna system. AptusNX provides an intelligent diagnosis function which enables accurate and enhanced antenna performance checks both on-board and remotely. This reduces the need for on-board maintenance and improves performance. The installation Wizard included in AptusNX automates system configuration so that network operators or service providers can bring the system onto their service faster than ever before.

Chapter 4. Planning Installation

The antenna installation requires extreme precaution and safety measures given its size and weight. Failure to follow the correct installation process may lead to injury of the installer and/or cause damage to the system. In order to maximize the performance of the system, a thorough review of this installation guide is strongly recommended, as well as executing the installation process as it is noted in this manual.



CAUTION

DO NOT OPERATE THE ANTENNA WITHOUT THE RADOME. THIS WILL RESULT IN DAMAGE TO THE ANTENNA AND ABNORMAL OPERATION.

4.1 Selecting Installation Site

The system should be placed in an area onboard the vessel with little to no RF signal blockage. When the antenna is transmitting, obstacles in way of the beam path will cause decreased satellite signal strength. The antenna unit should have direct line-of-sight with the desired satellite without any obstacles in the beam path. Certain minimum distances between the antenna and other onboard devices must also be considered during installation.

4.1.1 Minimizing Satellite Blockage

Install the antenna in accordance with the following procedures to ensure maximum performance of the antenna. The ideal antenna site should have a clear view of the horizon or satellite with all around clearance. Make sure there are no obstacles within the EL range -15° to $+110^{\circ}$ from the center of the antenna. Obstacles can interrupt the satellite signal transmission and reception of the antenna.

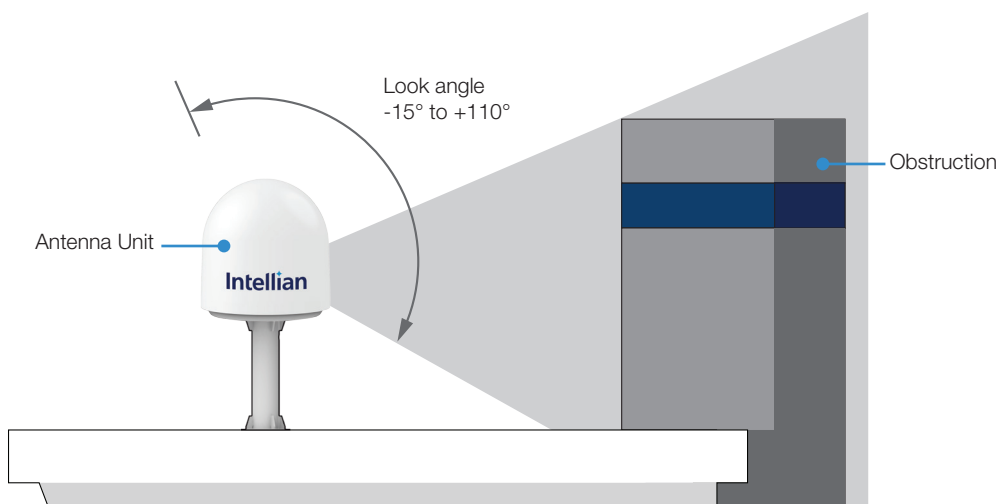


Figure 1: Elevation Limit of Obstacles

4.1.2 Avoiding RF Interference

Do not install the antenna near the high power shortwave radar. Most radar transmitters emit RF energy within an elevation range of -15° to $+15^{\circ}$. For this reason, it is recommended to position the antenna at least 4.6 m (15.09 feet) away from the radar.

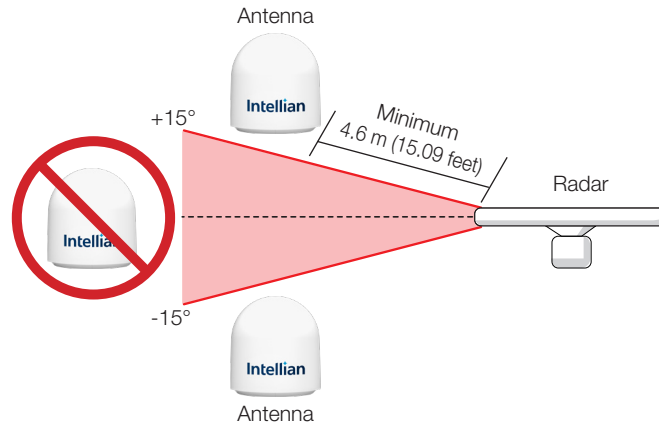


Figure 2: Potential RF Interference



WARNING

Never place the antenna in the beam path of the radar regardless of distance. The high power shortwave radar may impair its performance or damage the antenna.

4.1.3 RF Hazard Precautions

When the antenna is transmitting there's a potential health risk, as a result of radio frequency (RF) exposure, within the vicinity of the VSAT antenna. The intensity of the RF signal is related to the transmit power, direction and distance to the signal source. In contrary to an omni-directional antenna, the RF transmit signal of a parabolic reflector antenna is concentrated in its direction towards the satellite. Since the antenna is covered with a radome, it's difficult to predict where the antenna is pointed, which could be in any direction within the antenna's range of motion as to the antenna specifications. Although the antenna elevation range is typically down to -20° , it's unlikely for the antenna to transmit at this elevation, while the negative elevation is to compensate for vessel motion. In general, dependent on the satellite link budget, the antenna will have a poor receive signal for a satellite look angle below 10° elevation. In that case when the receive signal threshold is hit, the transmit signal will be blocked, typically referred to as TX mute, on either the modem or antenna. In most situations, the risk of RF exposure is present at lower elevation, corresponding a higher latitude and reduces at higher elevation.

When considering the antenna is typically placed in an area with minimal obstruction and signal interference, an effort should be made to avoid RF exposure as well. It's the responsibility of the antenna owner and/or operator to inform personnel and the general public of the risk of RF exposure. To create awareness, signs should be placed in the potential risk areas. To mitigate the risk of RF exposure, it's suggested to:

- Place the antenna higher up, to avoid the transmit signal reaching work and transit areas.
- Add blockage zones in the ACU for high risk areas of RF exposure.
- Power off the antenna when working in close proximity of the antenna.

While the legislation concerning RF exposure in the country of operation may be different, often reference is made to the ICNIRP guidelines of RF exposure for the occupational and general public scenario. For the frequency range between 6 to 2,300 GHz, the local absorbed power density (Sab) averaged at a 6 minute interval, should not exceed the 5 mW/cm² for occupational and 1 mW/cm² for the general public. The local Sab refers to the power density averaged over a 4 cm² surface area of the human body below 30 GHz and a 1 cm² surface area above 30 GHz.

FCC limits for the maximum permissible exposure (MPE) for the frequency range of 1,500 – 100,000 MHz are set to 5 mW/cm² for occupational/controlled and 1 mW/cm² for the general population/uncontrolled exposure.

Below table shows the minimum safety distance, with reference to the antenna focal line (Figure 3), of the different BUC configurations based on the FCC limits for occupational and general population exposure. The safety perimeter could be reduced by choosing a more suitable location for the antenna and/or adding blockage zones in the ACU.

Tx Power (W)	Occupational (m/ft)	General Public (m/ft)
	Controlled Exposure R(m), 5.0 mW/cm ²	Uncontrolled Exposure R(m), 1.0 mW/cm ²
6W	No distance limit	23.0/75.5
8W	No distance limit	30.7/100.7

*Main/sub reflector or the feed must avoid contact for all population when the terminal is in transmission.

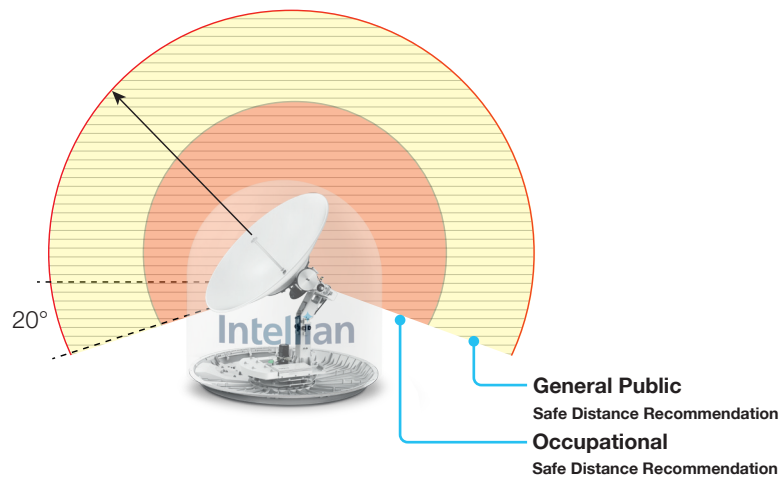


Figure 3: Antenna focal line safety distance

4.2 System Package

4.2.1 Above Deck Unit (ADU)

The ADU includes an antenna pedestal inside a radome assembly unit. The pedestal consists of a satellite antenna main dish with RF components mounted on a stabilized pedestal. The radome protects the antenna pedestal assembly unit from the severe marine environment.



Figure 4: Radome and Pedestal

4.2.2 Antenna Control Unit (ACU)

Antenna Control Unit (ACU) controls Antenna system operation. The following functions are supported by ACU.

- LED Indicator
- AptusNX Web application



Figure 5: Front Panel of ACU

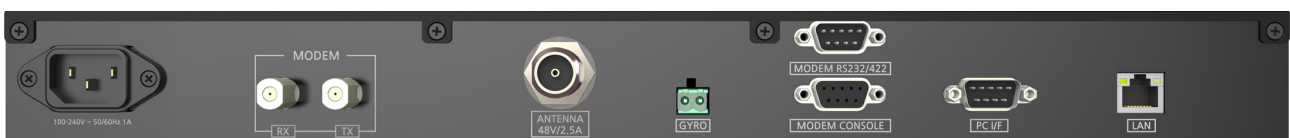


Figure 6: Back Panel of ACU

4.2.3 Packing List

Before beginning installation, make sure you have all the included components.

Item	Q'ty	Size	Description
Above Deck Unit (ADU)	1		Radome and Pedestal
Antenna Control Unit (ACU)	1	431 mm x 350 mm x 44.3 mm	Antenna Control Unit
Quick Installation Guide (QIG)	1		Installation guide
RF Hazard Sticker	1		Radiation safety distance (30 m) label
Mounting Template	1		Real size drawing of antenna mounting hole pattern
ACU Rack Mount Bracket	2		For installing ACU to 19-inch rack
Flat Head Screw	10	M4 x 12L	For mounting ACU Rack Mount Bracket on ACU
AC Power Cord (CEE7/7)	1	1.5 m	ACU Power Cord (220 V)
Ethernet Cable (RJ45 to RJ45)	1	1 m	To connect ACU to PC / network device
RF Cable (F (M) to F (M))	2	1 m	To connect ACU to modem (Tx / Rx)
Hex Bolt (BUMAX)	4	M12 x 80L	Bolt kit for antenna-deck (mast) assembly (1 spare set included)
Flat Washer (BUMAX)	4	M12	
Spring Washer (BUMAX)	4	M12	

4.3 System Cables (Customer Supplied)

4.3.1 Antenna RF Cable (Customer Supplied)

Due to the signal loss across the length of RF coaxial cable on L-Band, Intellian recommends to build RF cables using the following 50 Ω coaxial cable types for standard system installation. If you need RF cables that run longer than the maximum cable length recommended, contact Intellian Technical Support for assistance.

Cable Requirements

Coaxial Cable Type	Connector	Max. DC Resistance	Attenuation @ 2 GHz	Max. Cable Length ($\leq$ 16 dB loss @ 2 GHz)
LMR400	N (M) to N (M)	0.8 Ω	0.196 dB/m	60 m
LMR600			0.128 dB/m	100 m



NOTE

- Optimal tightening torque for N type RF connector: 1.5 N-m
- Maximum RF loss at 2 GHz: 16 dB including connectors

4.3.2 Gyrocompass Cable (Customer Furnished)

General types of gyrocompass cables are recommended for the compatible connection to Intellian antennas which are used in various environments of vessels.

Standard	NMEA 0183
Connector Type	2 pin terminal block connector
Cable Type	2-wire cable with one enclosed shield cable
Heading Information	Supports \$HEHDT, baud rate 4800, format 8N1 as standard

4.4 Unpacking System Package

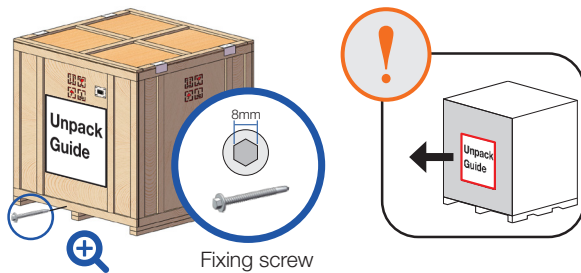


CAUTION

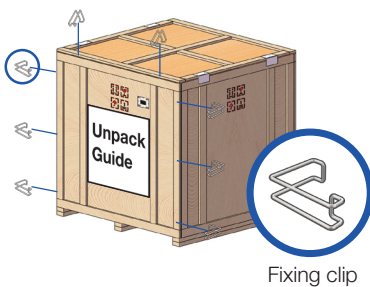
- The package box on the pallet should be lifted by a forklift.
- Follow the steps in order for easy and safe unpacking.

1. Open the side panel with an attached sticker paper (Wooden Crate Unpack Guide) by removing the fixing screw (1 ea) and clips (8 ea).

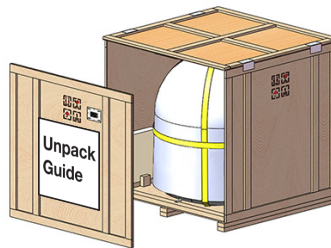
1-1 : 1 ea



1-2 : 8 EA

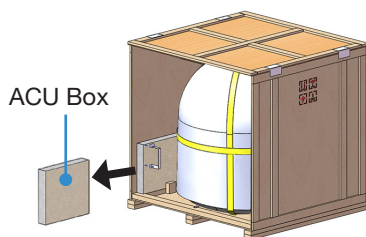


1-3



2. The ACU box is placed on a side panel inside the crate. Remove fixing screws (2 ea) from the ACU bracket, then take out the ACU box from the crate.

2-1



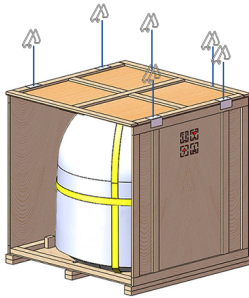
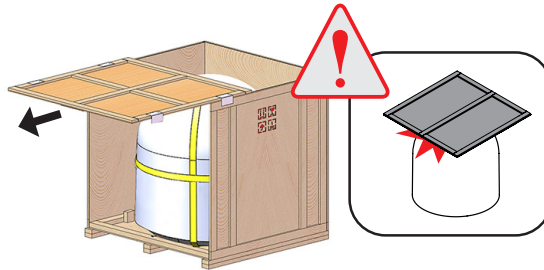
3. Remove the clips (6 ea) that attach the top panel, then carefully slide the top panel out from the crate as shown.

**WARNING**

The brackets installed at top two edges help the top panel to move stably. When removing the top panel, ensure that it doesn't fall on the radome.

3-1

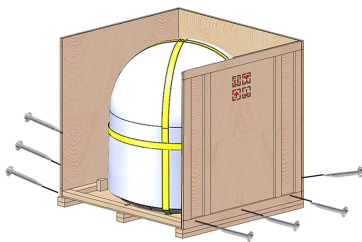
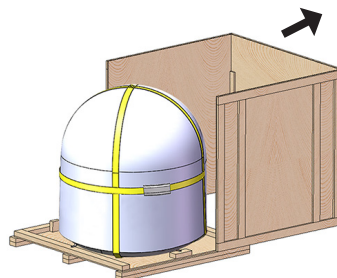
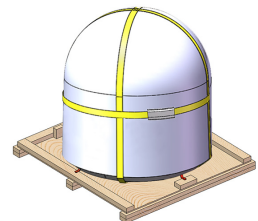
: 6 ea

**3-2**

4. Remove the fixing screws (7 ea) that secures the three side panels, then detach all the panels remaining the antenna on the pallet.

4-1

: 7 ea

**4-2****4-3**

Chapter 5. Installing Above Deck Unit (ADU)

5.1 Antenna Dimensions

Confirm the height and diameter of the antenna unit shown in the following figure before installing it. The mounting surface and overall space occupied by the antenna must be sufficient for the fully constructed radome on top of its base frame. Using a crane during the antenna installation is strongly suggested.

Unit: mm (inch)

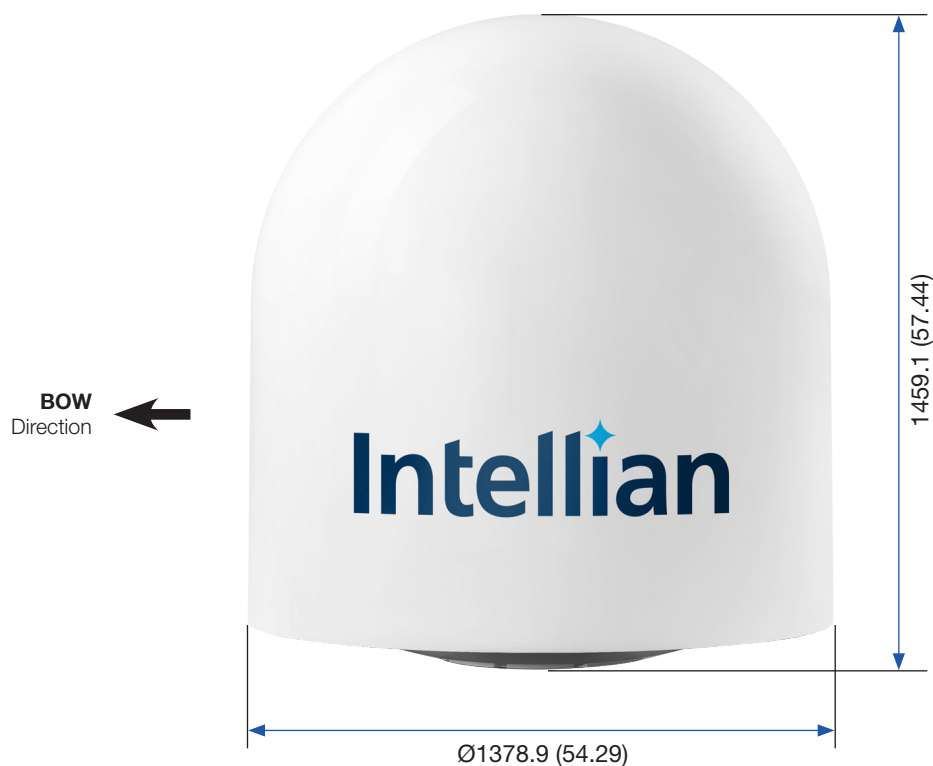


Figure 7: Antenna Front View



NOTE

Position the antenna with the BOW direction parallel to the center line of the ship.

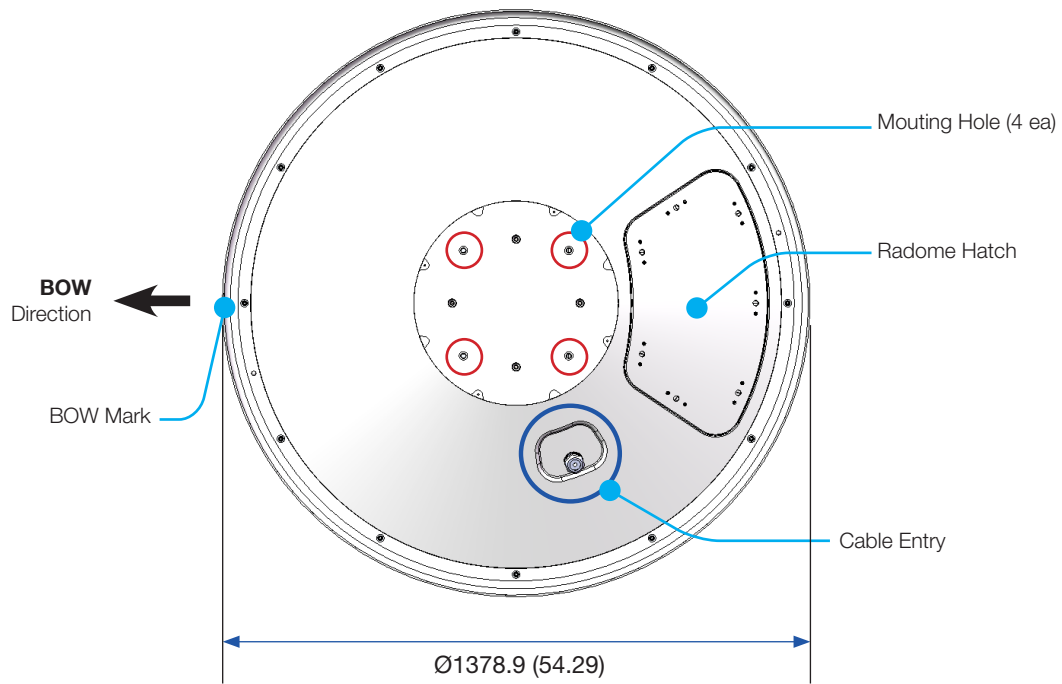


Figure 8: Antenna Bottom View

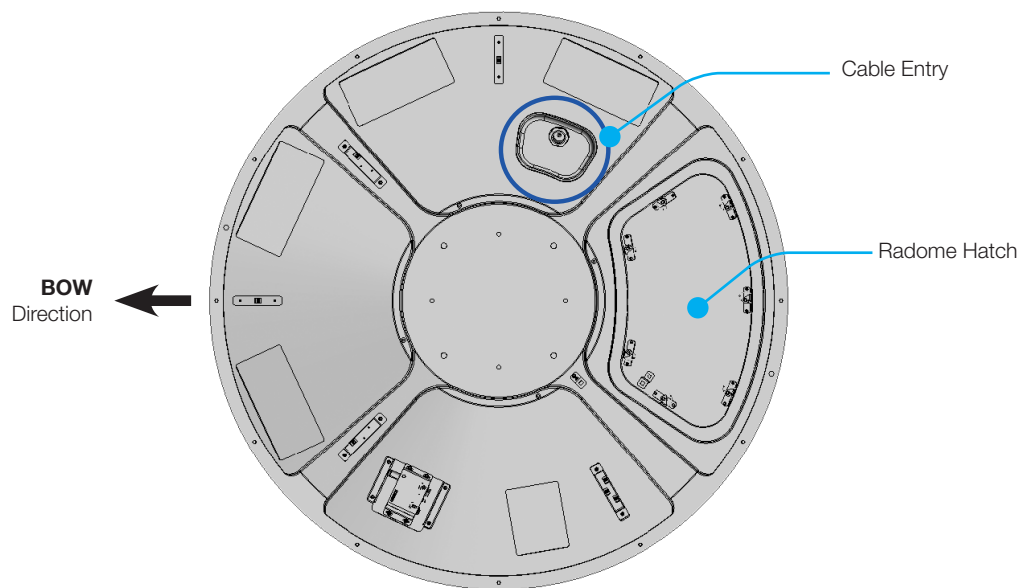


Figure 9: Antenna Top View (Inside Radome)

5.2 Antenna Mounting Hole Pattern

Use the supplied mounting template when drilling mounting holes on the mast. The hole placement for the antenna must match the mounting hole pattern on the template.



WARNING

When reusing an existing mast, check the condition of holes on the mast and make sure those are proper to use compared to the hole locations and sizes printed on the mounting template.

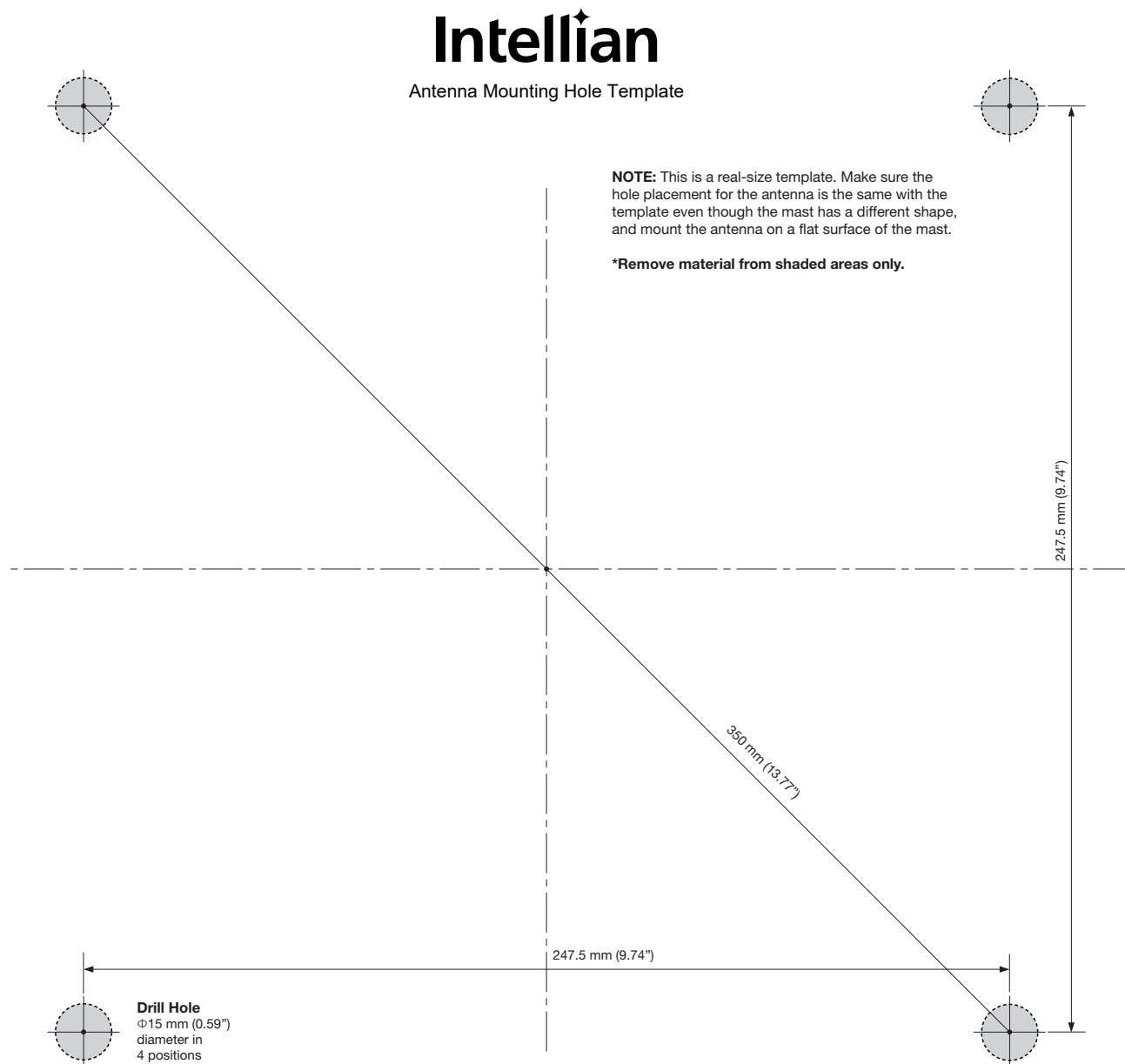


Figure 10: Antenna Mounting Hole Template

5.3 Designing Mast (Example Only)

The installation mast must be robust enough to prevent flex, vibration, and sway when an external force is exerted on the mast with antenna and radome. Refer to the following mast drawings for more details.



NOTE

- This is a general example of designing a mast. The shape of mast may differ depending on the ship's environment.
- Follow the installation recommended by Intellian for safety.



WARNING

- When designing a mast, consider the minimum and maximum thickness of the mast plate marked on the diagram. If the thickness of the mast plate is different from the recommended size (Min. 10.0 mm/ Max. 20.0 mm), choose right sized bolts for mounting antenna on the mast according to the table below.

Mast Plate Thickness	Recommended Bolt Size
10 ~ 28 mm (Recommended)	M12 x 80L (Supplied)
28 ~ 35 mm	M12 x 90L

- To use the supplied bolts (M12 x 80L) for mounting antenna on a mast, the thickness of mast plate must be 10 ~ 20 mm. The minimum thickness of the mast plate is 10 mm. If the mast plate is thicker than 20 mm, the supplied antenna-mast mounting bolts can be too short to mount the antenna on the mast securely.

Unit: mm (inch)

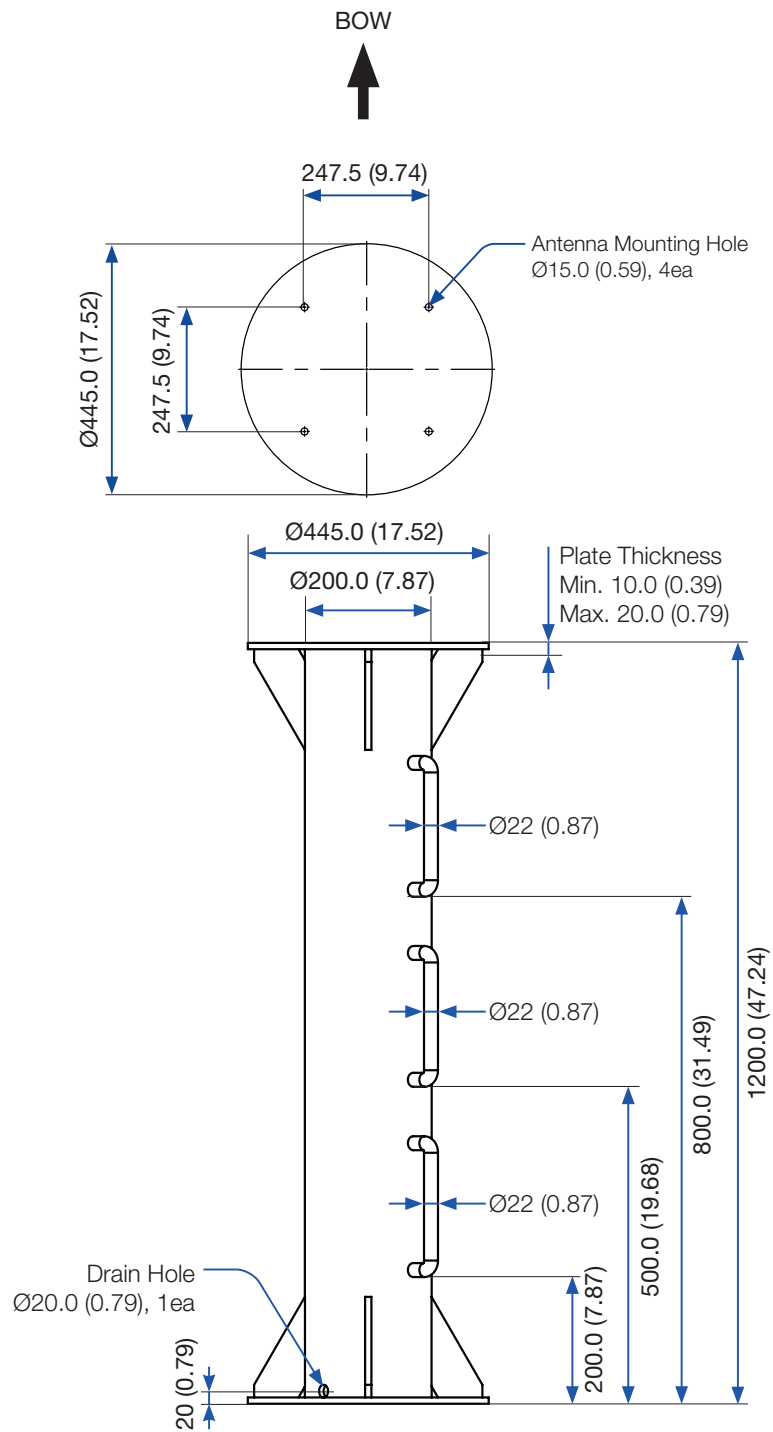


Figure 11: Recommended Size of Mast

5.4 Routing RF Cable on Mast (Example Only)

The cable must be routed from the antenna and through various areas of the ship to end up at the antenna control unit. When pulling the cables in place, avoid sharp bends, kinking, and excessive force. After placement, seal the deck penetration gland and tie the cable securely in place. The cable bracket must be installed on the mast to fix the relevant cable. The gooseneck must be installed on the side of the mast to protect the relevant cable against water.



WARNING

Ensure that cable has been run through watertight fittings to prevent water entry into the vessel when installation is completed.



NOTE

This is a general example of routing cables on the mast. The routing method may differ depending on the ship's environment.

Routing Cable on Outside of Mast

This method is generally recommended.

1. Route the cable from the gooseneck placed on the deck to the antenna as shown in the picture.
2. Maintain a sufficient cable length (at least 2 m) when routing the cable on the surface of the mast. After connecting the cable to the connector on the radome, adjust the length and fix the cable on the cable brackets using cable ties.

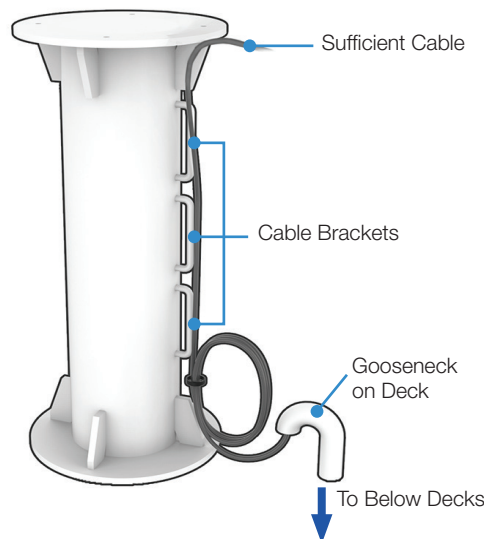
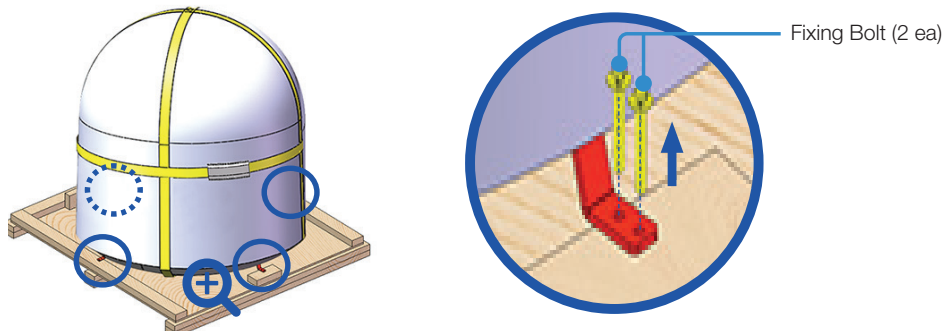


Figure 12: Routing Cable Through Outside of Mast

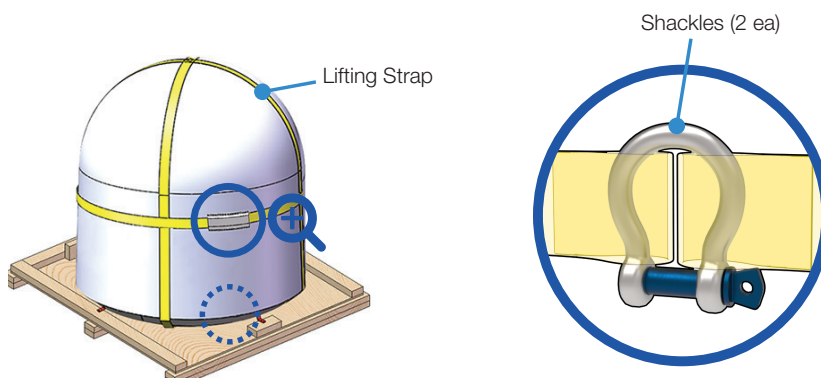
5.5 Removing Antenna from Wooden Pallet

Four radome brackets secure the antenna to the pallet. To remove the radome bracket, follow the procedure below.

1. Remove the fixing bolts (2 ea) on the radome bracket that secures the antenna to the pallet using a wrench.



2. Check the condition of lifting straps, and make sure the shackles (2 ea) are tightened. Re-wrap the shackles with the existing protection to avoid a radome damage.

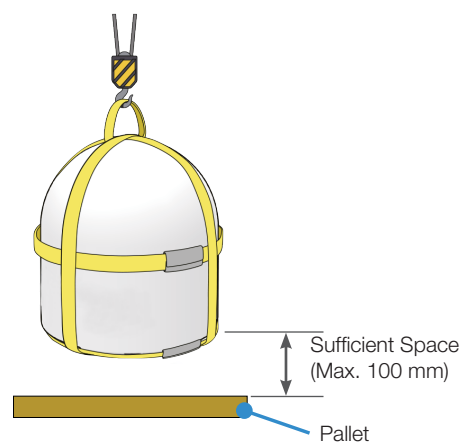


3. Lift the antenna above the pallet using a crane, and maintain a sufficient space (max. 100 mm) between the bottom of antenna and pallet to remove the radome brackets.

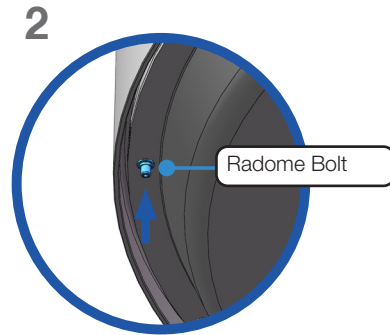
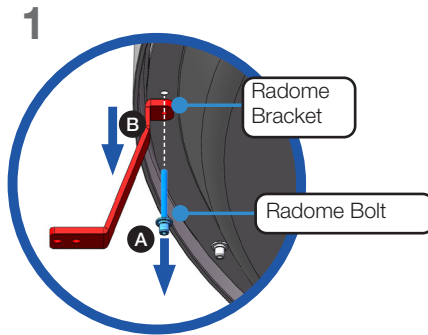
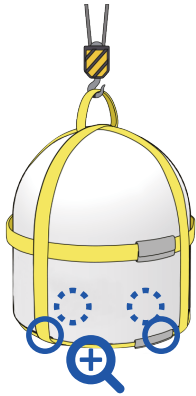


WARNING

- When lifting the antenna using the lifting straps, make sure to remove the securing radome brackets to separate antenna from the pallet.
- Be careful when lifting heavy objects. Incorrect handling of heavy objects may lead to personal injury or significant equipment damage.



4. Remove the radome bolt (1 ea) that secures the radome bracket on the radome with a wrench. Then detach the radome bracket from the radome.
5. After removing radome bracket, install the radome bolt (1 ea) back into the radome using a wrench. To fasten the bolt firmly, apply Loctite #243 to bolt threads before installing.
6. Repeat the procedure to remove all four radome brackets.



Fully tighten Radome bolts.

5.6 Placing Antenna Above Mast

The Intellian antenna comes with the lifting straps pre-mounted from the factory. Check the condition of the lifting strap ensure the shackle is tightened up. Lift the antenna above the mast using a crane and carefully lower down the antenna toward the mast.



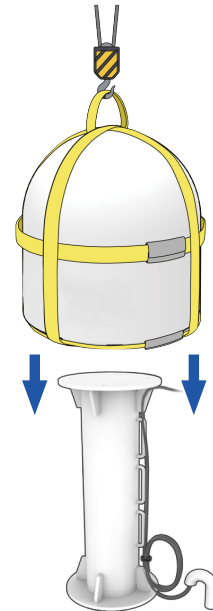
WARNING

When moving the antenna, it may sway by windy. Be careful when handling the antenna.



NOTE

Position the antenna with the BOW direction parallel to the center line of the ship.



5.7 Mounting Antenna on Mast

1. Bring M12 x 80L Hex Bolt sets (4 ea) for antenna-mast assembly from the ACU box.
2. Place the antenna on the mast and align the mounting holes of the antenna with those of the mast.
3. Before assembling bolts, apply Loctite #263 to the bolt threads to ensure the bolts are fastened firmly. Insert the bolts and washers from under the mast into the radome, and lightly tighten them by hand into the built-in nuts on the bottom of radome. Install 4 bolts in a criss-cross sequence as shown in the figure.
4. After installing all 4 bolt sets, fully tighten the bolts using a torque wrench.
5. After mounting the antenna on the mast, remove the lifting strap.

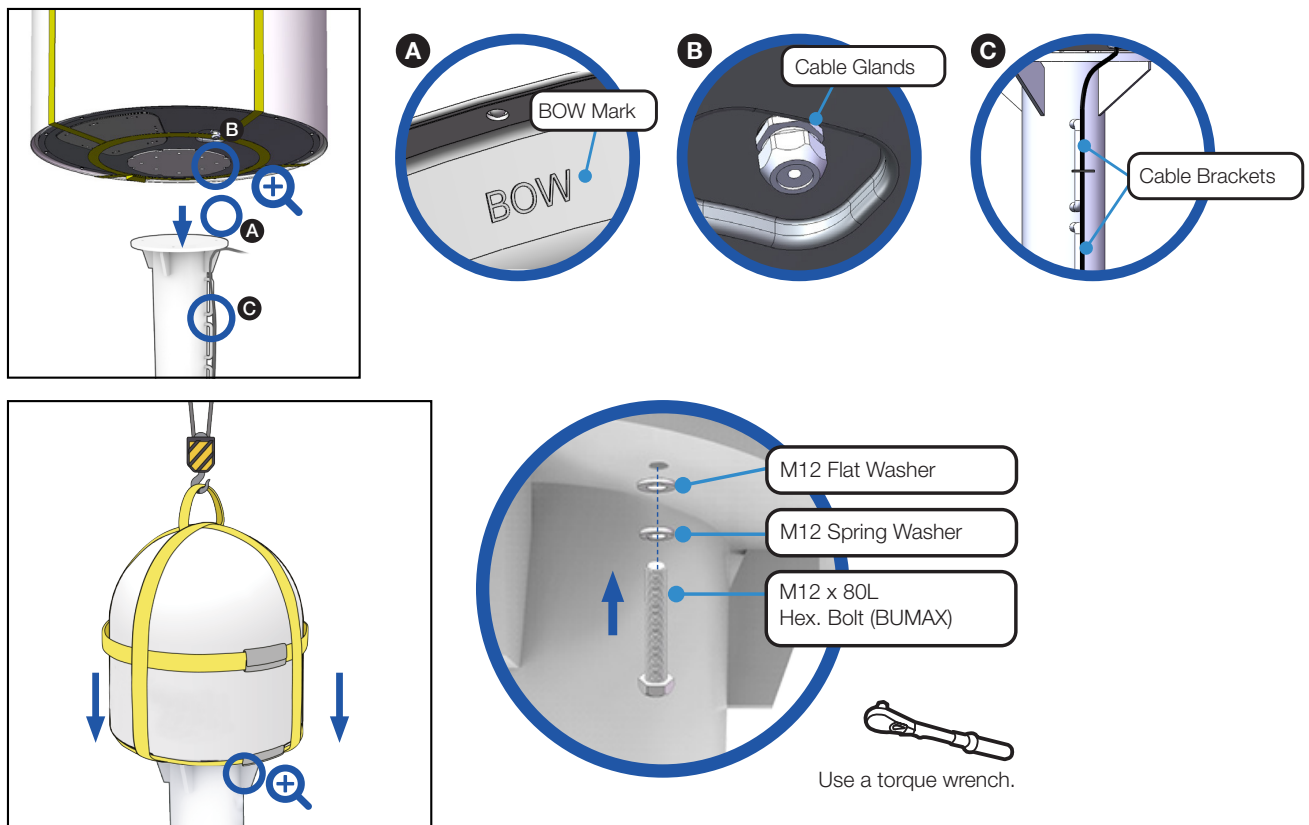


Figure 13: Installing Bolts for Antenna-Mast Assembly

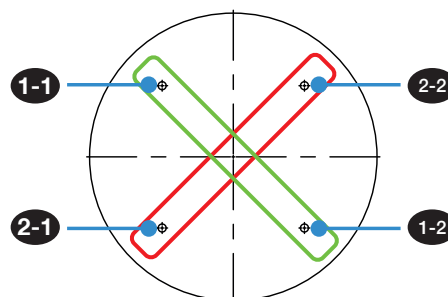


Figure 14: Installing Sequence of Bolts

NOTE

- Check the positions of **A** BOW mark, **B** cable glands, and **C** cable brackets when mounting antenna on the mast.
- Make sure the cable from the mast is aligned with the cable entry on the bottom of the antenna for a stable connection.
- Refer to **"12.1 Appendix A. Tightening Torque Specification" on page 92** for the bolt tightening torque.
- See **"10.2 Environmental Specification" on page 90** for detailed vibration and shock specifications.

**WARNING**

If a bolt does not fit into the mounting hole when installing the bolt by hand, stop installing and check the bolt size. **DO NOT** tighten the bolts forcefully. It may cause damage to the inner threads of the mounting holes of antenna. In this case, the damage is not covered by the warranty.

5.8 Connecting RF Cable to Antenna

For the cable connection at each end, cable termination should be completed using proper tools. After connecting the cable to a connector inside the radome, adjust the cable length and securely fix the cable on cable brackets of mast by using cable ties.



NOTE

Make sure the followings before installing system cables.

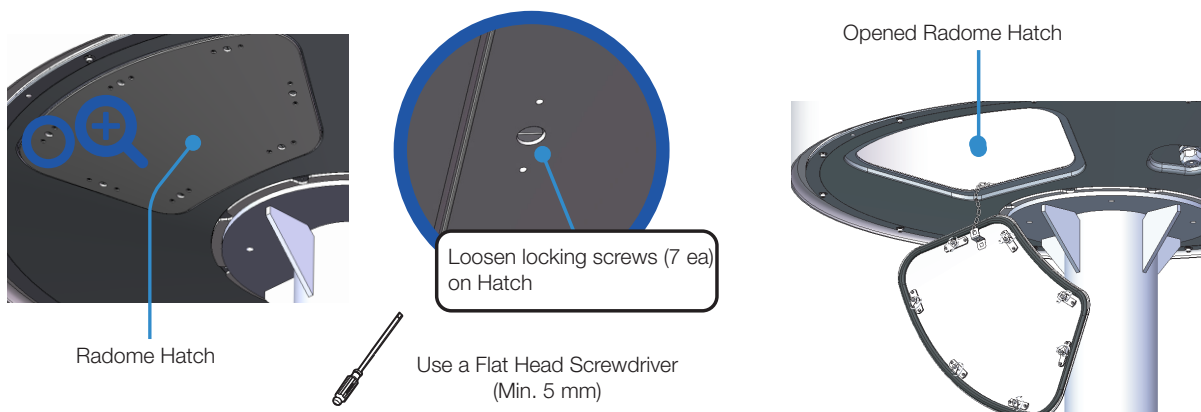
1. All cables need to be well clamped and protected from the physical damage and exposure to heat and humidity.
2. Don't use any acutely bent cable.
3. Use watertight glands or swan neck tubes at exposed bulkheads or deck heads where the cable passes through.
4. Install recommended size cables. Refer to "**4.3 System Cables (Customer Supplied)**" on page 17 to see cable requirements.



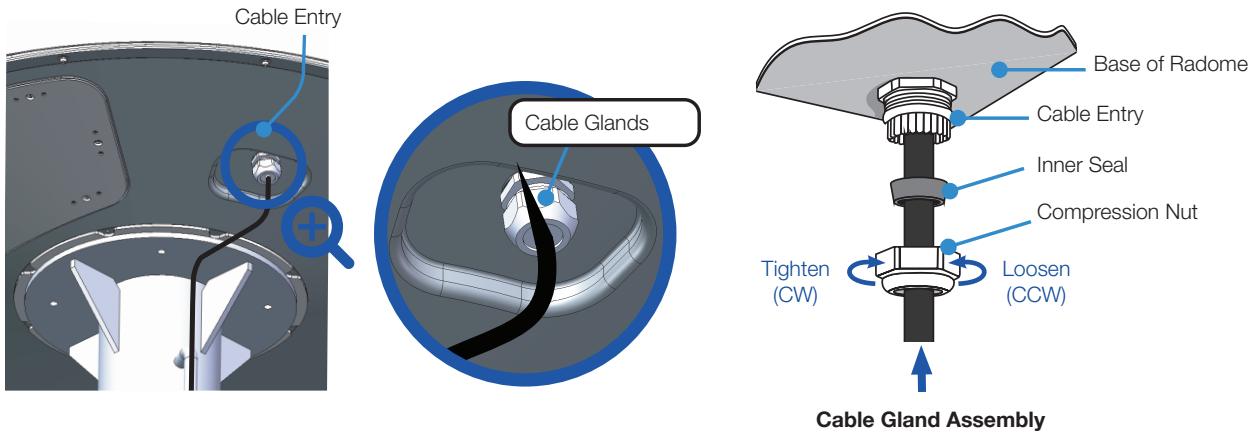
WARNING

Ensure that the power switch is off during installation. Turn on the power after install all the cables.

1. Access the ADU module inside the radome through the radome hatch to connect the system cable. Make sure that there is a sufficient space to open the radome hatch underneath the radome. Loosen the locking screws (slotted) (7 ea) using a flat head screwdriver, then open the radome hatch.

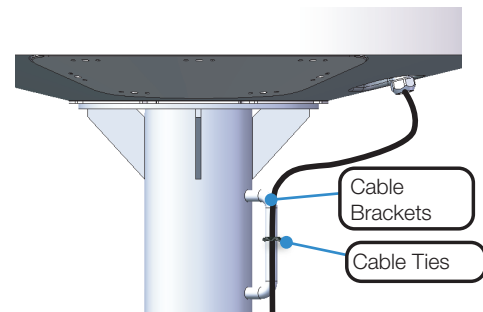


2. Insert the RF cable come from the ACU into the radome through the pre-installed cable gland at the base of radome. Initially, assemble cable gland temporarily to hold the cable in position. After finish the cable connection inside the radome, tighten the cable gland completely. Follow the cable gland assembly sequence as shown in the picture.

**NOTE**

- To prevent cable damage, insert the RF cable into the radome through the cable gland.
- ***Terminate RF Cable with N (M) connector inside the radome after inserting the cable into the radome.***
- ***Cable length inside the radome: Min. 1.7 m / Max. 1.8 m (from the cable entry of radome to the Power Switch Unit before the N connector termination)***

3. Temporarily, tie the cables loosely on the cable bracket by using cable ties. After connecting the cables to cable connector on the Power Switch Unit inside the radome, adjust the cable length and then fix the cables on the cable brackets using cable ties.



4. Terminate RF cable with N (M) connector inside the radome. Intellian recommends using genuine cable connectors and tools. Refer to the cable termination instructions provided by the connector manufacturers.
5. Connect the RF cable to the Power Switch Unit inside the radome. Ensure the cable is firmly fastened to the connector and fix it on cable mounts using cable ties. When the cable is installed completely, turn on the power switch.
6. Fully tighten the cable gland at the base of radome which is assembled temporarily in the previous step. Then put the radome hatch in the right place and close it by installing the locking screws (slotted) (7 ea) using a flat head screwdriver.

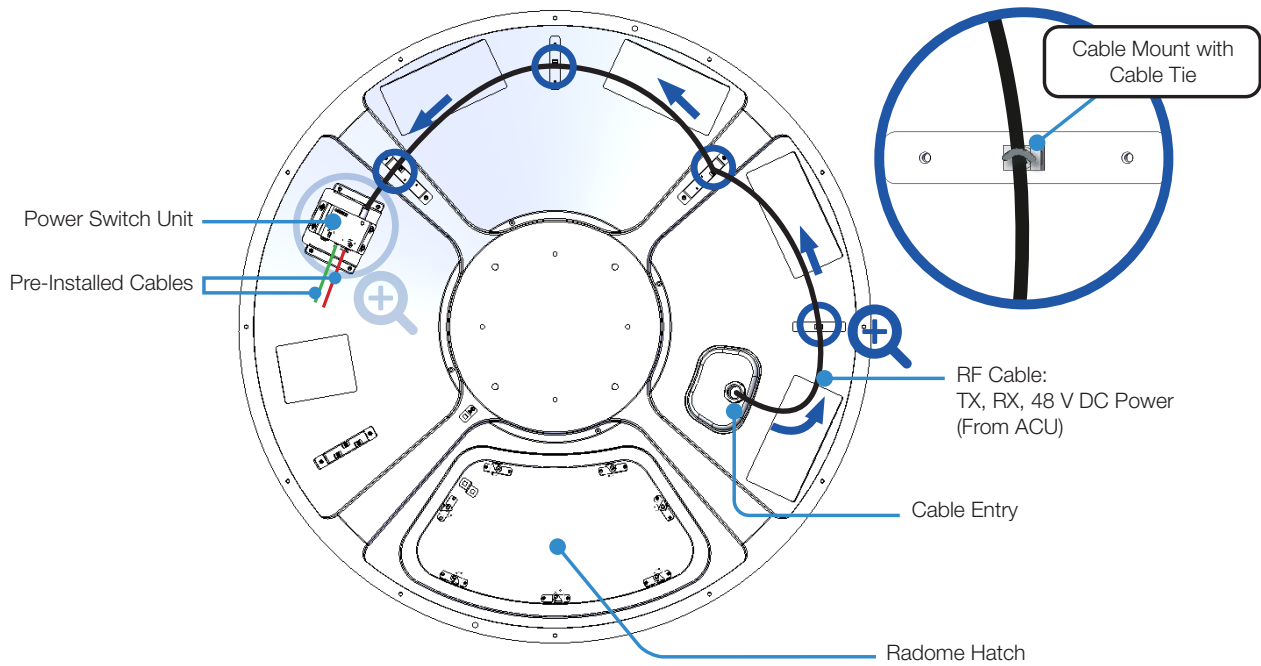


Figure 15: Routing RF Cable Inside Radome

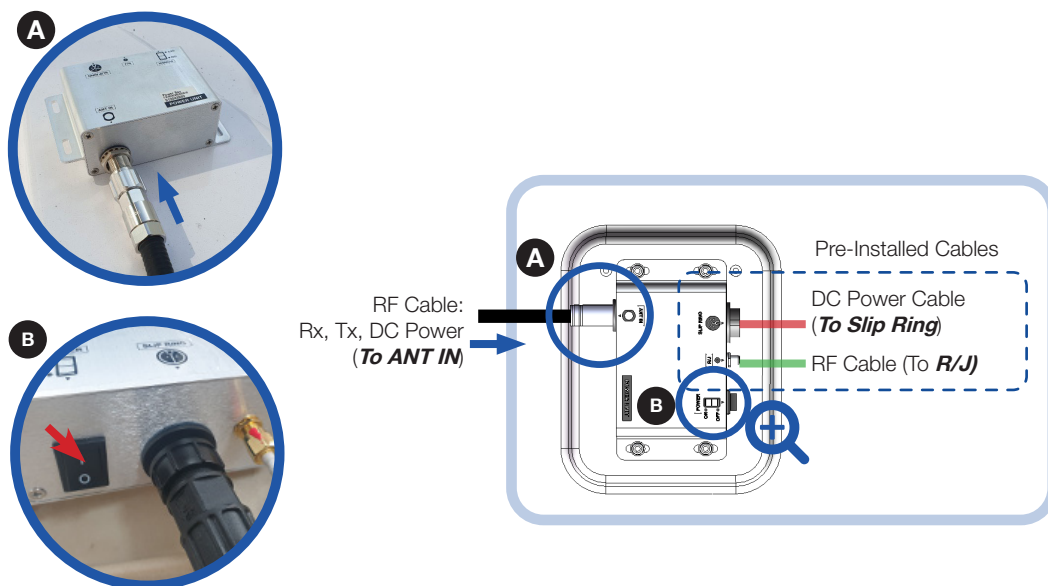


Figure 16: RF Cable Connection to Power Switch Unit



NOTE

- RF cable termination with N (M) connector must be done inside the radome after inserting cable inside the radome.
- RF cable length inside radome: Min. 1.7 m / Max. 1.8 m (from the cable entry to the Power Switch Unit before the N connector termination)

Chapter 6. Installing Below Deck Unit (BDU)

6.1 Selecting BDU Installation Site

The ACU should be installed below the deck in a location that is dry, cool and ventilated. The front panel of ACU should be easily accessible to users.

6.2 ACU Dimensions

Confirm the dimension of the ACU before installing it.

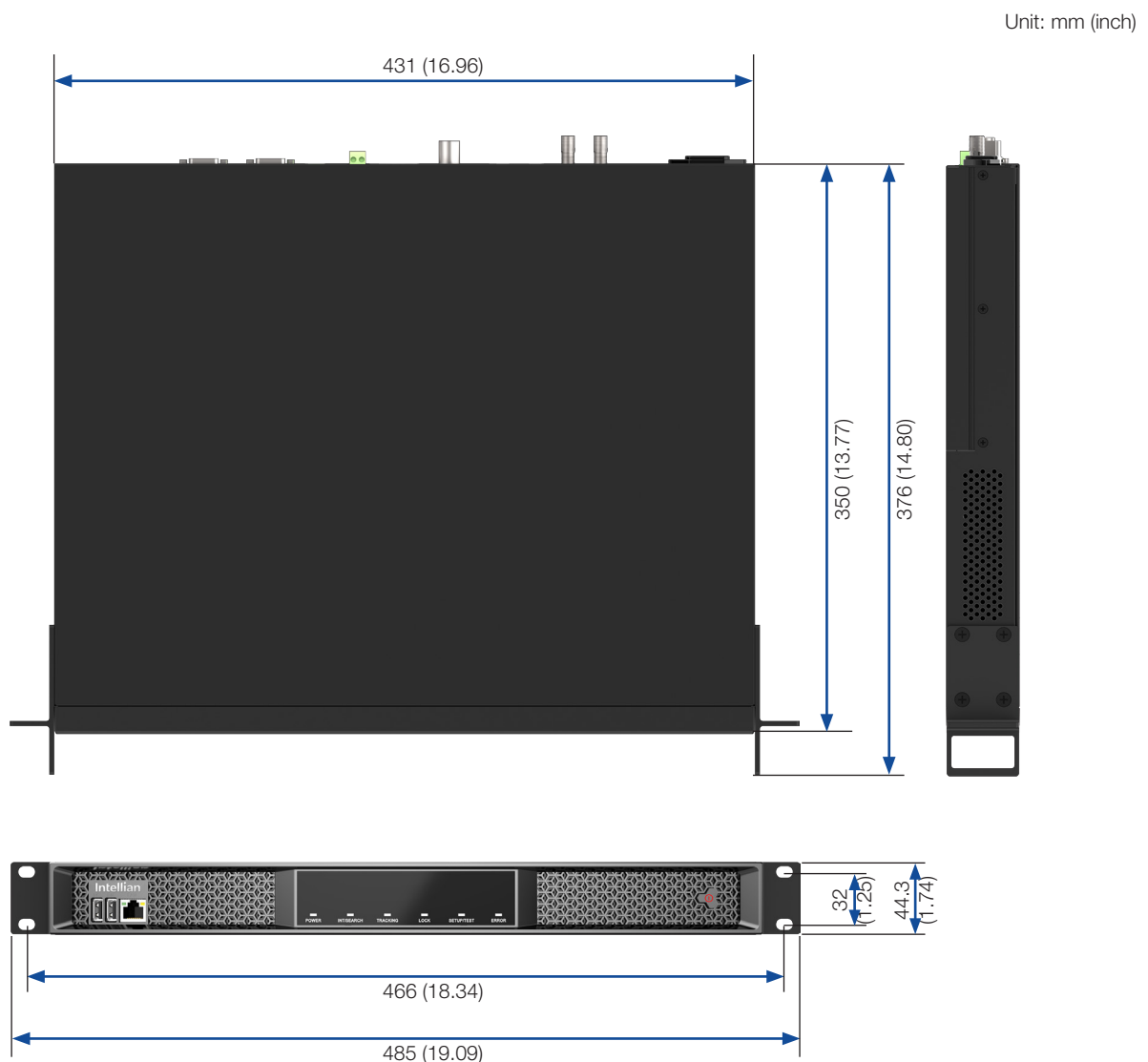


Figure 17: ACU Dimensions

6.3 Mounting ACU on 19-inch Rack

The ACU can be installed to 19" rack using the two rack mount brackets which can be found from the ACU box. Attach the rack mount brackets to the sides of the ACU using flat head screws. Connect cables to the back side of the ACU.



Figure 18: 19-inch Rack Mount ACU



WARNING

Ensure that the cables connected to the ACU are long enough to prevent damage when the ACU is pulled out from the rack.

6.4 Antenna System Configuration

For the proper operation of the satellite communication system, the required components must be connected as shown in the figure. Separate purchase of a satellite modem and ship's gyrocompass may be needed.

6.4.1 Single Antenna System Configuration

The basic system consists of one VSAT antenna and one ACU. Connect the cables according to the following configuration.

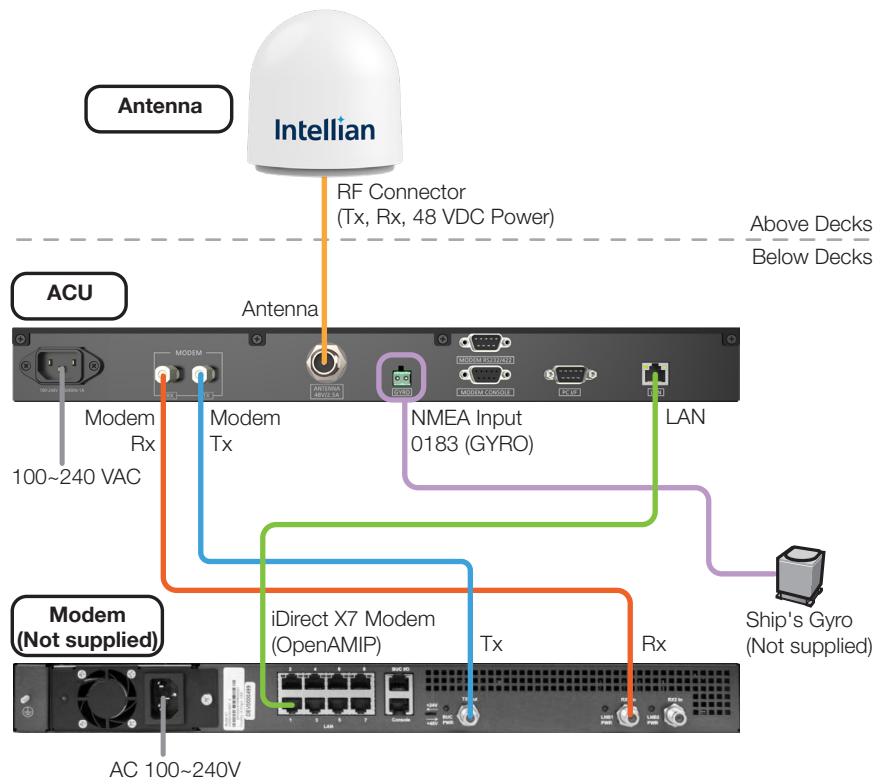


Figure 19: Antenna System Configuration



NOTE

The dual antenna system is not configurable with this system.

6.5 ACU Cable Connection

6.5.1 ACU Back Panel Connectors

The following figure shows the ACU back panel.

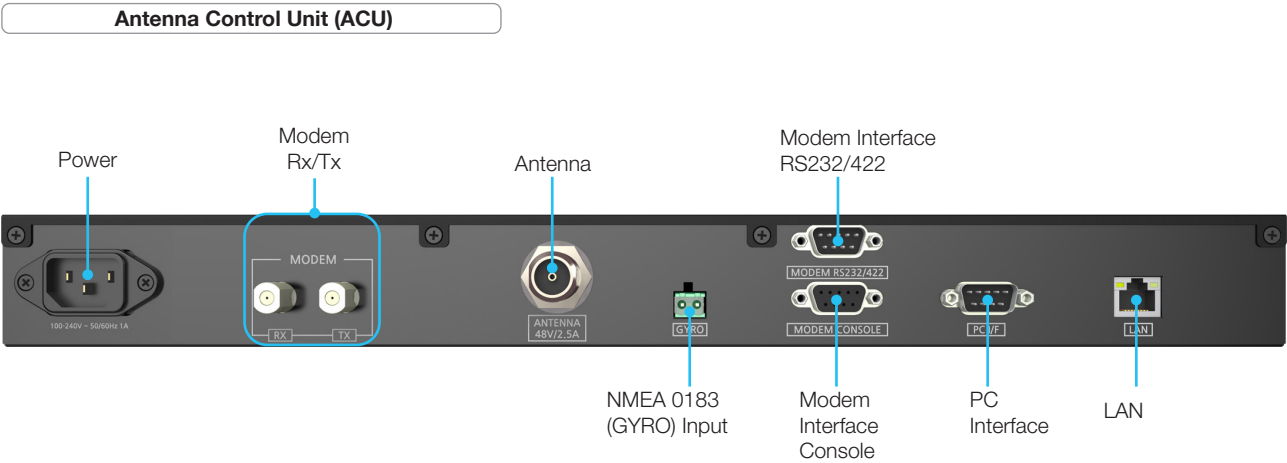
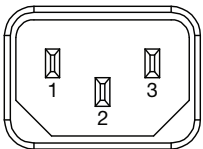


Figure 20: ACU Back Panel Connectors

6.5.2 ACU Connector Pinout Guide

Check the following connector pinout information applied to the connection ports of the ACU.

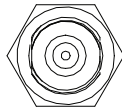
Power Connector



IEC 320 C14 Plug Male

Pin	Signal
1	NEUTRAL
2	GND
3	LIVE

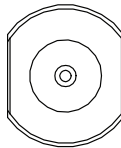
Modem Rx and Tx Connectors



RF F Type Female

Conductor	Function
Inner	DATA
Outer	GND

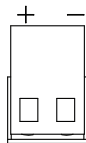
Antenna Connector



RF N Type Female

Conductor	Function
Inner	RX, TX, FSK, REFERENCE, POWER
Outer	GND

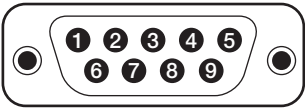
NMEA 0183 Input



2-Pin Terminal Block

Pin	Signal
+	HEADING IN
-	HEADING GND

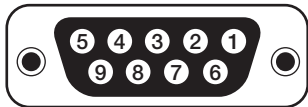
Modem Interface - RS232 & RS422 Connector



D-Sub 9-Pin Male

Pin	Signal
1	N/C
2	MODEM TX / MAX422 RX+
3	MODEM RX / MAX422 TX+
4	N/C
5	GND
6	N/C
7	MAX422 RX-
8	MAX422 TX-
9	N/C

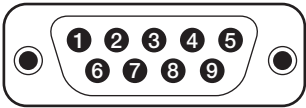
Modem Interface - Console Connector



D-Sub 9-Pin Female

Pin	Signal
1	GND
2	GPS_OUTA
3	MODEM_LOCK
4	MUTE 0
5	N/C
6	GPS_OUTB
7	EXM_AGC
8	MUTE 1
9	N/C

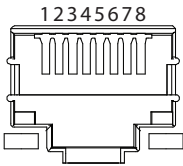
PC Interface - RS232 Connector



D-Sub 9-Pin Male

Pin	Signal
1	N/C
2	PC RX
3	PC TX
4	N/C
5	GND
6	N/C
7	IARM TO PC_ DBG_ TX
8	PC TO IARM_ DBG_ RX
9	N/C

LAN Connector



RJ-45 Female

Pin	Signal
1	TX-
2	TX+
3	RX-
4	N/C
5	N/C
6	RX+
7	N/C
8	N/C

6.5.3 Connecting Power to ACU

Connect the power cord from the power supply to the power connector (100~240 VAC) of ACU.

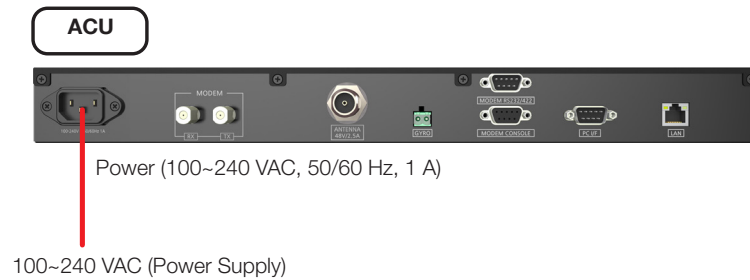


Figure 21: Connecting Power to ACU

6.5.4 Connecting ACU to Antenna

Connect an **Antenna RF cable (N to N)** (customer supplied) from the **ANTENNA (N)** port of the ACU to the **RF (N)** port of radome (antenna).

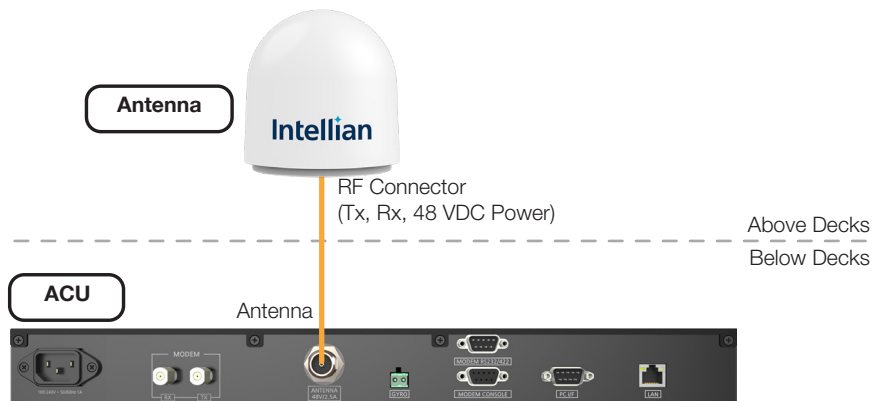


Figure 22: ACU to Antenna Cable Connection

6.5.5 Connecting ACU to Modem

1. Connect a **RF cable (F to F)** from the **MODEM Rx (F) port** of the ACU to the **Rx (F) port** of the modem.
2. Connect another **RF cable (F to F)** from the **MODEM Tx (F) port** of the ACU to the **Tx (F) port** of the modem.
3. When using the OpenAMIP modem protocol, connect an **Ethernet cable** from the **LAN (RJ45) port** of the ACU to a **LAN (RJ45) port** of the modem.

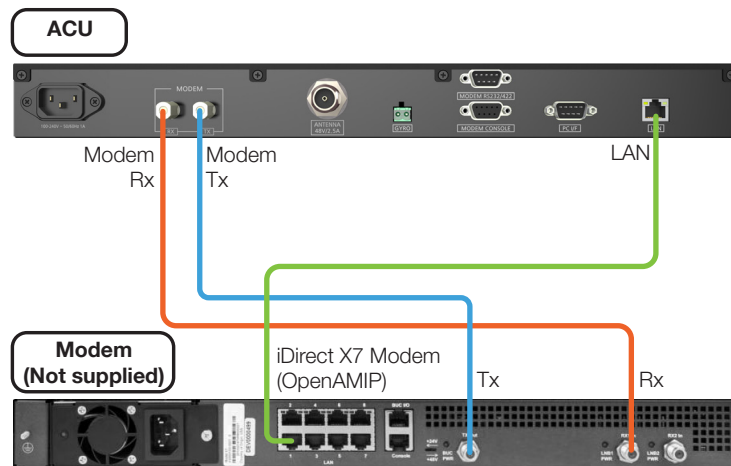


Figure 23: ACU to Modem Cable Connection

6.5.6 Connecting ACU to Ship Gyrocompass

For satellite tracking, connect a gyrocompass used on ship to the antenna system through the gyrocompass interface of the ACU. Intellian ACU supports NMEA 0183 (GYRO) gyrocompass input.

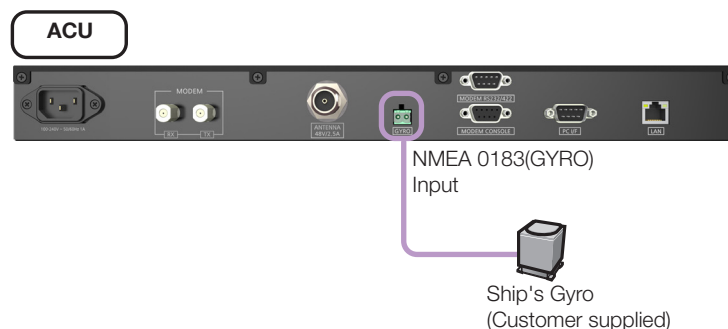
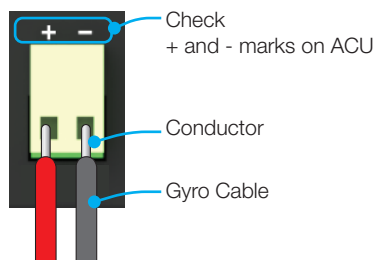


Figure 24: ACU to Ship Gyrocompass Cable Connection

How to Connect NMEA 0183 Gyrocompass Cable

1. Using a Phillips screwdriver, loosen the two screw terminals by rotating them counterclockwise.
2. Strip wires up to 5 mm (0.2"). Do not solder the cables.
3. Insert conductor of gyro cable to the terminal block. The polarity of the terminal is indicated on the ACU with + and - marks. After checking the polarity, connect the cables correctly.



4. Fully tighten the screws by rotating them clockwise to clamp the wires securely.
5. Insert the terminal block with gyro cables to the **NMEA 0183(GYRO)** port of ACU.

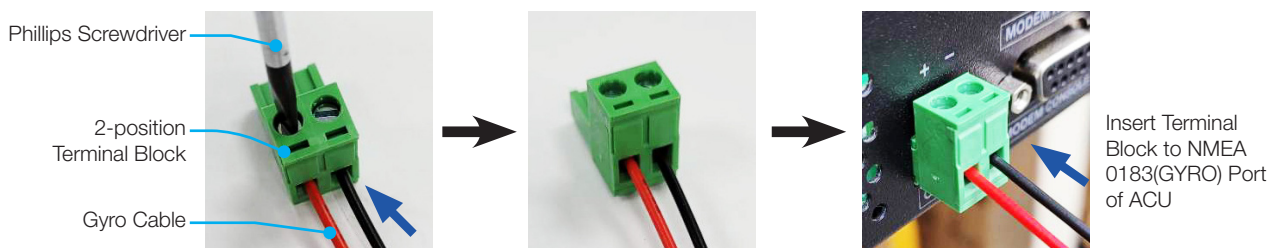


Figure 25: NMEA 0183 Gyrocompass Cable Connection

6.

6.6 ACU to PC Communication Setup

You can establish the data communication between the Antenna Control Unit (ACU) and PC using one of the following methods.

6.6.1 TCP/IP Connection

Connection through Front Panel Management Port

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

1. Connect an Ethernet cable from the Management LAN port on the front panel of ACU to a LAN port of PC.
2. The network connection is established automatically.
3. Use the following IP address to access Intellian *AptusNX* page.

- **IP Address: 192.168.2.1 (Default)**

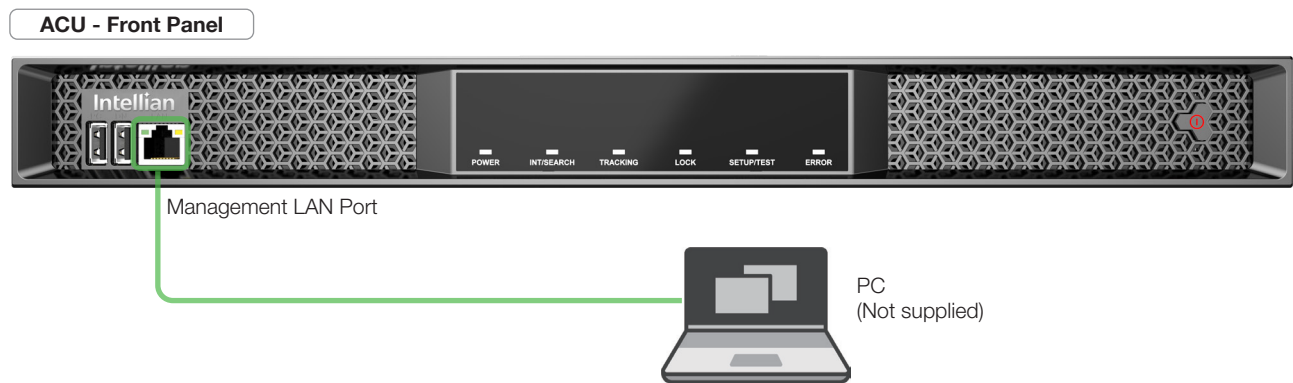


Figure 26: Front Panel Management LAN Port Connection

6.6.2 USB Connection

Using Left Side USB (Serial) Port on ACU Front Panel

Connect a USB Cable (A to A) (customer supplied) from the left side USB (serial) port on the front panel of ACU to PC for monitoring and controlling the antenna system.

NOTE



- The left side USB port is only for certified engineers' use only.
- Accessing AptusNX and iARM upgrade are NOT supported through the serial USB connection.

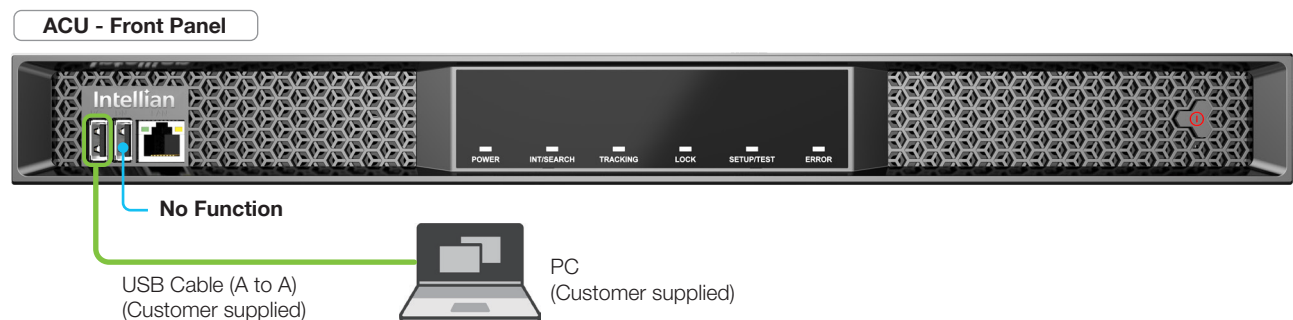


Figure 27: Front Panel USB Port Connection

Chapter 7. Operating Install Wizard

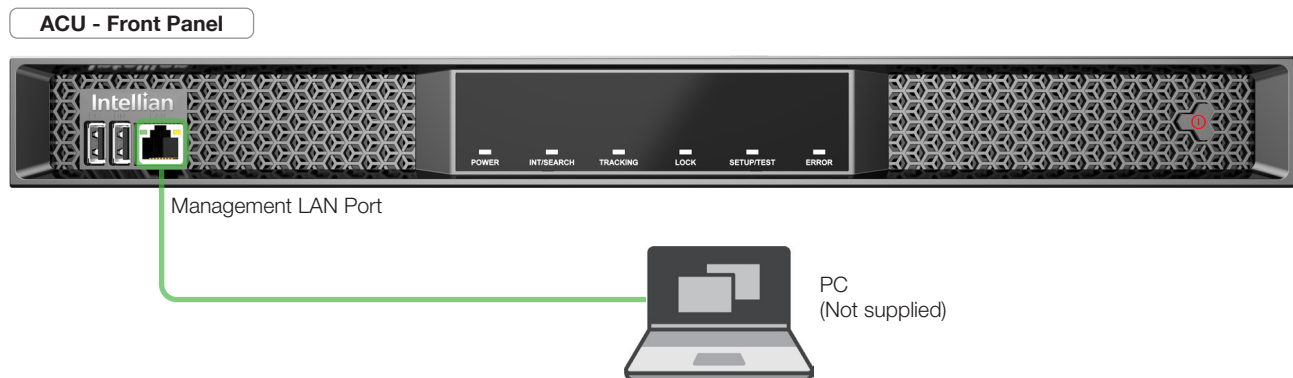
7.1 Turning On System

Make sure the antenna has a clear view of the sky. Press the **POWER** button on the front panel of the Antenna Control Unit (ACU), then wait a few minutes for system startup. Once the antenna finds the satellite, the **POWER** indicator will turn Green.

7.2 Accessing AptusNX

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

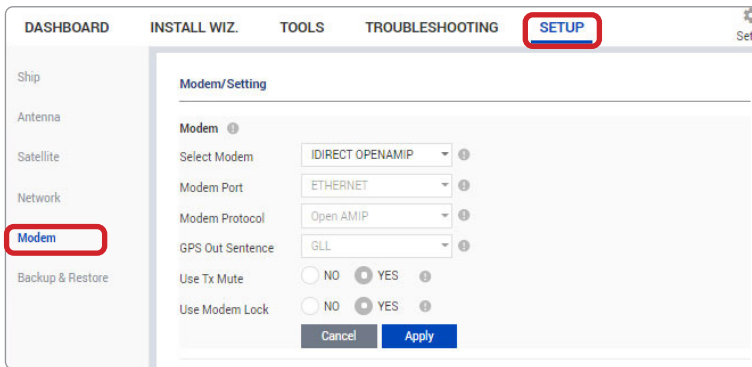
1. Connect an Ethernet cable from the Management LAN port on the ACU front panel to a LAN port of PC.
2. The network connection is established automatically.
3. Use the following IP address to access Intellian **AptusNX** page.
 - **IP Address: 192.168.2.1 (Default)**
4. Log into the **AptusNX** by entering User ID and Password.
 - **User ID: intellian (Default)**
 - **Password: 12345678 (Default)**



7.3 Modem Configuration

Before starting installation wizard, set up the modem configuration.

1. After accessing the **AptusNX** main page, go to the **SETUP → Modem** on the main menu then follow these steps.

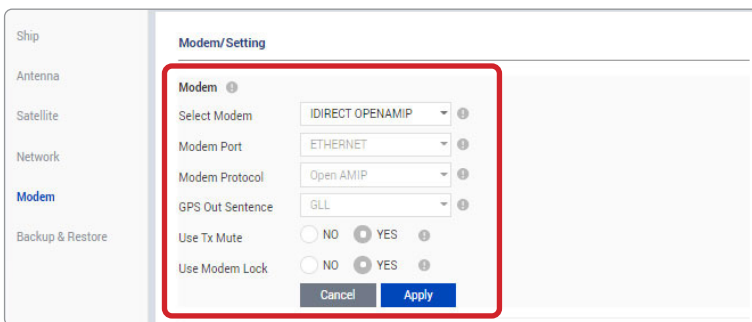


The screenshot shows the AptusNX web interface. The top navigation bar includes 'DASHBOARD', 'INSTALL WIZ.', 'TOOLS', 'TROUBLESHOOTING', and 'SETUP' (highlighted with a red box). The left sidebar lists 'Ship', 'Antenna', 'Satellite', 'Network', 'Modem' (highlighted with a red box), and 'Backup & Restore'. The main content area is titled 'Modem/Setting' and contains the following configuration options:

- Select Modem: IDIRECT OPENAMIP
- Modem Port: ETHERNET
- Modem Protocol: Open AMIP
- GPS Out Sentence: GLL
- Use Tx Mute: ☐ NO ☒ YES
- Use Modem Lock: ☐ NO ☒ YES

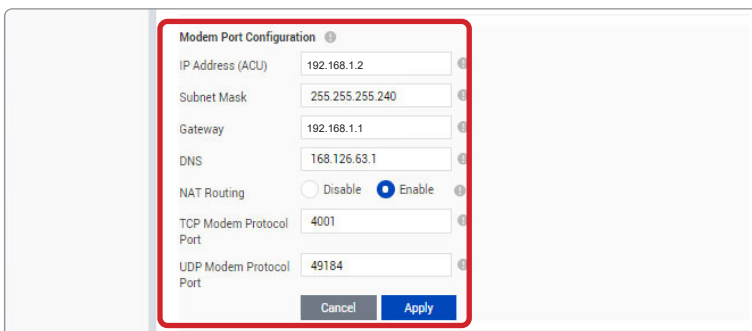
At the bottom of the configuration area are 'Cancel' and 'Apply' buttons.

2. Select your modem type from the **Select Modem** drop-down list for loading a pre-configuration of modem. The setting parameters related to the modem interface will be set automatically once the modem type is selected. If you select **USER SETTING** from the **Select Modem** drop-down list, the settings can be changed manually. Click the **Apply** button.



This screenshot is identical to the previous one, showing the 'Modem/Setting' configuration page. A red box highlights the 'Modem' section, which includes the dropdown menus for 'Select Modem', 'Modem Port', 'Modem Protocol', and 'GPS Out Sentence', as well as the radio buttons for 'Use Tx Mute' and 'Use Modem Lock'.

3. Enter the modem setting values to configure the modem. Refer to the information provided by your service provider. Click the **Apply** button.

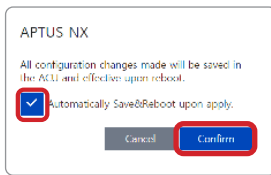


The screenshot shows the 'Modem Port Configuration' page. A red box highlights the configuration area, which includes the following fields:

- IP Address (ACU): 192.168.1.2
- Subnet Mask: 255.255.255.240
- Gateway: 192.168.1.1
- DNS: 168.126.63.1
- NAT Routing: ☐ Disable ☒ Enable
- TCP Modem Protocol Port: 4001
- UDP Modem Protocol Port: 49184

'Cancel' and 'Apply' buttons are located at the bottom of the configuration area.

- On the pop-up window, select the checkbox if you want the system to perform the **iARM Save & Reboot** automatically. Then, click the **Confirm** button.



- Reboot the system.

7.4 Starting Install Wizard

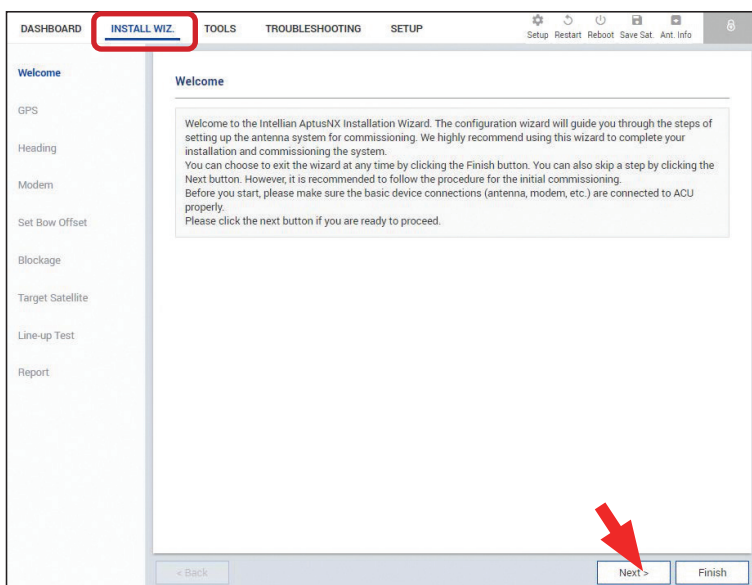
The Install Wizard will give you a guide by going through the steps of setup for the antenna system commissioning. We highly recommend using this wizard to complete the installation and commissioning of the system. You can exit the wizard at any time by clicking the **Finish** button. You can also skip steps by clicking the **Next** button. Before you start, make sure the basic devices (antenna, modem, etc) are connected to the ACU properly. After accessing the **AptusNX** main page, go to the **INSTALL WIZ.** on the main menu then follow these steps.



NOTE

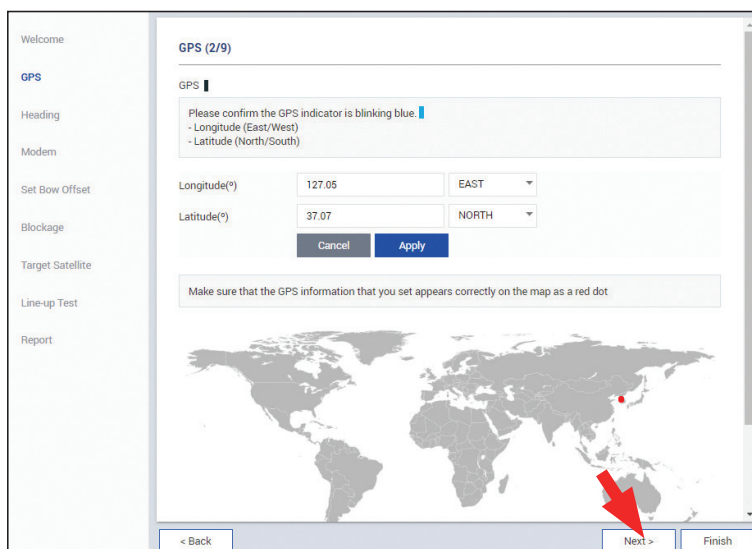
Refer to the "**Chapter 9. Using AptusNX**" on page 56 for detailed description of each function.

✓ Welcome Page



Welcome message is displayed. Click the **Next** button to start.

✓ Step 1: GPS



Set the GPS position of the vessel for the satellite searching. Check the GPS status connected to the antenna system. The colored indicator next to the title shows the GPS status. Make sure the GPS indicator is Blue (blinking).

- Blue (blinking): The system received a correct GPS signal.
- Red: The GPS signal is abnormal, or the received value is incorrect (Error).
- Black: The system has not received any GPS signal. You can enter the GPS value manually to set the GPS position.

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

✓ Step 2: Heading

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Line-up Test

Report

Heading (3/9)

Heading Device ■

Set the ship's heading device(NMEA, Static) and ship's heading information.
- The baud rate(4800/9600/19200/38400) must be set if NMEA is selected.

Current Device: NMEA

Baud Rate: 4800

Cancel Apply

Heading(°): 0

Cancel Apply

< Back Next > Finish

Set the ship's heading device. The colored indicator next to the title shows the heading device connection status.

- Blue: Ship's heading device is connected.
- Black: Ship's heading device is not connected.

If a gyrocompass is connected, choose the device type from the **Current Device** drop-down list. Then, click the **Apply** button. If no gyrocompass is connected, choose **NONE** for the **Current Device** from the drop-down list. Then, click the **Apply** button.

NOTE: Skip "Step 4: Set Bow Offset" if no gyrocompass is connected.

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

✓ Step 3: Modem

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Line-up Test

Report

Modem (4/9)

Modem

Select your modem type from the "Select Modem" drop-down list for loading pre-configuration which type of modem is used. The settings related to the modem interface will be set automatically once the modem type is selected. When you select "USER SETTING" the rest settings can be changed separately.

Select Modem: IDIRECT OPENAMP

Modem Port: ETHERNET

Modem Protocol: Open AMIP

GPS Out Sentence: GLL

Use Tx Mute: NO YES

Use Modem Lock: NO YES

Cancel Apply

Modem Connection

Set the information for connecting with the modem.

Modem IP: 10.110.6.81

Port: 23

ID: admin

Password: Auto Connection

Cancel Start

Last Update Date: 2018.10.22 5h:36m:46s

Connect LOGGEDIN

RX SNR: 14.1

< Back Next > Finish

Select your modem type from the **Select Modem** drop-down list for the modem configuration. The setting parameters related to the modem interface will be set automatically once the modem type is selected. If you select **USER SETTING** from the **Select Modem** drop-down list, the settings can be changed manually. Make sure the **Modem Connection** is in **LOGGEDIN** status.

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

✓ Step 4: Set Bow Offset

For setting the bow offset, a trackable satellite must be selected. There are two methods for tracking a target satellite.

(Option 1: Using Beam Switch Type)

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Cable Compensation

Line-up Test

Report

Set Bow Offset (5/9)

Satellite Tracking ⓘ

Tracking Type ☒ Beam Switch ☐ Library

Beam Selector

ID	Description
85	ktsat-K8-RMVSAT(not in map)
81	ktsat-K5-RMVSAT-Maritime Beam(not in map)
57	ktsat-K6-RMVSAT/CMVSAT(not in map)
27	ktsat-K5-RMVSAT(not in map)

Apply Lock Reboot Refresh

Heading

Current Device NMEA

Baud Rate 4800

Heading(°) 5.5

Bow Offset

The reference satellite has been successfully tracked.
When you press the 'Save Satellite' button, Bow offset is automatically calculated and displayed.

Save Satellite Lock

Current Bow Offset 182°

< Back Next > Finish

- **Step 1:** Choose the **Beam Switch** for the **Tracking Type**.
- **Step 2:** Select a satellite under the Beam List, then click the **Apply** button.

Wait while the antenna terminal tracks the satellite.

- **Step 3:** Make sure the **Lock** is on, then click the **Save Satellite** button in the **Bow Offset** menu to save the BOW offset information to ACU.

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

(Option 2: Using Library Type)

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Cable Compensation

Line-up Test

Report

Set Bow Offset (5/9)

Satellite Tracking ⓘ

Tracking Type ☐ Beam Switch ☒ Library

Select Satellite

Satellite List THAICOM5 (78.5°E)

Satellite Name THAICOM5 Longitude 78.5 EAST

Rx Polarization Horizontal Tx Polarization Vertical

Skew Offset 0 Local Frequency 11300

DVB Frequency 12272 Verify Type DVB Decode

Symbol(kSpS) 30000 NID 0x 0058

Start Searching

Heading

Current Device NMEA

Heading(°) 5.5

Bow Offset

The reference satellite has been successfully tracked.
When you press the 'Save Satellite' button, Bow offset is automatically calculated and displayed.

Save Satellite Lock

Current Bow Offset 182°

< Back Next > Finish

- **Step 1:** Choose the **Library** button on the **Tracking Type**.
- **Step 2:** Select a satellite under the **Satellite List**, then click the **Start Searching** button.

Wait while the antenna terminal tracks the satellite.

- **Step 3:** Turn on the **Lock**, then click the **Save Satellite** button in the **Bow Offset** menu to save the BOW offset information to the antenna.

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

✓ Step 5: Blockage

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Line-up Test

Report

Blockage (6/9)

Blockage

It is important to set up the blockage zones for Intellian VSAT. The ACU can be programmed with relative azimuth and elevation sectors to create up to five zones where transmit power could endanger personnel who are frequently in that area or blockage exists. Several indications are provided when the antenna is within one of these zones. A transmit inhibit output from the ACU will disable/mute the modem transmission within zones set in this steps. If you do not have any problem with block zone, this steps can be skipped. Also, this can be re-set in "SETUP" menus in future when blockage setting needs to be changed in future.

Enable	Description	Az. START ~ END	EL
☒		0 ~ 45	90
☒		180 ~ 210	90
☒		0 ~ 0	90
☒		0 ~ 0	90
☒		0 ~ 0	90

Cancel **Apply**

< Back **Next >** **Finish**

It is important to set up the blockage zones for Intellian VSAT. The VSAT system can be programmed with relative azimuth and elevation sectors to create up to five zones for the transmission mute.

The **AZ START** is the relative azimuth angle where the blockage starts, and the **AZ END** is the relative azimuth angle where the blockage ends (Range: 0 ~ 360).

The **EL** is the elevation angle where the blockage is set (Range: 0 ~ 90). The blockage is activated below the elevation angle.

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

✓ Step 6: Target Satellite

Set the target satellite to track. There are two methods for selecting a target satellite.



NOTE

The following images in this step show when the system is using the Open AMIP modem.

(Option 1: Using Satellite Controlled by Modem)

Welcome

GPS

Heading

Modem

Set Bow Offset

Blockage

Target Satellite

Line-up Test

Report

Target Satellite (7/9)

Current Satellite

☒ **Controlled by Modem** ☐ **Manual Setup**

Cancel **Apply**

Satellite Information

Display and set current tracking satellite settings.

Satellite Name: KOREA6

Longitude(°): 116 EAST

Skew Offset(°): -12

Local Frequency(MHz):

RX Polarization: Horizontal

TX Polarization: Vertical

Identify: ☒ Modem Lock ☐ DVB Lock

NBD Information

Display and set NBD tracking mode's tracking information.

Frequency(kHz_IF): 1190000

Reserved Parameter: 1000

Cancel **Apply**

< Back **Next >** **Finish**

This method is generally recommended.

Select the **Controlled by Modem** for the **Current Satellite**. Then, the current satellite and NBD information will be displayed automatically.

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

(Option 2: Using Manual Setup)

If you did not set the modem connection, select the **Manual Setup** for the **Current Satellite**. Then enter the satellite and NBD information manually to track a satellite. Click the **Apply** button.

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

✓ Step 7: Line-up Test

Perform a line-up test by the satellite operator to confirm antenna performance and operation status.

(Option 1: Using iDirect Open AMIP Modem)

1. Check modem status for connection readiness by clicking the **Check Modem Status** button. Then connect to iDirect Open AMIP modem by clicking the **CLI Connect** button.

2. Enter the CW signal frequency provided by your satellite operator into the **RF Uplink Frequency**, then click the **Apply** button to transmit the signal.

This menu can be edited when the antenna is connected to iDirect Open AMIP modem and the CW is off.

3. Adjust the **Transmit Power** of the frequency using the arrow keys which increases or decreases by 0.5 dBm.

4. Adjust the **Antenna Angle**.

5. Enter the **Test Result** value received from the satellite operator and click the **Apply** button.

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

Refer to the following table for a detailed explanation of each menu.

No.	Item	Description
①	Modem Information	Checks the iDirect Open AMIP modem information. The indicator right of the title shows the device connection status. (Blue: a iDirect Open AMIP modem is connected. Black: a iDirect Open AMIP modem is not connected.) • Modem Type: Displays the iDirect Open AMIP modem type. • Serial No.: Displays the iDirect Open AMIP modem's serial number. • SW Version: Displays the iDirect Open AMIP modem's SW version. - Check Modem Status: Before the CLI connection, check modem status for connection readiness by clicking the Check Modem Status button. - CLI Connect : Connect to iDirect Open AMIP modem by clicking the CLI Connect button. - CLI Disconnect: Disconnect from iDirect Open AMIP modem by clicking the CLI Disconnect button.
②	iDirect Modem Tx Control	Adjusts the modem frequency to receive optimal signal. This menu can be edited when the antenna is connected to iDirect Open AMIP modem and the CW is off. Click the Apply button to apply the settings to the system. • RF Uplink Frequency (MHz): Enters the RF uplink frequency provided by your satellite operator. • BUC LO Frequency (MHz): The BUC LO frequency is applied automatically. The value is assigned according to the satellite band. • Current IF Frequency (MHz): The current IF frequency is applied automatically. The value is RF Uplink Frequency value - BUC LO Frequency. The following menus are performed to adjust the transmit power of the frequency. • Adjust Transmit Power: Adjust the power calibration value using the arrow keys which increases or decreases by 0.5 dBm. • CW: Select whether to use the modulation function or not (On or Off). The indicator next to the title shows the CW status. (Blue: CW is on. Black: CW is off.) To edit the details of the iDirect Modem Tx Control menu, you must keep this function off.
③	Antenna Angle	Adjusts the antenna angle to receive optimal signal. • Relative Azimuth: Displays the relative azimuth angle. • Absolute Azimuth: Adjust the absolute azimuth angle using the arrow keys. • Elevation: Adjust the elevation angle using the arrow keys. • LNB Pol Angle: Adjust the LNB Pol angle using the arrow keys.
④	LNB Pol Sensor	Displays the Mechanical Offset value of the LNB Pol Sensor. The indicator right of the title shows the LNB Pol Sensor status. (Blue: the LNB pol sensor is on. Black: the LNB pol sensor is off.) • Mechanical Offset: Displays the mechanical offset value of the LNB Pol Sensor.
⑤	Test Result List	Enters the test result value received from the satellite operator. • CPI Value (dB): Enter the CPI value. • P1 dB Compression: Enter the P1 dB compression.

(Option 2: Using Other Modems)

1. Enter the CW signal frequency provided by your satellite operator into the **RF Uplink Frequency**, then click the **Apply** button to transmit the signal. (This CW signal frequency must be applied to the modem. The setting process differs depending on the modem, refer to the instruction manual of the modem.)

2. Adjust the **Antenna Angle**.

3. Enter the **Test Result** value received from the satellite operator.

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

Refer to the following table for a detailed explanation of each menu.

No.	Item	Description
①	iDirect Modem Tx Control	Adjusts the modem frequency to receive optimal signal. Click the Apply button to apply the settings to the system. - RF Uplink Frequency (MHz): Enters the RF uplink frequency provided by your satellite operator. - BUC LO Frequency (MHz): The BUC LO frequency is applied automatically. The value is assigned according to the satellite band. - Tx Frequency: The Tx frequency is applied automatically. The value is RF Uplink Frequency value - BUC LO Frequency. - Attenuator (dB): The attenuator is applied automatically.
②	Antenna Angle	Adjusts the antenna angle to receive optimal signal. - Relative Azimuth: Adjust the relative azimuth angle. - Absolute Azimuth: Adjust the absolute azimuth angle. - Elevation: Adjust the elevation angle. - LNB Pol Angle: Adjust the LNB Pol angle.
③	Test Result List	Enters the test result value received from the satellite operator. - CPI Value (dB): Enter the CPI value. - P1 dB Compression: Enter the P1 dB compression

✓ Step 8: Report

**NOTE**

The following image shows when the system is using the Open AMIP modem.

In case of using other modems, the displayed items on the Report may change.

The configuration report is displayed.

You can save the results to the ACU by clicking the **Save Report** button and download the report file (.json) by clicking the **Export** button.

Click the **View Last Report** to check the recently saved report information including the saved date and time.

After complete the steps, click the **Finish** button.

Chapter 8. Operating ACU

8.1 ACU Front Panel View

The following figure shows the ACU's front panel.

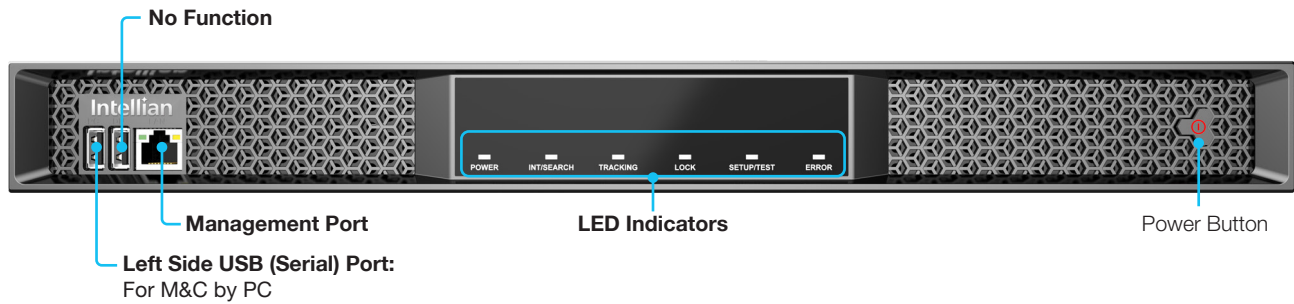


Figure 28: ACU Front Panel View

The following table shows status indicators on the ACU.

LED Indicator	Color	Description
POWER	Steady Green	The ACU is powered on.
	Off	The ACU is powered off.
INT/SERCH	Steady Green	The antenna is searching a satellite.
	Blinking	The antenna is initializing.
TRACKING	Steady Green	The antenna is in tracking mode.
LOCK	Steady Green	The satellite is locked.
SETUP/TEST	Steady Green	The antenna is in Setup mode.
	Blinking	The antenna is in Test mode.
ERROR	Steady Red	The antenna is in error.

Chapter 9. Using AptusNX

9.1 Introduction

With the embedded **AptusNX** software, the antenna can be monitored, controlled, and diagnosed remotely from anywhere, anytime through TCP/IP protocol. It saves your time and cost generated by various maintenance activities such as operating firmware upgrades, tracking parameter resets, and system diagnosis, etc..

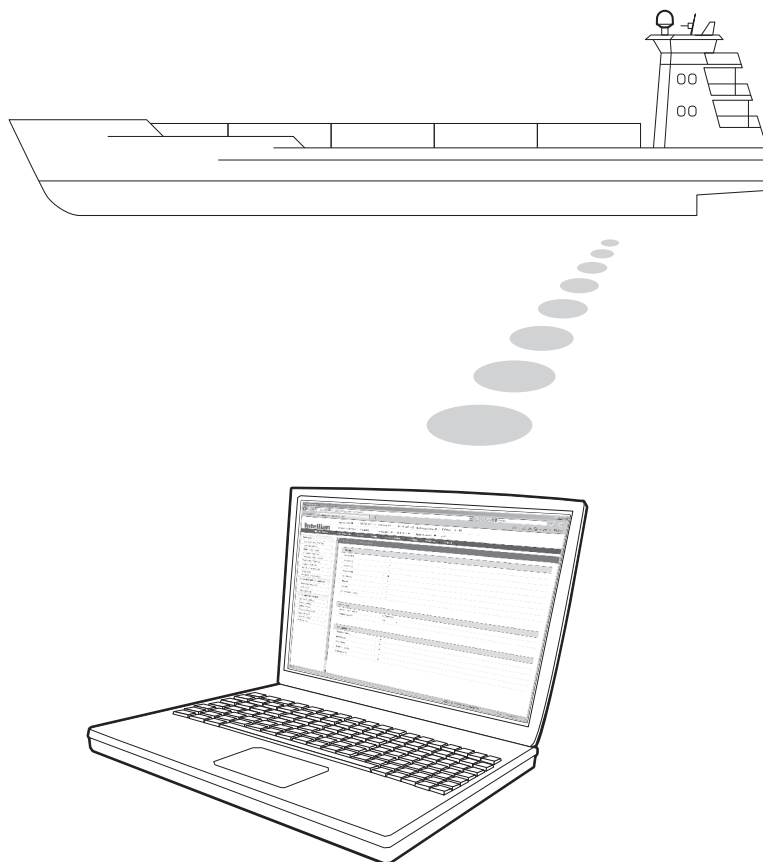
9.2 Accessing AptusNX for ACU

1. Connect an Ethernet cable from the Management LAN port on the front panel of the ACU to a LAN port of PC. This method is generally recommended.
2. Enter the ACU IP address (**Default: 192.168.2.1**) into the address bar of web browser to login into the internal HTML page of ACU.



NOTE

AptusNX works on Internet Explorer 11 or higher (Windows 7 or higher editions), Firefox, Microsoft Edge and Chrome web browsers.

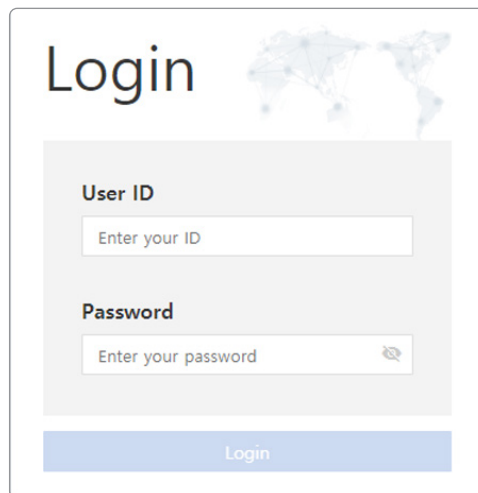


9.3 Main Page (Page Login)

The Intellian software Aptus provides different user access levels to protect the system for safe operation. Depending on the user level, the accessible range of function in the software can be limited.

1. Log into the ACU by typing in User ID and Password. The followings are the factory default values.

User Type	User ID	Password	Access Authority
Admin	<i>intellian</i>	<i>12345678</i>	All menus for monitoring and setting
	<i>captain</i>	<i>12345678</i>	All menus for monitoring and setting Assigns permissions to users
User	<i>guest</i>	<i>guest</i>	Limited menus for monitoring (Dashboard, Tools, Troubleshooting)

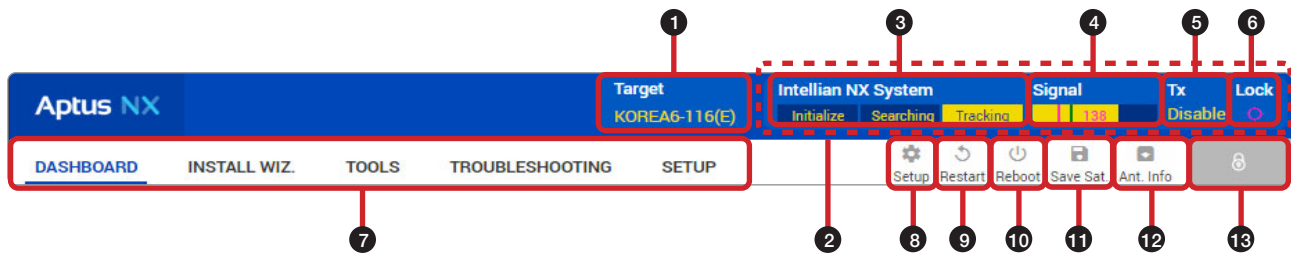



NOTE

After entering with the default password, the user must change the default password to a new password for security.

9.4 Top Menus

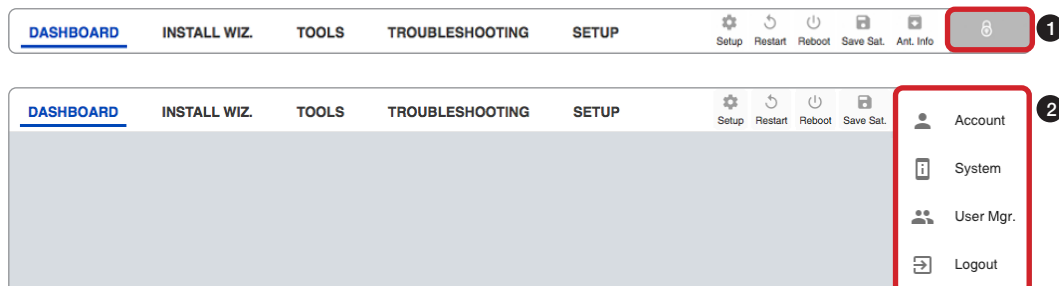
Once you log in, the following information and menus are displayed.



No.	Item	Description											
①	Target Satellite	Displays the name of the targeted satellite.											
②	Quick Status Screen Area	When clicking this top menu area (marked as red dots), the Quick Status Screen appears. You can quickly monitor each status of the five items (Enable Mode, Blockage, Pointing, Modem Lock) through the screen (Blue: enable, Black: disable). APTUS NX Enable Mode Blockage Pointing Modem Lock Close <Quick Status Screen>											
③	Antenna Status Info	Displays the antenna status through a yellow indicator in the SETUP mode. - Initialize: the antenna system is initialized. - Searching: the antenna is searching the target satellite. - Tracking: the antenna is tracking the target satellite.											
④	Signal Level	Displays the current signal level.											
⑤	Tx Status	Displays whether the antenna is able to transmit data or not.											
⑥	Lock	Displays whether the satellite is locked or not.											
⑦	Main Menu	Selects the Main Menu (DASHBOARD, INSTALL WIZ, TOOLS, TROUBLESHOOTING, SETUP). Each main menu offers side menus on the left of the screen.											
⑧	Setup	Enters the setup mode to modify settings. The following functions are available only in setup mode. <table> <tr> <th>Main Menu</th><th>Side Menu</th><th>Function</th></tr> <tr> <td rowspan="5">SETUP</td><td rowspan="4">Antenna</td><td>Antenna Angle</td></tr> <tr> <td>Dish Scan Range Check</td></tr> <tr> <td>Sensor Calibration - Tilt Sensor Bias - Rate Sensor Bias </td></tr> <tr> <td>Antenna Mode - Sets Idle Mode </td></tr> <tr> <td>Backup & Restore Setting</td><td>Antenna Restore</td></tr> </table>	Main Menu	Side Menu	Function	SETUP	Antenna	Antenna Angle	Dish Scan Range Check	Sensor Calibration - Tilt Sensor Bias - Rate Sensor Bias	Antenna Mode Sets Idle Mode	Backup & Restore Setting	Antenna Restore
Main Menu	Side Menu	Function											
SETUP	Antenna	Antenna Angle											
		Dish Scan Range Check											
		Sensor Calibration - Tilt Sensor Bias - Rate Sensor Bias											
		Antenna Mode Sets Idle Mode											
	Backup & Restore Setting	Antenna Restore											
⑨	Restart	The antenna system exits the Setup mode and switches to the normal mode (Searching/Tracking mode).											
⑩	Reboot	The antenna system powers off and restarts. After system initialization, the antenna switches to normal mode (Searching/Tracking mode).											
⑪	Save Sat.	Saves current satellite settings. Bow offset will be adjusted and saved automatically.											
⑫	Ant. Info	Obtains current antenna information.											
⑬	Account Button	Click the  button to manage the user account. The Account , System , and User Mgr. menus are for the user management. Click the Logout button to log-out of the AptusNX web page.											

9.5 Account Menu

1. Click the  button to manage the user account
2. The **Account**, **System**, and **User Mgr.** menus are for the user management. Click the **Logout** button to log- out of the **AptusNX** web page.



9.5.1 Account

No.	Item	Description
①	Account	Updates your password and sets time-outs.
②	Change Password	You can change your password. • Current User ID: Displays your user ID. • User ID: Enter the current user ID. • Current Password: Enter the current password. • New Password: Enter the new password. • Confirm New Password: Re-enter the new password to verify that it was entered correctly. Click the Change Password button to set the password to the new password. For the next login, the new password is required.
③	Session	You can give guests the accessibility to the AptusNX and set time-outs. • Allow Guest Connections: Select the guest's accessibility to the system (Disable / Enable). • Idle Session Timeout: Set the idle session time-out. • Console Timeout: Set the console time-out. Click the Apply button to apply the settings to the system.

9.5.2 Registration

Account

Registration ①

System

User Mgr.

Registration

For better customer service, please register your product information and customer information. Thank you.

② Product

Antenna: XX-XX-XXXX

Serial Number: XXXXXXXXXXXX

③ Vessel

Has IMO Number: ☐ Yes ☒ No

Ship Name: Ship_Name

Type: Cargo vessel

Owner: Intelliantech

④ Service Provider

Service Provider 1:

Service Provider 2:

Service Provider 3:

Cancel Register(Update)

No.	Item	Description
①	Registration	Enter the product registration information for your convenience. Click the Register (Update) button to apply the settings to the system.
②	Product	Displays the antenna information. - Antenna: Displays the antenna name. - Serial Number: Displays the antenna serial number.
③	Vessel	Enter the vessel information. You can choose either using the IMO number or not. If you have the IMO number, select Yes and enter the number. If you do not have the IMO number, select No and enter the Ship Name, Type, and Owner information. - Has IMO Number: Select whether using the IMO number or not. - IMO Number: Enter the IMO number. - Ship Name: Enter the ship name. - Type: Enter the ship type. - Owner: Enter the owner's name.
④	Service Provider	Enter the information of your service provider. Service Provider 1/2/3: Enter the names of service providers.

9.5.3 System

Account
Registration
System
User Mgr.

System

Print

Antenna Information

Antenna Size xx cm / xx inch
Antenna Voltage 44.8V
ACU Voltage 28.0V
Temperature 3.7°C
Antenna Product xx-xx-xxxx
ACU Product xx-xxxxx
Antenna Serial Number xxxxxxxxxxxx
ACU Serial Number xxxxxxxxxxxx
System Polarization Cross Pol
System Band Ku Band

S/W Version Information

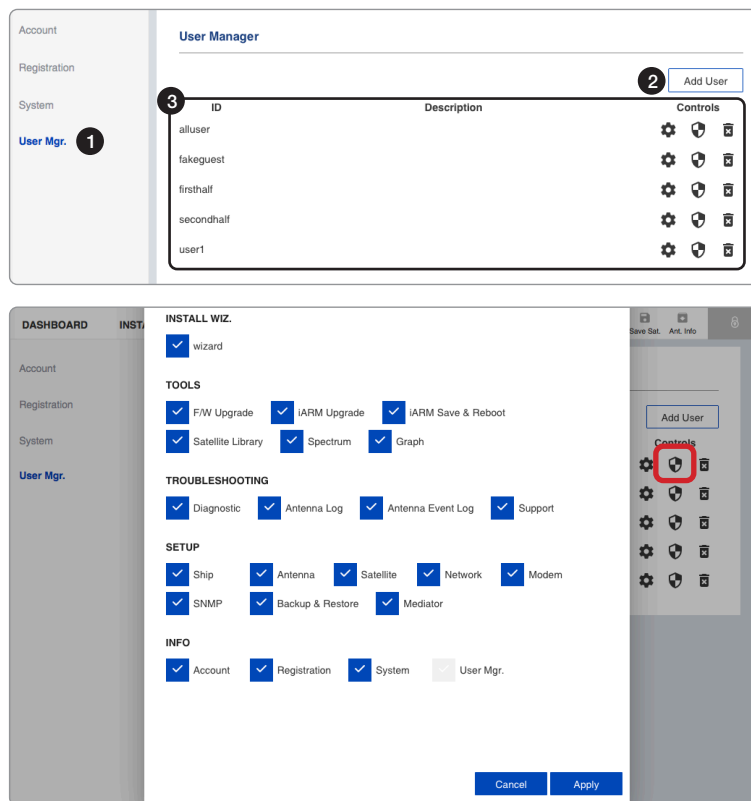
Antenna PCU v1.00
Antenna Stabilizer v1.00
ACU Main v1.00
Lib Ver v1.00

Network Information

Control IP 192.168.2.1
Current IP 192.168.2.1
Idle Session Timeout xx:xx:xx
Date xxxx-xx-xx
Time xx:xx:xx

No.	Item	Description
①	System	Displays system information such as the antenna, S/W version, and network IP address.
②	Antenna Information	Displays antenna information.
③	S/W Version Information	Displays S/W version information.
④	Network Information	Displays network information.

9.5.4 User Manager

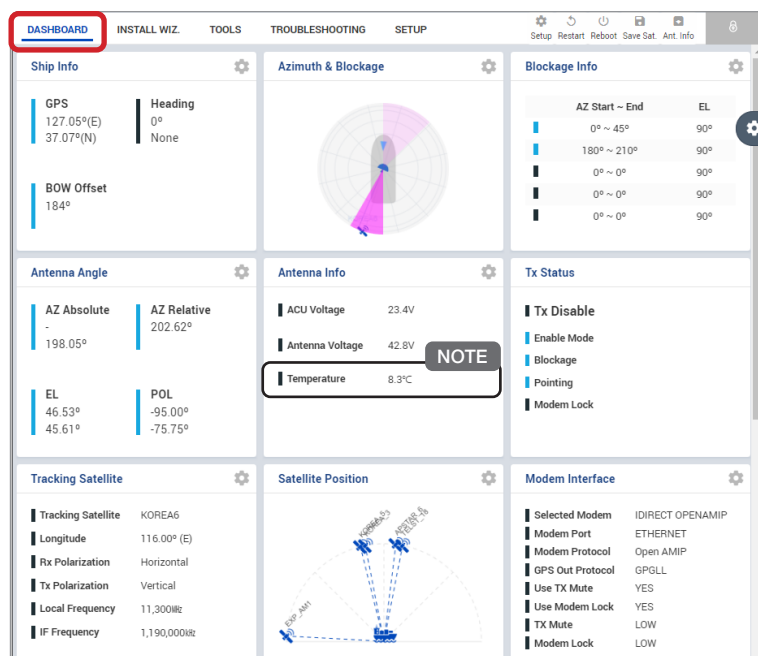


Editable User Permissions Menu

No.	Item	Description
①	User Manager	The captain with admin permissions can control and manage user permissions separately.
②	Add User	To create a new user, click the Add User button. Then the pop-up window is opened. Enter the new user ID and password, then click the Add User .
③	User Management List	Displays the user management state and can control and manage through the control buttons. - ID: displays the registered user ID. - Description: Displays the user's description. - Controls: Each user can be controlled and managed by individual settings. - User Setting: Reset the user ID by clicking the Update User button, and changes the password by clicking the Reset Password button. - Edit Menu Permission: Choose user permissions to give by selecting the checkboxes, then click the Apply button. The user can access only the permitted options. - Delete User: Deletes the user.

9.6 Dashboard

The Dashboard menu is displayed as below to provide quick monitoring of the antenna status. The Dashboard helps you arrange panels on a single screen while providing you with a broad view of a variety of information at once. The dashboard contains multiple panels, which can easily customize the structure of your dashboard and arrange your panels in various ways to make them more readable and user-friendly.



NOTE

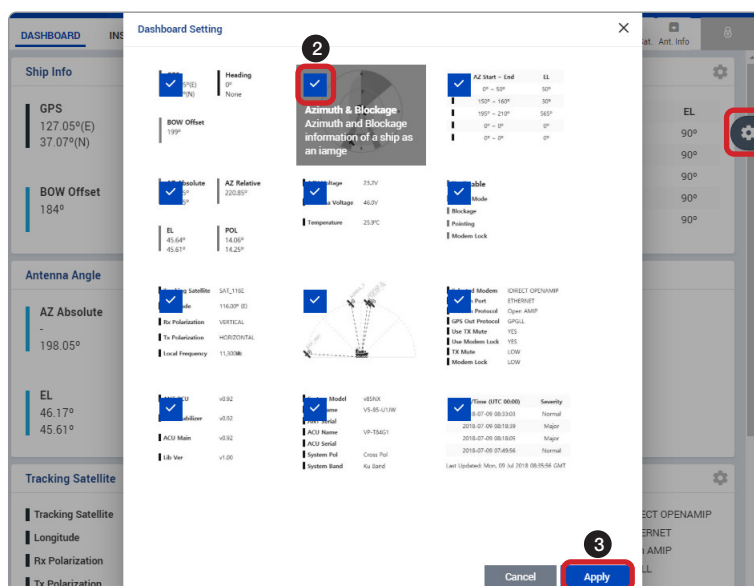


In the Antenna Info panel, the measured temperature can be different from the actual temperature.

9.6.1 How to Add & Remove Panels (Dashboard Setting)

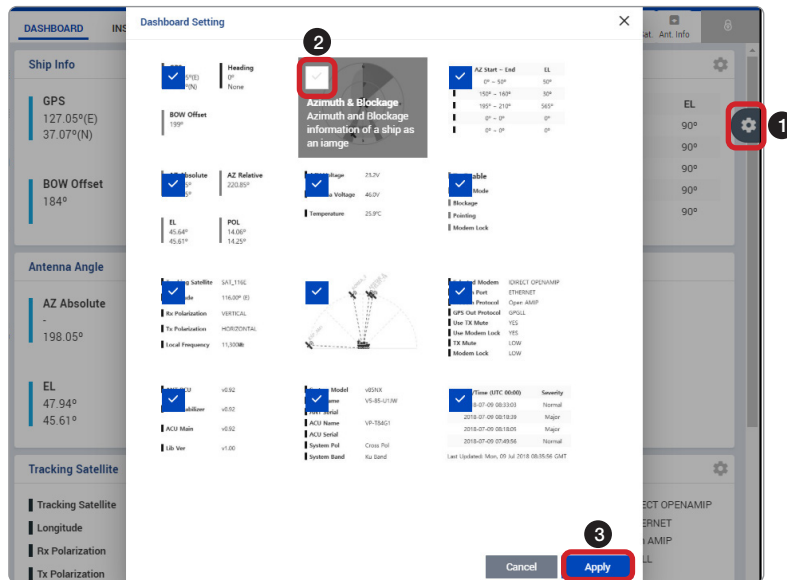
Adding Panels

1. On the right side of the page, you will see the gear icon to edit your dashboard. To start editing, click on the gear icon.
2. Check the box of the panel that you wish to add to the dashboard.
3. Click the **Apply** button to apply the settings to the system.
4. Once the panel is added, it will be automatically placed at the bottom of the page.



Removing Panels

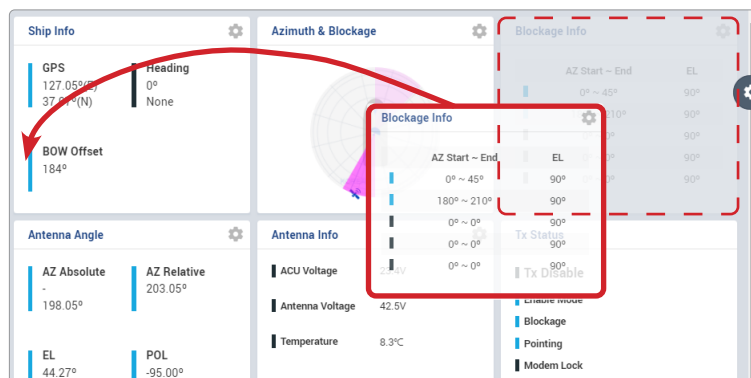
1. Click the gear icon on the right side of the page (see figure below). The Dashboard Setting window displays.
2. Uncheck the box of the panel that you wish to remove from the dashboard.
3. Click the **Apply** button to apply the settings to the system.



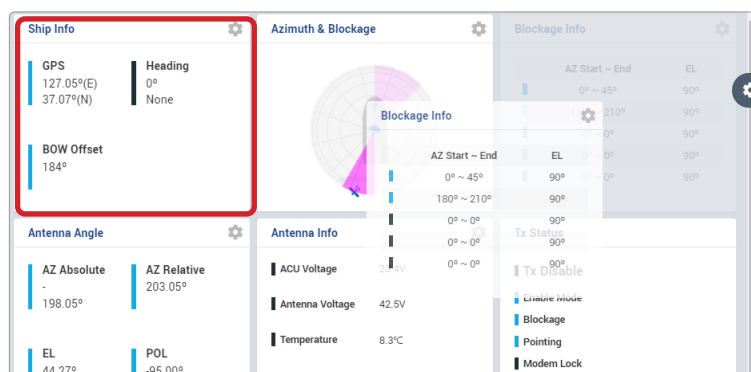
9.6.2 How to Arrange Dashboard Layout

You can customize the dashboard by rearranging panels as you wish.

1. Click and hold the left mouse button on a panel's title and then drag-and-drop in the desired position.



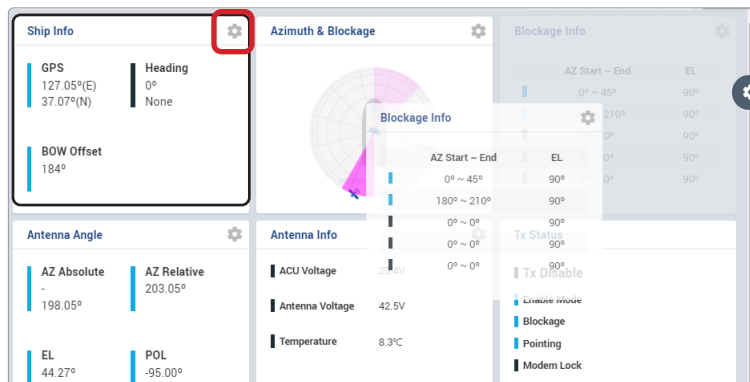
2. This time, the selected panel will be moved to the desired position. You can also move multiple panels into a customized layout in the same manner.



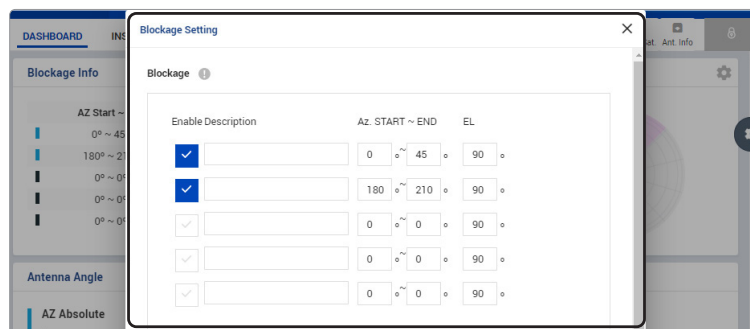
9.6.3 How to Use Shortcut Settings

Many panels on the dashboard provide a shortcut function. Using the **Shortcut** button on right side of the panel, you can easily access detailed information and manage settings.

1. Click the **Shortcut** button (⚙️) to open the setting page.

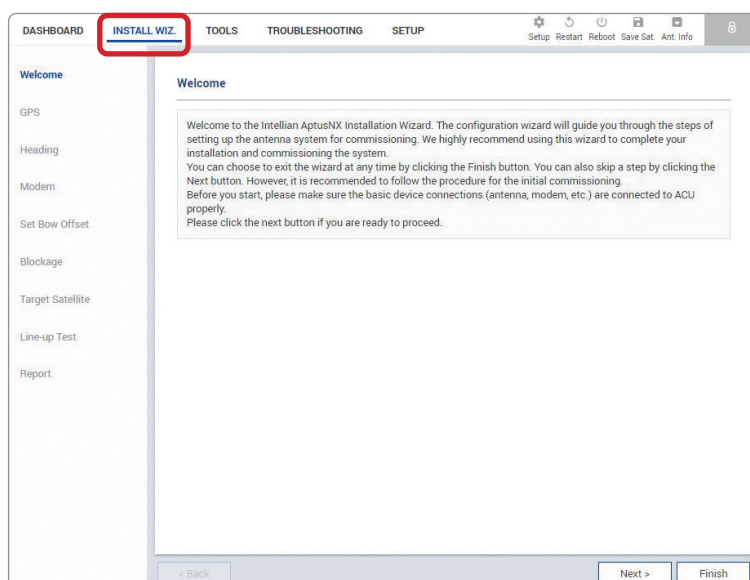


The setting page will appear on an individualized web page. On settings pages, you can check the detailed information and quickly apply the settings that you wish.



9.7 Install Wizard

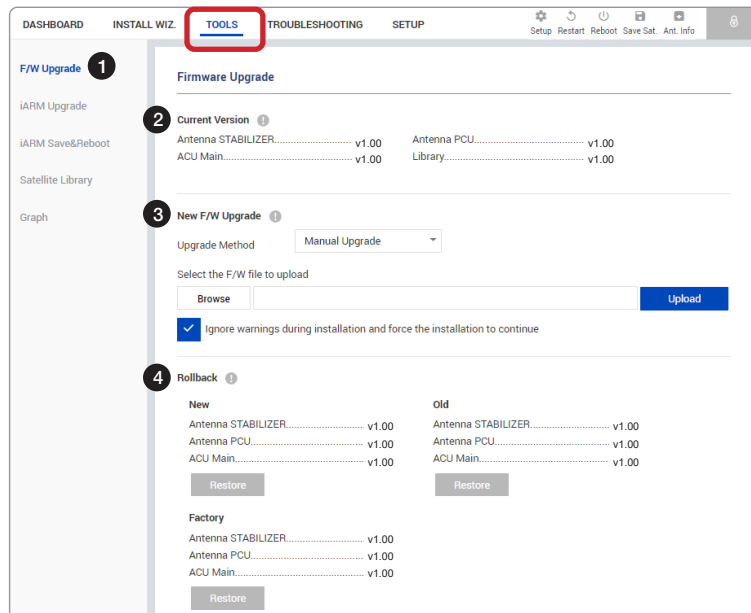
The description of this menu is written on the previous page. Refer to **"7.4 Starting Install Wizard"** on **page 47** for more details.



9.8 System Tools

This menu sets and displays the F/W Upgrade, iARM Upgrade, iARM Save&Reboot, Satellite Library, and Graph function.

9.8.1 Firmware Upgrade



No.	Item	Description
①	Firmware Upgrade	Displays current firmware versions and upgrades antenna firmware.
②	Current Version	Displays current firmware versions (Antenna STABILIZER, Antenna PCU, ACU Main, Library)
③	New F/W Upgrade	Upgrades antenna firmware. The update may take a few minutes to complete. The upload time may vary due to a variety of factors such as the speeds of your network. Uploading an incorrect firmware file may cause serious damage to your antenna and ACU. Check firmware version before uploading firmware. Upgrade Method: selects an upgrade method between Manual Upgrade or Auto Upgrade. NOTE: When using the Manual Upgrade method, refer to the following "Antenna Firmware Update (Manual Upgrade method) Procedures" page for more details.
④	Rollback	Displays the previous and latest versions of the firmware package and restores them. Other function cannot be operated while rollback is in process. New: Most currently upgraded version of firmware Old: Previous version of firmware before the upgrade Factory: Initial version of firmware which was installed by the factory The new, old or factory version of firmware can be restored by clicking on the RESTORE button.

Antenna Firmware Upgrade (Manual Upgrade method) Procedures:

1. Choose **Manual Upgrade** from the pull-down menu of Upgrade Method. Browse and select the upgrade package file to upload. Click on the **Upload** button to transfer the Firmware package file (*.fwp) to iARM module.

New F/W Upgrade ⓘ

Upgrade Method: Manual Upgrade

Select the F/W file to upload

Browse Upload

☒ Ignore warnings during installation and force the installation to continue



NOTE

If you select the box "Ignore warnings during installation and force the installation to continue", warning messages do not appear during the upgrade.

2. The antenna firmware versions are displayed on the pop-up window. Check the current version installed and the new version available for each type of firmware, then click the **Start Upgrade** button.

APTUS NX

Type	Current Ver.	New Ver.
PCU	v1.00	v1.01
STAB	v1.00	v1.01
ACU Main	v1.00	v1.01

Cancel Start Upgrade

3. The upgrade of each firmware type is performed in order, and the process is displayed on the window. If the current version matches with the new version of the firmware, the upgrade process is skipped.

APTUS NX

Please do not turn off the power during the upgrade.

Type	Current Ver.	New Ver.	Result
STAB	v1.00	v1.01	30 %
PCU	v1.00	v1.01	20 %
ACU Main	v1.00	v1.01	Ready

Ok

4. If the firmware is successfully upgraded, the result is marked as "Success". Click the **Ok** button to close the pop-up window.

APTUS NX

Please do not turn off the power during the upgrade.

Type	Current Ver.	New Ver.	Result
STAB	v1.00	v1.01	Success
PCU	v1.00	v1.01	Success
ACU Main	v1.00	v1.01	Success

Ok

9.8.2 iARM Upgrade

The screenshot displays the 'iARM Upgrade' web interface. On the left sidebar, there are links for 'F/W Upgrade', 'iARM Upgrade' (highlighted with a red circle 1), 'iARM Save&Reboot', 'Satellite Library', and 'Graph'. The main content area is titled 'iARM Upgrade' and contains four numbered steps:

- 1 iARM Upgrade**
- 2 New iARM Firmware**: Includes a 'Select the F/W file to upload' section with a 'Browse' button and a 'Start Upgrade' button. Below this is a checkbox labeled 'Ignore warnings during installation and force the installation to continue.' which is checked.
- 3 Bootstrap/Bootloader**: Displays version information for 'Bootstrap' and 'Bootloader' across 'Main', 'Factory Default', and 'Active' states. All versions are listed as v1.00.
- 4 Kernel/File System**: Displays version information for 'Sys0', 'Sys1', 'Factory Default', and 'Current Active' across 'Kernel' and 'File System' components. 'Sys0' and 'Factory Default' have 'Activate' buttons. 'Sys1' has an 'Activated' button. 'Current Active' shows 'Current Package' as 'Sys1' and has 'Activate' buttons for both 'Kernel' and 'File System'.

No.	Item	Description
①	iARM Upgrade	Upgrades the firmware of iARM module.
②	New iARM Firmware	Browse and select the iARM firmware file to upload and click Start Upload button. The update may take a few minutes to complete. The upload time may vary due to a variety of factors such as the speeds of your network. Uploading an incorrect firmware file may cause serious damage to your antenna and ACU. Check the firmware version before uploading firmware. NOTE: refer to the following "iARM Upgrade Procedures" page for more details.
③	Bootstrap/Bootloader	Displays current bootstrap and bootloader version. • Bootstrap: displays the Bootstrap Version (Main, Factory Default). • Bootloader: displays the Bootloader Version (Main, Factory Default, Active Bootloader)
④	Kernel/File System	The ACU has three storage parts the Sys0, the Sys1 and the Factory Default. Selects the desired storage part and click the Activate button. Then perform the "9.8.3 iARM Save & Reboot" on page 70 to apply the settings to the system. • Sys0: displays the Sys0 version. • Sys1: displays the Sys1 version. • Factory Default: displays the Factory Default version. The Current Active displays activated storage part Information. • Current Active - Current Package: displays the activated storage part's name (Sys0, Sys1 or Factory Default). - Kernel, File System: displays the activated storage part's file version.

iARM Upgrade Procedures:

1. Browse and select the iARM firmware file (.tgz) that you wish to upgrade. Click on **Start Update** button to update the iARM firmware. Wait until the page is loaded.



New iARM Firmware ⓘ

1 Select the F/W file to upload

Browse

2 Start Upgrade

☒ Ignore warnings during installation and force the installation to continue.

**NOTE**

If you select the box "Ignore warnings during installation and force the installation to continue", warning messages do not appear during the upgrade.

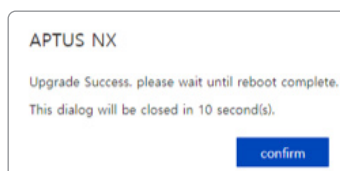
2. Once the update starts, the update process will be displayed on the screen. It will take about two minutes to complete the firmware upgrade.

**WARNING**

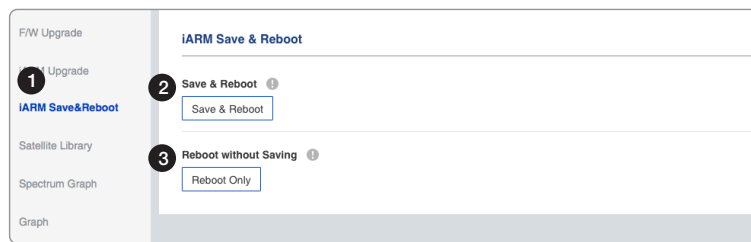
Do not turn off the device power if the firmware upgrade page is displayed. Failure to comply may lead to damage and/or malfunction of the system.



3. Once the upgrade is completed, the iARM module will automatically reboot in 10 seconds.



9.8.3 iARM Save & Reboot



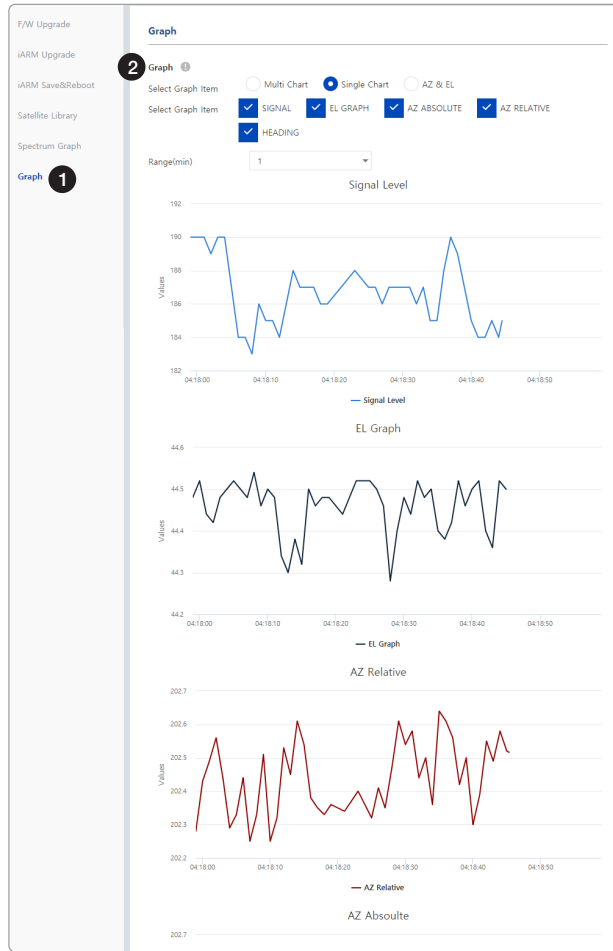
No.	Item	Description
①	iARM Save & Reboot	Save settings for the iARM and reboot the system.
②	Save & Reboot	Saves the modified settings for the iARM, and reboots the system. All configuration changes made will be saved in the ACU and effective upon the reboot. Click the Save & Reboot button.
③	Reboot without Saving	Reboots the system without saving the modified settings of the iARM . All configuration changes made will be lost upon the reboot. Click the Reboot Only button.

9.8.4 Satellite Library

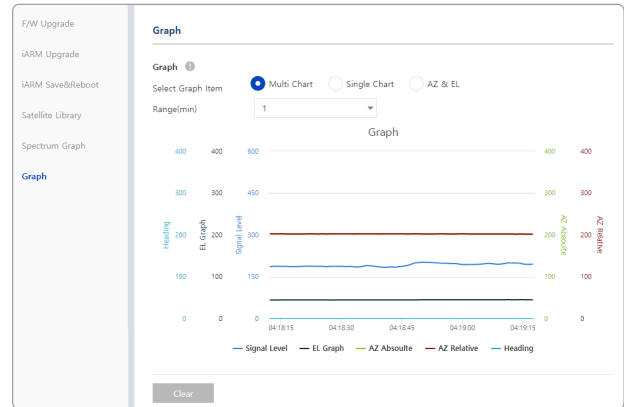
The screenshot shows the 'Satellite Library' configuration window. The sidebar on the left has the following options: F/W Upgrade, iARM Upgrade, iARM Save&Reboot, **Satellite Library** (selected), and Graph. The main content area is titled 'Satellite Library' and contains a 'Satellite List' section with a message 'satellite list is empty.' and four buttons: 'Get Library from ACU', 'Save to PC(Download)', 'Get Library from PC', and 'Save to ACU'. Below this is a 'Load Satellite' button. A blue box highlights the 'Common Information', 'DVB Information', and 'NBD Information' sections. The 'Common Information' section includes fields for Satellite Name (KOREA6), Longitude (116), Skew Offset (-12), Identify (Modem Lock), Rx Polarization (Horizontal), and Tx Polarization (Vertical). The 'DVB Information' section includes Frequency (12490), Symbol (29500), NID (0x 00AD), and Verify Type (DVB Lock). The 'NBD Information' section includes Frequency (1190000), Bandwidth (1000), and Base Local (11300).

No.	Item	Description
①	Satellite Library	Sets the satellite library information.
②	Satellite List	Reads or manages satellite information from the library. - Get Library from ACU: obtains satellite library file from the ACU. - Get Library from PC: obtains the satellite library file from the PC. - Save to PC (Download): saves the current library file to the PC. - Save to ACU: saves the current library file to the ACU.
③	Satellite Information	Select one of the satellites in the Satellite List then Click the Load Satellite button to load the satellite information.
④	Common Information	Displays selected satellite information. - Satellite Name: displays the satellite name. - Longitude(°): displays satellite orbit position. - Skew Offset: displays the Skew offset. - Identify: displays the lock setting type (Modem Lock / DVB Lock) for satellite tracking. - Rx Polarization: displays the current Rx polarization. - Tx Polarization: displays the current Tx polarization.
⑤	DVB Information	Displays DVB mode's tracking information. - Frequency (MHz): displays the tracking frequency. - Symbol (kSps): displays the symbol rate. - NID: displays the network ID. - Verify Type: displays the verification type.
⑥	NBD Information	Displays NBD mode's tracking information. - Frequency (kHz_IF): sets the tracking frequency. - Bandwidth (kHz): sets the detection bandwidth. - Base Local (MHz): sets the base local.

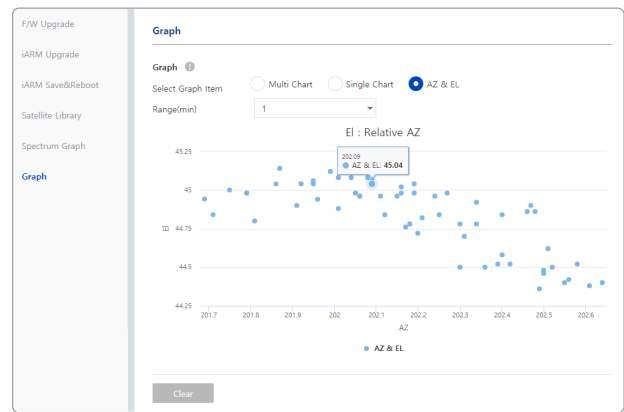
9.8.5 Graph



Single Chart View



Multi Chart View



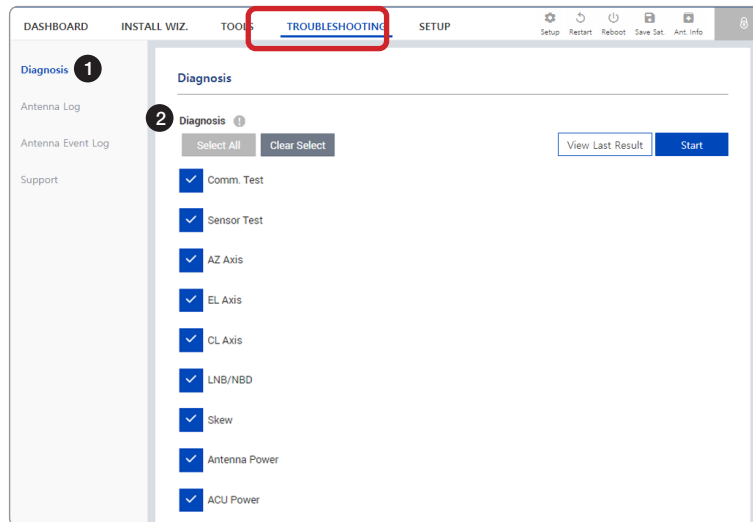
AZ & EL View

No.	Item	Description
①	Graph	This view provides information on the Signal Level, EL Graph, AZ Absolute, AZ Relative, Heading in the Multi Chart, Single Chart or AZ & EL formats.
②	Graph	Sets detailed options for the graph. • Select Graph Item: shows the graphs of only the checked item(s) in the Multi Chart, Single Chart or AZ & EL formats. - Multi Chart: displays multiple graph Items in one graph View. - Single Chart: displays the checked graph Item in each graph View. - AZ & EL: displays the AZ / EL angle value in one graph View. • Range (min): displays the data for the set time. By clicking the Clear button, the existing displayed graph is cleared and a new graph is displayed.

9.9 System Troubleshooting

This menu sets and displays the Diagnosis, Antenna Log, Antenna Event Log and Support function.

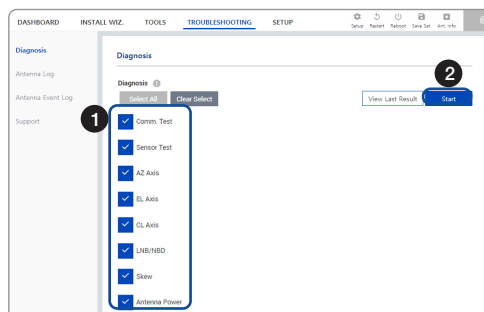
9.9.1 Diagnosis



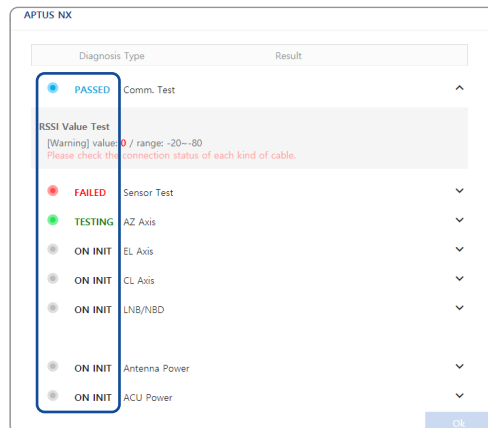
No.	Item	Description
①	Diagnosis	Executes antenna diagnosis test to check the antenna status.
②	Diagnosis	Select the checkbox (full diagnosis test or single diagnosis test) before modifying the settings. • Select All: select to run a full diagnosis test. • Clear Select: select to run a single diagnosis test. • View Last Result: displays the recently saved diagnosis result. • Start: executes the diagnosis test.

Diagnosis Procedures:

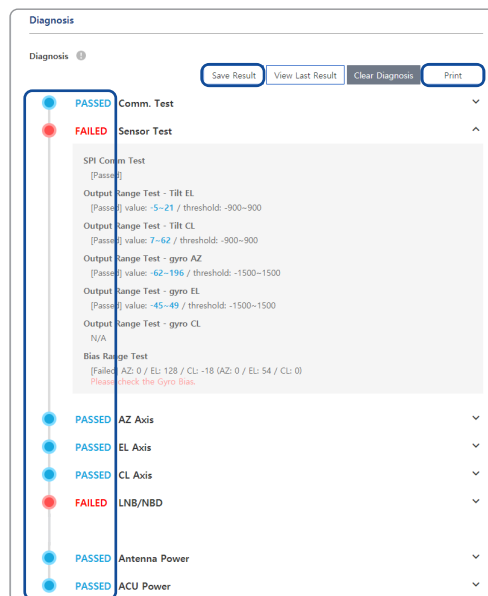
1. Select the checkbox for each test that you want to run on the system. Click on the **Start** button to run the diagnostic test.



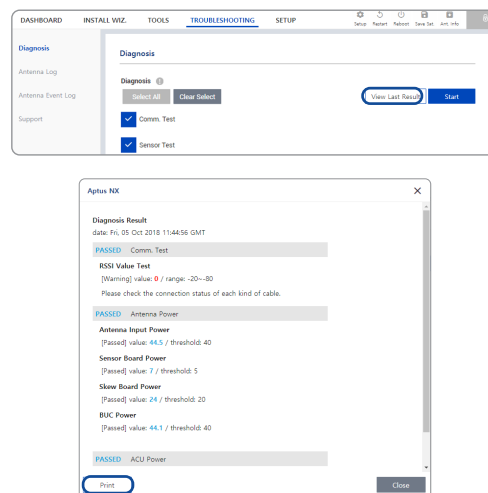
Once the diagnosis starts, the page will indicate test status. It will take a few minutes to complete the test.



2. After the diagnosis is completed the system shows the diagnosis results of each item. You can save the results to the ACU by clicking the **Save Report** button and print this page by clicking the **Print** button. To remove the result, click the **Clear Diagnosis** button.



3. When you want to check the recently saved diagnosis results, click the **View Last Report** button. The pop-up page of the diagnosis results, including the save date and time, will appear. You can print this page by clicking the **Print** button.



9.9.2 Antenna Log

Antenna Log

2 GPS Log Option

Turn On ☐ Off ☒ On

3 Antenna Log Download

Duration

☒ Include Backup/Report File ☒ Compress

Start Download

4 Antenna F/W Log

Date/Time (UTC 00:00)	STAB	PCU	Main
Tue, 29 Oct 2019 23:37:28	1.09 Success	1.05 Success	1.15 Success

No.	Item	Description
①	Antenna Log	Displays the antenna log data.
②	GPS Log Option	Turns on/off the GPS log download option. Click the Apply button to apply the settings to the system.
③	Antenna Log Download	Any log data within three months can be downloaded. Select the duration on the calendar view that you want to show. Then click the Start Download button. NOTE: when selecting the box Include Backup/Report File before downloading, the Backup/Report File will download together. When selecting the box Compress before downloading, log files are downloaded in a compressed format.
④	Antenna F/W Log	Displays log information about firmware upgrade.

9.9.3 Antenna Event Log

No.	Item	Description
①	Antenna Event Log	Displays the antenna system and user log information by setting urgency level.
②	Query Filter	Sets the log message option to display the event log. - Severity: sets the urgency level. - Category: sets the target that caused the message. - Time Frame: sets the time limit that you want to show. - Duration: sets the duration on the calendar view that you want to show. - Tracking Method: sets the sorting type (Descending / Ascending). Click the Query Event Log button to apply the settings to the system.
③	Event Log	Displays event log information.

9.9.4 Support

No.	Item	Description
①	Support	Supports the manual web page, support desk and FAQ list.
②	Manual and Help	Shows the manual web page and support desk information. - View Manual: click the View Manual button to open the manual web page. - Support Desk: click the Support Desk button to open Intellian's contact details for support.
③	FAQ	Provides answers to frequently asked questions about the product.

9.10 System Setting

This menu sets and displays the Ship, Antenna, Satellite, Network, Modem, and Backup & Restore function.

9.10.1 Ship Setting

The screenshot shows the 'SETUP' menu in the top navigation bar. The 'Ship' settings section is active, showing the following configuration:

- GPS:** Longitude(°) 127.05, Latitude(°) 37.07, EAST, NORTH. Buttons: Cancel, Apply.
- Heading Device:** Current Device NMEA, Baud Rate 4800, Heading(°) 0. Buttons: Cancel, Apply.
- BOW Offset:** Current Bow Offset(°) 184. Buttons: Cancel, Apply.
- Blockage:** A table with 5 rows for enabling/denying blockage zones. The first two rows are checked (enabled).

Enable	Description	Az. START	~ END	EL
☒		0	~ 45	90
☒		180	~ 210	90
☐		0	~ 0	90
☐		0	~ 0	90
☐		0	~ 0	90

Buttons: Cancel, Apply.

No.	Item	Description
①	Ship	Sets the ship information and block zone.
②	GPS	Sets the GPS position of the vessel for searching for a satellite. Check the GPS status connected to the antenna system. The indicator left of the help button shows the GPS status. Make sure the GPS indicator is Blue (blinking). (Blue (blinking): the system received a correct GPS input. Black: the system has not received a GPS input. You can enter the GPS value manually to set the GPS position.) - Longitude(°): sets Longitude information (East / West). - Latitude(°): sets Latitude information (North / South). Click the Apply button to apply the settings to the system.

No.	Item	Description
③	Heading Device	Sets the ship's heading device. Choose the device type from the Current Device drop-down list. The indicator left of the help button shows the device connection status. (Blue: a ship's heading device is connected. Black: a ship's heading device is not connected.) • Current Device: select the heading device (None, NMEA (0183), Static). • Baud Rate: select the band rate (4800, 9600, 19200, 38400). It must be set when NMEA is selected on the Current Device list. • Heading(°): enter the heading information. Click the Apply button to apply the settings to the system.
④	BOW Offset	For setting bow offset, you need to select a satellite which is trackable in satellite library information. When the antenna tracks the selected satellite, bow offset will be set up automatically. • Current Bow Offset (°): Enter the Bow Offset Range (0 – 360°). Click the Apply button to apply the settings to the system.
⑤	Blockage	It is important to set up the blockage zones for Intellian VSAT. The VSAT system can be programmed with relative azimuth and elevation sectors to create up to five zones for transmission mute. It is indicated when the antenna is within one of the zones. A transmit inhibit output from the ACU will disable/mute the modem transmission within the blockage zones. The AZ START is the relative azimuth angle where the blockage starts, and the AZ END is the relative azimuth where the blockage ends (Range: 0 ~ 360). The EL is the elevation angle where the blockage is set (Range: 0 ~ 90). The blockage is activated below the elevation angle. Click the Apply button to apply the settings to the system.

9.10.2 Antenna Setting

Ship

Antenna ①

Satellite

Network

Modem

Backup & Restore

Antenna Setting

2 Antenna Angle

Relative Azimuth 198.03°

Absolute Azimuth - / 198.05°

Elevation 45.58° / 45.61°

LNB Pol Angle -95.00° / -75.75°

3 Tracking / Searching Parameter

Thresholds Setting

Detect Level

Tracking Level

Tx Enable

4 Search Parameter

Wait Time(sec)
0 ~ 300sec

Search Step(°)

Azimuth(°)

Search1	Search2	Search3
400	6	3

Elevation(°)

Search1	Search2	Search3
8	6	4

5 Conical Range

Azimuth

Elevation

6 Conical Range Check

Switch Activation ☒ Off ☐ On

AZ EL

No Data

7 Sensor Calibration

EI Adjust

EI Adjust(°)

8 Tilt Sensor Bias

EL

CL

9 Rate Sensor Bias

Azimuth

Elevation

Cross-level

10 LNB Pol Sensor Calibration (Skew)

Sat Skew Offset(°)

Mechanical Offset(°)

Consolidated Offset(°)

11 Antenna Mode



NOTE

The **Set Rate Sensor Bias** function must be used by experienced engineers only.

No.	Item	Description
①	Antenna Setting	Sets current antenna position and search parameters. These parameters should only be changed by an authorized service technician. Improper setting of these parameters will render your system inoperable.

No.	Item	Description
②	Antenna Angle	The system must be in Setup Mode to modify these settings. Sets current antenna position and LNB pol angle. You can move the antenna's azimuth and elevation position and LNB pol angle by using the arrows or inputting a value to find the desired satellite manually. • Relative Azimuth: Displays the antenna's relative azimuth angle. • Absolute Azimuth: sets the antenna's absolute azimuth angle. • Elevation: sets the elevation angle. • LNB Pol Angle: sets the LNB pol angle
③	Thresholds Setting	Sets current detect level threshold and tracking level threshold. • Detect Level: sets the current detect level threshold. • Tracking Level: sets the current tracking level threshold. • Tx Enable: sets the Tx enable threshold. Click the Apply button to apply the settings to the system.
④	Search Parameter	Sets the timeout, search step and search range. • Wait Time (sec): sets the time-out for automatic initiation of a search after the signal level drops below the pre-defined threshold value. • Search Step(°): sets increment step size. • Search1/3: sets Search 1 and 3 search range. Search is conducted in a two-axis pattern consisting of alternate movements in azimuth and elevation to form an expanding square. • Search2: this is reserved for future use. Click the Apply button to apply the settings to the system.
⑤	Conical Range	The relative force of the motors controlling azimuth and elevation. Sets the conical range while the antenna is in tracking mode. Click the Apply button to apply the settings to the system.
⑥	Conical Range Check	The system must be in Setup Mode to these modify settings. Monitors the Azimuth and the elevation values when the conical range is modified. • Switch Activation: choose whether to use the switch activation function (On / Off). Click the Apply button to apply the settings to the system.
⑦	Sensor Calibration	The system must be in Setup Mode to modify these settings. Adjusts the elevation to offset the angle difference between the mechanical elevation angle and actual elevation angle. Click the Apply button to apply the settings to the system.
⑧	Tilt Sensor Bias	NOTE: The tilt values of the elevation and cross-level axes were calibrated to the optimal condition at the factory prior to shipment. However, when the antenna MCU unit or fixed sensor unit is replaced, the elevation and the cross-level axes must be checked by adjusting tilt and rate sensor value. Refer to the replacement manual for detailed procedures. The separate device (e.g. level indicator) for manual adjustment is not provided by Intellian. Enter Setup Mode to modify settings. Maintain the elevation and the cross-level axes to keep the pedestal parallel to the horizon. • Ready: click the Ready button to bring the elevation and cross-level to 0. • EL/CL: select EL/CL and click the Up and Down arrow keys to adjust the elevation and cross-level. Click the Restart button on the top menu to restart the antenna system.

No.	Item	Description
⑨	Rate Sensor Bias	NOTE: The rate values of the azimuth, elevation, and cross-level axes were calibrated to the optimal condition at the factory prior to shipment. If additional rate adjustment is required, make sure that the antenna is placed on a rigid and flat platform. During the calibration process, the antenna must avoid any motion as it can affect the antenna's performance. Enter Setup Mode to modify settings manually. Calibrates DC voltage output from the three rate sensors used to sense antenna motion in azimuth, elevation and cross-level axes. These are used to sense antenna motion that corresponds to the ship's motion (roll, pitch, and yaw) for stabilizing the pedestal. The DC voltage output from each of the rate sensors may vary by an amount which is directly proportional to the direction and rate of motion induced on it. - Rate Sensor Calibration: click the Rate Sensor Calibration button to calibrate the rate sensor automatically. The indicator to the left of the help button shows the rate sensor calibration status. (Black: The calibration is ready to start. Blue: The calibration is completed. Red: The calibration failed. Green: the calibration is in process.) - Save Sensor Bias: click the Save Sensor Bias button to save the calibrated value of the rate sensor to the system.
⑩	LNB Pol Sensor Calibration (Skew)	Calibrates the LNB pol angle when the control board, the skew motor or belt is replaced. - Sat Skew Offset: Displays the skew offset value. - Mechanical Offset: Displays the skew offset value. The indicator right of the value box shows the skew offset status. - Blue: Mechanical skew offset value is less than ± 10 degrees. - Red: Mechanical skew offset value is greater than ± 10 degrees. - Consolidated Offset: Displays the consolidated offset value. - Pol Sensor Calibration: Calibrates the skew motor and checks the skew range. - Mechanical Skew Offset Reset: To reset the mechanical skew offset value to 0, click on the Mechanical Skew Offset Reset button. The mechanical skew offset is pre-set with a factory default value (0, 1 or 2) depending on the assembly condition. You may need to reset the mechanical skew offset when the satellite skew offset is unknown (consolidated skew offset = satellite skew offset + mechanical skew offset). Mechanical skew offset is set automatically by moving the Pol Angle left or right in the search or tracking mode. NOTE: Each satellite has its own skew offset. Intellian recommends that you contact your service provider or satellite operator to get the satellite skew offset value. To set the satellite offset value, go to SETUP menu → Satellite → Satellite Information → Skew Offset.
⑪	Antenna Mode	Sets the motor to idle mode to check the antenna's balance. - Set Idle Mode: Enter Setup Mode to modify settings. Releases the elevation and cross-level motor. - Reboot: Reboots the system.

9.10.3 Tracking Satellite Setting

The screenshot shows the 'Tracking Satellite Setting' window. On the left, a sidebar lists 'Ship', 'Antenna', 'Satellite' (selected), 'Network', 'Modem', and 'Backup & Restore'. The main panel has a 'Library' button in the top right. It contains five numbered sections:

- 2 Satellite Information**: Satellite Name (KOREA6), Longitude (116), EAST, Skew Offset (-12), Local Frequency (9750), RX Polarization (Horizontal), TX Polarization (Vertical), Identify (Modem Lock selected, DVB Lock unselected).
- 3 NBD Information**: Frequency (1190000), Reserved Parameter (1000), Cancel, Apply.
- 4 Eutel Satellite**: Eutel Sat (Off selected, On unselected), Cancel, Apply.
- 5 Modem Lock Use for Verification**: Modem Verify (Off selected, On unselected), Cancel, Apply.

No.	Item	Description
①	Tracking Satellite Setting	Sets the current tracking satellite settings.
②	Satellite Information	Sets the current tracking satellite settings. • Satellite Name: sets the satellite name. • Longitude(°): sets the satellite orbit position. • Skew Offset(°): sets the skew offset. • Local Frequency (MHz): sets the local frequency. • Rx Polarization: sets the current Rx polarization. • Tx Polarization: displays the current Tx polarization. • Identify: sets the lock setting type (Modem Lock / DVB Lock) for satellite tracking. Click the Apply button to apply the settings to the system.
③	NBD Information	Sets NBD mode's tracking information. • Frequency (kHz_IF): sets the tracking frequency. • Reserved Parameter(kHz): sets the reserved parameter. Click the Apply button to apply the settings to the system.
④	Eutel Satellite	Select ON when the antenna is tracking the Eutelsat satellite. With this option enabled, a defined skew angle for each Eutelsat satellite is automatically applied without allowing a manual modification to the skew offset value. Click the Apply button to apply the settings to the system.
⑤	Modem Lock Use for Verification	Verifies modem lock status (modem lock function: active/inactive). • Modem Verify: choose whether to use the modem lock function or not. (On / Off) Click the Apply button to apply the settings to the system.

9.10.4 Network Configuration

This function is available after performing the "9.8.3 iARM Save & Reboot" on page 70.

APTUS NX

All configuration changes made will be saved in the ACU and effective upon reboot.

☒ Automatically Save&Reboot upon apply.

Cancel Confirm

NOTE

When clicking the **Apply** button after editing the system settings, this pop-up message will appear. If you want to automatically save and reboot the system, select the check-box and click the **Confirm** button.

No.	Item	Description
①	Network Configuration	Sets the ACU's Internal IP address and ports.
②	Management Interface Configuration	Sets the Management Port's network configuration. The Management Port is located on the ACU front panel. • IP Address: sets the network IP address (Factory default: 192.168.2.1). • Subnet Mask: sets the subnet mask (Factory default: 255.255.255.0). • Lease Start Address: sets the lease IP address start range. • Lease End Address: sets the lease IP address end range. • Lease Time: sets the lease IP address update time. Click the Apply button to apply the settings to the system.
③	Network Service Configuration	Sets the network service configuration • Telnet Service: sets the telnet service (Disable / Enable). • HTTPS Port: sets the HTTPS port number. • SSH Service: sets the SSH service status (Disable / Enable). Click the Apply button to apply the settings to the system.

No.	Item	Description
④	Sys Log Configuration	Sets the system log configuration. Antenna sends log messages according to the emergency level. Enabling this function sends the message to your management server. • Management Server: sets the management server status (No / Yes). • Server IP: sets the management server IP address. • UDP Port: sets the management port. • Message Type: selects message type (Intellian message level) to send to the management server (Lower number indicates higher emergency). • Syslog Target Level: if you select this target level, the management server receives a log message equal to or less than this level. Click the Apply button to apply the settings to the system.
⑤	Radius Configuration	This menu is used when the network administrator needs to authorize user connections using Radius server. • Client: sets the Radius authentication (Disable / Enable). • Server IP: sets the Radius server IP Address. • Timeout: sets the Timeout value in seconds for the authentication process. • Server Secret: sets the Pass-Phase. This should be matched between server and ACU. Click the Apply button to apply the settings to the system.

9.10.5 Modem/BUC Setting

The screenshot displays the AptusNX web interface for Modem/BUC configuration. The left sidebar shows navigation options: Ship, Antenna, Satellite, Network, **Modem/BUC** (highlighted with a blue bar and callout 1), and Backup & Restore. The main content area is titled 'Modem/BUC Setting' and contains several sections:

- Modem** (Callout 2): Includes dropdowns for Select Modem (iDirect OpenAMIP), Modem Port (ETHERNET), Modem Protocol (Open AMIP), and GPS Out Protocol (GLL). It also has radio buttons for Use Tx Mute and Use Modem Lock, both set to 'Yes'.
- Modem Port Configuration** (Callout 3): Includes input fields for IP Address (ACU), Subnet Mask, Gateway, Modem IP, DNS, NAT Routing (set to 'Enable'), TCP Modem Protocol Port, and UDP Modem Protocol Port.
- Modem Connection** (Callout 4): Includes input fields for Modem IP, Port, ID, and Password, along with an 'Auto Connection' checkbox and 'Start'/'Cancel' buttons.
- Beam Selector** (Callout 5): Shows 'No Beam Data' and buttons for 'Apply', 'Lock', 'Reboot', and 'Refresh'.
- BUC Vendor** (Callout 6): Includes a dropdown for BUC Vendor (RevGO (High Power)) and 'Apply'/'Cancel' buttons.
- BUC Status** (Callout 7): Includes a 'Refresh BUC information' button and a list of status parameters: BUC Type (8W), BUC Vendor (RevGO), SW Version (v1.7.1), Tx Status (Off), BUC Alarm (2), Temperature(C) (22°C), Tx Power (-50 dB), Alarm (Temperature, Ref. PLL, RF PLL), and Tx Forward Power (-50 W (+0.5 dBm)).
- BUC Setting** (Callout 8): Includes radio buttons for Tx Status (set to 'Off') and an 'Attenuator (dB)' dropdown (set to 0).
- Modem** (Callout 9): A separate window showing 'Newtec Modem Monitor' with input fields for dBm, Es/NO, and Ntc_s Request Delay Time (ms), along with 'Apply'/'Cancel' buttons.

No.	Item	Description
①	Modem Setting	Sets parameters for the modem.

No.	Item	Description
②	Modem	Sets the interface between the ACU and the satellite modem. • Select Modem: Select your modem type from the Select Modem drop-down list (IDIRECT OPENAMIP, COMTECH ROAM, SATLINK VACP, NEWTEC AMIP) for loading a pre-configuration for the type of modem used. The settings related to the modem interface will be set automatically once the modem type is selected. When you select USER SETTING the other settings can be changed independently. • Modem Port: Select a proper data communication port of the ACU for the satellite modem interface. • Modem Protocol: Select a proper communication protocol of the ACU for the modem interface. • GPS Out Sentence: Select the GPS out sentence type. • Use Tx Mute: Select whether to use the Tx Mute function for the modem or not. • Use Modem Lock: Select whether to use Modem Lock function for the modem or not. • Tx Mute: This function can be edited when User Setting option is selected in the Select Modem menu. It selects the Tx Mute option. The Tx Mute is a transmit inhibit output from the ACU to disable/mute the modem transmit through a 5 V (HIGH) or 0 V (LOW) current whenever the antenna is blocked, searching, or pointed 0.5 degrees off from peak satellite position. • Modem Lock: This function can be edited when User Setting option is selected in the Select Modem menu. It selects the Modem Lock option. The Modem Lock provides a logic input through a 5V (HIGH) or 0 V (LOW) current to the ACU to identify when the system is on the correct satellite. Click the Apply button to apply the settings to the system.
③	Modem Port Configuration	This function is available after performing the "9.8.3 iARM Save & Reboot" on page 70. Sets the ACU's internal IP address, routing, and ports. • IP Address: Enter the network IP address. • Subnet Mask: Enter the subnet mask. • Gateway: Enter the gateway. • DNS: Enter the current default DNS address. • NAT Routing: Select the NAT routing (Enable / Disable). • TCP Modem Protocol Port: Enter the TCP port number for modem protocols using TCP as transport. • UDP Modem Protocol Port: Enter the UDP port number for modem protocols using UDP as transport. Click the Apply button to apply the settings to the system.

No.	Item	Description
④	Modem Connection	Enter the connection information of the modem (IDIRECT OPENAMIP, COMTECH ROAM, SATLINK VACP, NEWTEC AMIP). • Modem IP: Enter the modem IP address. • Port: Enter the connection port. • ID: Enter the connection ID. • Password: Enter the connection password. • Auto Connect: By enabling the auto connect, the connection information is saved and the modem is connected automatically when the system reboots. • Last Update Date: Displays the last update date and time. • Connect: Displays last updated data and time of the modem data. • Rx SNR: Displays the Rx SNR data.
⑤	Beam Selector	<i>This menu can be edited when IDIRECT Open AMIP Modem option is selected in the Select Modem menu.</i> Selects the target satellite that you want to track. • Beam List: Choose the target satellite in the list. • Apply: Click the Apply button to apply the selected beam to the system, it will switch to the beam desired. • Lock: Within condition given for test or commissioning, if the user wishes to stay on a selected beam, the user can lock the beam by clicking the Lock button. This will lead modem stays with the user-selected beam. • Reboot: If you do not want to lock the beam, click the Reboot button. • Refresh: Click the Refresh button to load the latest satellite list.
⑥	Modem BUC vendor	<i>This menu can be edited when RevGo BUC is installed.</i> Select the vendor of BUC (RevGo).
⑦	BUC Status	<i>This function is activated depending on the BUC type.</i> Displays current BUC status information (BUC Type, BUC S/W Version, Tx Status, PLL Lock, Temperature, Checksum and Tx Power Level). • To Refresh BUC information: Click the Refresh BUC information button to update the BUC status information.
⑧	BUC Setting	<i>This function is activated depending on the BUC type.</i> Sets the BUC setting options. • Tx Status: Turn ON or Off Tx connection. • Attenuator (dB): Select the attenuator value from the drop-down list (0~15). Click the Apply button to apply the settings to the system.
⑨	Newtec Modem Monitor	<i>This menu can be edited when NEWTEC AMIP option is selected in the Select Modem menu.</i> Sets the Newtec Modem options. • dBm: Displays the signal level from the Newtec Modem. • Es/NO: Displays the Es/NO value from the Newtec Modem. • Ntc_s Request Delay Time (ms): Set the delay time of the system for receiving the signal level (dBm) and Es/NO value from the Newtec Modem. Click the Apply button to apply the settings to the system. Then perform the "9.8.3 iARM Save & Reboot" on page 70.

9.10.6 Backup & Restore

The screenshot displays the 'Backup & Restore' configuration page. On the left sidebar, 'Backup & Restore' is highlighted with a circled '1'. The main content area is divided into two sections: 'Antenna Backup & Restore' (labeled with a circled '2') and 'iARM Backup & Restore' (labeled with a circled '3').

Antenna Backup & Restore:

- Antenna Backup:** Includes a 'Backup to PC' button.
- Antenna Restore:** Includes a 'Browse' button and a 'Restore' button.

iARM Backup & Restore:

- iARM Backup:** Includes radio buttons for 'Flash' and 'PC' (selected), and a 'Backup to' button.
- iARM Restore:** Includes radio buttons for 'Flash' and 'PC' (selected), a 'Restore from' button, and a 'Restore' button.

No.	Item	Description
①	Backup & Restore	Backs up & Restores the antenna setting files and the iARM files.
②	Antenna Backup & Restore	- Antenna Backup: Back up antenna settings and parameters to PC by clicking on the Backup button. - Antenna Restore: Restore the antenna setting by uploading the saved backup file from PC. Browse the backup file, then click the Restore button to restore it.
③	iARM Backup & Restore	- iARM Backup: Back up iARM setting to internal Flash drive in ACU or PC by clicking the Backup button. - iARM Restore: Restore the iARM settings by uploading the saved backup file from internal Flash drive in ACU or PC. Browse the backup file, then click the Restore button to restore it.

Chapter 10. Specification

10.1 Technical Specification

Antenna System			
Antenna Radome Height			1459 mm (57.36")
Antenna Radome Diameter			Ø1379 mm (54.29")
Antenna Reflector Diameter			Ø1050 mm (41.33")
Antenna Unit Weight (With Radome)			<121.5 kg (267.86 lbs)
Platform			3-axis: Azimuth, Elevation, Cross-level
Positioning			3-axis Velocity Mode Servo Control: Azimuth, Elevation, Cross-Level
Pedestal Motion Range	Azimuth Range		Unlimited
	Elevation Range		-20° to +115°
	Cross-level Range		Up to ±37°
Pointing Stabilization Accuracy			0.2° max in presence of specified ship motions
Ship's motion	Roll		±25° at 6 second
	Pitch		±15° at 6 second
	Yaw		±8° at 6 second
	Turning rate		10°/sec²
AZ/EL/CL motor			BLDC Motor
Motor Brake			Without motor brake
Sensor			3 axis Gyro-Rate Sensor & 3 axis Acceleration Sensor (Fixed Sensor)
Rx	Frequency		10.7 ~ 12.75 GHz Ku-band
	Gain		Min. 40.5 dBi @ 11.7 GHz (without Radome)
	G/T over Rx Range		Min. 19.8 dB/K @ 12.75 GHz (30° EL, with Radome)
Tx	Frequency		13.75 ~ 14.5 GHz Ku-band
	Gain		Min. 42 dBi @ 14.25 GHz (without Radome)
	EIRP	6W BUC	Min. 48.88 dBW @ 14.25 GHz, (with Radome)
		8W BUC	Min. 50.3 dBW @ 14.25 GHz, (with Radome)
Cross Pol isolation		30 dBc	
Tx to Rx Isolation			80 dBc @ 13.75~14.5 GHz
Polarization			Cross-Pol Only
BUC	6W BUC		6W Ku-band BUC (NJRC, N type)
	8W BUC		8W Ku-band BUC (RevGo, N type)
LNB			Universal VSAT PLL LNB (Low band: 9.75 GHz, High band: 10.6 GHz)
ACU to ADU Cable (Antenna Cable)			Single 50 Ω coax RF cable connected from ACU to ADU for Rx, Tx, FSK, Reference and Power
Input power			48 V DC (max 300 W) through a single RF cable

Antenna Control Unit (ACU)	
ACU Size	431 mm x 350 mm x 44.3 mm
ACU Weight	5.2 Kg
LED Indicator	Six LEDs for POWER, INT/SEARCH, TRACKING, LOCK, SETUP/TEST, ERROR
Ship's Gyrocompass Interface	NMEA 0183
PC Interface	Front: Ethernet port, USB (PC, DN: Not working) Back: RS-232C (57600 bps 8, N, 1)
Modem Interface	Ethernet port, RS-232/422, I/O Console
Ethernet port	Front: RJ-45 Management LAN port (1 ea) Back: RJ-45 LAN port (1 ea)
RF Port	Antenna: N-Type (1 ea) Modem Tx/Rx: F-Type (2 ea)
Input Power	100 ~ 240 V AC, 50/60 Hz, 1A

10.2 Environmental Specification

Test	Intellian Standard	
Temperature (ADE)	Operational	-25 °C to +55 °C (IEC-60945)
	Survival	-40 °C to +80 °C (IEC-60945)
	Storage	-40 °C to +85 °C (IEC-60945)
Temperature (ACU)	Operational	-15 °C to +55 °C (IEC-60945)
	Survival	-25 °C to +70 °C (IEC-60945)
	Storage	-40 °C to +85 °C (IEC-60945)
Water Proofing (ADE)	IPX6 (IEC-60529)	
Salt Mist	Saline solution: 5 ±1 % NaCl Storage period: 7 Days (IEC-60945)	
Vibration	Operational	IEC-60945
	Survival	IEC-60721-3-6 Class 6M3
Shock	Operational	IEC-60068-2-27 Method Ea 20g, 7 ms
	Survival (Transient)	IEC-60721-3-6 Class 6M3 type II 30g, 6 ms
	Survival (Bump)	IEC-60068-2-29 Method Eb 25g, 6 ms

Chapter 11. Warranty

Intellian systems are warrantied against defects in parts and workmanship, these warranties cover TWO (2) YEAR of parts and TWO (2) YEAR of factory repair labor to return the system to its original operational specification. Warranty periods commence from the date of shipment from Intellian facility.

Intellian Technologies warranty does not apply to product that has been damaged and subjected to accident, abuse, misuse, non-authorized modification, incorrect and/or non-authorized service, or to a product on which the serial number has been altered, mutilated or removed. Intellian Technologies, will (at its sole discretion) repair or replace during the warranty period any product which is proven to be defective in materials or workmanship, in accordance with the relevant product warranty policy. All products returned to Intellian Technologies, during the warranty period must be accompanied by a Service Case reference number issued by the dealer/distributor from Intellian Technologies, and (where applicable) a copy of the purchase receipt as a proof of purchase date, prior to shipment. Alternatively, you may bring the product to an authorized Intellian Technologies, dealer/distributor for repair.

Chapter 12. Appendix

12.1 Appendix A. 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

12.2 Appendix B. Important notice of waterproofing connector

12.2.1 Introduction

During antenna installation, it is important to ensure that once the cable is connected to the antenna, proper waterproofing of the connector must be done with a self-amalgamating tape.

If you need any assistance, please contact Intellian Technical Support (support@intelliantech.com).

12.2.2 Outline of taping

Self-amalgamating tape comes with a protective, plastic peel-away layer that allows the tape to be 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.



12.2.3 Procedure

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

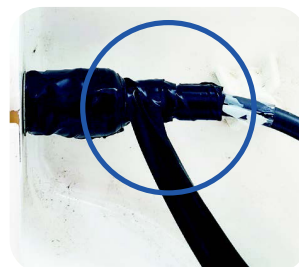


CAUTION

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

2. Apply tape over the connector.

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 in 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.