



v240M 2

Dual-band Antenna System

Installation and Operation User Guide

Serial Number of Product

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



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Chapter 1. Precautions

1.1 Warnings, Cautions, and Notes

WARNING, CAUTION, NOTE, and IMPORTANT statements are used throughout this manual to emphasize important and critical information. You must read these statements to help ensure personal 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 personal injury, or damage to equipment. 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.
	IMPORTANT An IMPORTANT indicates an emphasis on notable characteristics in working procedures or information on working procedures and technology for convenient use.

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, which can cause surface cracking or other damage.
	DO NOT STACK Do not stack boxes/crates; if stacked boxes or crates fall, equipment inside of the containers can 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.



WARNING: RF RADIATION HAZARD

The VSAT antenna system is dedicated to transmitting and receiving. During transmission, the antenna radiates microwave power from the reflector. Exposure to RF radiation, including exposure associated with improper use of the transmitting equipment, is potentially hazardous to anyone in close proximity to the antenna. When the antenna system is in transmit mode, do not venture within the radiation range of the antenna reflector.

The facility operator and anyone working on the system are responsible for the safety of others.

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 C- and Ku-band. It defines the antennas radiation, and each article regulates the followings;

- §25.218 (d)(1): Regulation for Azimuth Direction & Co Polarization in the C-band
- §25.218 (d)(2): Regulation for Other Direction & Co Polarization in the C-band
- §25.218 (d)(3): Regulation for Cross Polarization in the C-band

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

Intellian Technologies, Inc. declares that v240M 2 complies with the threshold level as defined in §25.218(d)(1) and §25.218(f)(1), and declares that v240M 2 is in accordance with all defined regulations from §25.218(d)(2) to §25.218(d)(3), §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 v240M 2, 2.4m C/Ku -band VSAT antenna system	
EIRP spectral density limit	C-Band	-6.22 dBW/ 4KHz
	Ku-band	-15.69 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.

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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 v240M 2, 2.4m C- & Ku-band VSAT Antenna System
-------------------------	--

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 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013	Pass
EMC (Art. 3.1.b)	EN 301 843-1 v2.1.1	Pass
SPECTRUM (Art. 3.2)	EN 301-447 (C-band) EN 302-340 (Ku-band)	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
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UK-CA Declaration of Conformity

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* according to UK legislation Electrical Equipment (Safety) Regulations 2016 (S.I. 2016/1101).

Product Information:

Product Name(s):	Intellian v240M 2, 2.4m C- & Ku-band VSAT Antenna System
Model Number(s):	VM2-24X-XXX,

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 301-360 EN 301-459 EN 303-978	Pass

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Chapter 3. Introduction

3.1 Intellian v240M 2 Introduction

The Intellian Dual-band v240M 2 antenna is a stabilized 2.4 m maritime VSAT antenna system designed to be deployed for a wide range of maritime and semi-fixed applications such as on shipping vessels, oil rigs, and cruise liners, etc. The dual-band system is capable of operating in two different frequency bands of C and Ku-band via the motorized feed assembly and choice of external modems.

The change of the frequency band of operation with the same 2.4 m reflector is done electronically via configuration control or by the operators using the user-friendly GUI at the Below Deck Unit (BDU) Web Interface.

The v240M 2 provides the unique capability of switching between different satellite frequency bands (C and Ku-band), as needed without any user intervention. This then enables the operator to select the best solution for the geographic location or for flexibility in achieving the highest throughput on virtually any satellite.

The v240M 2 requires minimal involvement to the commission. It is easy to operate and also simple to upgrade and manage. Each unit comes preloaded with a ready-to-use, customizable satellite library that can be conveniently tailored via Aptus®, Intellian's remote antenna control software. The ACU provides easy connection to and control of the antenna, simplifying routine processes such as firmware updates, routine maintenance, and diagnostics.

3.2 Intellian v240M 2 Features

Automatic Frequency Band Switching

New Intellian v240M 2 suggests the unique capability of switching among different satellite frequency bands. It allows automatic switching between C-band and Ku-band without any user intervention. This then enables the operator to select the best solution for the geographic location or for flexibility in achieving the highest throughput on virtually any satellite.

Maximized RF Performance

The main reflector, feed-horn, and other RF parts are designed to maximize the antenna performance for maritime applications. With the highest level of gain and Maximum Allowed EIRP Density amongst the similar sized VSAT antenna systems, the Intellian v240M 2 also conforms to FCC requirements.

Optimized Antenna Radome

The v240M 2 is available in 154 inch radome size. It can get the maximum performance in operation and meet the antenna performance across the multi-bands, i.e. C and Ku.

Future Proof Satellite Network

The v240M 2 provides Ka-band upgrade path and MEO upgrade kit as an option which unlocks access to any satellite constellation in GEO and MEO. It ensures that the equipment's capabilities are future-proof to customers seeking the fastest and most reliable broadband connectivity.

Chapter 4. Planning Installation

The v240M 2 installation requires extreme precaution and safety measures due to the unit size and weight. Failure to follow the correct installation process may lead to injury of the installer and/or cause damage to the system. To maximize the performance of the system, a thorough review of this installation guide is strongly recommended, as well as following the installation process as it is written 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 Selection of Installation Site

The system should be placed in an area on board the vessel with little to no RF signal blockage. A safe mounting place and a restricted access location should be selected due to the system heavyweight and size.

When the antenna is transmitting, obstacles in the way of the beam path will decrease 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.

4.2 RF Interference and Recommended Distance

The Antenna Unit should be mounted at least 2.5 meters away from any of the following devices: L-band satellite antennas, magnetic compass installations, and GPS receiver antennas.



WARNING

See Figure below, in which safe distances and mounting planes are shown for the v240M 2 in relation to any on-board radar assembly. A minimum safe distance of 10 m is recommended. The antenna should also be mounted 15 degrees above or below the radar plane, as shown.

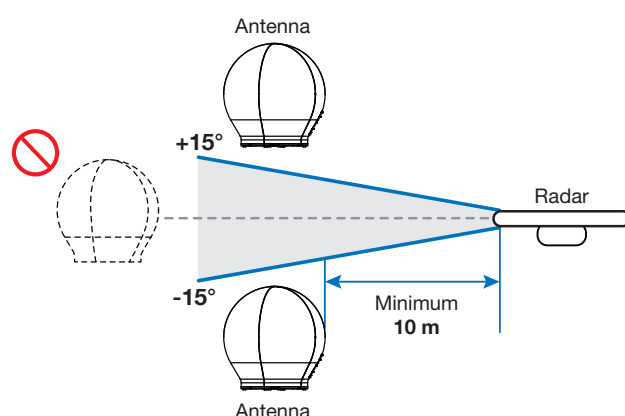


Figure 1: RF Interference and Recommended Distance from Radar

Recommended Distances	Other Antenna Affecting the ADE
10 meters *It depends on the power of the radar.	All Radar antenna
5 meters	Any high power shortwave antenna
4 meters	Any short range antenna

4.3 RF Radiation Hazard Precautions

The antenna is designed to be used with various radiation transmitters. Exposure to RF radiation, including exposure associated with an improper use of the transmitters, may be hazardous to persons close to the above-deck unit. Ensure the safety who work on the system.

During transmission, ensure to keep the minimum safety distance. The recommended minimum safety distance to the reflector on the focal line is about 270 m, based on a radiation level of 1 mW/cm² under uncontrolled environment. No hazard exists >20° below the antenna's mounting plane.

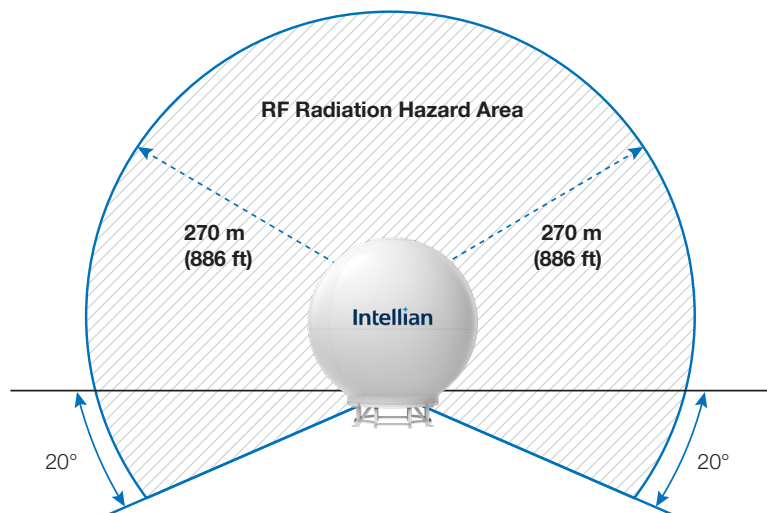


Figure 2: RF Radiation Hazard Area



WARNING: RF RADIATION HAZARD

TO ENSURE THE SAFETY OF THE INSTALLATION PERSONNEL, KEEP THE MINIMUM SAFE DISTANCE FROM THE REFLECTOR. THE RECOMMENDED MINIMUM DISTANCE TO THE REFLECTOR ON THE FOCAL LINE IS APPROXIMATELY 270 m, BASED ON A RADIATION LEVEL OF 1 mW/cm² UNDER UNCONTROLLED ENVIRONMENT.

4.4 System Package



WARNING

ANTENNA PACKAGING AND EQUIPMENT CAN BE HEAVY. A HOIST OR CRANE IS RECOMMENDED TO LIFT AND MOVE HEAVY COMPONENTS. PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT CAN OCCUR UNLESS CARE IS TAKEN.

4.4.1 Antenna Unit

The v240M 2 antenna is manipulated for optimal satellite tracking by the Antenna Control Unit (ACU). The signal that is received from the satellite is optimized by the modem and transmitted by RF switch. The antenna is protected from the severe marine environment by the Radome.



Figure 3: 154-in. Antenna Units

4.4.2 Antenna Control Unit (ACU)

The Antenna Control Unit (ACU) is the main control unit of an antenna system. Through Intellian's web-based software, it monitors the status of antenna operation and sets up for the antenna, satellite & GPS information, the user's environmental conditions, the interface with PC, etc. It supports the real-time data logging and diagnostics to be saved online or in the external USB drive.



Figure 4: ACU (VP-T537)

4.4.3 Packing List (For 154-in. Radome Antenna)

Before beginning installation, make sure all components are included in the kit. The components are packaged in four (4) crates listed in Table below.

Antenna Package (Crate 1)			
Size (WxDxH): 2715 x 2295 x 2225 mm		Weight: Min. 773 kg / Max. 829 kg	
Pedestal			
Description	Q'ty	Size	Remarks
VSAT 2.4 m Pedestal	1		Pedestal Unit
Antenna Lifting Strap Box			
Description	Q'ty	Size	Remarks
Lifting Strap	1	5 m	For Antenna Assembly
Antenna Installation Kit			
Description	Q'ty	Size	Remarks
User Guide	1		
Stable Mount Jig	1		To fasten Stable Mount Unit
Hex Bolt	4	M16 x 40	Bolt Kit for Stable Mount
Flat Washer	4	M16	
Spring Washer	4	M16	
Hex Bolt (BUMAX)	10	M12 x 60L	Bolt Kit for Antenna Mounting
Lock Washer	20	M12	
Nut (BUMAX)	10	M12	
Wrench Bolt	3	M8 x 70L	Bolt Kit for Reflector Support Pipe
Flat Washer	6	M8	
Spring Washer	3	M8	
Nut	3	M8	
Weight CL 04 (1t)	10	PL1t x 70 x 42	Weight Kit for Antenna Balance Adjustment
Weight CL 03 (2t)	10	PL2t x 70 x 42	
Hex-S Bolt_SF_STS304_Pa	10	M5 x 12L	
Hex-S Bolt_SF_STS304_Pa	10	M5 x 15L	
Hex-S Bolt_SF_STS304_Pa	5	M4 x 12L	Bolt Kit for Ku-band Flexible Wave guide
Hex-S Bolt_SF_STS304_Pa	9	M5 x 20L	Bolt Kit for C-band Flexible Wave guide
Hex-S Bolt_SF_STS304_Pa	5	M6 x 20L	Bolt Kit for Dual-Band Module & Sub-reflector Assembly
Wrench Bolt	13	M10 x 35L	Bolt Kit for Dual-Band Module to Antenna Assembly
Flat Washer	13	M10	
Spring Washer	13	M10	
Cable Tie	30		
Loctite 243	1		
Loctite 263	1		

ACU Box			
Description	Q'ty	Size	Remarks
Antenna Control Unit (VP-T537)	1	43.1 cm x 38.0 cm x 4.4 cm	Compatible for v240C, v240K, v240M
Antenna Installation Kit			
Description	Q'ty	Size	Remarks
Wi-Fi Antenna	1		
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
D-Sub 9 pin Male Connector	2		For ACU-Modem Interface-Console port
USB Cable (A-A)	1	1.8 m	To connect ACU (front panel) to PC
AC Power Cord (CEEE7/7)	1	1.5 m	ACU Power Cord (220 V)
AC Power Cord (USA)	1	1.5 m	ACU Power Cord (110 V)
RF Cable RG6 3m Belden 1694A	1	3 m	To connect ACU to Mediator
PC Serial Cable	1	1.8 m	To connect ACU to PC
Modem Interface Cable (For iDirect Modem)	1	1.5 m	To connect ACU (RS232 & RS422) to Modem (iDirect Modem)
Modem Interface Cable (For Comtech Modem_DB-9 pin Male)	1	1.5 m	To connect ACU (Console) to Modem (Comtech Modem)
Ethernet Cable (RJ45/LAN)	2	1.5 m	To connect ACU to PC/local device
N(M) to F(F) Adaptor	1		For ACU cable connection
USB Flash Drive	1		
RF Hazard Sticker	1		Radiation safety distance label
Radome Lifting Strap Box			
Description	Q'ty	Size	Remarks
Lifting Straps for 154" Radome	1	13 m	Optional, for lifting radome
154" Radome Installation Kit			
Description	Q'ty	Size	Remarks
Hex Bolt_SF(Ø18)_STS304_Pa	198	M6 x 30L	Bolt Kit for Radome Assembly
Washer Nut_STS304	198	M6	
Hex Bolt_SF(Ø18)_M6x35L_STS304_Pa	52	M6 x 35L	Bolt Kit for Radome Base Assembly
Hex Nut_M6_STS304	52	M6	
Washer Nut M6_STS304	52	M6	
Bolt Cap	52	M6	
Hex Bolt_SF(Ø18)_STS304_Pa	10	M6 x 35L	Bolt Kit for Upper Radome Lift Bracket
Radome Top Lift Bracket	4		
Radome Top Lift Bracket Plate	4		
Silicon	10		
Silicon Gun	1		

Radome Package (Crate 2)			
Size (WxDxH): 3015 x 2265 x 2225 mm		Weight: Min. 534 kg / Max. 631 kg	
Radome			
Description	Q'ty	Size	Remarks
Radome Top_154 inch	4		
Radome Bottom_154 inch	3		
Radome Bottom Hatch_154 inch	1		
Radome Cap_154 inch	1		
Assy_Side Hatch_154 inch	1		

Base Frame Package (Crate 3)			
Size (WxDxH): 2515 x 2265 x 2225 mm		Weight: Min. 740 kg / Max. 940 kg	
Base Frame			
Description	Q'ty	Size	Remarks
Base Frame and Air-conditioner Frame (Post included)	1		
Dometic Air Conditioning Unit	1		Optional
Aeron External Air Con. Unit	1		Optional

4.5 Preparing System Cables

Before installing the System Cables, consider the following points:

- All cables must be securely clamped and protected from physical damage and exposure to heat and humidity.
- Ensure that the System Cables do not exceed the recommended bend radius.
- Where a cable passes through an exposed bulkhead or deckhead, a watertight gland or swan neck tube should be used.



NOTE

For cables that are longer than the recommended length, consult Intellian technical support.

4.5.1 Power Cable (Customer Furnished)

The cable sizes recommended in the following table are the input power cable size for standard system installation. The three core elecDualc cable types are required.



NOTE

When installing the air conditioner, a separate Air Conditioner Power Cable is needed. See “5.5 Installing Air-Conditioner (Optional)” on page 31 for more details.

Cable Length	Up to 100 m	Up to 200 m
AWG (American Wire Gauge) Size	13	11
Cable Core Diameter	1.8 mm	2.3 mm
Cable Cross-Sectional Area	2.6 mm ²	4.2 mm ²

4.5.2 RF Cables (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



Note

If you need to extend the connection from the below deck unit (ACU) to the antenna beyond 120 m distance, you can use Intellian Fiber Link which supports up to 2 km length connection with no signal loss.

Refer to “12.3 Appendix C. Fiber Link Options” on page 138 for more details.

4.5.3 Gyrocompass Cable (Customer Furnished)

See Table for recommended Gyrocompass Interface Cable types that are compatible with the antenna system

	NMEA 2000	NMEA 0183
Connector Type	Micro-C 5 pins connector	2 pins terminal block connector
Cable Type	5 wires within a single cable	2-wires constructed with one enclosed shield cable
Heading Information	Supports PGN, 127250: Vessel Heading	Supports \$HEHDT , baud rate 4800, format 8N1 as standard.

4.5.4 Power Requirements

The Intellian v240M 2 has been designed to work on a vessel's power supply rated at 220 VAC. Intellian recommends that all above deck equipment (ADE) and below deck equipment (BDE) equipment use a suitable universal power supply (UPS) for all A/C power applications. An additional A/C power setup is needed for optional Air Conditioners and Heaters.

Chapter 5. Installing Antenna



WARNING

ANTENNA PACKAGING AND EQUIPMENT CAN BE HEAVY. A HOIST OR CRANE IS RECOMMENDED TO LIFT AND MOVE HEAVY COMPONENTS. PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT CAN OCCUR UNLESS CARE IS TAKEN.

5.1 Heading Alignment

The radome assembly is recommended to be positioned with the BOW marker parallel to the center line of the ship.

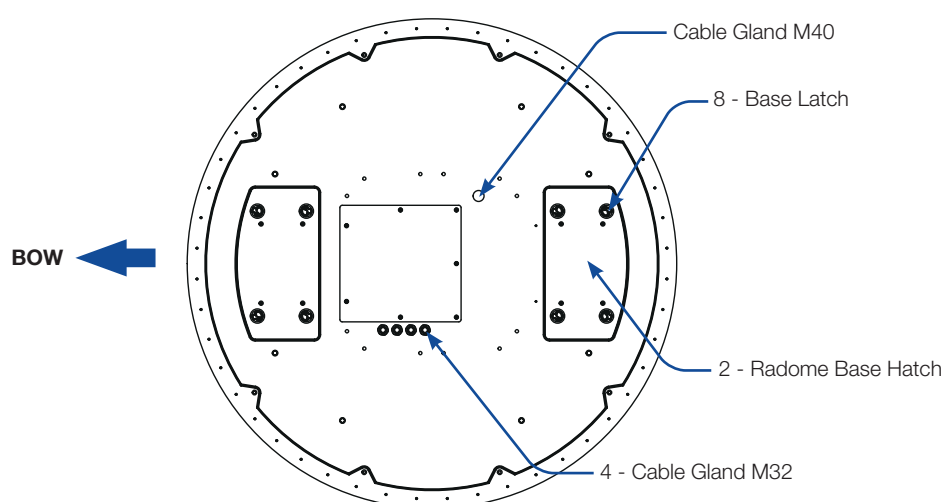


Figure 5: 154-in. Radome Antenna Heading Alignment

5.2 Radome Dimensions

Confirm the height and diameter of the bottom surface of the antenna unit before installing it. The mounting surface and overall space occupied by the antenna must be sufficient for the height and diameter of the fully constructed radome on top of its base frame. The height and diameter of the bottom surface of the antenna are as shown in the following drawing.

Unit: mm (inch)

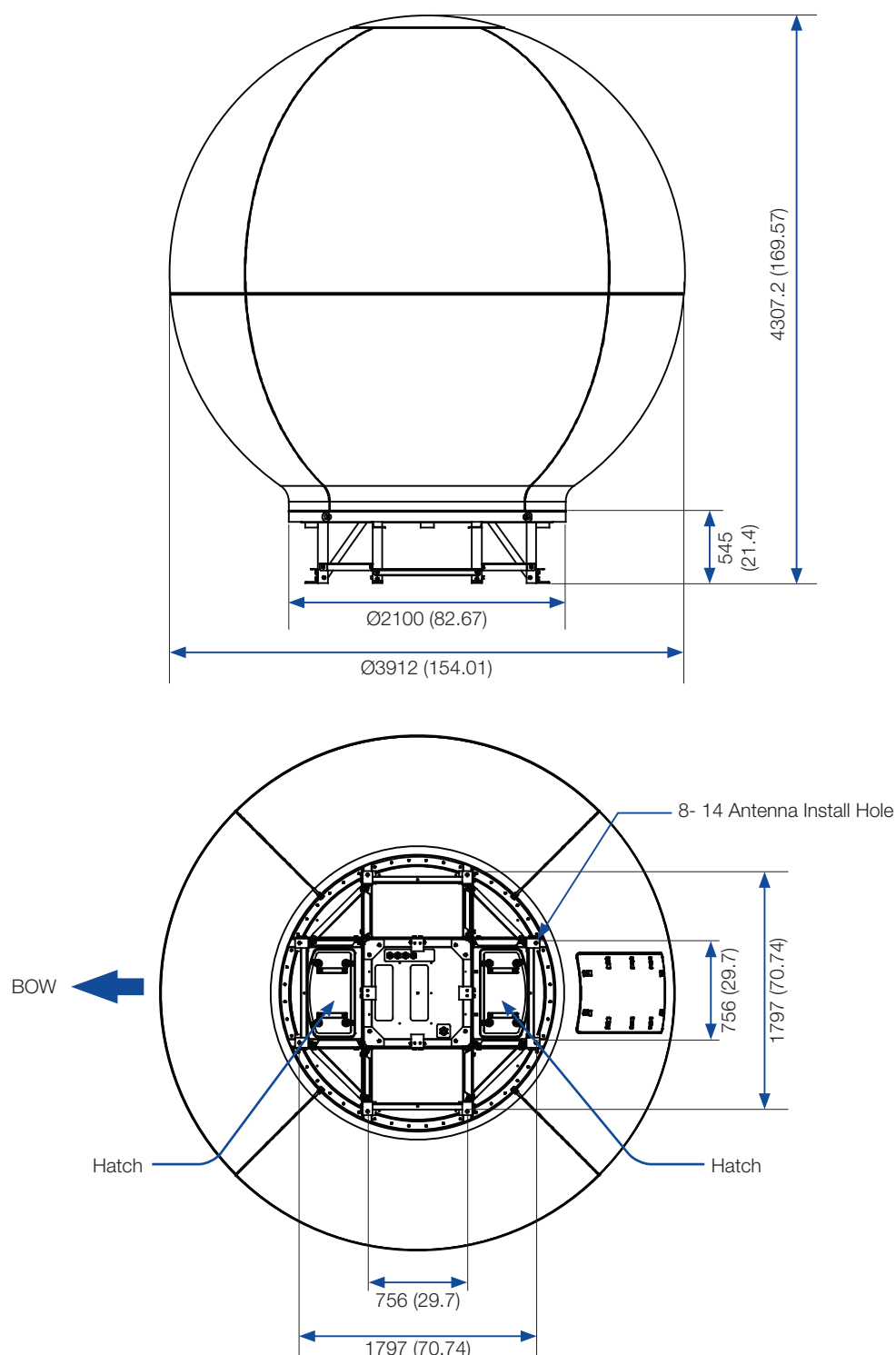


Figure 6: 154-in. Radome Antenna Dimensions

5.3 Package Composition

For the 154" radome antenna, the installation kit consists of four packages: Antenna Package (Crate 1), Radome Package (Crate 2), Base Frame Package (Crate 3), and Dual-Band Module Package (Crate 4) as shown in the figure below.

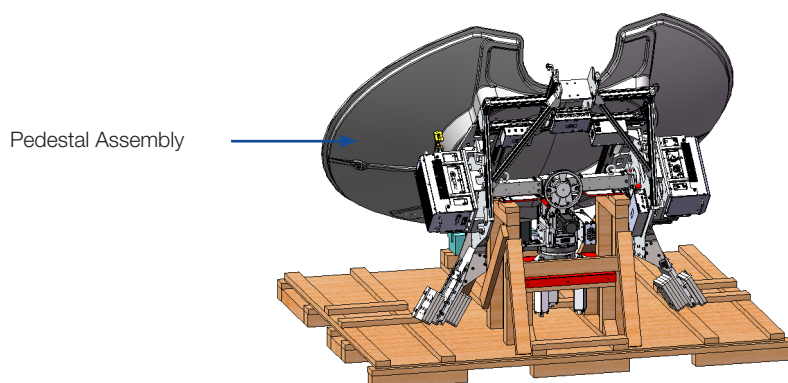


Figure 7: Antenna Package (Crate 1)

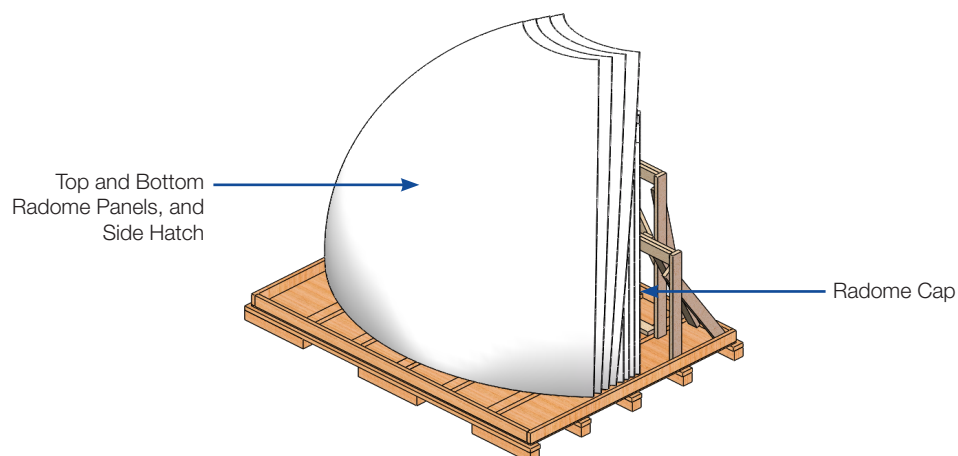


Figure 8: Radome Package (Crate 2)

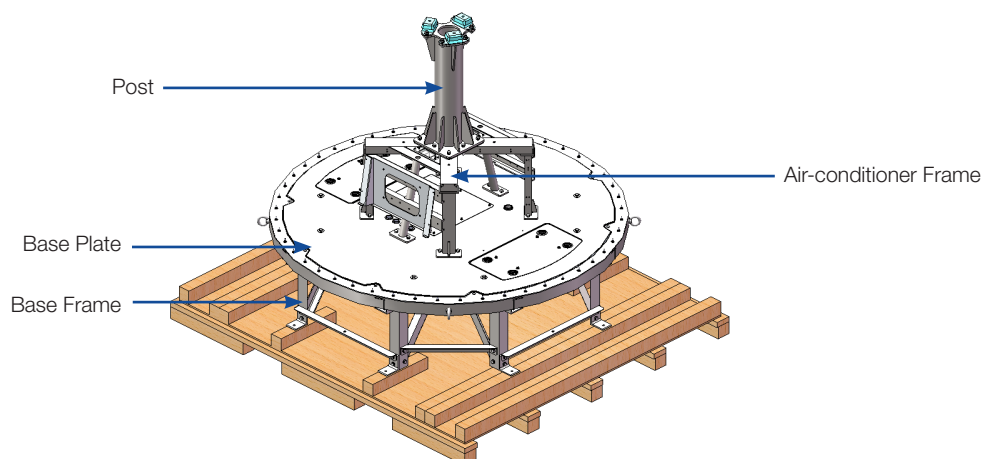


Figure 9: Base Frame Package (Crate 3)

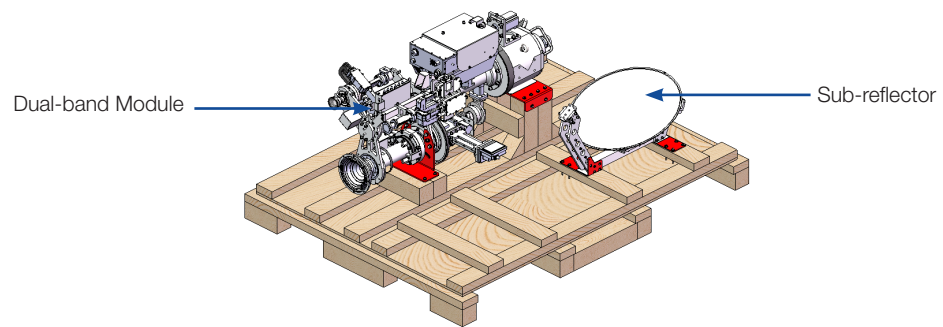


Figure 10: Dual-Band Module Package (Crate 4)

5.4 Placing Base Frame

5.4.1 Uncrating Base Frame Package (Crate 3)

You can find the base frame and base plate in the Base Frame Package.

1. Remove the bolts securing top panel ① and lift it off using a forklift. Remove the side panel in the order as numbered in the figure.

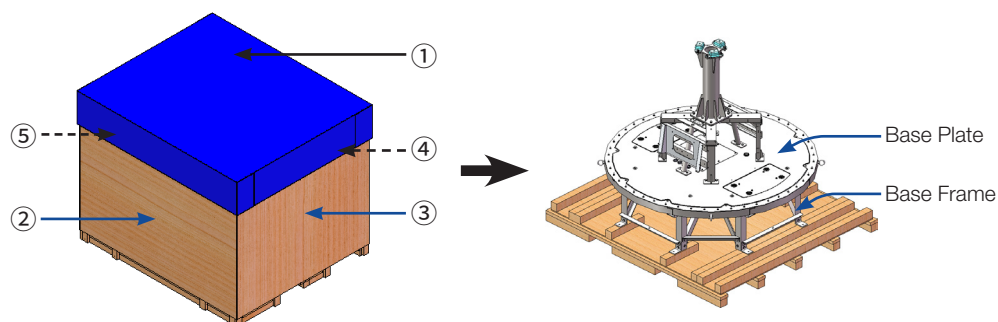


Figure 11: Uncrating Base Frame Package (Crate 3)



WARNING

FOLLOW THE UNCRATING INSTRUCTIONS CAREFULLY. PERSONAL INJURY AND DAMAGE TO EQUIPMENT CAN OCCUR FROM FALLING COMPONENTS.

2. Remove the bolts (8 ea) securing the Base Frame legs on the pallet.

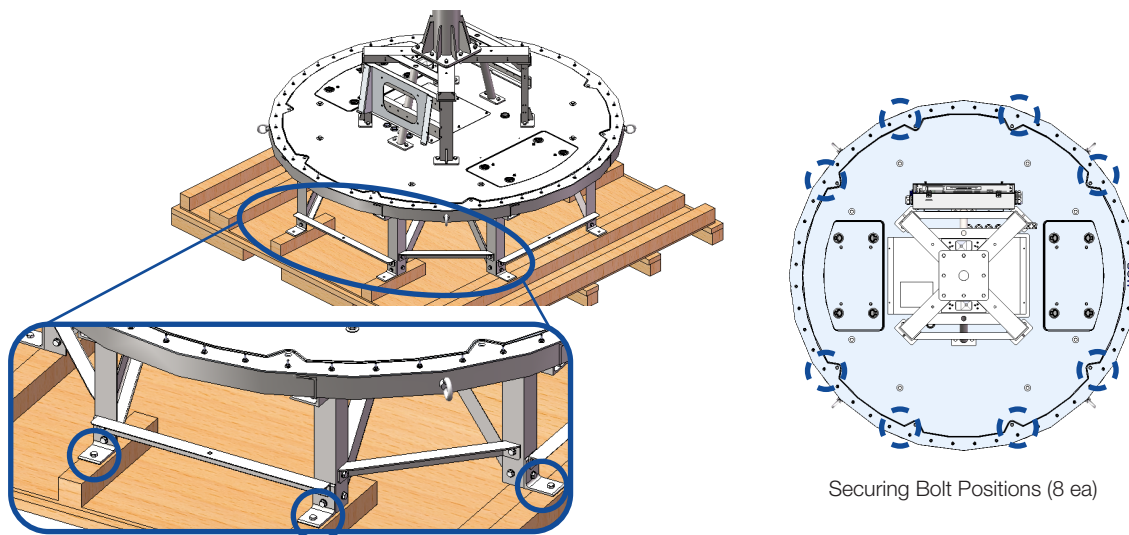


Figure 12: Removing Bolts Securing Base Frame Legs

5.4.2 Moving Base Frame by Forklift

Insert the forks to the marked entry position. Then move and place the unit on a sturdy floor.

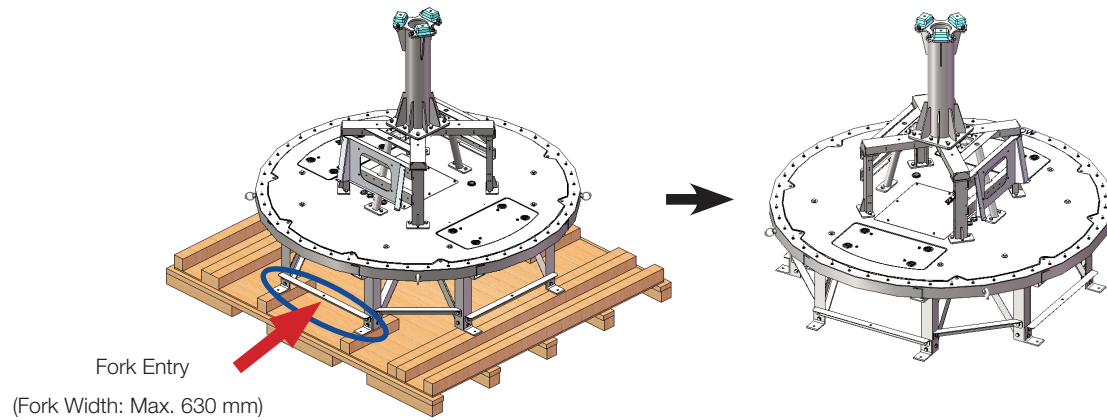


Figure 13: Lifting Base Frame by Forklift



CAUTION

- Notice the assembling direction of the bolts. Assemble bolts from the bottom to top.
- Tighten the nut using a **Deep Socket Wrench** instead of a standard socket wrench.



NOTE

Refer to “**12.1 Appendix A. Tightening Torque Specification**” on page 136 for the bolt tightening torque.

5.5 Installing Air-Conditioner (Optional)

1. Get the Air-Conditioner unit from the Base Frame Package (Crate 3).
2. Before installing the Air-Conditioner, remove the air-vent cover from the base plate to open the air-vent.

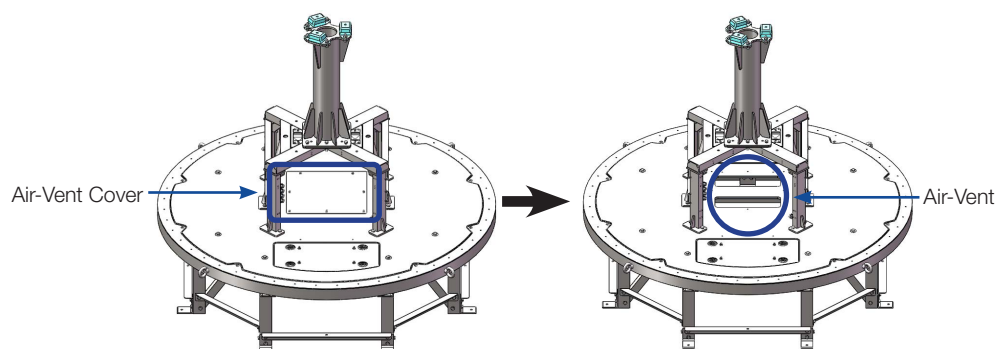


Figure 14: Removing Air-Vent Cover

3. Install the Air-Conditioner into the A/C frame on the base plate.

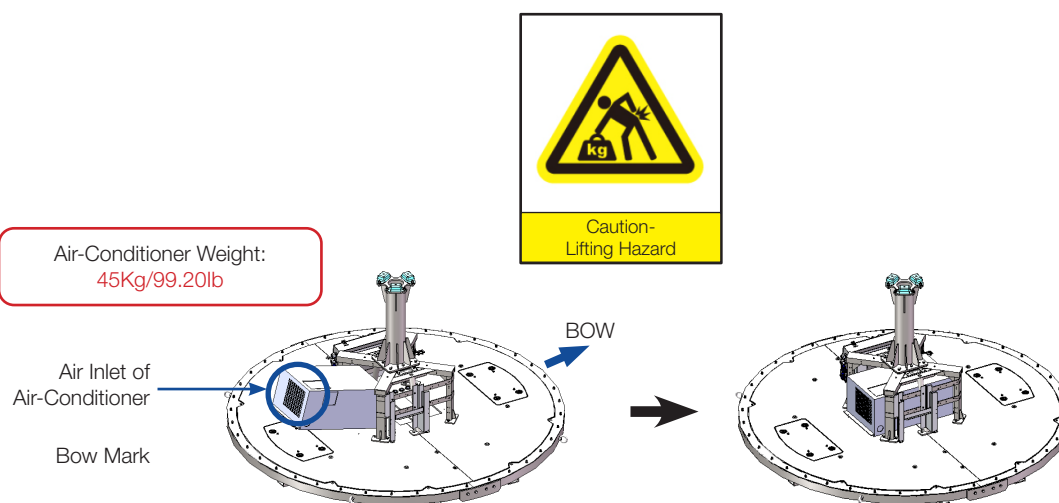


Figure 15: Assembling Air-Conditioner on Base Plate



NOTE

Notice the orientation of the Air-Conditioner. The Air Inlet is pointing in the same direction as the Bow Mark.



WARNING

- Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.
- This procedure must be done by more than 2 people for safety.

- Place the Air-Conditioner on the Base Plate and then tighten the rubber damper and bolts to the M6 Nut Holes on Base Plate.

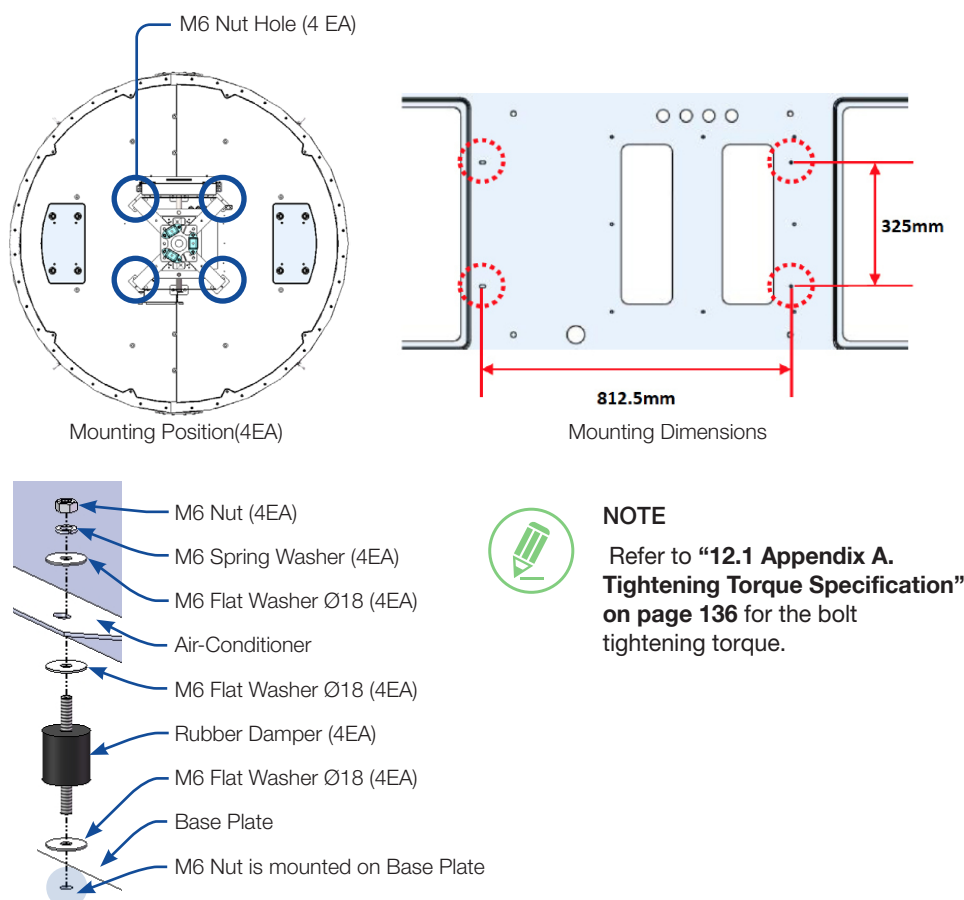


Figure 16: Assembling Air-Conditioner

- After assembling the Air-Conditioner, connect the Power Cable and the drain hose.

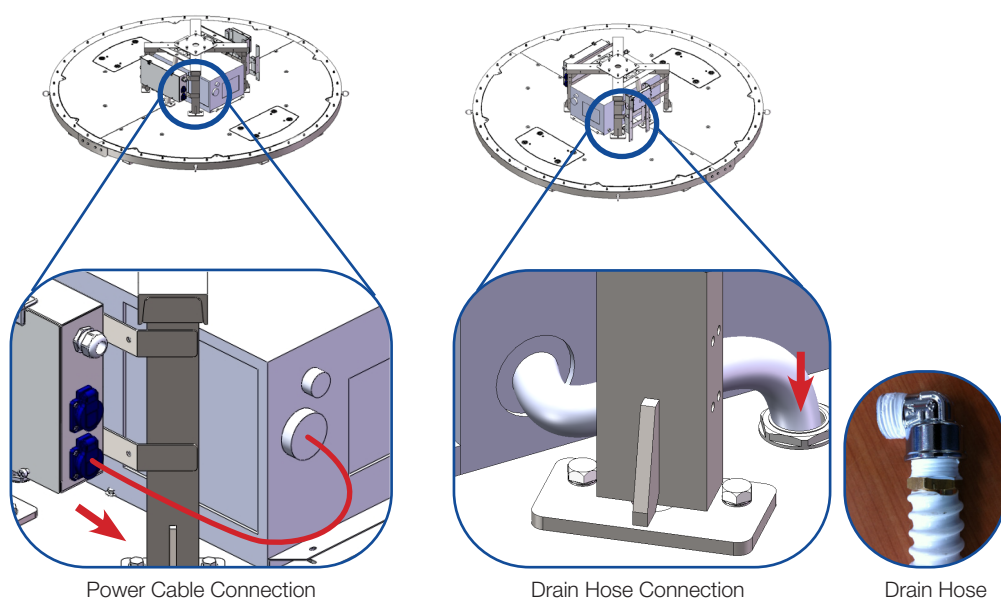


Figure 17: Connecting Power Cable and Drain Hose to Air-Conditioner

5.6 Reflector and Pedestal Assembly

5.6.1 Uncrating Antenna Radome Package (Crate 1)

Remove the bolts securing top panel ① and lift off using a forklift. Remove the side panels in the order shown in Figure.

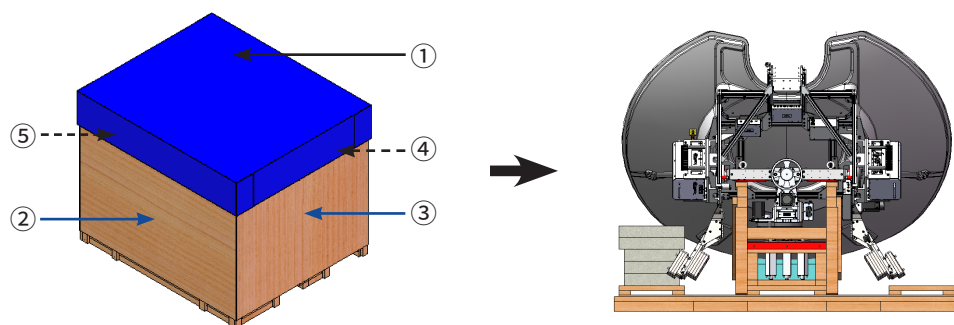


Figure 18: Removing Panels of Package Crate

5.6.2 Removing Dummy Blocks



WARNING

- The fixed Dummy Blocks must be removed before removing the Shipping Brackets for a safe installation.
- When unfolding the Base Frame, avoid Pinch Points. Keep hands and fingers clear.

Follow the steps below for the Three (3) Sets of Dummy Blocks.

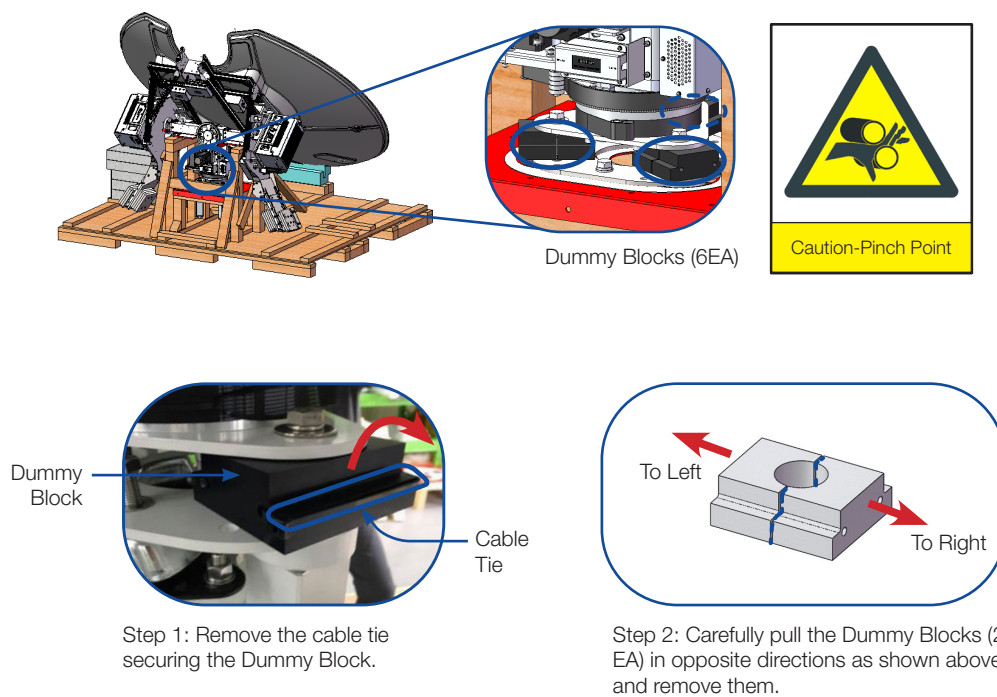


Figure 19: Removing Three Sets of Dummy Blocks

5.6.3 Unpacking Dual-band Module Package

Get the Dual-Band Module Bolt Kit from the Antenna Package (Crate 1). Remove the bolts securing top panel ① and lift off using a forklift. Remove the side panels in the order as numbered in the figure.

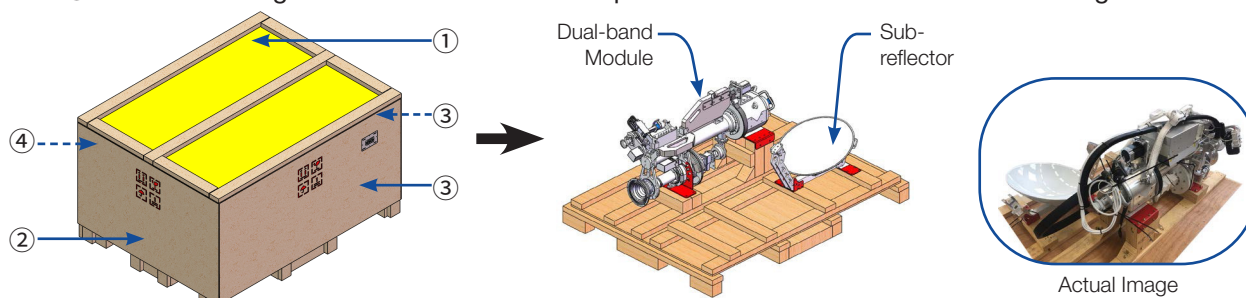


Figure 20: Removing Panels of Package Crate

5.6.4 Taking Out Sub-reflector

Remove shipping bracket bolts, then remove the sub-reflector from the bottom panel.

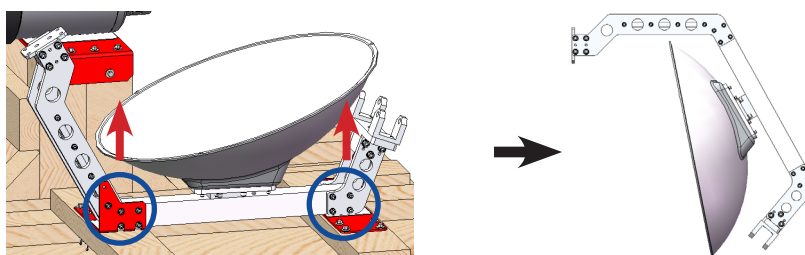


Figure 21: Remove Sub-reflector from Bottom Panel.

5.6.5 Assembling Sub-reflector to Dual-band Module

Attach the Sub-reflector to Dual-band Module, then tighten the M6x20L Hex-s bolts (4 EA) using a wrench.

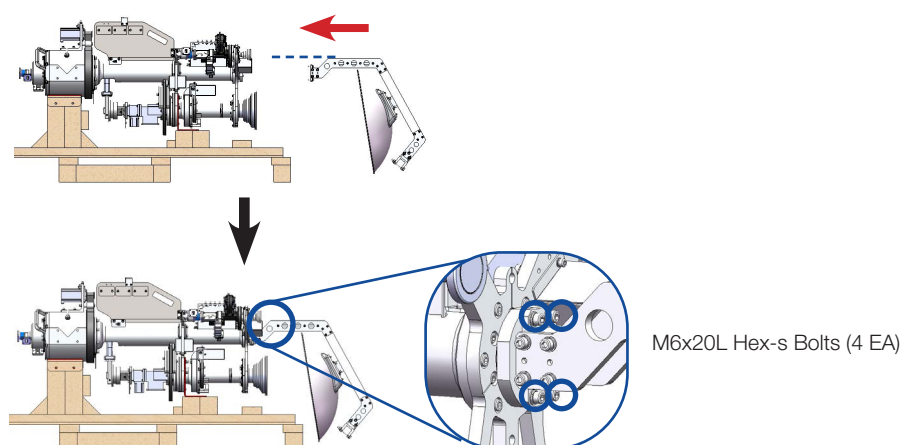


Figure 22: Assembling Sub-reflector to Dual-band Module



NOTE

Refer to “12.1 Appendix A. Tightening Torque Specification” on page 136 for the bolt tightening torque.

5.6.6 Removing Cable Ties Securing C-band Skew

Remove the ties securing the C-Band Skew. Disassemble the bolts using a wrench. Move the skew position by rotating it to make enough space to insert the wrench.

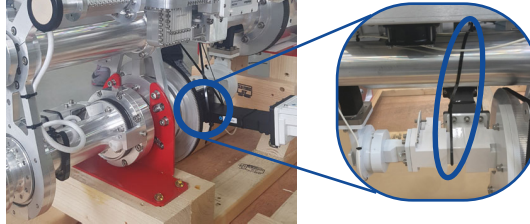


Figure 23: Removing Cable Ties Securing C-band Skew

5.6.7 Taking Out Dual-band Module

Remove shipping bracket bolts, then take out the Dual-band module from the bottom panel.

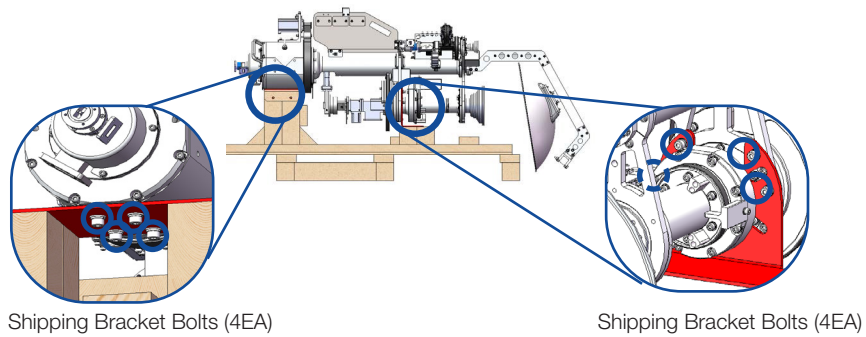


Figure 24: Removing Dual-band Module from Bottom Panel

5.6.8 Assembling Dual-band Module to Antenna

1. The Dual-band module comes with the lifting straps (1m, 3EA) preconnected from the factory. ① Connect the lifting strap (5m, 1EA) to the end of the module. ② Lift Dual-band module using a crane. The operators must lift the unit by adjusting the balance of the module using the connected lifting strap and the handle of the unit. ③ Remove the bolts and detach the shipping bracket.

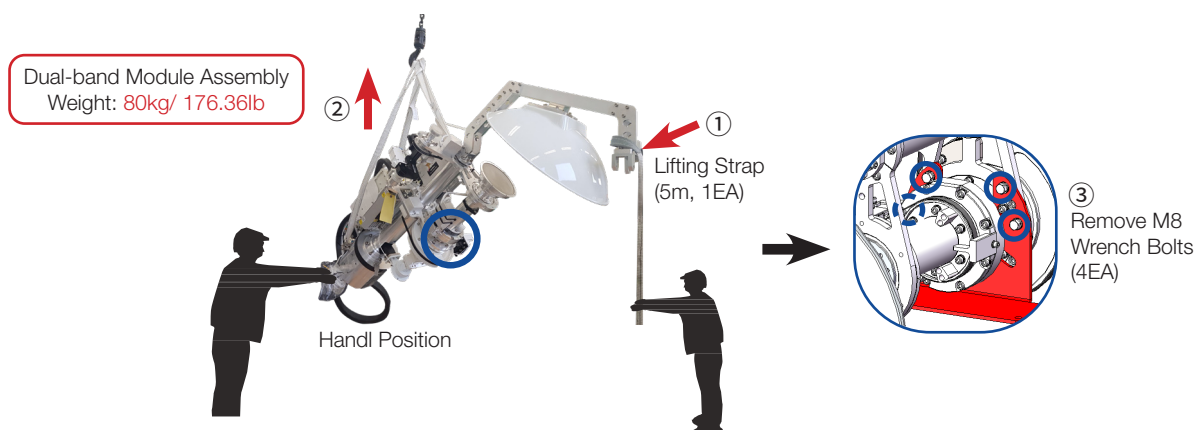


Figure 25: Moving Dual-band Module



WARNING

Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.

2. Position the Dual-band Module above the reflector frame, then mount the Dual-band Module on the top of the reflector frame by engaging V-cut edges.

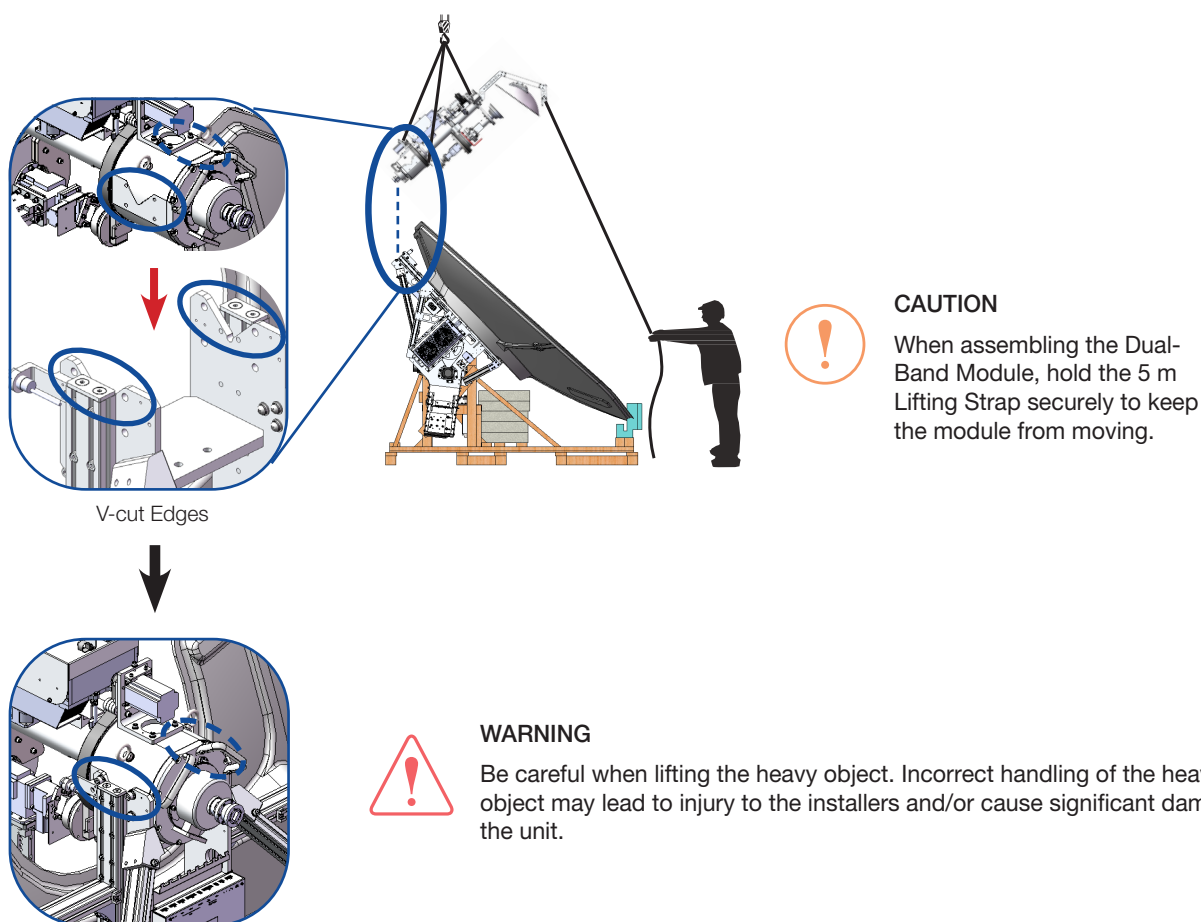


Figure 26: Positioning Dual-band Module

3. Fully tighten bolts on bottom and both sides of the Dual-band Module.

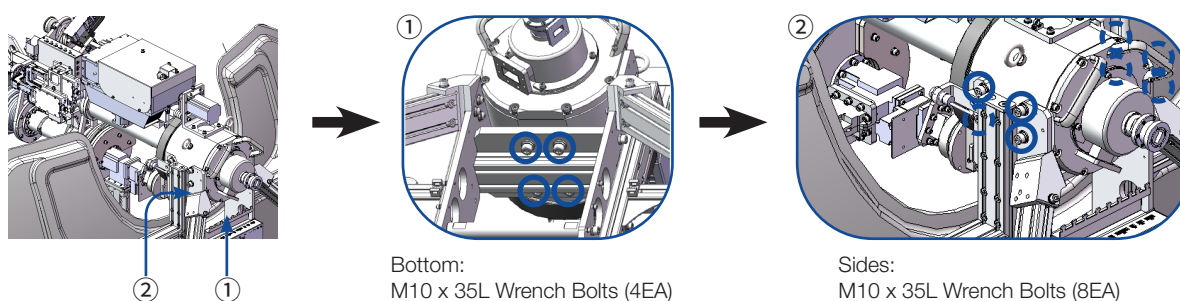


Figure 27: Tightening Dual-band Module



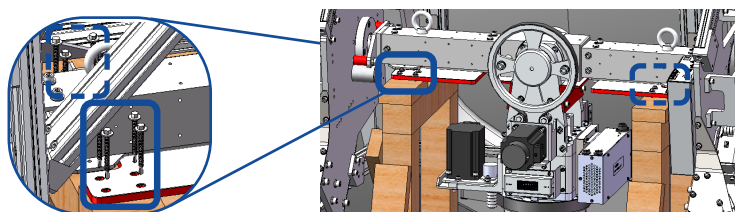
NOTE

Refer to “12.1 Appendix A. Tightening Torque Specification” on page 136 for the bolt tightening torque.

5.6.9 Removing Shipping Brackets on CL/EL Arm

Release the cross-level arm by removing bolts. Remove the four (4EA) brackets on the elevation-level arm. Follow the steps below for both sides.

Step 1: Remove bolts (8 EA) securing wooden supports.



Step 2: Remove bolts (2 EA) securing the counterweight plate using an 8 mm hex key.

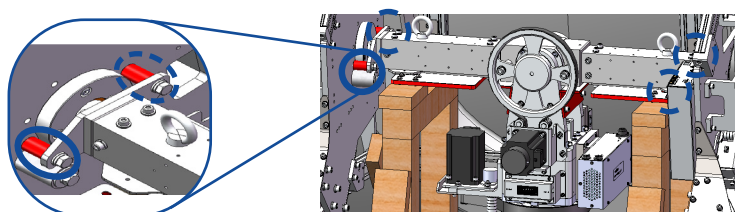


Figure 28: Taking Out Dual-band Module from Bottom Panel

5.6.10 Assembling Reflector Assembly to Base Frame


CAUTION

When using a forklift, be careful not to damage the peripheral module and cables while inserting the fork. Intellian is not responsible or liable for any damage incurred due to improper handling.

1. Lift the reflector assembly at least 600 mm using a forklift, then push the bottom reflector to stand reflector assembly up for connecting eye-bolts. Remove all lifting straps connected to the Dual-band module.

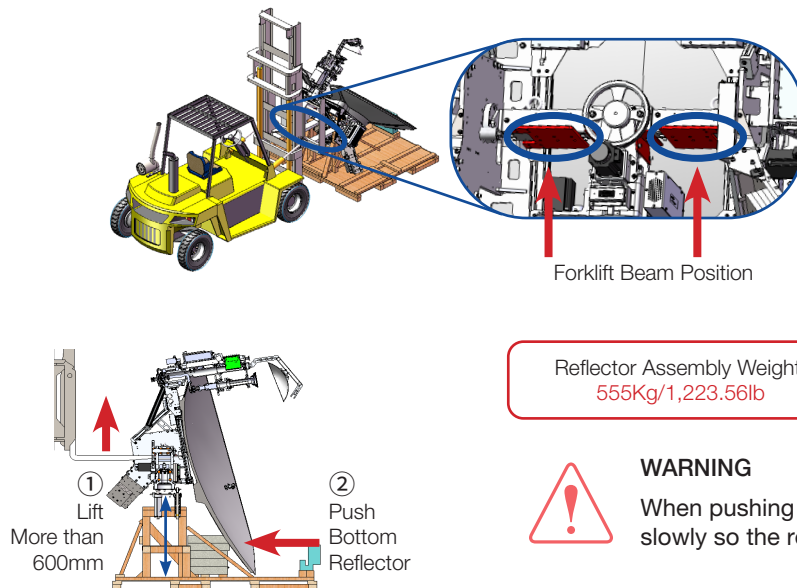


Figure 29: Standing Up Reflector Assembly


WARNING

Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.

2. Connect the lifting strap (5m, 1EA) to the eye-bolts of the EL arm. Lift the reflector assembly using a crane, and move it above the post.

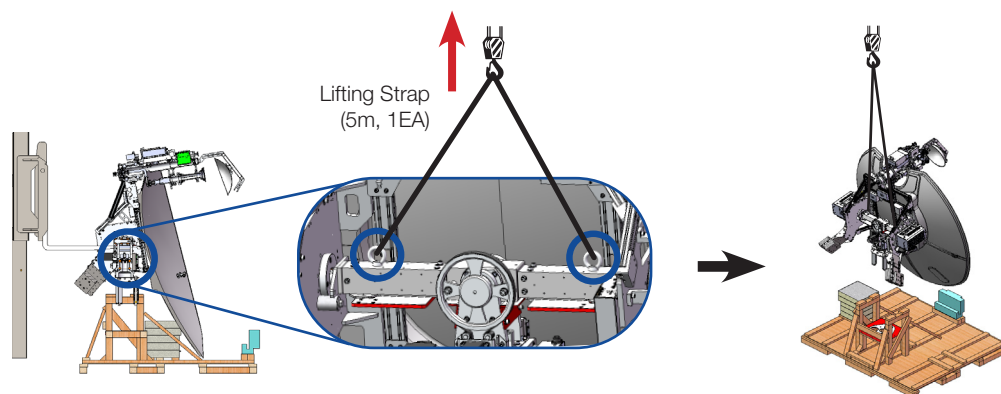


Figure 30: Lifting Reflector Assembly

3. Attach the Reflector Assembly to the Post. Before putting the reflector assembly down onto the post, be sure the cables go through the center hole of the post, and that the two BOW markers on the pedestal and the post are facing the same direction.

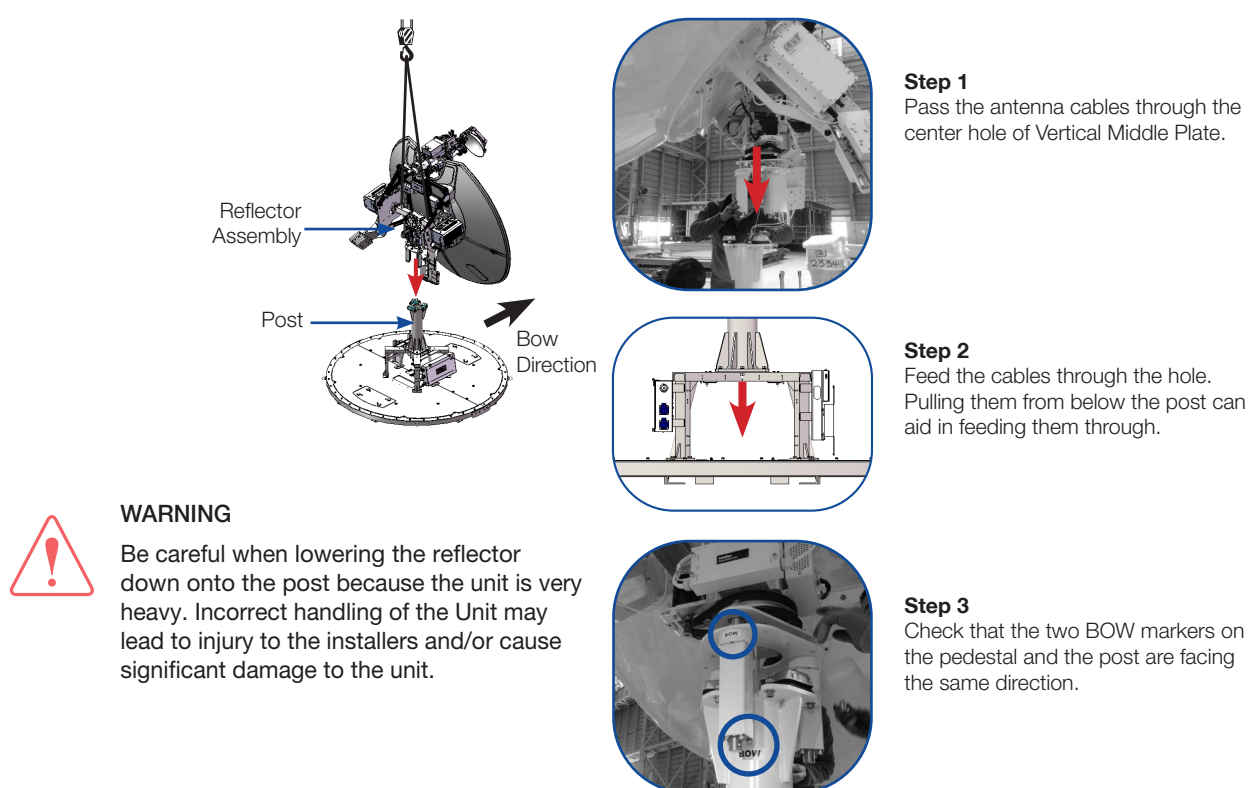


Figure 31: Cables in Post Center and BOW Marks facing Same Direction

4. After putting the Reflector and the Post together, they should be fastened with the Stable Mounts (3EA) using bolts as shown in Figure. Fasten Reflector and Post. When tightening bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly. Use the Tool (Stable mount jig) to adjust the Stable Mount position.
5. Remove the lifting strap (5 m, 1 EA) connected to the eye-bolts of the EL arm.

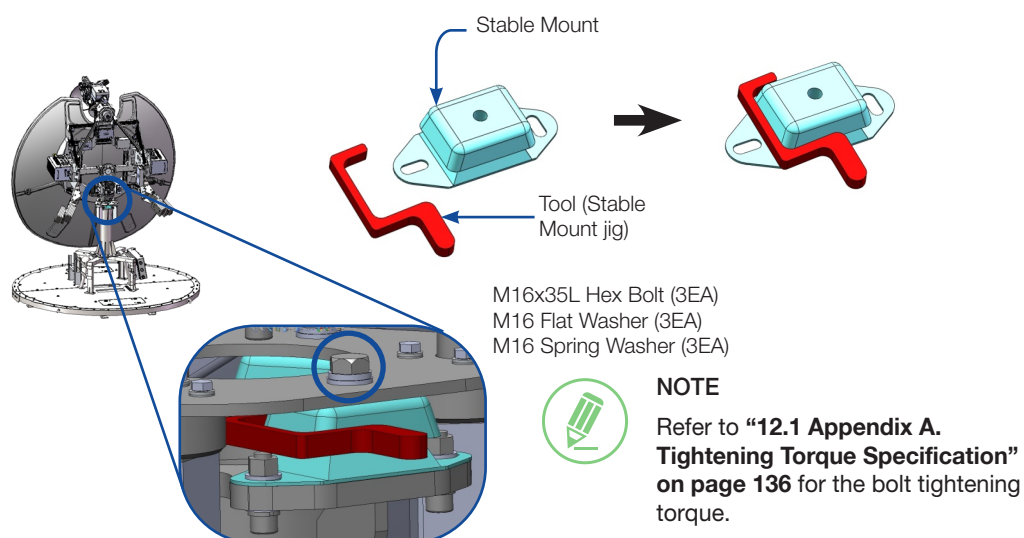


Figure 32: Fastening Reflector and Post

5.6.11 Assembling Reflector Support Pipe

Assemble the Dual-band Module and Reflector Support Pipes using bolts as shown in the figure below. The Dual-band Module should be connected to both the left and right pipes.

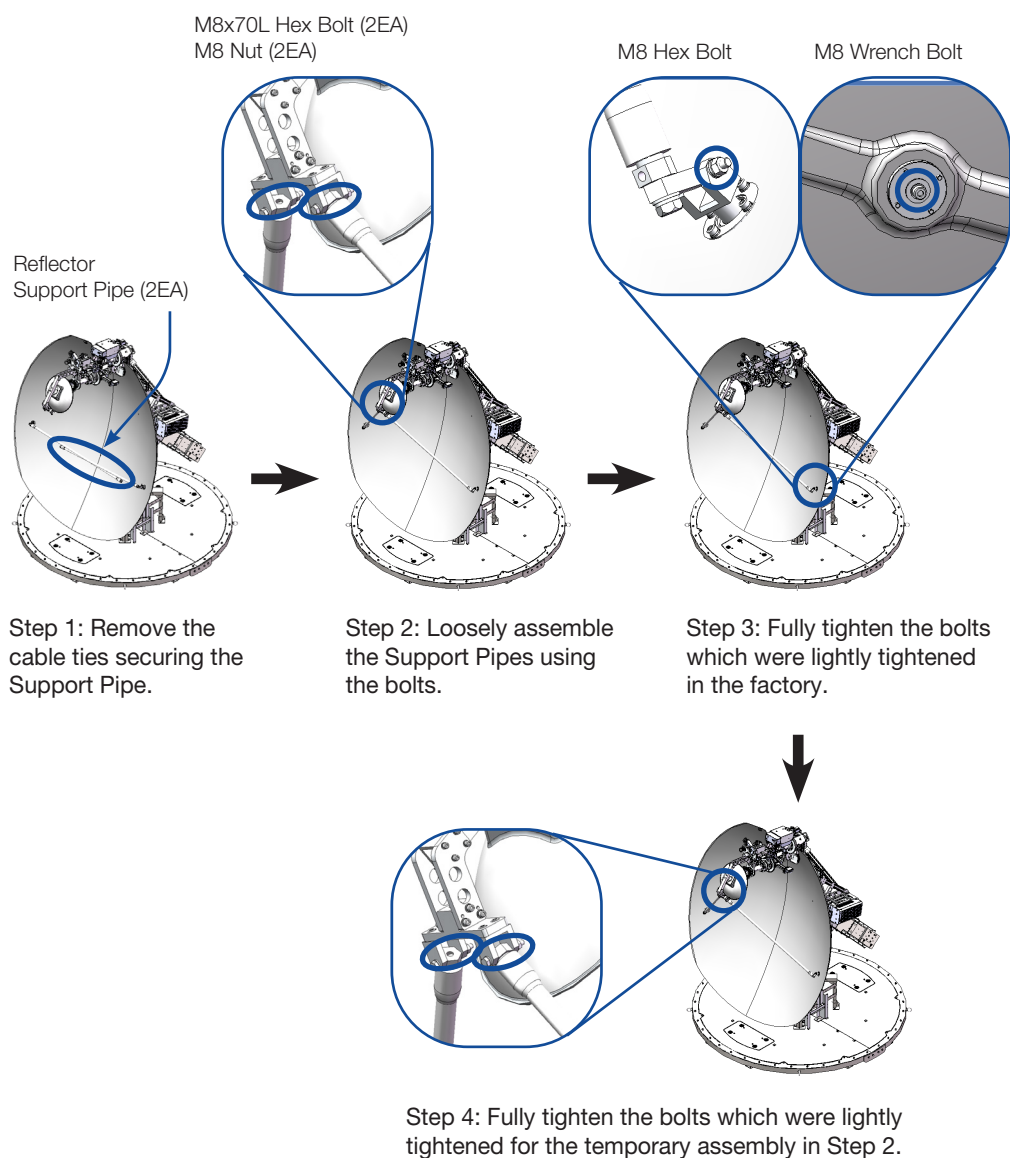


Figure 33: Assembling Reflector Support Pipes

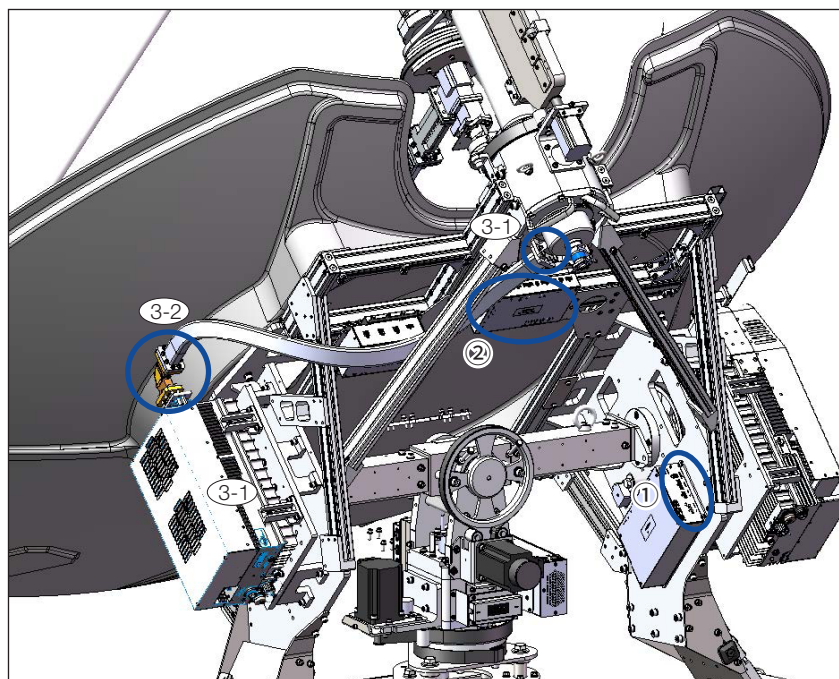


NOTE

Refer to “**12.1 Appendix A. Tightening Torque Specification**” on page 136 for the bolt tightening torque.

5.6.12 Connecting Dual-band Module Cables

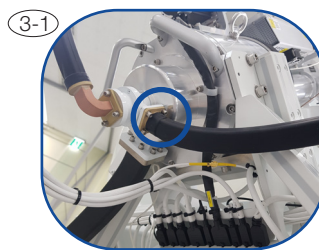
Dual-band Module Cables should be connected following the procedure as shown in the figure. After connecting all cables, make sure all connectors are tightened. Get the Bolt Kits for Ku-band/C-band flexible wave guide from the Antenna Package (Crate 1).



Step 1: Connect the **Rx Out cable** of Rx Control Unit to the **Rx In** port of the Main Control Unit.

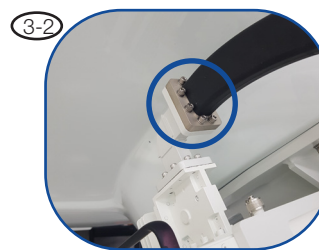


Step 2: Connect the **Rx Ctrl Unit cable** of Rx Control Unit to the **Rx Ctrl Unit port** of the Tx Control Unit.



Step 3-1: Connect the **Ku-band Flexible Waveguide** to the Dual-band module using the bolts.

M4 x 12L Hex-s Bolt (5 ea)



Step 3-2: Connect the **C-band Flexible Waveguide** to the BUC using the bolts.

M5 x 20L Hex-s Bolt (9 ea)

Figure 34: Connecting Dual-band Module Cables

5.6.13 Turning Reflector Assembly

1. Turn the reflector assembly slowly as shown in the figure.

- Reference Direction: Incoming Beam
- Turning Radius: $-15^{\circ} \sim +120^{\circ}$

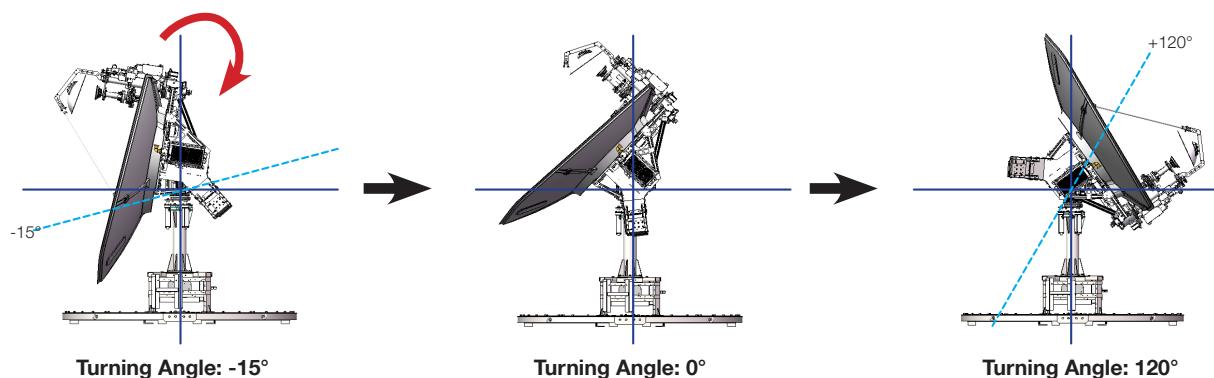


Figure 35: Turning Reflector Assembly



CAUTION

- When turning the Reflector, move it carefully to prevent damage to the Reflector assembly.
- Since the weight balance is not yet adjusted, be careful when turning the Reflector.



WARNING

This procedure must be done by more than 2 people for safety.

2. Make sure to use a safe and solid stepladder for installation in high places.

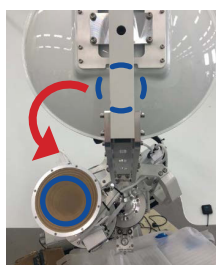


WARNING

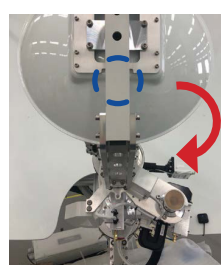
USE CARE WHEN WORKING ON A LADDER, WATCH YOUR STEP. FALLING OFF OF A LADDER CAN CAUSE PERSONAL INJURY.

5.6.14 Checking Skew Movement and Cable Connections

After removing cable ties from skew, turn the Skew $\pm 90^{\circ}$ left and right by hand and check that the cables are not excessively folded.



Left Side (Ku BUC)



Middle

Figure 36: Checking Skew Movement and Cable Connections

5.7 Connecting Antenna Cables to Base Frame

The four cables (**Antenna Rx**, **Antenna Tx**, **Antenna Power**, and **BUC Power**) of the antenna must be connected to the cable junction and Power Switch Unit located on the A/C Frame.

1. Connect the **Antenna Rx cable** to the **Antenna Rx port** of the cable junction on the A/C Frame.
2. Connect the **Antenna Tx cable** to the **Antenna Tx port** of the cable junction on the A/C Frame.
3. Connect the **Antenna Power cable (3-wired)** to the **Antenna Slipping terminals (Neutral, Live, and F.G)** of the Power Switch Unit.
4. Connect the **BUC Power cable (3-wired)** to the **BUC Slipping terminals (Neutral, Live, and F.G)** of the Power Switch Unit.

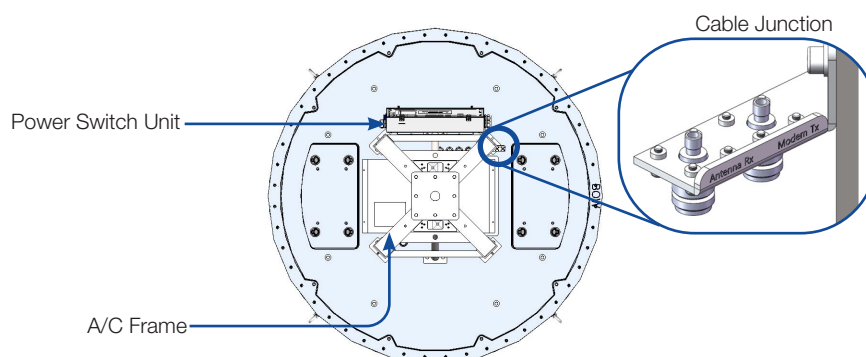


Figure 37: Positions of Power Switch Unit and Cable Junction

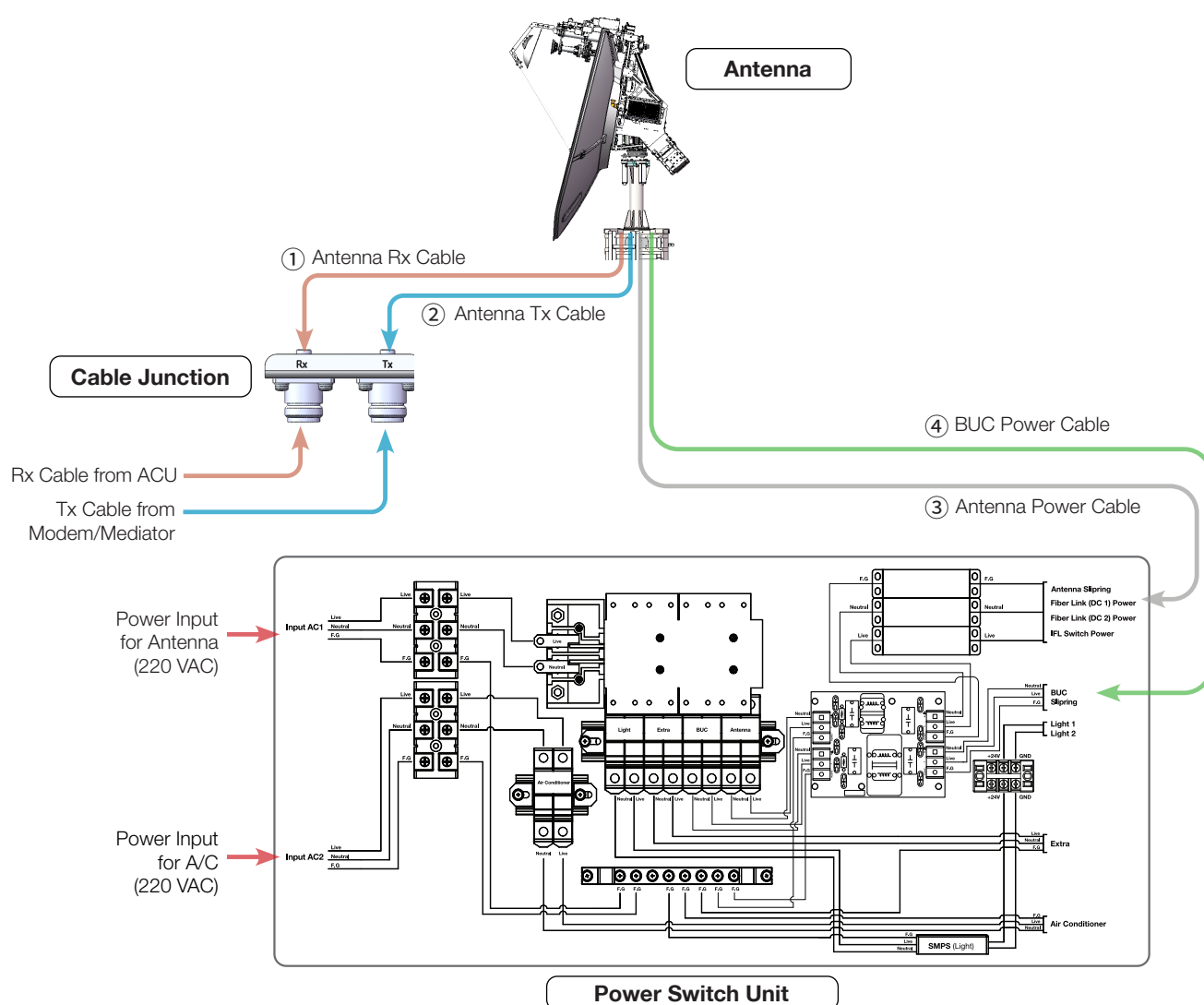


Figure 38: Antenna Cable Connection to the Base Frame

**CAUTION**

The input power voltage of Air-Conditioner is different per model. Check the rated input power of your A/C before you supply the power.

Intellian A/C Model #	Description	Rated Power
VC1-2104	Aeron External Air Conditioner Unit (AM-01)	220 VAC
VC1-2113	Dometic Air-Con.(20200402)	220 VAC

5.8 Radome Assembly

5.8.1 Uncrating Radome Package (Crate 2)

Remove the bolts securing top panel ① and lift off using a forklift. Remove the side panels in the order shown in Figure.

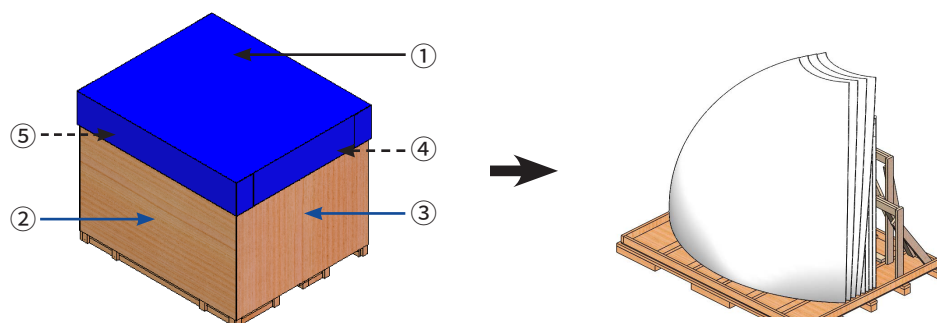


Figure 39: Remove Panels of Package Crate

5.8.2 Assembling Top Radome

The top radome consists of four panels. To assemble the top radome, follow the procedures below:

- ***Two panels are assembled to make the first set.***
- ***Place the Cap on top of the Radome.***
- ***The other panels are assembled to make the Top Radome.***

1. Spread silicone on the binding surface of each panel, and connect them using bolts. Keep the bolts loosened temporarily.

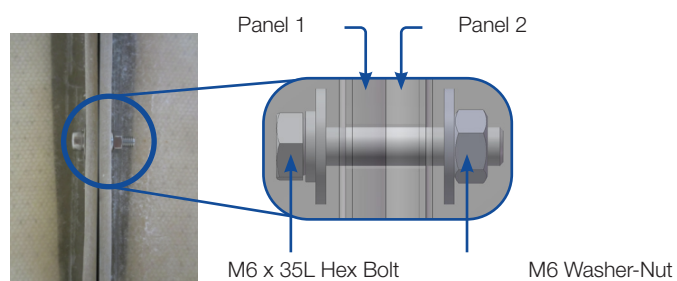


Figure 40: Top Radome Assembly



NOTE

- Refer to “**12.1 Appendix A. Tightening Torque Specification**” on page 136 for the bolt tightening torque.
- Refer to the information below for proper silicone use to protect the surface.
 - Tack-free Time (TFT): 60 min.
 - Setting speed: 3mm / 24hr
 - Applicable temperature: +10 to +35 deg.
 - Applicable temperature range: -40 to +90 deg.

- After joining the panels together, apply silicone to panels from the outside as shown in the figure below. After applying the silicone, remove excess silicone from each bead and clean the surface of the Radome.



Figure 41: Spreading Silicone between Radome Panels

5.8.3 Assembling Bottom Radome

- Assemble bolts on the edge of the base frame.

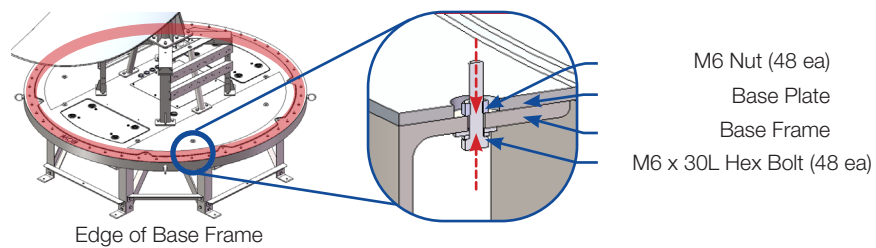


Figure 42: Tightening Bolts on Edge of Base Frame



CAUTION

- Notice the assembling direction of the bolts. Assemble bolts from the bottom to top.
 - Tighten the nut using a **Deep Socket Wrench** instead of a standard socket wrench.
- The Bottom Radome consists of multiple panels. Before assembling Bottom Radome, check that the Side Hatch (Ⓐ) is located on the opposite side of the Bow Mark (Ⓑ) as shown below, then complete the assembly, ensuring that the panels are secured in place. assemble the rest of Bottom Radome firmly.

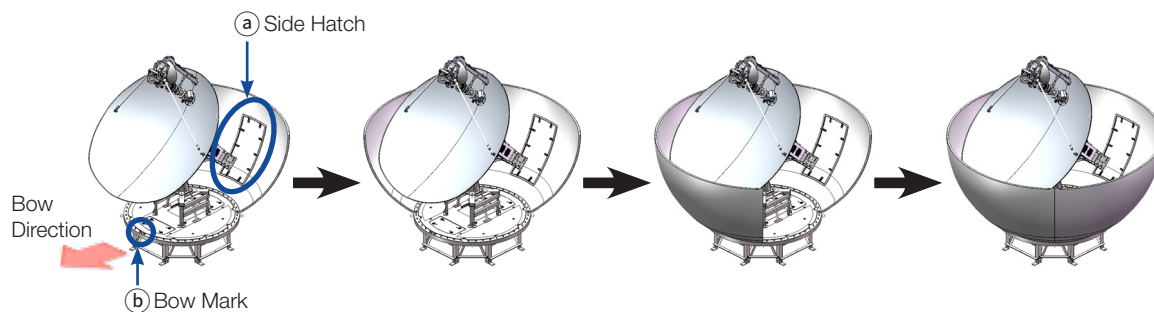


Figure 43: Assembly Sequence of 154-in. Bottom Radome

3. As shown in the figure below, spread silicone on the binding surface of each panel, and fasten them together using the bolts provided.

- ① Spread silicone on the Base Frame and Side Panels.
- ② Tighten bolts to secure the panels as shown in the figure below.

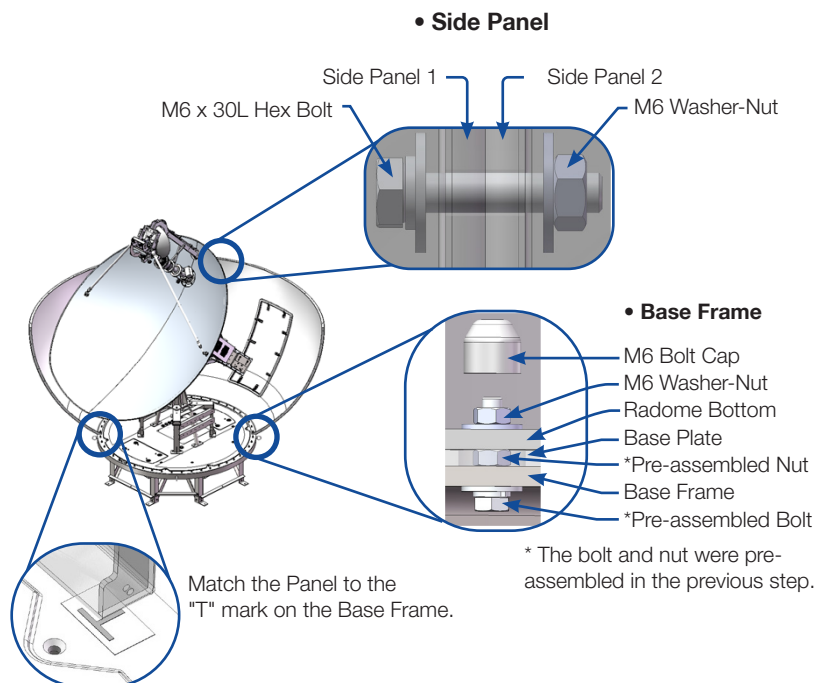


Figure 44: Assembling 154-in. Bottom Radome



NOTE

Refer to “12.1 Appendix A. Tightening Torque Specification” on page 136 for the bolt tightening torque.

5.8.4 Completing Radome Assembly

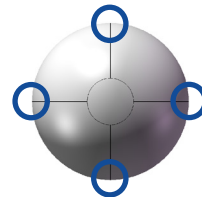
To join the Top and Bottom Radome sections, follow the procedures below:

- **Attach the lift brackets under the Top Radome.**
- **Lift and place the Top Radome on top of the Bottom Radome.**
- **Match the Top and Bottom Radomes and Remove the lift brackets.**
- **Connect the Top and Bottom Radomes.**

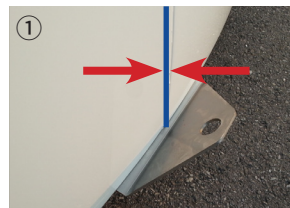
1. Before lifting the Top Radome, attach the lift brackets (4 ea) under the Top Radome as shown in the figure below. Each lift bracket should be positioned on the boundary line of two panels as shown in figure ①, and the bolts should come down through the holes as shown in figure ②.



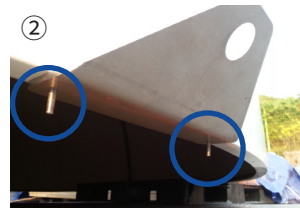
Top Radome



Bottom View-Lift Brackets Position



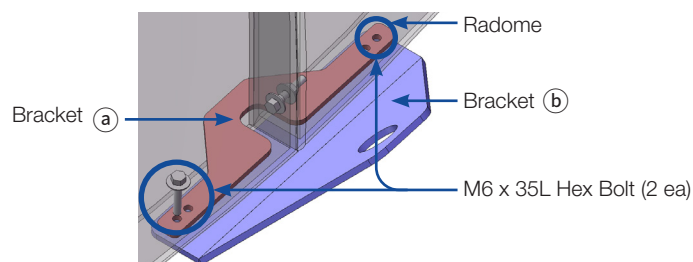
Boundary line of two panels



M6x35L Hex Bolt(2EA)

Figure 45: Lift Bracket Attachment

2. Each bracket is composed of (a), (b), and bolts as shown below. Assemble bracket (a) → Radome → bracket (b) in order by using bolts.



Lift Bracket Components



WARNING

USE CARE WHEN LIFTING THE HEAVY TOP RADOME. INCORRECT HANDLING OF THE RADOME CAN CAUSE PERSONAL INJURY AND DAMAGE TO THE EQUIPMENT.

Figure 46: Assembling Bracket in Order



NOTE

Refer to “12.1 Appendix A. Tightening Torque Specification” on page 136 for the bolt tightening torque.

3. After connecting the three (3EA) Lifting Straps to the lift brackets, slowly Lift the Top Radome and place it on top of the Bottom Radome as shown in the figure below.

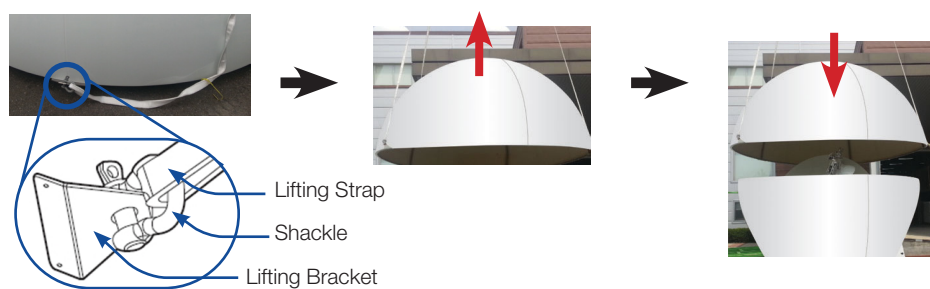
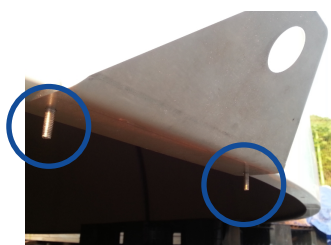


Figure 47: Placing Top Radome on Top of Bottom Radome

4. Before placing the Top Radome on the Bottom Radome, position the two ends of the bracket bolts in conjunction with the holes on the Bottom Radome as shown below. Spread silicone on the binding surface of the Bottom Radome before lowering the top section.



Check Position of Bracket Bolts



Spread Silicone on Surface

Figure 48: Assembling Top Radome and Bottom Radome

5. Match the ends of Bolt (2 EA) to the holes located on the binding surface of the Bottom Radome.

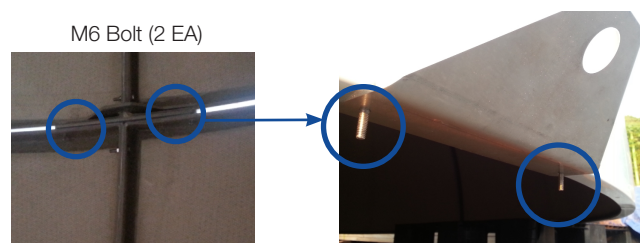


Figure 49: Matching Two Ends of M6 Bolts to Bottom Radome

6. First, temporarily assemble bolts to join the Top Radome and the Bottom Radome before removing lift bracket.

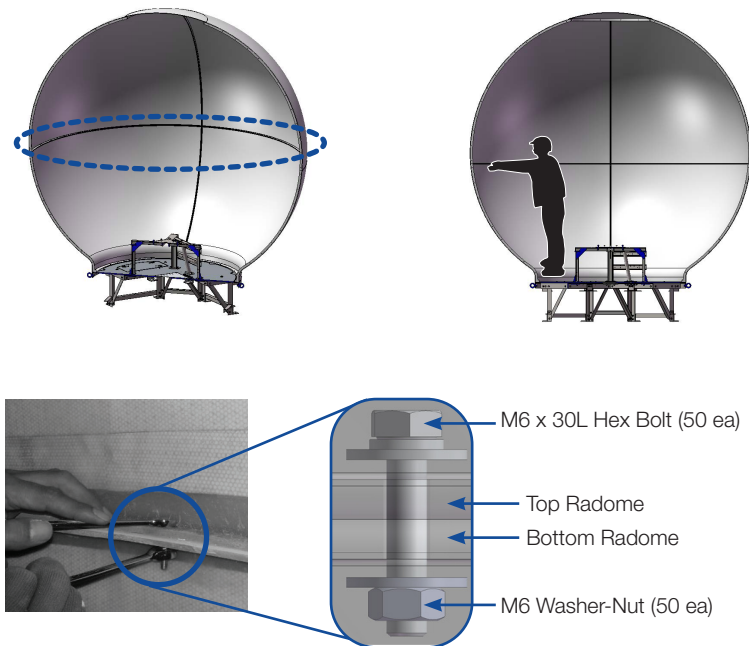


Figure 50: Temporarily Assembling Radome Bolts



IMPORTANT

Do not tighten the bolts at this time, they need to be loose in order for the easy removal of the lift brackets in the next step.

7. Remove all lift bracket bolts from inside the Radome, and then take out the brackets from outside as shown below.

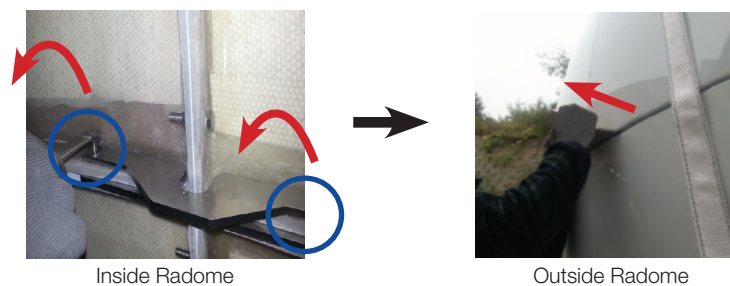


Figure 51: Removing Lift Brackets

8. When all lift brackets are removed, fully tighten the existing bolts which were loosely assembled in the previous step.

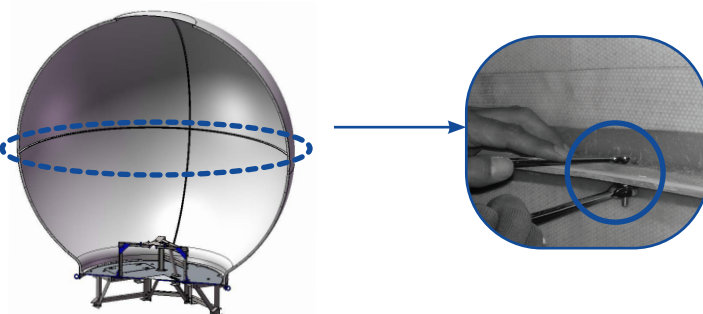


Figure 52: Fully Tightening Existing Bolts



NOTE

Refer to “**12.1 Appendix A. Tightening Torque Specification**” on page 136 for the bolt tightening torque.

9. Complete the radome assembly.



Figure 53: Completely Assembled 154-in. Radome

5.9 Radome Mounting on Mast

5.9.1 154-in. Radome Antenna

1. Bring the 13M Lifting Strap (Optional) from the Radome Package (Crate 1).
2. Hook the two (2EA) frame legs using the Lifting Strap as shown in ①, and tie the strap as shown in the below.
3. Once secured and lightly tensioned using a crane, check to be sure the straps match the vertical connection lines of the Radome panels as shown in ③.

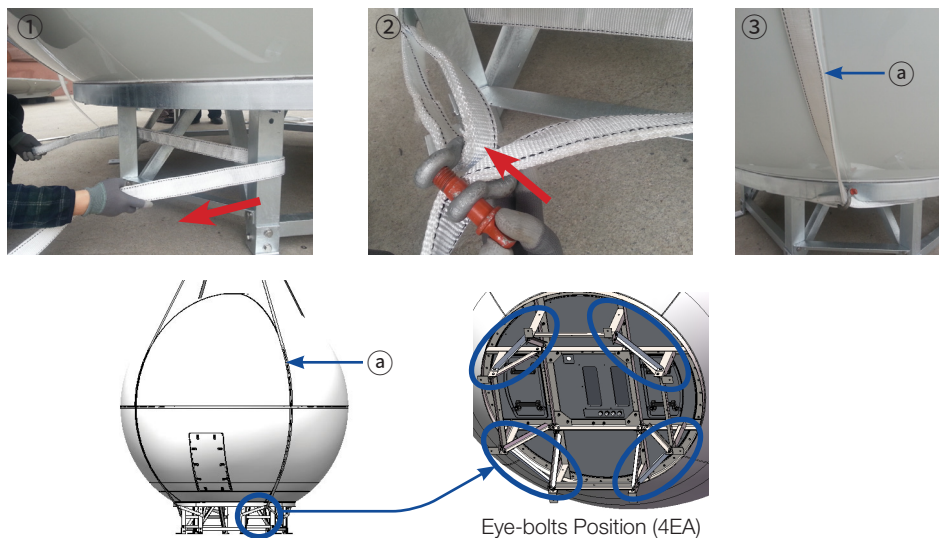


Figure 54: Connecting Lifting Strap

4. Lift the Radome hanging Lifting Strap on a crane hook as shown in the figure below. Straighten out the lifting straps as shown below before lifting the entire load of the antenna.

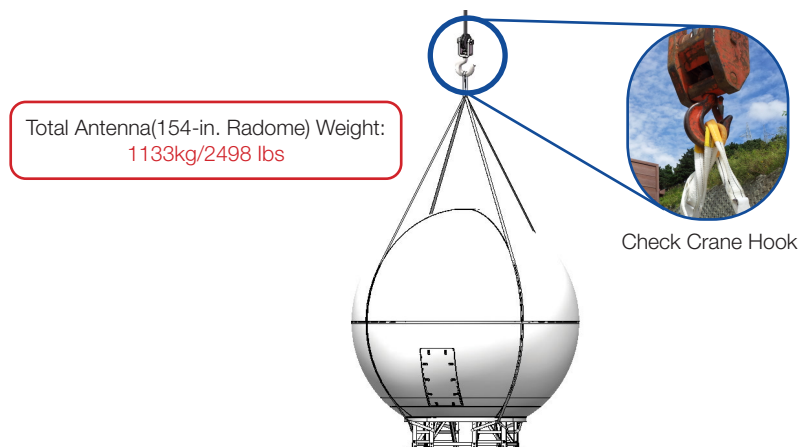


Figure 55: Lifting Radome by Using Crane



WARNING

Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.

5. After placing the antenna on the ship's mast, fix the antenna frame to the mast using bolts. When tightening bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.

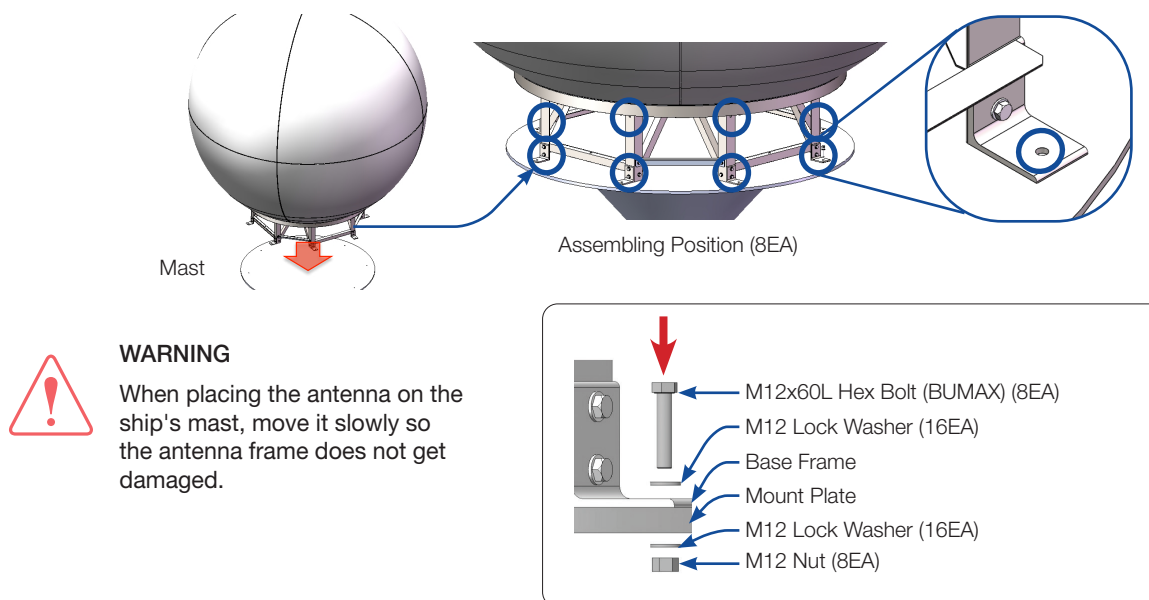


Figure 56: Fixing Antenna to Mast

**NOTE**

Refer to “12.1 Appendix A. Tightening Torque Specification” on page 136 for the bolt tightening torque.

6. Remove the lifting straps after fixing the antenna frame to the ship's mast as shown Figure below. The disconnecting procedures for the lifting straps are performed in reverse order of assembling.

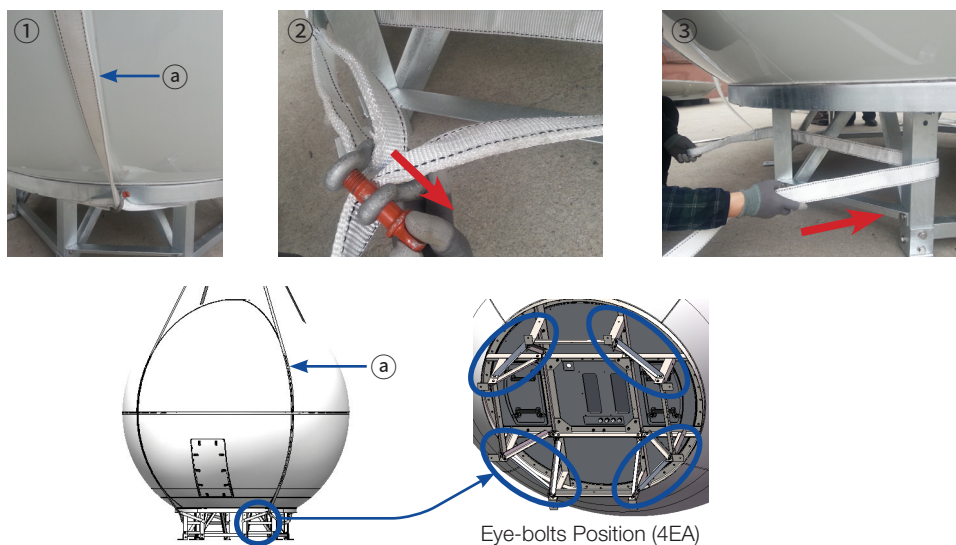


Figure 57: Removing Lifting Strap

Chapter 6. Installing Below Deck Unit (BDU)

6.1 Mounting ACU

6.1.1 Selecting ACU Installation Site

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

6.1.2 Mounting ACU using Brackets

The ACU should be installed using the two supplied 19" Rack Mounting Brackets. Using the Flat Head Screws supplied, attach the mounting brackets to the sides of the ACU. Connect the cables to the back of the ACU.

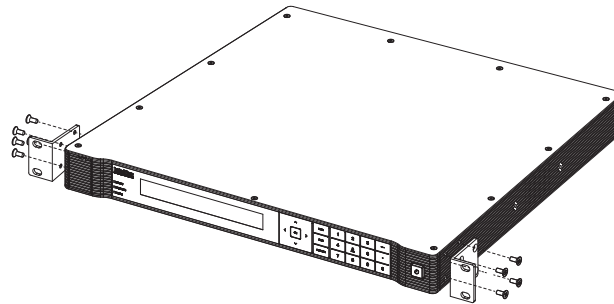


Figure 58: 19-in. Rack Mount Type ACU



CAUTION

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

6.1.3 ACU Dimensions

Confirm the dimensions of the ACU before installing it.

Unit: mm (inch)

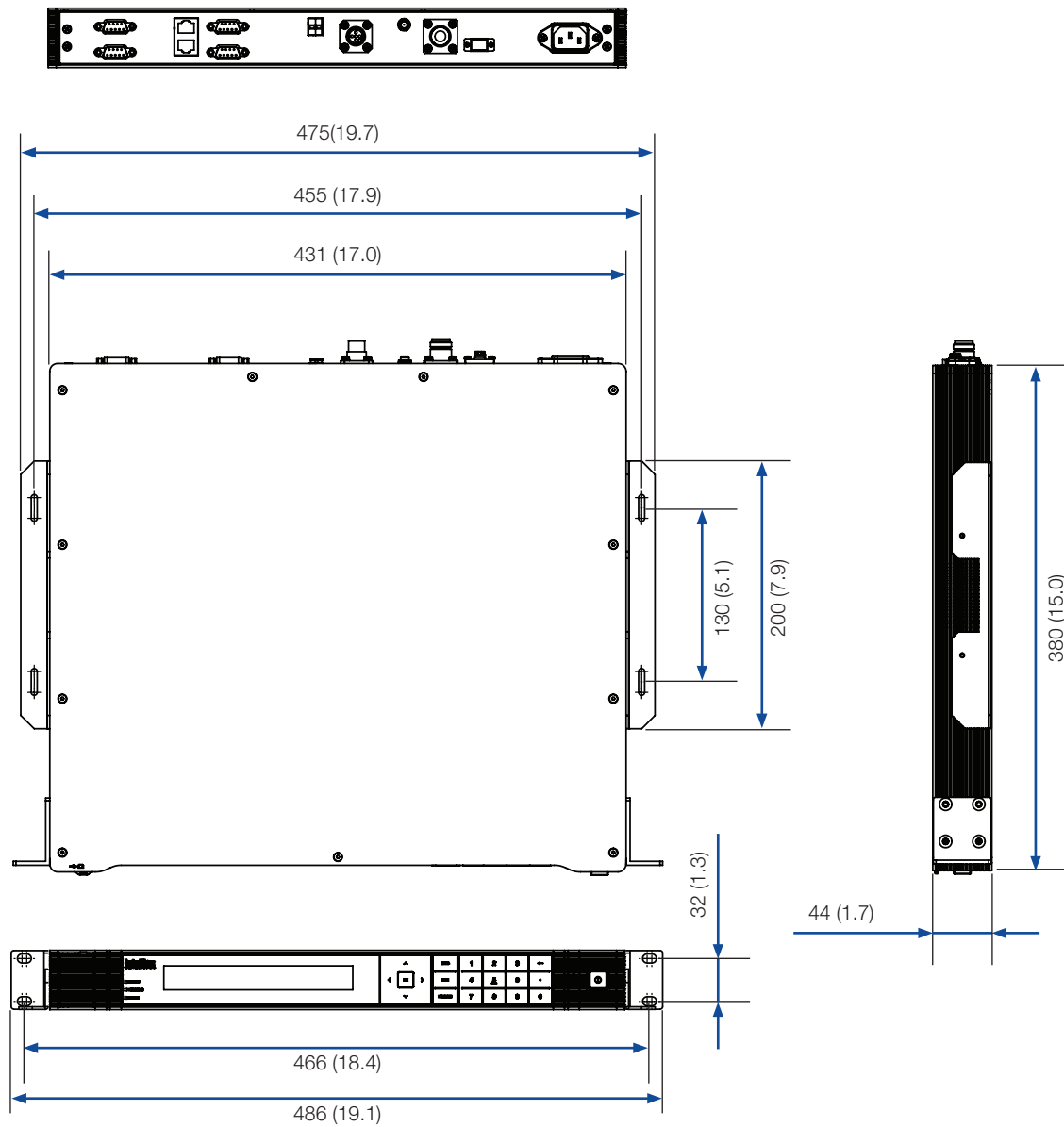


Figure 59: ACU Dimensions

6.2 ACU Cable Connection

6.2.1 ACU Back Panel

The following figure shows the ACU's back panel.

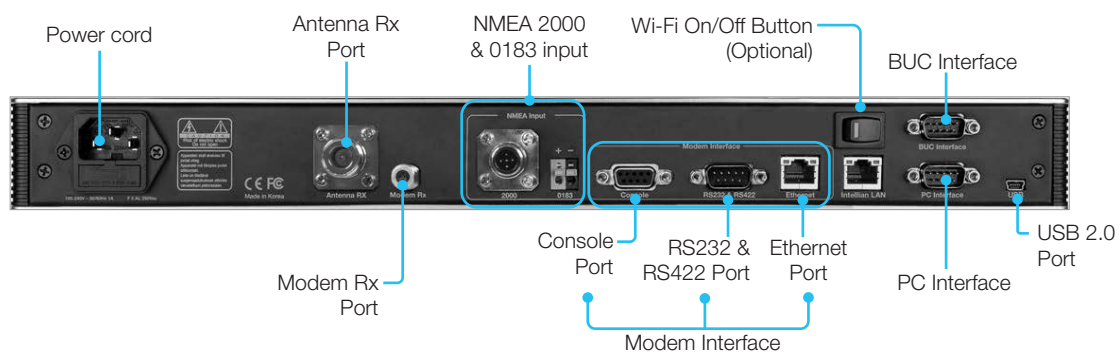
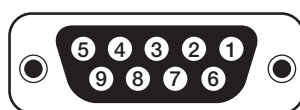


Figure 60: ACU Back Panel

6.2.2 ACU Connector Pinouts Guide

The ACU connector pins and their corresponding descriptions are shown in the following figures and tables

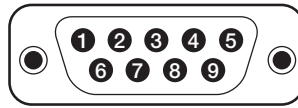
Console Port (Modem Interface)



D-Sub 9 Pin-Console
(Female Connector Type)

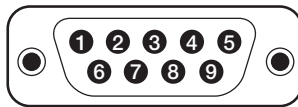
Pin	Signal
1	GND
2	GPS OUT +
3	MODEM_LOCK
4	MODEM_CTRL1 (Tx MUTE)
5	GPS IN +
6	GPS OUT -
7	MODEM_SIGNAL_IN
8	MODEM_CTRL2
9	GPS IN -

Figure 61: Console Connector (Modem Interface) Pinout

RS-232 Port (Modem Interface / BUC Interface)D-Sub 9 Pin-RS-232
(Male Connector Type)

Pin	Signal	Pin	Signal
1	-	6	-
2	RXD	7	-
3	TXD	8	-
4	-	9	-
5	GND		

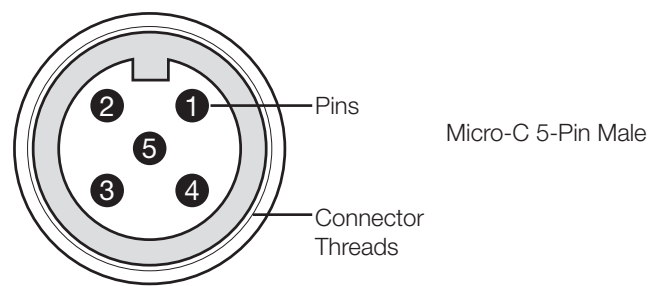
Figure 62: RS232 Connector (BUC Interface) Pinout

RS-422 Port (Modem Interface)D-Sub 9 Pin-RS-232
(Male Connector Type)

Pin	Signal	Pin	Signal
1	-	6	-
2	RXD+	7	RXD-
3	TXD+	8	TXD-
4	-	9	-
5	GND		

Figure 63: RS232 Connector (Modem and Mediator Interface) Pinout

NMEA 2000 Input



Pin	Signal
1	N/C
2	N/C
3	N/C
4	NET-H (CAN-H)
5	NET-L (CAN-L)

Figure 64: NMEA 2000 Connector Pinout

NMEA 0183 Input



2-Pin Terminal Block

Pin	Signal
+	HEADING IN
-	HEADING GND

Figure 65: NMEA 0183 Connector Pinout

6.2.3 Cable Connection of Single Antenna System

The Single Antenna System consists of one VSAT antenna and one ACU.

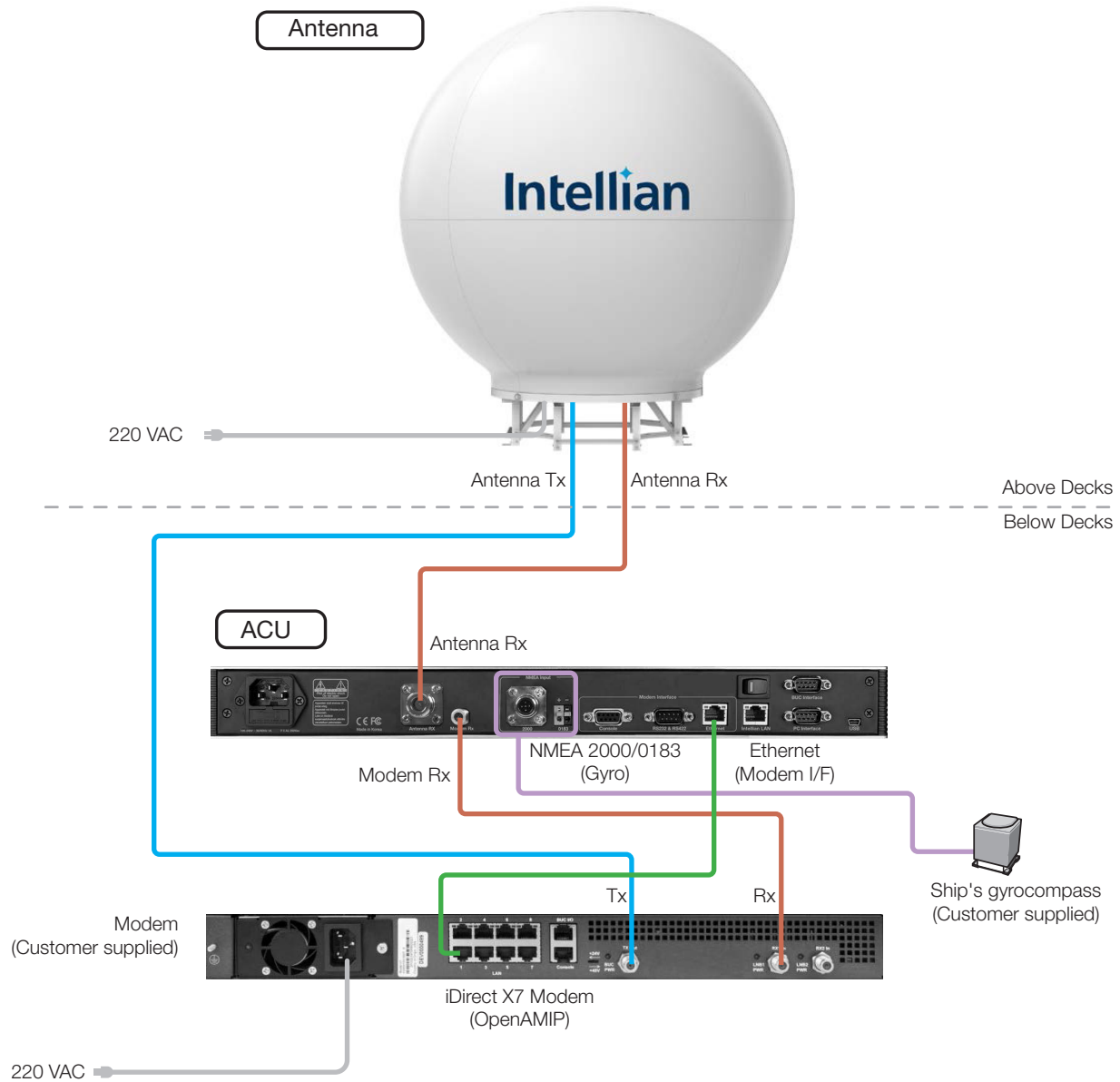


Figure 66: Cable Connection of Single Antenna System



NOTE

If you need to extend the connection from the ACU to the antenna beyond 120 m distance, you can use Intellian Fiber Link which supports up to 2 km length connection.

6.2.4 Cable Connection of Dual Antenna System

The Dual Antenna System consists of two VSAT antennas and two ACUs. The antenna and modem mediators are required for the Dual Antenna System for the simultaneous controlling and managing of two VSAT antenna systems. As shown in the configuration below, connect the cables correctly.

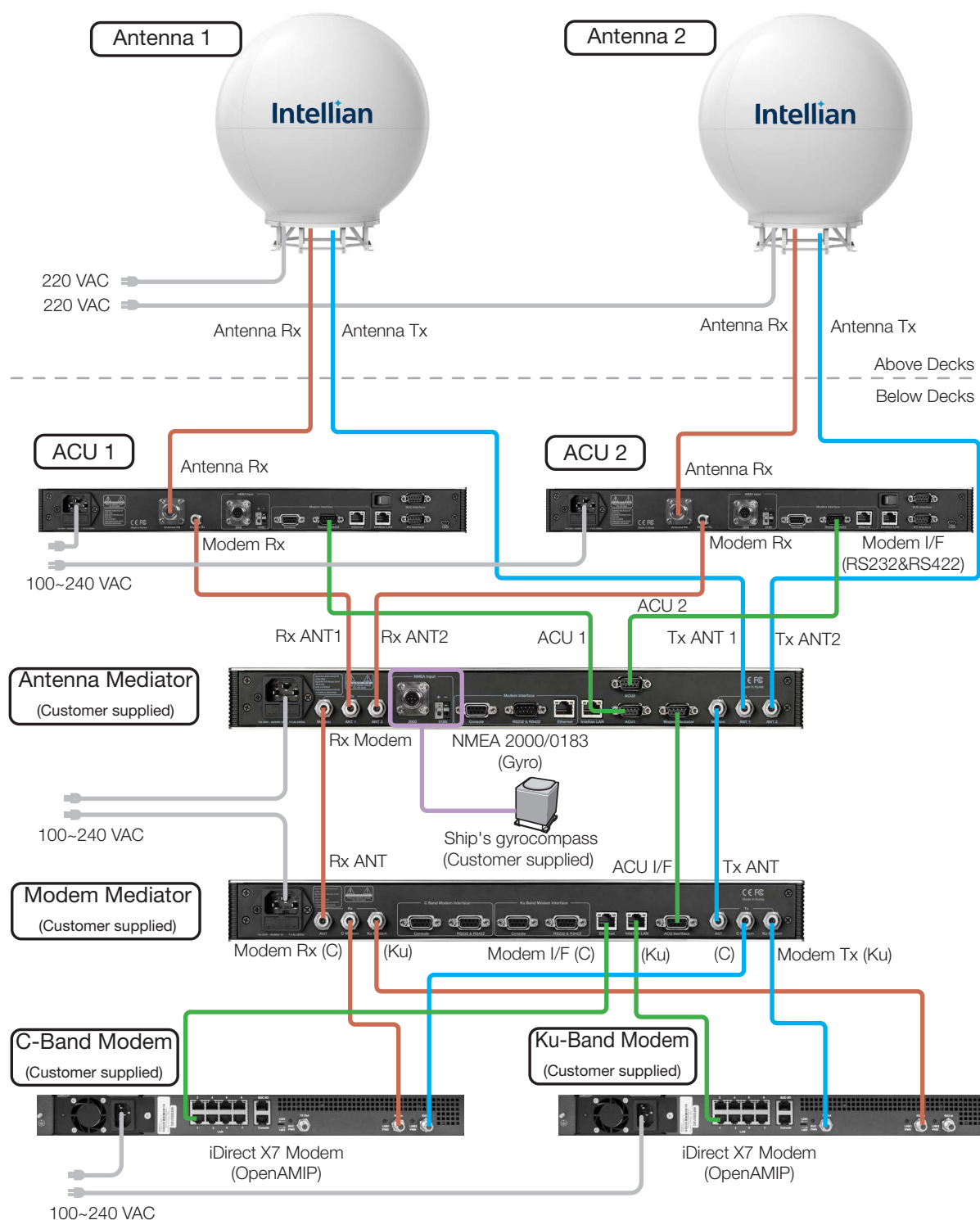


Figure 67: Cable Connection of Dual Antenna System

Chapter 7. Operating ACU

7.1 Introduction

7.1.1 Antenna Control Unit (ACU)

The Antenna Control Unit (ACU) controls the various settings of the antenna. The functions of the ACU are as follows:

- Monitors the antenna status.
- Changes the target satellite.
- Sets up the user environment.
- Sets the current GPS information.
- Moves the antenna manually
- Built-in real-time diagnostics function and event log recorder
- Sets up the interface with a PC.
- Supports Wi-Fi operation.
- Logs data and firmware upgrade through USB
- Built-in web-based remote control management

7.1.2 ACU Front Panel

The following figure shows the ACU's front panel.

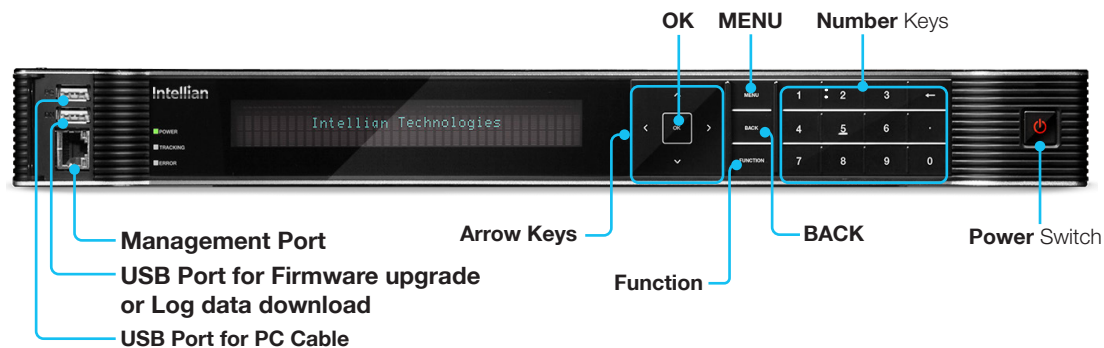


Figure 68: ACU Front Panel

The following table shows the function of each touch key.

Touch key	Function
OK KEY	Enters the next step or menu.
MENU	Enters the SETUP mode.
BACK	In SETUP mode, returns to the previous menu or option, or saves the adjusted settings. In NORMAL mode, returns to the first page of the antenna's current status.
ARROW KEYS	Moves cursor to an alternative option to select, or increase and decrease the selected character to the desired value.
FUNCTION	Saves the adjusted settings.
NUMBER KEYS	Inputs numbers.

7.2 Normal Mode

7.2.1 Startup

With the system is installed and power applied, the ACU screen will show the following sequence.

Startup

INTELLIAN TECHNOLOGIES INC.

1. The data communication is being established between the antenna and the ACU.

Initialize
antenna info

INITIALIZE - ANTENNA INFO
INTELLIAN v240M 2

2. The ACU receives antenna information.

Initialize elevation
& cross-level angle

INITIALIZE - EL POSITION
INTELLIAN v240M 2

3. The elevation angle and cross-level angle are initialized.

Initialize azimuth
angle

INITIALIZE - AZIMUTH POSITION
INTELLIAN v240M 2

4. The azimuth angle is initialized.

Initialize target
satellite position

INITIALIZE - SAT POSITION
INTELLIAN v240M 2

5. The antenna returns to the target satellite position.

Search status

SEARCH1 125.0E ASIA6AH SIG:101 C
AZ:150.7(150.7) EL:45.3 SK:02.0

6. The antenna is searching for the target satellite.

Tracking status

TRACKING 125.0E ASIA6H SIG:201 C
AZ:181.7(181.7) EL:47.3 SK:02.0 Fn

7. The antenna has locked onto the satellite.

7.2.2 Monitoring Antenna's Current Status

When the ACU power is on, it displays the status of the antenna. The current status of the antenna is displayed as shown below.

Current search status

```

# SEARCH1 125.0E ASIA6AH SIG:101 C #
AZ:150.7(150.7) EL:45.3 SK:02.0

```

1. The antenna is searching for the target satellite.

Current tracking status

```

# TRACKING 125.0E ASIA6H SIG:201# C #
AZ:181.7(181.7) EL:47.3 SK:02.0 Fn

```

2. The antenna has locked onto the target satellite. The current IF signal level (SIG/AGC) is displayed. SIG is displayed when the Narrow Band Detection (NBD) mode for TRACKING SIGNAL is selected. AGC is displayed when the DVB mode for TRACKING SIGNAL is selected. The symbol “#” is only displayed when the satellite signal is strong enough to generate a lock. The C/ Ku / Ka indicator changes depending on the satellite being tracked. The true azimuth [181.7] position of the antenna is the sum of the ship's heading 000.0 [HDG] and antenna relative [181.7].

Save current satellite info

```

SAVE CURRENT SAT INFO ?
→ YES NO

```

3. Press the **FUNCTION** key to save the current BOW OFFSET information or abort and return to the main display. “Fn” will be displayed only if the antenna is in tracking mode.

Current tracking status

```

# TRACKING 125.0E ASIA6H SIG:201# C #
AZ:181.7(181.7) EL:47.3 SK:02.0 Fn

```

4. Press the **RIGHT** arrow key to display NBD, GPS, and ship's heading information.

Tracking and Heading information

```

# NBD F:1070000 BW:1000 SIG:201# #
127.05E 37.00N HDG:000.0 L:5150 Fn

```

5. NBD, GPS, and ship's heading information are shown.
 - NBD (Narrow Band Detection) IF tracking frequency: 1070000 KHz
 - Detected Band Width: 1000 kSps
 - SIG (Signal Level): 201
 - W (West) / E (East) Longitude: 127.05 ° E
 - N (North) / S (South) Latitude: 37.00° N
 - HDG (Ship's Heading): 000.0 degree
 - LNB local oscillator(LO) frequency: 5150 MHz (C band)

Antenna and ACU
versions

```

❖  A M 2   2 4 F   A 6 8 3   A N T .   S e r i a l   1 . 0 0 / 1 . 0 0 ❖
    V P - T 5 3 7           A C U   S e r i a l   1 . 0 0 / 1 . 0 0
  
```

6. Press the **RIGHT** arrow key to display the information below.
 - Antenna part number, Antenna serial number and PCU / Stabilizer firmware version.
 - ACU part number, ACU serial number, ACU / Pol. Controller firmware version.
 - Part number and serial number are displayed depending on each product.

Press the **BACK** Key to return to the first page of the antenna's current status.

Select USB
functions

```

❖  [ U S B   F U N C T I O N ]   S E L E C T   U S B   F U N C T I O N   ❖
                                ⋮      U P G R A D E   F I R M W A R E      ⋮
  
```

7. Press the **RIGHT** arrow key to display the USB FUNCTION.
When a USB Memory Stick is connected to the USB port, the above screen will be displayed. With the Firmware package file (FWP) stored in the USB Memory folder, the ACU upgrades itself once the USB drive is inserted into the port.
 - **UPGRADE FIRMWARE:** The ACU is upgraded with the FWP file in the designated folder of a USB memory stick.
 - **COPY LOG DATA:** Copies all data logs to the USB memory stick.

Upgrade the system

```

                                U P G R A D E   ?
                                ⋮
                                →   Y E S                               N O
  
```

8. Press the **OK** key to upgrade firmware.

Firmware Error Messages:

- **UPGRADE FIRMWARE**
 - FIRMWARE FILE NOT FOUND: No FWP file on the USB memory stick
 - INVALID FIRMWARE : FWP file is broken or an invalid file
 - MORE THAN 2 FILES EXIST : There are more than 2 FWP files
 - CHECK USB CONNECTION : The USB memory stick is not connected
- **COPY LOG DATA**
 - COPY LOG DATA TO USB[30%]: displays the status of data copying
 - NOT ENOUGH SPACE IN USB : There is too little space on the USB memory stick
 - CHECK USB CONNECTION : The USB memory stick is not connected

Real-time
diagnostic result

```

❖  [ D I A G N O S I S ]           S E N S O R   B O X           ❖
                                ⋮                                ⋮
                                C O D E 1 0 9      R E S U L T S   :   F A I L E D      F N
  
```

9. Press the **RIGHT** arrow key to display the real-time diagnosis result.
REALTIME DIAGNOSIS RESULT
It shows the ERROR status after the power is turned ON.
If there is no ERROR, this page will not be shown.

Erase
Error message

ERASE DIAGNOSIS ERROR LOG ?
→ YES NO

10. Press the **FUNCTION** key to erase diagnosis error messages.

7.3 Setup Mode

To enter SETUP MODE, follow the instructions below.

Searching /
Tracking Mode

⌵ TRACKING 125.0E ASIA6AH SIG: 201⌵ C ⌵
AZ: 183.7 (183.7) EL: 47.3 SK: 02.0 Fn

1. While the antenna is in SEARCHING / TRACKING mode, press the **MENU** key to enter SETUP mode. * indicates the keypad lock function is on (Refer to KEY LOCK menu to set up the keypad lock function). When the keypad lock function is activated press the **MENU** key; or when the “Fn” menu is activated, press the **FUNCTION** key. Then the ENTER PASSWORD menu will be displayed.

Enter password

ENTER PASSWORD
- - - -

2. If the keypad lock function is on, enter the password before accessing SETUP mode. If the keypad lock function is off, access SETUP mode directly by following Step 3.

Setup Mode

SETUP MODE ?
→ YES NO

3. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode or press the **RIGHT** arrow key to move the cursor to NO and press the **OK** key to abort and return to the main display.

Exit Setup Mode

EXIT SETUP MODE ?
→ YES NO

4. While the antenna is in SETUP mode, press the **ESC** key as a shortcut key to exit

7.4 Antenna Settings

7.4.1 Manual Search

Search for the desired satellite manually.

Setup Mode

SETUP MODE ?	
→ YES	NO

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

Antenna Mode

→ + ANTENNA	+ SATELLITE
+ SYSTEM	

2. Press the **OK** key to enter the ANTENNA menu.

Manual search Mode

→ + MANUAL SEARCH	+ SET POL ANGLE
+ DIAGNOSTIC	

3. Press the **OK** key to enter the MANUAL SEARCH menu.

Antenna movement

STEP	SIZE	AZIMUTH	ELEVATION	AGC
# 00.2 #	→ 231.7 ←	48.3	301	F n

4. Current IF tracking signal level (AGC) / (SIG) is displayed to assist you in manually peaking the AZIMUTH (0°-360°) and ELEVATION (0°-90°) angles for the best signal level.
 - Press the **NUMBER** key to change the STEP SIZE (Range: 0.1~99.9).
 - Press the **LEFT** and **RIGHT** arrow keys to increase or decrease the azimuth angles.
 - Press the **UP** and **DOWN** arrow keys to increase or decrease the elevation angles.
 - Press the **FUNCTION** key to save the current settings or abort and return to the main display.

Save

SAVE CURRENT SAT INFO ?	
→ YES	NO

5. If the current settings are able to locate the satellite, press the **FUNCTION** key to save "current satellite information". This will help to reduce the satellite acquisition time after restarting the system. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to save the settings.



NOTE

If the gyrocompass type is not NMEA or the gyrocompass is not connected to the ACU, the information cannot be saved.

7.4.2 Setup Antenna LNB Pol Angle

Setup Mode

SETUP MODE ?	
→ YES	NO

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

Antenna Mode

→ + ANTENNA	+ SATELLITE
+ SYSTEM	

2. Press the **OK** key to enter the ANTENNA menu.

Set pol angle Mode

⌵	+ MANUAL SEARCH	→ + SET POL ANGLE	⌶
	+ DIAGNOSTIC		

3. Press the **RIGHT** arrow key to move the cursor to the SET POL ANGLE menu and press the **OK** key to enter it.

LNB pol angle type

SELECT LNB POL. ANGLE MENU	
⌵	CALIBRATION
	⌶

4. Press the **UP** and **DOWN** arrow keys to select the LNB pol angle menu and press the **OK** key to run the selected operation “CALIBRATION”, “MANUAL ADJUST POL”, or “RESET MECHANICAL OFFSET”. Select MANUAL ADJUST C/KU/KA POL to control the LNB pol angle manually. If the control board, skew potentiometer or belt is replaced, select CALIBRATION to calibrate the LNB pol angle.

LNB pol angle
Signal

KU/KA

LNB POL ANGLE	SIGNAL : 180
⌵ 20.5 ⌶	

C

LNB POL ANGLE	POLARITY	SIGNAL : 180
⌵ 10.0 ⌶	⌵ LINEAR ⌶	

5. Press the **UP** and **DOWN** arrow keys to increase or decrease the LNB pol angle manually and the correspondent SIGNAL level will be displayed next to it. If the tracking satellite is a C-band satellite, the POLARITY item is shown as above. If the tracking satellite is a Ku/Ka-band satellite, the POLARITY item is not shown. Polarity is changeable to “LINEAR”, “RHCP”, and “LHCP” with the **LEFT/RIGHT** key. Press the **BACK** key to return to the main display.



NOTE

LNB POL ANGLE menu will be displayed only if MANUAL ADJUST is selected.

7.4.3 Diagnosis Procedures

Refer to the diagnosis codes for the test results.

Setup Mode

S E T U P M O D E ?	
→ Y E S	N O

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

Antenna Mode

→ + A N T E N N A	+ S A T E L L I T E
+ S Y S T E M	

2. Press the **OK** key to enter the ANTENNA menu.

Diagnosis Mode

⌵	+ M A N U A L S E A R C H	+ S E T P O L A N G L E	⌶
	→ + D I A G N O S T I C		

3. Press the arrow keys to move the cursor to DIAGNOSIS and press the **OK** key to enter it.

Select diagnosis

D I A G N O S I S	C O M M U N I C A T I O N
⌵ C O D E 1 0 1 ⌶	R E A D Y

4. Press the **UP** and **DOWN** arrow keys to select a full diagnostic test or single diagnostic Test and press the **OK** key to execute the selected diagnostic test. Refer to the following Diagnosis Code list.

Full diagnostic test
result

D I A G N O S I S	F U L L T E S T I N G
F U L L T E S T	- - - - -

5. A full diagnostic is successfully completed.

Single diagnostic
test result

D I A G N O S I S	C O M M U N I C A T I O N
C O D E 1 0 1	R E S U L T : P A S S E D

6. A single diagnostic test is successfully completed.

Diagnosis Code:

CODE 101: The data communication between the antenna and the ACU is tested.

CODE 102: The azimuth motor is tested.

CODE 103: The elevation motor is tested.

CODE 104: The cross-level motor is tested.

CODE 105: The azimuth encoder is tested.

CODE 106: The cross-level encoder is tested. (Skip for v240M 2)

CODE 107: The rate sensor is tested.

CODE 108: The tilt sensor is tested.

CODE 109: The sensor box motor is tested.

CODE 110: The LNB/NBD is tested.

CODE 111: The LNB pol motor is tested.

CODE 112: The sub-reflector is tested. (Skip for v-series communication products)

CODE 113: The antenna power is tested.

CODE 114: The ACU power is tested.

CODE 115: The receiver power is tested. (Skip for v-series communication products)

CODE 116: The home sensor is tested.

An example of test result: ●2●●●●●●●●-●-●●

●: The test has passed.

2: The test has failed. (CODE102)

-: The test is skipped. (Only for TVRO products)

?: The test is in process.

7.5 Satellite Settings

7.5.1 Load Satellite

Setup Mode

S E T U P M O D E ?	
→ Y E S	N O

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

Satellite Mode

+ A N T E N N A	→ + S A T E L L I T E
+ S Y S T E M	

2. Press the **RIGHT** arrow key to move the cursor to SATELLITE and press the **OK** key to enter it.

Load sat Mode

→ + L O A D S A T .

3. Press the **OK** key to enter the LOAD SAT. menu.

Load satellite

L O A D S A T E L L I T E			
⋈	[1]	C	ASIA6AH 125.0E
⋈			

4. Press the **UP** and **DOWN** arrow keys to select satellite that you wish to track. Press the **OK** key to load the selected satellite.

Load

L O A D ?	
→ Y E S	N O

5. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to load the selected satellite and execute the current settings. Or press the **RIGHT** arrow key to move the cursor to NO and press the **OK** key to abort and return to the main display.

7.6 System Settings

7.6.1 Setting Location

Setup Mode

SETUP MODE ?	
→ YES	NO

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

System Mode

+ ANTENNA	+ SATELLITE
→ + SYSTEM	

2. Press the **DOWN** arrow key to move the cursor to SYSTEM and press the **OK** key to enter it.

Set location Mode

⌂ + SET LOCATION	+ MANAGEMENT
+ KEY LOCK	

3. Press the **RIGHT** arrow key to move the cursor to SET LOCATION and press the **OK** key to enter it.

Gyrocompass type and Baud rate

GYRO TYPE	BAUD RATE
NMEA	⌂ 4800 ⌂

4. Set the ship's **GYRO TYPE*** and BAUD RATE.
Search pattern 1 or 3 will initiate according to which GYRO TYPE is selected and the availability of the gyrocompass input. Set the BAUD RATE as 4800, 9600, 19200 or 38400 according to your device.

A search pattern 1 will initiate automatically if the gyrocompass input does not exist and the gyrocompass type is set any setting other than GROUND TEST.

Heading Data Receive Status	Setting of Heading Device		
	NONE	NMEA NMEA 2000	Ground Test
Heading Data Available	Search 1	Search 3	Search 3
Heading Data Unavailable	Search 1	Search 1	Search 3

GYRO TYPE*

- NONE
- NMEA
- NMEA 2000
- GROUND TEST



NOTE

The bow offset will not be saved when Search 1 mode. In this case, the antenna will need to retarget the desired satellite using Search 1 every time if the antenna restarts.

Latitude & longitude

→	L A T I T U D E	L O N G I T U D E
	3 7 . 0 0 N	1 2 6 . 5 0 E

5. Set the current LATITUDE and LONGITUDE.
Press the **LEFT** and **RIGHT** arrow keys until the desired character is underscored (selected). Press the **UP** and **DOWN** arrow keys to increase or decrease the value. Or press the **NUMBER** keys to set the desired value directly. Press the **OK** key to set the parameter.

Heading

	H E A D I N G
	0 0 0 . 0

6. Entry of the ship's heading is not required when your system is connected to the NMEA (0183) or NMEA2000 Heading Gyrocompass output. Ensure that the supported gyrocompass type is set correctly. For the v240M 2, if the ship's gyrocompass output is Step-by-Step (SBS) or Synchro, the separate purchase of a gyrocompass converter is required.

Save

	S A V E ?
→ Y E S	N O

7. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to save the current settings. Or move the cursor to NO and press the **OK** key to abort and return to the main display.

7.6.2 System Management

Setup Mode

S E T U P M O D E ?	
→ Y E S	N O

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

System Mode

+ A N T E N N A	+ S A T E L L I T E
→ + S Y S T E M	

2. Press the **DOWN** arrow key to move the cursor to SYSTEM and press the **OK** key to enter it.

Management Mode

+ S E T L O C A T I O N	+ M A N A G E M E N T
+ K E Y L O C K	

3. Press the arrow keys to move the cursor to MANAGEMENT MODE and press the **OK** key to enter it.

Select process type

S E L E C T P R O C E S S T Y P E			
	B A C K U P	U S E R	D A T A 

4. Press the **UP** and **DOWN** arrow keys to **SELECT PROCESS TYPE***
Press the **OK** key to set the parameter and the processing message will be displayed.

* SELECT PROCESS TYPE

- **DEFAULT ACU-REMOTE P/W:** to change the webserver module's password to default.
- **RESTORE USER DATA:** Restores the user settings to the antenna.
- **UPGRADE FROM USB:** Upgrades the antenna by accessing a FPW file stored on a USB.
- **COPY LOG TO USB:** Copies the data log from the antenna to a USB drive.
- **BACKUP TO USB:** Backs up the antenna user settings to a USB drive.
- **RESTORE FROM USB:** Restores the antenna by using the backup user data from a USB.
- **UPGRADE ACU-REMOTE:** Upgrades the iARM processor by retrieving a TGZ file stored on a USB drive.
- **UPGRADE FROM USB / COPY LOG TO USB / BACKUP TO USB / RESTORE FROM USB / UPGRADE ACU-REMOTE:** These items are shown only when the USB memory stick is connected to the ACU.

B A C K U P A N T I N F O

D O N O T T U R N O F F !           

7.6.3 Key Lock (Password Management)

Setup Mode

SETUP MODE ?	
→ YES	NO

1. Press the **LEFT** arrow key to move the cursor to YES and press the **OK** key to enter SETUP mode.

System Mode

+ ANTENNA	+ SATELLITE
→ + SYSTEM	

2. Press the **DOWN** arrow key to move the cursor to SYSTEM and press the **OK** key to enter it.

Key lock Mode

+ SET LOCATION	+ MANAGEMENT
⌂ + KEY LOCK	

3. Press the arrow keys to move the cursor to KEY LOCK and press the **OK** key to enter it. The menu INTELLIAN DEVICE is not available for v240M 2.

Set key lock and password

KEY LOCK	UNLOCK P / W
⌂ ON ⌂	1 5 9 0

4. Press the **UP** and **DOWN** arrow keys to choose whether or not to use the keypad lock function when entering SETUP mode or saving the satellite information. Setup the password for disabling the keypad lock. The factory default is **1590**.

Check key lock activation

⌂ TRACKING 125.0E ASIA6H	SIG: 201⌂	C ⌂
* AZ: 181.7 (181.7) EL: 47.3 SK: 02.0 F n		

When KEY LOCK function is activated, the “⌂” mark is displayed.

Chapter 8. Aptus

8.1 Introduction

Intellian's new GUI Antenna PC Controller Software, Aptus® is a next-generation graphically based antenna remote control software. It is designed in the MS.NET programming environment with an additional Software Development Kit (SDK). The SDK allows the NOC or service center to integrate antenna monitoring and control into existing network management systems in an easier, more user-friendly, and convenient manner.

8.2 Compatibility

Aptus® is compatible with Intellian's TVRO and VSAT antenna systems.

8.3 Requirements

Table below lists the minimum PC hardware and software requirements to install and run Aptus®.

8.3.1 Hardware

Hardware	Requirements
CPU	Intel® Pentium® 4 or higher
Memory	512MB or higher
Video Card	DirectX9.0 or higher supported
	H/W acceleration supported
	Video Memory 128MB or higher
HDD	1GB or higher

8.3.2 Software

Software	Requirements
Operating System	Windows XP SP or higher
Framework	Microsoft.Net Framework 3.5 Service Pack 1 or higher

8.4 Software Installation

Double-click the Install icon to install Aptus directly onto your computer/ laptop. The InstallShield Wizard will guide you through the program setup process. The installation routine places an icon on the desktop that can be clicked to start the software. Also, Intellian also provides patch files for software upgrades.



Figure 69: Aptus Install Icon

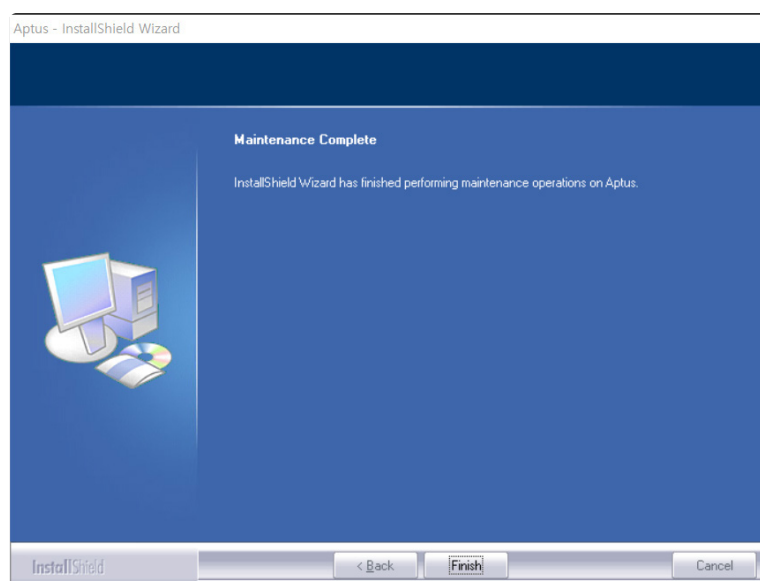


Figure 70: Aptus InstallShield Wizard

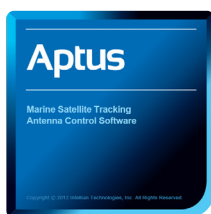


Figure 71: Aptus Icon

8.5 PC to ACU Communication Setup

8.5.1 Starting Aptus

By double-clicking the Aptus desktop icon, the Communication Window appears where you can establish the data communication between your PC and the ACU. You are given the options of accessing your ACU through Serial Port Communication or through Network Communication (TCP/IP).

8.5.2 Access The ACU through Serial Communication

1. Connect a 9-pin Serial Cable from the PC INTERFACE connector on the ACU to the 9-pin serial port on the PC. If there is not a 9-pin serial port on the PC, use a USB-Serial adapter.
2. Select **Serial** in the communication type combo-box.
3. Select a COM port which is not in use by other devices.
4. The baud rate of the ACU is automatically configured.
5. Click the **Connect** button.

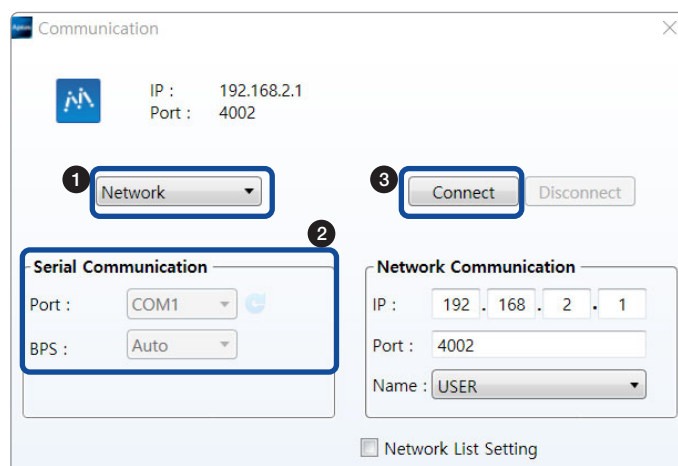


Figure 72: Serial Communication

8.5.3 Access ACU through Network Communication (TCP/IP)

1. If you want to use an Ethernet connection, Turn off the wireless connection on your ACU because the Ethernet port on the ACU front panel is disabled when the Wi-Fi function is active.
2. Select **Network** in the communication type combo-box.
3. Enter the ACU's IP address. (**Factory default: 192.168.2.1**)
4. Enter the ACU's port number. (**Factory default: 4002**)
The IP address and port number can be customized by enabling the Network List Setting option. The user network setting list can be edited, through the ADD, MODIFY and DELETE options. Once added to the list, you can select the desired network list in the Network Communication's Name combo-box.
5. Click the **Connect** button.
6. The Authentication window will appear.

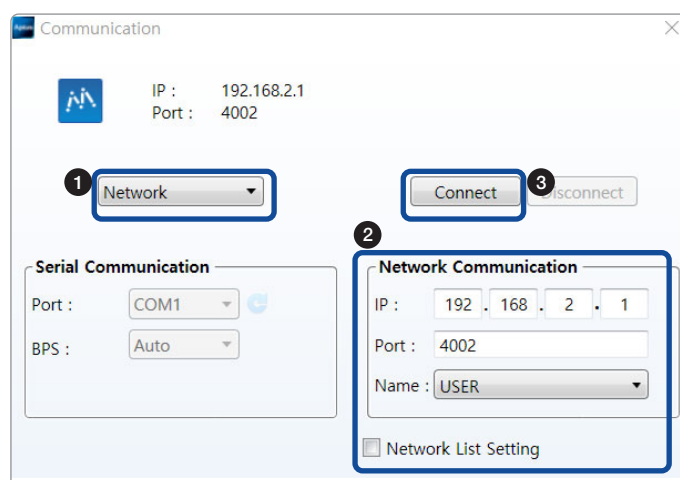


Figure 73: Network Communication

7. Log in by using the username and password:

- **Username: intellian (Factory default)**
- **Password: 12345678 (Factory default)**

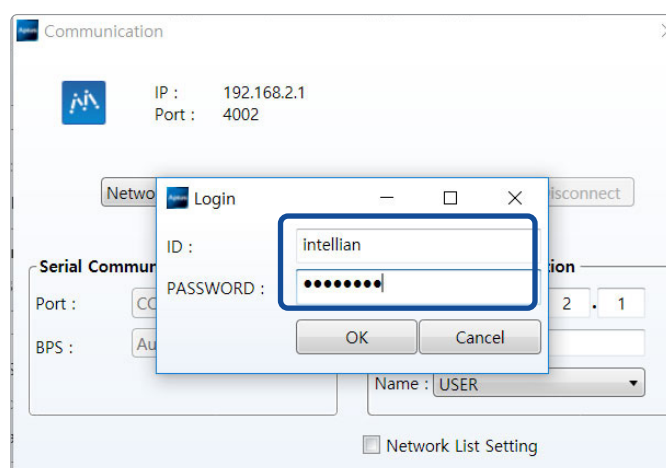


Figure 74: Authentication Window

**NOTE**

You must change the default password to a new password for security after you have logged in for the first time. If you want to use an Ethernet connection, changing password is only possible via the Aptus web page.

**CAUTION**

The amount of data will increase rapidly if Network Communication is in use. Intellian recommends using Remote Web Access to access the ACU.

8.5.4 AutoUpdate Function

Intellian Aptus® checks and notifies the latest version when it is started to maintain up to date software version by its AutoUpdate function.

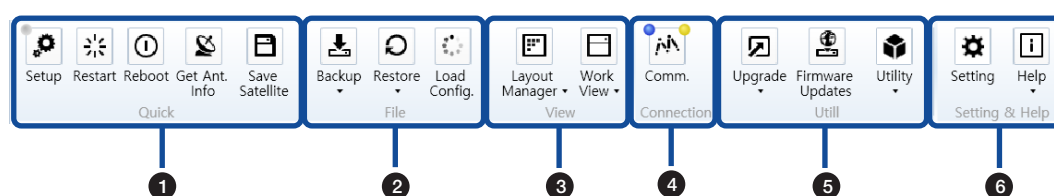
1. When Aptus is started, it automatically checks the latest software version from the server and runs AutoUpdate which will display the current software version and if a new version one is available.
2. When a new software version is available, click the **Start** button and the **File downloading...** message will be displayed while the files are downloaded from the server. When the download is finished, an **installing...** message is displayed, Aptus patch runs and the InstallShield installation will start.
3. Click the **Finish** button when InstallShield installation is finished, then **Run the Aptus** message is displayed, Aptus runs, and **AutoUpdate** will automatically finish.



Figure 75: Aptus Software Auto-Update

8.6 Toolbar Menu

With the Toolbar menu, you can quickly and easily access the most commonly used functions of Aptus® through the toolbars and icons at the top of the screen.



1 Quick

	Setup: enters Setup mode.
	Restart: exits Setup mode and restarts the antenna.
	Reboot: reboots the antenna.
	Get Ant. Info: obtains the information stored in the antenna.
	Save Satellite: saves the current bow offset only if the antenna is tracking onto the satellite. Satellite acquisition time can be reduced significantly after the antenna is restarted.

2 Files

	Backup: backs up the antenna information to the ACU or PC. Select To PC to back up the antenna information to PC. The backup files (file format: *.rpt and *.ibf) will be generated on the PC.
---	--

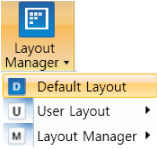
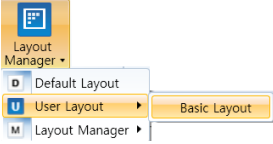
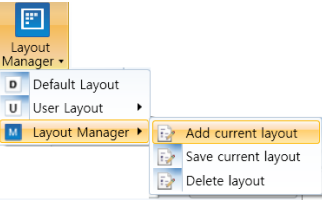
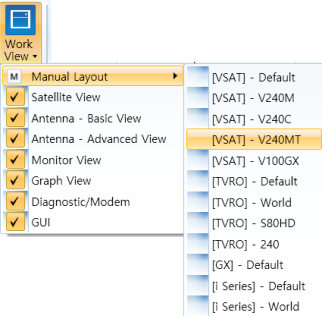


NOTE

Both *.rpt and *.ibf files contain antenna information. However, while *.ibf file can be used for restoring antenna information, *.rpt file is stored as plaintext for viewing purpose only. You can open the *.rpt using text editors such as notepad software.

	Restore: restores the antenna by using the stored information on ACU or PC. Select From PC to restore the antenna by using the stored information on PC (file format: *.ibf).
	Load Config.: loads the antenna configuration file (file format: *.cfg). The configuration file includes the antenna control parameters which are preloaded at the factory and should only be changed by an authorized service technician. Improper setting of these parameters will render your system inoperable. Consult Intellian for changing antenna parameters.

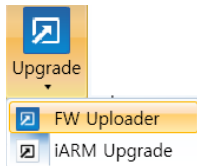
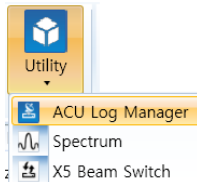
3 View

	Layout Manager: displays and sets the layout. • Default Layout: returns the current layout to the default layout.
	• User Layout: displays the layout list that you have previously stored by using the Layout Manager. If you select a layout in this list, the selected layout will be constructed on the Work View screen. The Basic layout is provided by default.
	• Layout Manager: provides you with add, delete, and save functionalities in order to manage the layouts. - Selecting Add current layout opens a pop-up window. Type in the desired name of the current layout and click Add, then the new name of the current layout will be saved to the list under User Layout menu. - When changes are made to the current layout, select Save current layout option. The current layout will be saved with changes. - To remove a layout, select the Delete layout option. Select the desired layout to remove on the pop-up window, then click Delete. Close the window by clicking on Close. The selected layout is removed from the User Layout list.
	Work View: displays a list of seven pre-constructed Work View Tabs (Satellite View, Antenna Basic View, Antenna Advanced View, Monitor View, Graph View, Diagnostic/Modem View and GUI View) and also provides the Activate / Close functionalities for each view tab. Activate the work view tab by ticking the checkbox next to it.

4 Connection

	Comm: at any time, a data communication channel can be reestablished between the Antenna and ACU via a Serial or Network connection. Selecting Comm Button will display the Communication Window to connect to the ACU via Serial or Network communication.
---	---

5 Util (Utility)

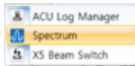
	• Firmware Uploader: launches firmware upload wizard to upgrade Antenna and ACU firmware from a PC. make sure that the USB Cable is connected between the USB port on the PC to the PC port on the ACU. Then follow instructions on the Wizard until the firmware upgrade is complete.  Figure 76: Firmware Uploader Wizard • iARM Upgrade: upgrades the firmware of iARM module.
	Firmware Updates: provides you with the latest firmware package and iARM firmware file of antenna via Aptus Server.
	• ACU Log Manager: displays the antenna log data in a calendar view which is downloadable directly to the desired path. • Spectrum: displays current spectrum graph and allows switching between spectrum data view options. • X5 Beam Switch: switches the iDirect X5 Beams and receives the beam list using the connected LAN Cable to the iDirect X5 modem directly.

Setting Up Spectrum Analyzer

1. Spectrum Analyzer Function

- Displays spectrum analyzer measurement of input Rx signal frequency within the full frequency range and sets spectrum data view.
- The disconnect fault can be checked and solved through spectrum analyzer results.

2. Access Spectrum Analyzer

On the Aptus PC, select **Utility** () → **Spectrum** () on the toolbar menu to display current spectrum graph and allow setting of spectrum data view options.

3. Spectrum Graph / Data View

After clicking the Spectrum menu button, the spectrum analyzer main menu will appear. To use the Spectrum Analyzer function, see the following Main Menu screen elements:

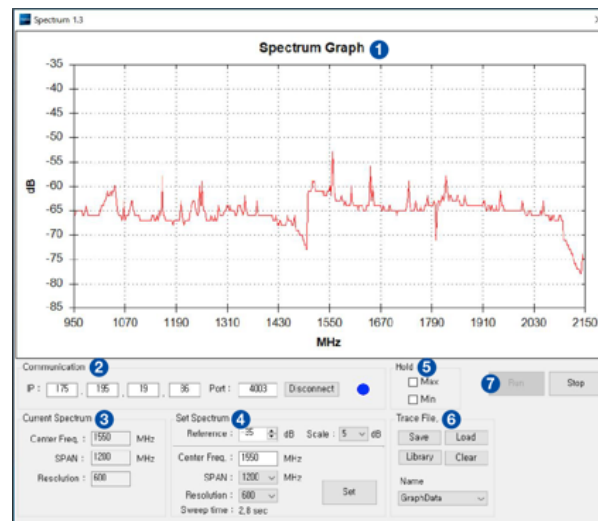


Figure 77: Spectrum Analyzer Main Menu

1) Graph

Displays measurement results. The spectrum analyzer display has frequency on the horizontal axis and amplitude on the vertical axis.

2) Communication

Access the Spectrum Analyzer by entering the ACU's IP address and Port number. Then click the **Connect** button. When Aptus is connected via Ethernet, the Spectrum Analyzer will connect automatically. The connection status is displayed on the right-side LEDs. The **Blue** LED indicates connection status and the gray is disconnection status.

3) Current Spectrum

Displays the current Spectrum settings.

4) Setting Spectrum

- **Reference/Scale:** sets the Amplitude Reference Level and Scale. Press the **Reference Level** submenu key and use the arrow keys or the keypad to change the reference level (2000 to -2000). Select the Scale number (1, 2, 5, or 10 dB) in the drop-down list to enter the desired scale.
- **Center Freq.:** changes the center frequency. Enter the desired center frequency by using the keypad then click the **Set** button to apply the adjusted value. The adjusted value is shown at the Current Spectrum part.
- **Span:** to quickly move the span value up or down, select the span number (6, 60, 300, or 1200 MHz) in the drop-down list. These numbers facilitate a zoom-in, zoom-out feature. Then click the **Set** button to apply the adjusted value. The adjusted value is shown at the Current Spectrum part.
- **Resolution:** to quickly adjust the resolution value up or down, select the resolution number (100, 200, 300, or 600) in the drop-down list. These numbers facilitate a zoom-in, zoom-out feature. Then click the **Set** button to apply the adjusted value. The adjusted value is shown at the Current Spectrum part.
- **Sweep Time:** displays the elapsed time in which all data is received during the start to stop testing interval.

5) Hold

- **Max:** set the desired maximum display range value by clicking the check button. Then click the Set button to change the max level.
- **Min:** set the desired minimum display range value by clicking the check button. Then click the Set button to change the min level.

6) Trace File

- **Save:** saves current Spectrum setting values and data.
- **Load:** loads the Trace file and displays the data on the spectrum graph.
- **Library:** creates a new Trace file. After saving the file, the filename is displayed in the Name list.
- **Clear:** removes the spectrum data displayed on the graph.
- **Name:** shows the Trace file which was created in the Library in the drop-down list.

7) Run/Stop

- **Run:** continuously requests spectrum data from the antenna and updates the graph data in real-time.
- **Stop:** stops requesting the spectrum data. (The graph cannot be updated.)

4. Change Zoom in Spectrum Graph

For example, **1550 MHz** is the default frequency in the spectrum graph. If you want to base the spectrum graph on **1824 MHz**, follow these steps:

- 1) Adjust **Center Freq.** to the desired value. (e.g. 1824 MHz)
- 2) Adjust **Span value** to the desired value. (e.g. 300 MHz)
- 3) Adjust **Resolution** to the desired value. (e.g. 300)
- 4) Click the **Set** button to apply the adjusted values. Verify that the spectrum graph is now displaying the desired values.

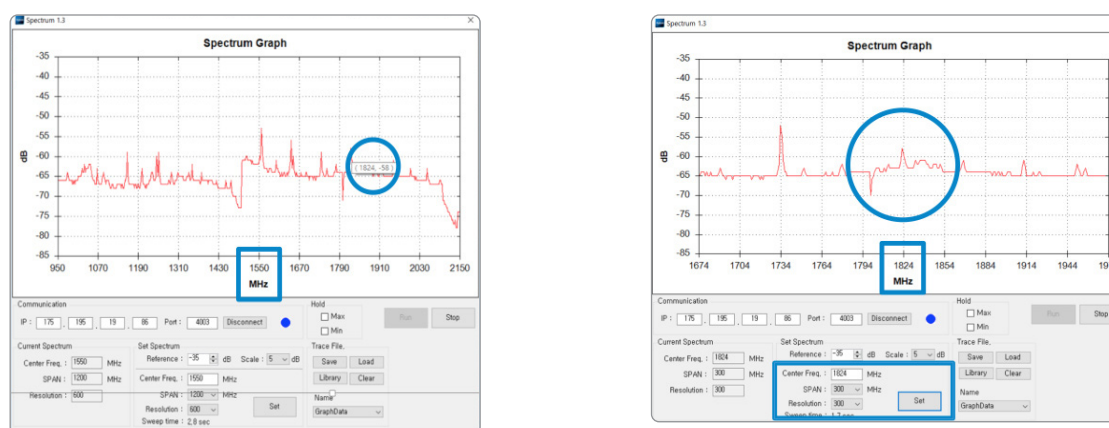


Figure 78: Spectrum Analyzer Graph Defaults and Zoom

⑥ Setting & Help

 Setting	• Auto-update: when Aptus PC has started, you can turn the auto-update on or off. If the auto-updated check button is clicked, Aptus PC will check to see if there is a new version available for download on the server. • Network Communication: sets up the timeout to display the message box which appears when there is no Ethernet connection to the antenna.
 Help	• Report: provides contact to Intellian technical support team to let the user report problems at any time. • Information: displays the information of current Aptus® software version.

8.7 System Property Status Dashboard

You can monitor the antenna status, the availability of Tx transmission, signal level, GPS and heading status, software information, product information, and error status quickly through the property status dashboard on the left side of the screen

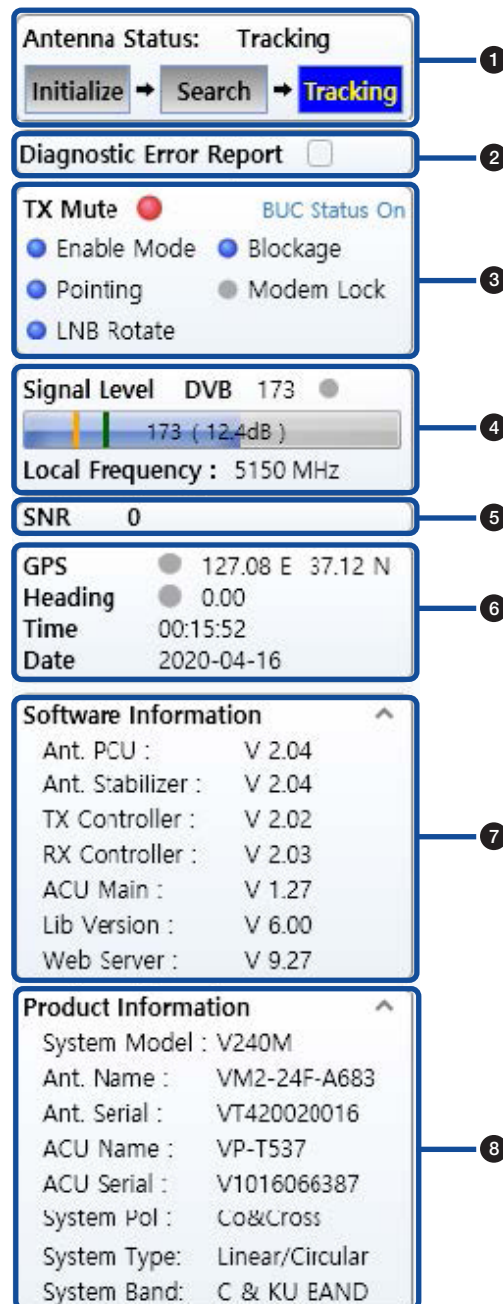


Figure 79: System Property Status Dashboard

1 Antenna Status

Displays the status of the current mode of the antenna.

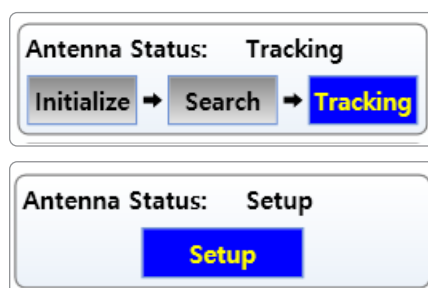


Figure 80: Antenna Status View

- **Search:** the antenna is searching for the target satellite signal. The search will automatically be initiated when the ship's heading input does not exist or if it fails. The search cycle will repeat until the antenna receives a lock signal from the modem or until the DVB transponder of the target satellite is decoded by the antenna. The search will also automatically be initiated when the AGC (NBD mode is in use) or SIG (DVB mode is in use) falls below the current tracking level threshold value. Once the desired signal is found and is above the predefined tracking threshold, the ACU will enter tracking mode.
- **Search 1:** the Search 1 pattern will automatically be initiated when the ship's heading input does not exist or if it fails. The search cycle will repeat until the antenna receives a lock signal from the modem or until the DVB transponder of the target satellite is decoded by the antenna.
- **Search 2:** the Search 2 is reserved for future use.
- **Search 3:** the Search 3 pattern will automatically be initiated when AGC (DVB mode is in use) or SIG/dB (NBD mode is in use) falls below the current tracking level threshold value. Once the desired signal is found and is above the predefined tracking threshold, the ACU will enter to tracking mode.
- **Tracking:** the antenna is tracking the target satellite.
- **Initialize:** the antenna or ACU is initializing.
- **Setup:** the antenna is in SETUP mode.

2 Diagnostic Error Report

The square button next to the Diagnostic Error Report turns red when the system receives an error. Click the button to see a Diagnostic Report.

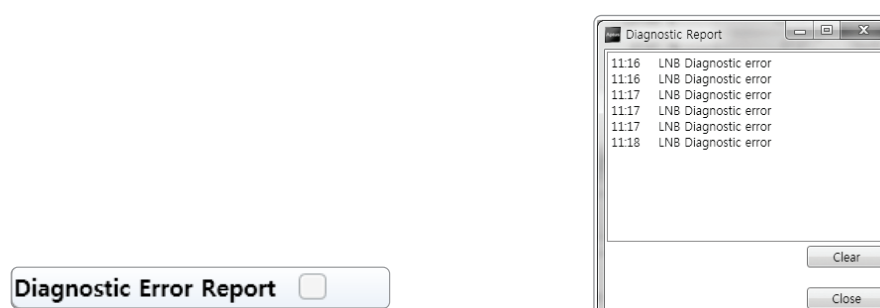


Figure 81: Diagnostic Error Report

3 Tx Enable

Displays the status of the Tx transmit function. If the circle next to Tx Enable is **Blue**, it means the antenna Tx function is enabled. If the circle shows **Red**, it means the antenna Tx function is disabled. The Tx function will be enabled only if all five factors (Enable Mode, Blockage, Pointing, Modem Lock, and LNB Rotate) listed below show a **Blue** circle next to each of them. However, if the "Use Tx Mute" function in the ACU System Work Tab is disabled, the Tx function will be enabled regardless of the above factors.

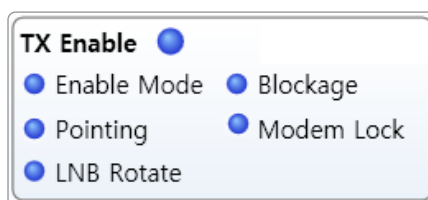


Figure 82: Tx Enable Status View

- **Enable Mode:** displays whether or not the antenna is in SETUP mode. If the antenna is in Setup mode, the circle next to Enable Mode will be **Gray**.
- **Blockage:** displays whether or not the antenna is pointing to a predefined block zone(s). If the antenna is pointing to the blockage zone, the circle next to Blockage will be **Gray**. If the antenna is pointed outside the blockage zone, the circle next to Blockage will be **Blue**.
- **Pointing:** displays whether or not the antenna is pointing to the target satellite. If the antenna is miss-pointing to the target satellite, the circle next to Pointing will be **Gray**. If the antenna is pointing to the target satellite, the circle next to Pointing will be **Blue**.
- **Modem Lock:** displays whether or not the antenna is tracking onto the correct satellite by receiving a confirmation signal from the satellite modem. If the antenna is tracking on the wrong satellite, the circle next to Modem Lock will be **Gray**. If the antenna is tracking on the correct satellite, the circle next to Modem Lock will be **Blue**.

**NOTE**

If Modem Lock shows **Gray**, check the cable connection between the antenna system and the satellite modem as well as settings on the modem.

- **LNB Rotate:** displays whether or not the LNB is rotating. If the LNB is rotating, the circle next to LNB Rotate will be **Gray**. If the LNB is not rotating, the circle next to LNB Rotate will be **Blue**.

4 Signal Level

Shows “DVB” when DVB signal tracking mode is in use and “NBD” when NBD signal tracking mode is in use. The **Red** line indicates the signal “Detect Level Threshold” and the **Orange** line indicates the signal “Tracking Level Threshold”. If the signal level is higher than the tracking level threshold, the signal level bar will display **Blue** color. If the signal level is lower than the tracking level threshold, the signal level bar will display **Orange** color and the antenna will stay in searching mode.

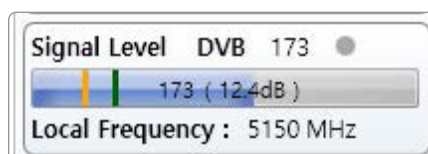


Figure 83: Signal Level View

**NOTE**

If the signal level is not higher than the tracking threshold, decrease the detection and tracking level.

5 SNR

Displays the signal-to-noise ratio (SNR) value of the Rx signal:

6 GPS and Heading

Displays the current GPS location from the Antenna and Ship's heading information. The status light flashes green if the system receives a correct input of the GPS and Ship's heading. Displays UTC time and date.

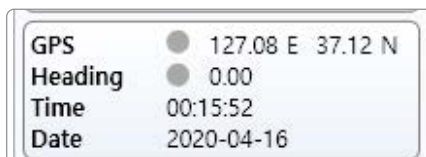


Figure 84: GPS and Heading Information View

7 Software Information

Displays the antenna, ACU, and library version. Note that the display may be different in accordance with the model.



Figure 85: Software Information View

8 Product Information

Displays the antenna and ACU serial numbers, the model, antenna, and ACU name.

The System Pol displayed depends on the band type as shown below.

- Ku-band: Co/Cross
- C-band: Cross

The System Type displayed depends on the band type as shown below.

- Ku-band: Linear
- C-band: Linear/Circular

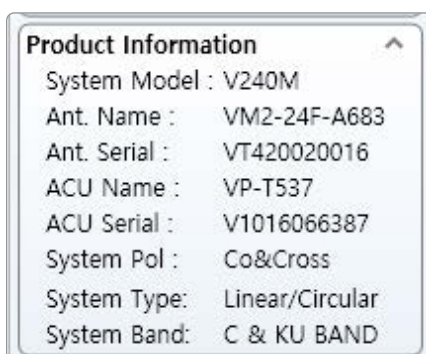


Figure 86: Product Information View

8.8 Work View Tabs

Aptus® provides seven Work View Tabs (Antenna Basic View, Antenna Advanced View, Satellite View, Graph View, Monitor View, Diagnostic/Modem View, and GUI View) to manage the Antenna and the Satellite configuration. Check the box next to the Set button to modify the settings. After the desired value is entered, press the Set button to save the settings

Enter Setup mode to modify the following settings:

- Antenna Angle
- Tilt Sensor Bias
- Rate Sensor Bias

The following settings can be modified both in Setup mode and Operation mode:

- Heading and Heading device
- Current satellite information
- Bow Information
- Conical Range
- EL Adjust
- Search Parameters
- Threshold Setting
- Tx Enable threshold
- Blockage

8.8.1 Antenna – Basic Info.

This view tab provides information on the GPS location, Heading Device, Bow Information, Skew Information, and the Antenna's Angle. This view tab uses the Antenna's AZ and EL information as well as the Ship's Heading information to provide a dynamic graphic user interface (UI).

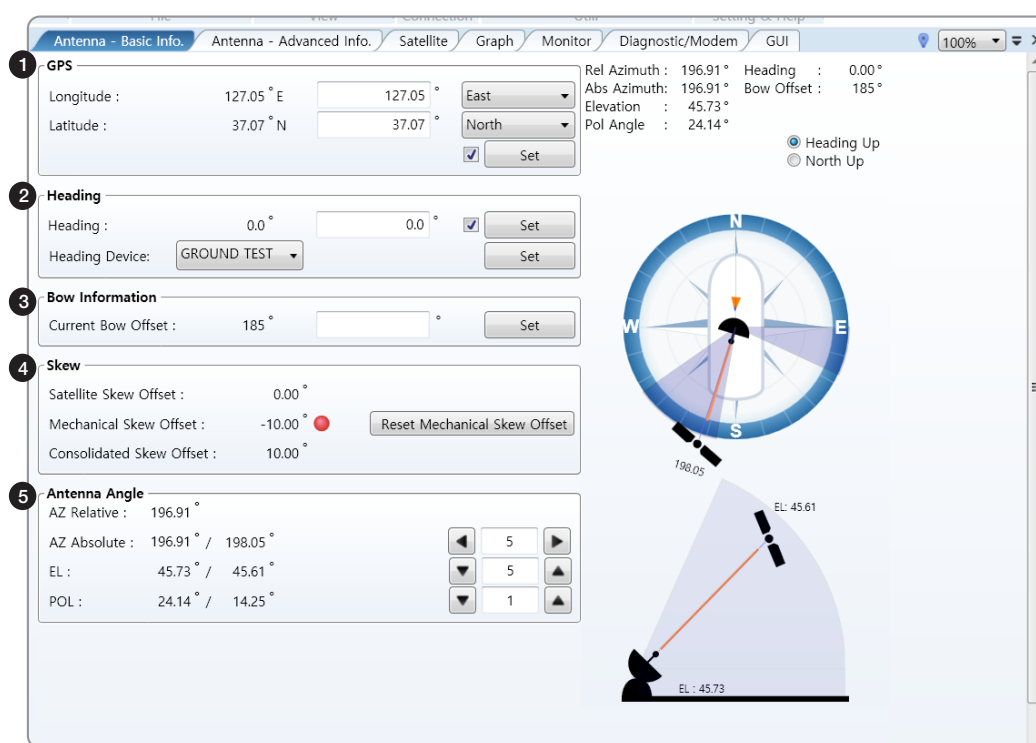


Figure 87: Antenna Basic Info Tab

No.	Item	Description
①	GPS	Displays and sets the antenna's current GPS.
②	Heading	Displays and sets the ship's current heading information. Heading Device: None / NMEA / NMEA 2000/Ground Test. NOTE: Some options may not be available depending on the model. The baud rate (4800/ 9600/ 19200/ 38400) must be set if NMEA is selected.
③	Bow Information	Displays and sets the antenna's current bow.
④	Skew	Displays the antenna's current skew and skew offset. - Pol Sensor Calibration: calibrates the sensor (potentiometer). - Reset Mechanical Skew Offset: the mechanical skew offset is preset in the factory with a default value (0, 1, or 2) depending on the assembly status. Resetting of the mechanical skew offset may be required when the satellite skew offset is unknown (Consolidated Skew Offset = satellite skew offset + mechanical skew offset). Due to each satellite having its own skew offset, Intellian recommends you check with your service provider or satellite operator to get the satellite skew offset value and input it in Satellite Work Tab rather than resetting the mechanical skew offset directly.
⑤	Antenna Angle	Displays and sets the antenna's current absolute and relative AZ (azimuth) position, EL (elevation) 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.

8.8.2 Antenna – Advanced Info.

This view provides information on the Tilt Sensor Bias, Rate Sensor, Conical Range, EL Adjust, Search Parameter, Threshold Setting and Blockage.

The screenshot shows the 'Antenna - Advanced Info.' tab in the Aptus Web for ACU interface. It contains several configuration sections:

- 1 Tilt Sensor Bias:** Includes a 'Ready' button, an 'EL' dropdown, and '+'/'-' buttons. Below, 'EL : 0.0 °' and 'CL : 2.0 °' are displayed.
- 2 Rate Sensor Bias:** Shows 'AZ : -30', 'EL : -73', and 'CL : 22'.
- 3 Conical Range:** Shows 'AZ : 50', 'EL : 45', and radio buttons for 'C', 'KU', and 'KA'.
- 4 EL Adjust:** Shows 'EL Adjust : 0.1 °' and a 'Set' button.
- 5 Blockage:** A table with columns 'No', 'AZ Start', 'AZ End', and 'EL'. It lists five entries, all with checkboxes in the first column.
- 6 Search Parameter:** Includes 'Search1', 'Search2', and 'Search3' fields, 'Wait Time : 5 (s)', and 'Search Step : 0.50 °'.
- 7 Threshold Setting:** A table for 'DVB Detect Level', 'DVB Tracking Level', and 'NBD Detect Level', with columns for 'KU', 'C', and 'KA'.

On the right, there is a compass rose and a diagram of the antenna pointing towards a satellite. The diagram shows the antenna's elevation (EL) and azimuth (AZ) relative to the horizon and the satellite's position.

Figure 88: Antenna Advanced Info Tab

No.	Item	Description
①	Tilt Sensor Bias	This maintains the elevation and the cross-level axes in order to keep the pedestal parallel to the horizon. Adjust the two solid-state tilt sensors to provide absolute cross-level tilt of the antenna and elevation feedback to eliminate long-term pointing drift (error). Tilt bias must be adjusted when the antenna control board or sensor box is replaced. If the bubble on the button level located on the sensor box is not centered, perform the following steps to adjust the tilt sensor bias. - Step 1. Enter Setup mode and press the Ready button to bring the elevation and cross-level to 0°. - Step 2. Select EL from the drop-down list and press the Up and Down arrow keys to adjust the bubble until it is located in the center of the button level. - Step 3. Select CL from the drop-down list and press the Up and Down arrow keys to adjust the bubble until it is located in the center ring of the button level. - Step 4. Press the Restart button to reboot the antenna.

No.	Item	Description									
②	Rate Sensor	This is used to calibrate the DC voltage output from the three rate sensors (azimuth, elevation, and cross-level). 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. Before calibrating the rate sensors located on the Sensor box, make sure that the antenna is placed on a rigid and flat platform. During the calibration process, any motion of the antenna should be avoided as it can affect the antenna's performance. Proceed with the following steps to perform the calibration. • Step 1. Enter Setup mode. • Step 2. Press the Idle Mode button to release the elevation and cross-level motor brakes while the antenna is in Setup mode. • Step 3. Check whether or not the bubble is located at the center of the button level. If not, move it to the center (Refer to the previous instruction of Tilt Sensor Bias adjustment). • Step 4. Press the Bias Check button to calibrate the rate sensor. A Blue circle will be displayed next to the Bias Check button if the calibration is completed. A red circle will be displayed if calibration failed. A green circle will be displayed during the calibration process.									
③	Conical Range	The relative force of the motors controlling azimuth (AZ) and elevation (EL). Sets the conical range while the antenna is in tracking mode. • Standard Setting Values for Conical Range <table border="1"> <thead> <tr> <th>Freq. Band</th><th>AZ</th><th>EL</th></tr> </thead> <tbody> <tr> <td>C-band</td><td>70</td><td>70</td></tr> <tr> <td>Ku-band</td><td>35</td><td>30</td></tr> </tbody> </table>	Freq. Band	AZ	EL	C-band	70	70	Ku-band	35	30
Freq. Band	AZ	EL									
C-band	70	70									
Ku-band	35	30									
④	EL Adjust	The elevation adjustment is to offset the angle difference between the mechanical elevation angle and the actual elevation angle. If this value is not properly adjusted, the antenna may take a longer time for satellite search or tracking.									
⑤	Blockage	Displays current blockage zones by azimuth and elevation sectors. Up to 5 blockage zones can be programmed. A Blue shading area in the Antenna UI view at the right will be displayed once the blockage zone is created.									
⑥	Search Parameter	• Wait time: 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. • Type 1 & Type 3 (Search 1 & 3) Range: this parameter may not be available dependent on model (ex. i-series). Sets Search 1 & 3 search range. Search 3 is conducted in a two-axis pattern consisting of alternate movements in azimuth and elevation as it forms an expanding square. • Type 2 (Search 2) Range: is reserved for future use.									
⑦	Threshold Setting	Sets the options below to each band in use. • DVB Detect Level: displays and sets signal detection threshold level when DVB tracking mode is in use. • DVB Tracking Level: displays and sets signal tracking threshold level when DVB tracking mode is in use. • NBD Detect Level: displays and sets signal detection threshold level when NBD tracking mode is in use. • NBD Tracking Level: displays and sets signal tracking threshold level when NBD tracking mode is in use. • Tx Enable Threshold: displays and sets Tx enable threshold.									

8.8.3 Satellite

This view provides information on the Satellite's Information, Common Tracking, Information, DVB and NBD Tracking Transponder, LNB Local Frequency, and the Satellite Library. Some settings can be varied by the model depending on specific functions of the antennas. This view shows a graphic UI of the current satellite at which the antenna is pointing and the satellites that are located at a 180° arc on the horizon with reference to the current position.



NOTE

Based on the satellite EIRP footprint and the size of the antenna, you may not be able to track all the satellites visible in 180° arc.

No	Name	Band	Longitude	AZ	EL
1	CHINA6_H	C	115.30 E	198.88	45.37
2	CHINA6_V	C	115.30 E	198.88	45.37
3	ASIA7_V	C	105.30 E	213.38	41.43
4	ASIA7_H	C	105.30 E	213.38	41.43
5	ASIA4_H	C	122.10 E	188.33	46.77
6	CHINA6A_H	C	125.00 E	183.54	47.04
7	EXAM3_R	C	103.00 E	216.66	40.16
8	ASIA5_H	C	100.30 E	219.80	38.79
9	EXAM5_R	C	140.00 E	159.22	45.00
10	YAMAL_L	C	90.00 E	231.52	32.20
11	EXAM33_R	C	96.30 E	224.54	36.42
12	INT20_H	C	68.30 E	249.85	16.22
13	INT19_H	C	166.00 E	126.75	31.01
14	INT19_V	C	166.00 E	126.75	31.01
15	INT17_H	C	66.00 E	251.65	14.26
16	NSS9_L	C	177.00 W	112.19	18.38
17	KR6_KU_H	KU	116.00 E	198.11	45.51
18	KR5_KU_V	KU	113.00 E	202.70	44.58

Figure 89: Satellite Tab

No.	Item	Description
①	Tracking Information of Current Satellite	Displays the current satellite's name, longitude position, and satellite skew of the satellite in the library. Eutel Sat: 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.
②	Tracking Common Information	Displays the current LNB local oscillator frequency that is in use and the corresponding voltage supplied. Selects the tracking mode (DVB / NBD) to be used and sets polarization (Horizontal / Vertical) for the Rx pol and the Tx pol.
③	DVB/NBD	Sets tracking transponder information for either DVB tracking mode (Verification Type, Frequency, Symbol rate, and NID) or NBD tracking mode (Frequency and bandwidth). NOTE: DVB and NBD parameter settings should only be changed by an authorized service technician. Improper setting of these parameters will render your system inoperable. Consult Intellian for changing antenna parameters.

No.	Item	Description
④	LNB Local Frequency	Displays or sets LNB local frequency and its corresponding LNB voltage supplied. You may select pre-programmed LNB LO settings from the drop-down list. This procedure is same for both the Intellian Global VSAT PLL LNB and any other LNB.
⑤	Bottom Buttons	• Tracking Information of Library: selecting this option enables "Add Satellite", "Edit Satellite" and "Delete Satellite" buttons as shown at the bottom of window. • Add Satellite: adds the satellite information as defined in the current settings. • Edit Satellite: edits the satellite information of the selected satellite. • Delete Satellite: deletes the selected satellite from the library. • Get Data From ACU: pulls the satellite information from the ACU. • Load Satellite: uploads the satellite information to the ACU. • Get library from PC: opens the satellite library file (File format: *.ilf) from the supplied CD or the external hard drive/PC. • Upload To ACU: uploads the satellite library to ACU. • Save To PC: saves the current library settings to PC. NOTE: The Save to PC button must be clicked after the Edit Satellite, Add Satellite, or Delete Satellite button is clicked.

8.8.4 Graph

This view provides information on Signal, Elevation (EL), Absolute AZ (Azimuth), Relative AZ, Heading, AZ and EL in Single or Multi graph formats.

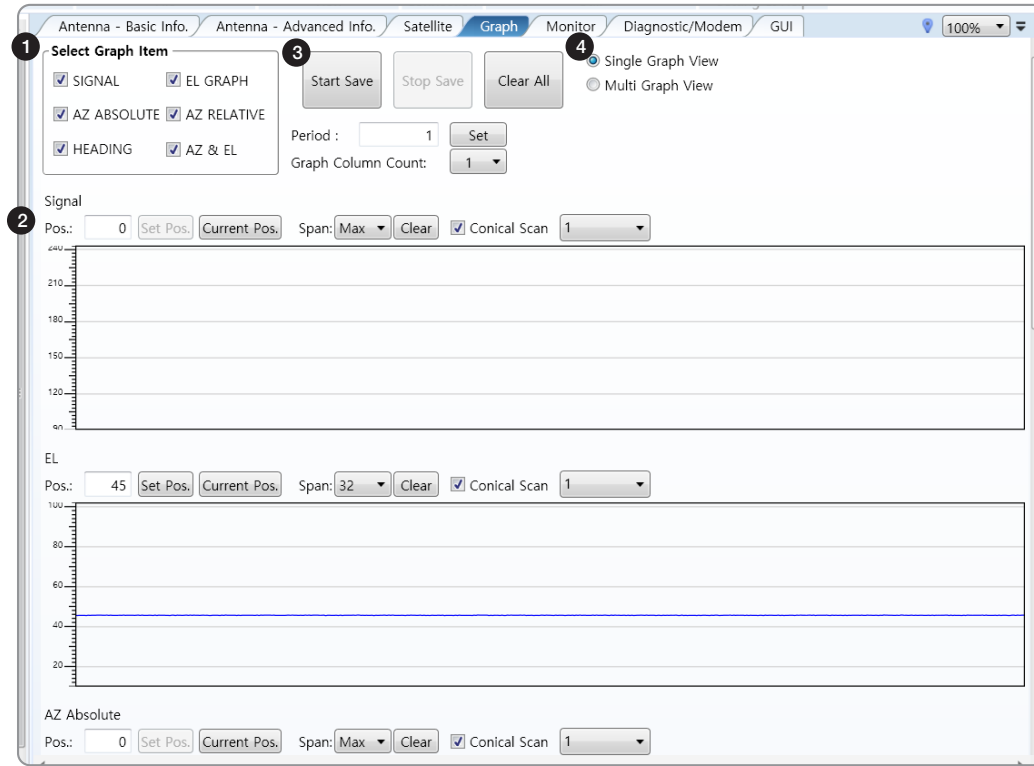


Figure 90: Graph Tab

No.	Item	Description
①	Select Graph Item	Shows the graphs of only the checked item(s) in a Single or Multi Graph View.
②	Setting Buttons	- Set Pos.: sets the current position as multigraph value of each Graph Item. - Current Pos.: moves the location according to values of each Graph Item. - Span: sets the Display Range(s) of the corresponding Graph Item.
③	Setting Buttons	- Start/Stop Save: the chosen item is saved in the data log. The data log which stores the information displayed in the graphs can be later used for a service technician to find out a cause of any possible problem with the antenna. - Clear All: clears everything drawn on the Graph View window. - Period: displays and sets the signal sampling rate. - Graph Column Count: makes all Graph Views show in either a one or two-column format.
④	Single/Multi Graph View	- Single Graph View: supports multiple Graph Items in one large Graph View. Shows Graph Views per each single Graph Item selected in "Select Graph Item". - Multi Graph View: supports the Graph Item(s) chosen in each Graph View. Shows one large integrated Graph View of multiple Graph Items selected in "Select Graph Item".

8.8.5 Monitor

This view provides a UI which can monitor all data that has been received from the ACU.

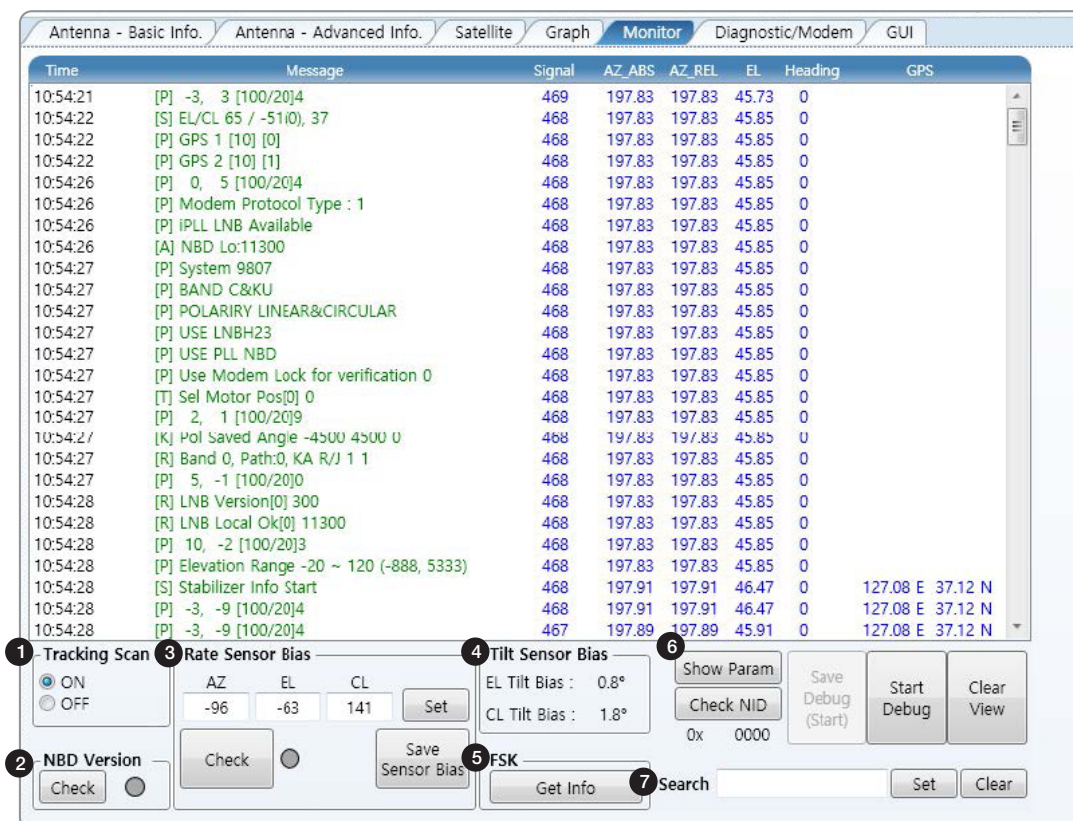


Figure 91: Monitor Tab

No.	Item	Description
①	Tracking	Turns on or off the dish scan function. If the dish scan function is disabled, the antenna will stop adjusting the antenna pointing angle to optimize the receive signal level.
②	NBD Version	Displays NBD current version by clicking the Check button.
③	Rate Sensor Bias	This is used to calibrate the DC voltage output from the three rate sensors (azimuth, elevation, and cross-level). These are used to sense antenna motion that corresponds to the ship's motion (roll, pitch, and yaw) for stabilizing the pedestal. You can find the same function in Antenna-Advanced View Tab.
④	Tilt Sensor Bias	Displays the EL and CL Tilt Bias between the antenna and the sensor.
⑤	FSK	Check the current FSK version and the signal level and verify the signal level through the result value (Good, Bad, Worst, N/A).
⑥	Setting Buttons	- Show Param: shows the current antenna parameters. - Check NID: verifies the NID (network ID) of the current tracking transponder. Press the NID button to obtain the NID only if the antenna is locked onto the desired satellite. - Save Debug (Start): saves the debug messages and the log messages of the antenna simultaneously into a *.txt file once pressed. - Save Debug (Stop): stops saving the debug messages and the log messages of the antenna once pressed. - Start Debug: starts the debug log of the antenna. The debug message will be displayed once the debug button is pressed. - Stop Debug: stops debug logging of the antenna. - Clear View: clears the debug message or log data in monitoring window.
⑦	Search	Searches for a specific word in the monitor information list.

8.8.6 Diagnostic/Modem

This view provides Antenna Diagnostic Testing and also provides functions to set up the interface between the ACU and the Intelligent Mediator or the satellite modem.

The screenshot displays the 'Diagnostic/Modem' tab in the Aptus Web interface. The interface is divided into several sections:

- 1 Diagnostic:** Contains buttons for 'Start', 'Save Result', 'Select All', and 'ALL Clear'. Below these are two columns of diagnostic tests: Serial Comm., Motor AZ, Motor EL, Motor CL, Encoder AZ, Rate Sensor, Tilt Sensor, Home Sensor, ACU Power, Antenna Power, SKEW, LNB/NBD, and Sensor Box Limit. Each test has a status indicator (Start, End, or a progress bar).
- 2 Modem:** Includes dropdowns for 'Use Mediator' (NO), 'Select Modem' (IDIRECT-AMIP), 'Modem Port' (Ethernet), 'Modem Protocol' (Open AMIP), and 'GPS Out Protocol' (GPGLL). It also has radio buttons for 'Use TX Mute' (Yes/No), 'Use Modem Lock' (Yes/No), and 'TX Mute' (Low/High). A 'Set Modem' button is present.
- 3 Network:** Features an 'Ethernet Setting' section with input fields for IP (10.225.100.194), Subnet Mask (255.255.255.240), Gate Way (10.225.100.193), DNS (168.126.63.1), TCP Port (4001), and UDP Port (49184). 'Get' and 'Set' buttons are at the bottom.
- 4 BUC (KU-Band):** Shows 'KU-BUC' and 'C-BUC' both set to 'Terrasat'. A 'BUC Status' section displays various parameters: BUC Type (100W), BUC S/W (5.29), Tx Status (ON), PLL Lock (Normal), Temperature (41 °C), Attenuator (0.50 dB), TX Power Level (1.9 W (32.73 dBm)), and Input Power (0.00 dBm). A 'Get Information' button is at the bottom.
- 5 Tx Status:** A radio button for 'Tx Status' is set to 'ON', with a 'SET' button.
- 6 Attenuator:** A dropdown menu is set to '0.5' dB, with a 'SET' button.
- 7 Alarm Status:** A 'Show Alarm Status' button.
- 8 Power Mode:** A dropdown menu is set to 'CSM Mode', with a 'Set' button.

Figure 92: Diagnostic/Modem Tab

No.	Item	Description
①	Diagnostic	Selects to run a full diagnostic test or a single diagnostic test. Green indicator is displayed for the test under progress. Blue indicates the test result as Pass while Red indicates the result as Fail. Yellow indicates the test has been skipped. - Serial Comm: tests the data communication between the antenna and the ACU. - Motor AZ: tests the azimuth motor. - Motor EL: tests the elevation motor. - Motor CL: tests the cross-level motor. - Encoder AZ: tests the azimuth encoder. - Rate sensor: tests the rate sensor. - Tilt Sensor: tests the tilt sensor. - Home sensor: tests the home sensor. - ACU power: tests the ACU power to see whether or not it is within the nominal operating range. - Antenna power: tests the antenna power to see whether or not it is within the nominal operating range. - Skew: tests the LNB skew motor. - LNB/ NBD: tests the LNB and NBD (Narrow Band Detection). - Sensor Box Limit: tests the sensor box motor.

No.	Item	Description
②	Modem	Sets the interface between the ACU and the Intelligent Mediator or the satellite modem. NOTE: Before using this function, confirm the connection of the RJ45 Cable from the Ethernet connector on the ACU to the modem or connect a 9 pin Serial Cable from the RS-232/422 connector on the ACU to the modem. • Use Mediator: enables the use of the Intelligent Mediator. Use Mediator must be set to NO if there is no MEDIATOR connected to the ACU. Improper setting of this parameter will cause your ACU's modem interface to not work correctly. • Select Modem: selects your modem type for loading pre-configuration settings. If the ABS (auto beam switching) function is in use, select either IDIRECT-AMIP or COMTECH-ROSS depending on which type of modem is used. • Modem Port: selects the proper data communications port (RS-232/ 422/ Ethernet) to interface with the modem. • Modem Protocol: selects a proper communications protocol on the ACU to interface with the modem (I/O Console/ Open AMIP/ Serial GPS/ ROSS/ VCAP/ ELEKDualKOM AMIP/ GILAT-SE-II). • GPS Out Protocol: selects GPS Out Sentence type (GPGLL/ GPGLL/ Simple GPGLL). • Use Tx Mute: selects whether or not to use the "Tx Mute" function from the satellite modem. A transmit inhibit output from the ACU will disable/ mute the modem transmit via a voltage change whenever the antenna is blocked, searching, or pointed 0.5 degrees off from the peak satellite position. • Use Modem Lock: selects whether or not to use external lock signal from the modem. "Use Modem Lock" will only be activated when the modem protocol is set to I/O Console. • Tx Mute: 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. Tx Mute will only be activated when modem protocol is set to I/O console. • Modem Lock: is the modem lock output from the modem. It 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. "Modem Lock" will only be activated when modem protocol is set to I/O Console. • Quick Search: when Quick Search is turned ON, the antenna will go into tracking mode quickly. (When the satellite signal is enough to surpass threshold level, the antenna will go into tracking mode immediately). If Quick Search is turned OFF, the antenna compares the full signal pattern during search 3, and then goes into tracking mode. The antenna will move back slightly when it goes into tracking mode. • Modem Verify: when Modem Verify is turned ON the antenna will go into tracking mode if Modem Lock is also On. This increases modem dependency. If Modem Verify is turned OFF the antenna can go into tracking mode regardless of Modem Lock.

No.	Item	Description
③	Network	Displays the ACU's Internal IP addresses and ports. To modify the ACU's Internal IP addresses and ports, press the Set button. When changes are complete, press the Save & Reboot button and wait several seconds. Then press the Get button to validate the changes. • IP: factory default (Primary:192.168.0.223)/(Secondary:10.10.1.1). • Subnet Mask: factory default (255.255.255.0). • Gate way: factory default (192.168.1.1). • DNS: current default DNS Address is assigned. • TCP Port: TCP port number for modem protocols using TCP as transport. • UDP Port: UDP port number for modem protocols using UDP as transport.
④	BUC	Sets the BUC options. - BUC Status: displays BUC information (BUC Type, BUC S/W, Tx Status, Temperature, Checksum, Attenuator and Tx Power Level).
⑤	Tx Status	Selects Tx Status (ON or OFF).
⑥	Attenuator	Sets attenuation value.
⑦	Alarm Status	By clicking the Show Alarm Status button, displays the current alarm status.
⑧	Power Mode	Sets power mode (CSM or Burst).

8.8.7 GUI

This view shows a graphical representation of the current antenna position, which allows easy identification of whether or not the antenna is aligned properly to the target satellite or is in a block zone. Also, this view shows the current satellite that the antenna is pointed towards, and the satellites that are located in the 180° arc on the horizon, according to the current position.



NOTE

Based on the satellite EIRP footprint and the size of the antenna, you may not be able to track all the satellites visible in the 180° arc.

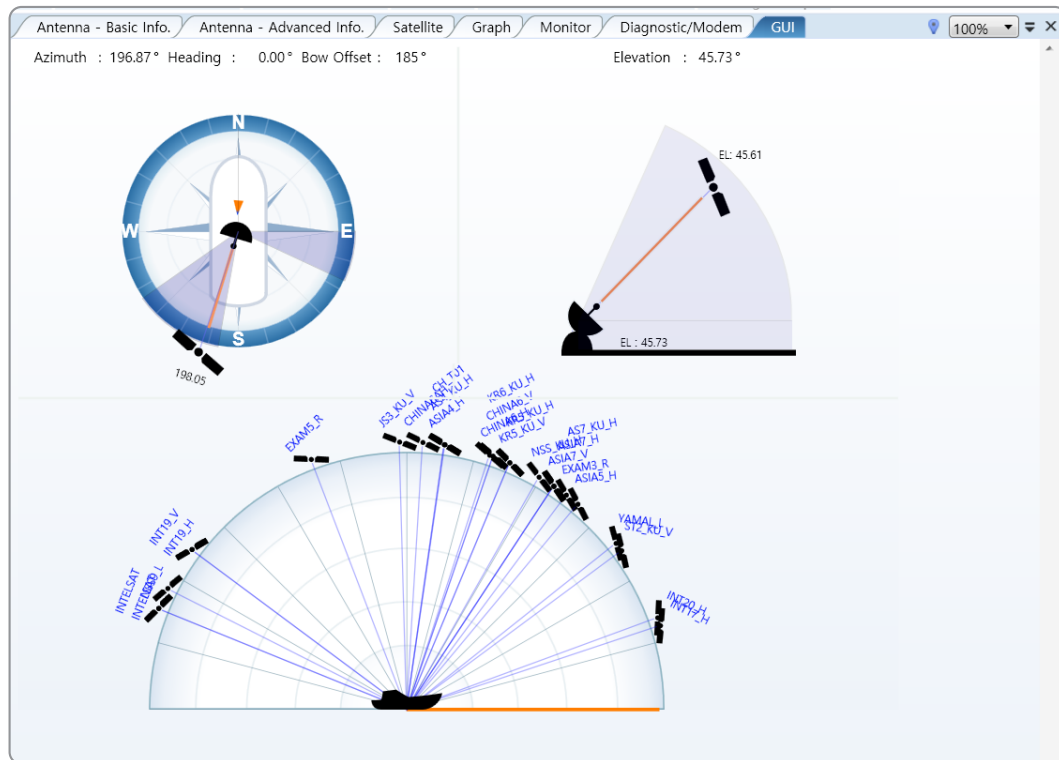


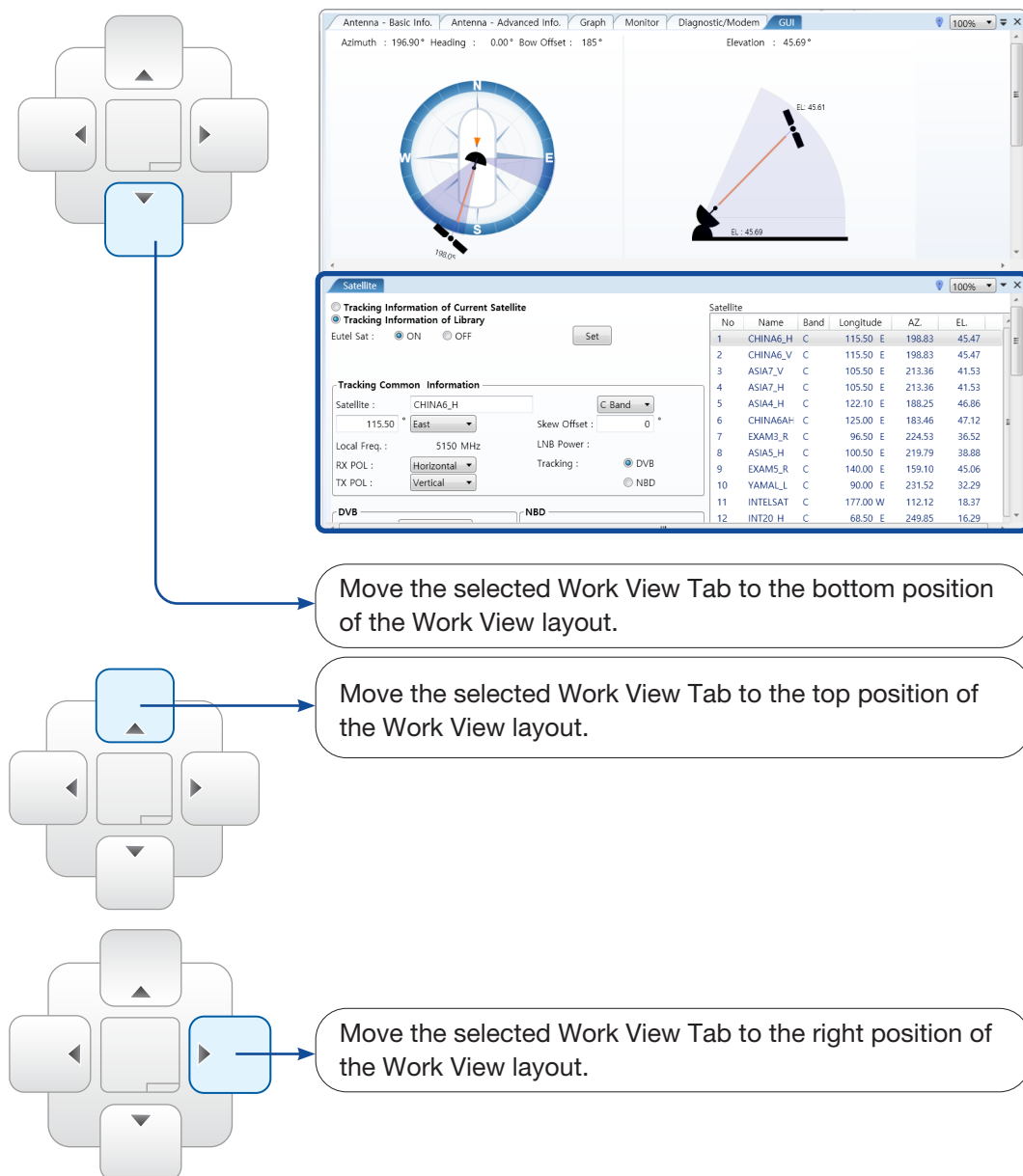
Figure 93: GUI View Tab

8.9 Work View Functions

The seven Work View Tabs displayed in the Work View can be arranged in customized layouts.

8.9.1 Layout Formatting

Each of the Work View Tabs can be separated from the rest of the Tabs. Click and hold the left mouse button on the Work View Tab's header and then drag the desired Tab out. When a Work View Tab is separated from the rest of your Work View Tabs, again click and hold the left mouse button on the Work View Tab's header to display a cross-shaped Navigator icon. While holding the mouse button, bring the selected Work View Tab closer to the Navigator icon and release the mouse button at your desired position (top, left, right or bottom arrow). This time, the selected Tab will be moved to the desired position.



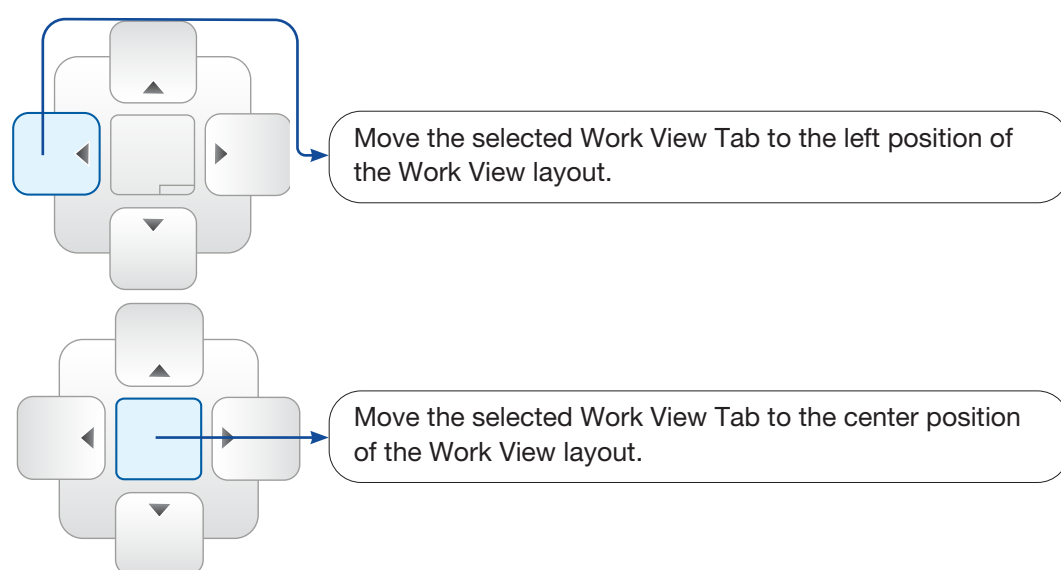


Figure 94: Work View Tabs Layout Formatting

You can also drag multiple Work View Tabs into a customized layout in the same manner. Click and hold the left mouse button on each Work View Tab's header and drag it onto the desired arrow on the Navigator icon. Then each Work View Tab can be placed in the desired positions as shown in the figure below.

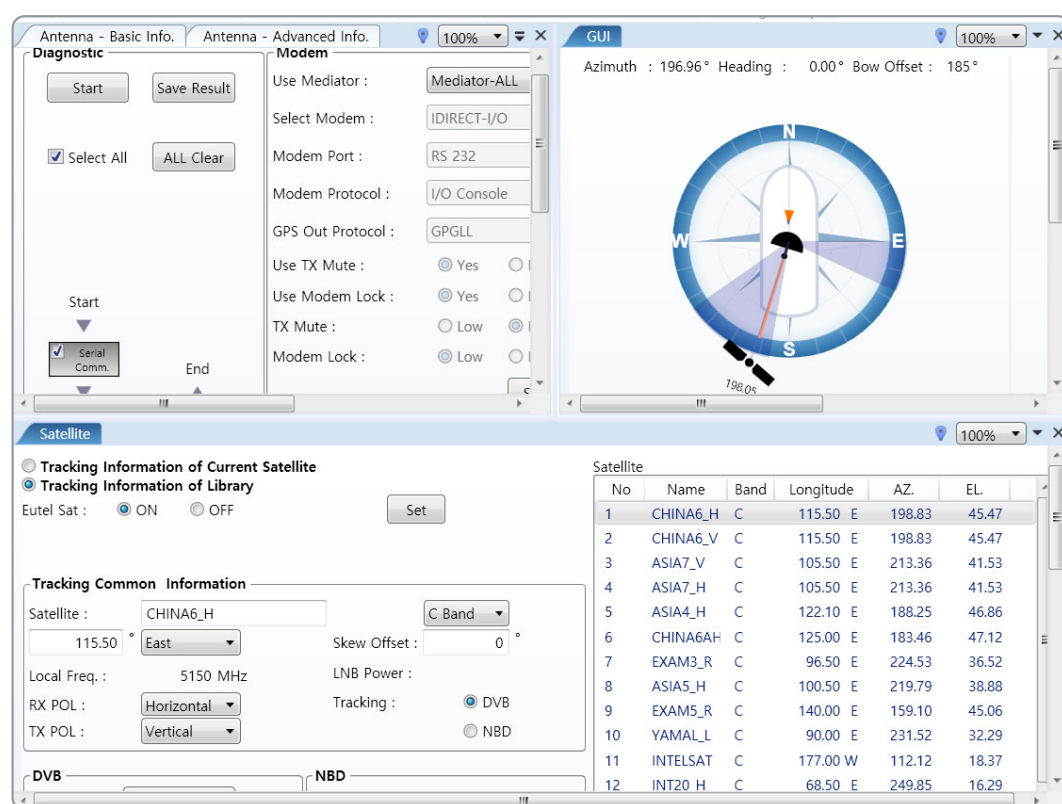


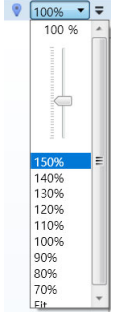
Figure 95: Work View Tabs in Customized Layout

The Navigator will appear in each area your mouse pointer is located. To return to the default layout, select the Default Layout under View → Layout Manager in the tool bar menu.

- **Horizontal or Vertical Tab Group:** The Work View Tabs can be also aligned horizontally or vertically. Without dragging them out, rightclick on the desired Tab header and select the New Horizontal Tab Group or New Vertical Tab Group option. Selecting New Horizontal Tab Group will separate a selected Tab from the rest of other Tabs then arrange it in a horizontal format. Likewise, selecting New Vertical Tab Group

will separate a selected Tab from the rest of other Tabs then arrange it in a vertical format.

- **Closing the Work View Tab:** To close the Work View Tab, right-click on the desired Tab header and select the Close option in the drop-down list. To close all Work View Tabs except for the selected Tab, select the Close All But This option in the drop-down list.
- **Zoom Tool:** Using the Zoom tool, you can easily select the magnification you want by using the Zoom In and Zoom Out bar, and the Fit in Work View button.

	Fit Work View Button: fits the current view to the Work View window size. The button toggles between the fit view and the previous view.
	Zoom In and Zoom Out Bar: zooms in and out to expand and reduce the View to the desired size. (The zoom changes in 10% increments.)
	View Switch Button: displays a list of the current views. Choosing one of these views will display the selected view in the Work View window.
	View Name Button: displays the current Work View name.
	Close View Button: closes the current view.

Chapter 9. Aptus Web for ACU

9.1 Introduction

With the embedded Aptus Web software, the v240M 2 can be monitored, controlled, and diagnosed remotely from anywhere, anytime through the TCP/IP protocol. This cannot only save time but also save the cost generated from the hundreds of routine maintenance activities such as operating firmware upgrades, tracking parameters resets, and system diagnostics.

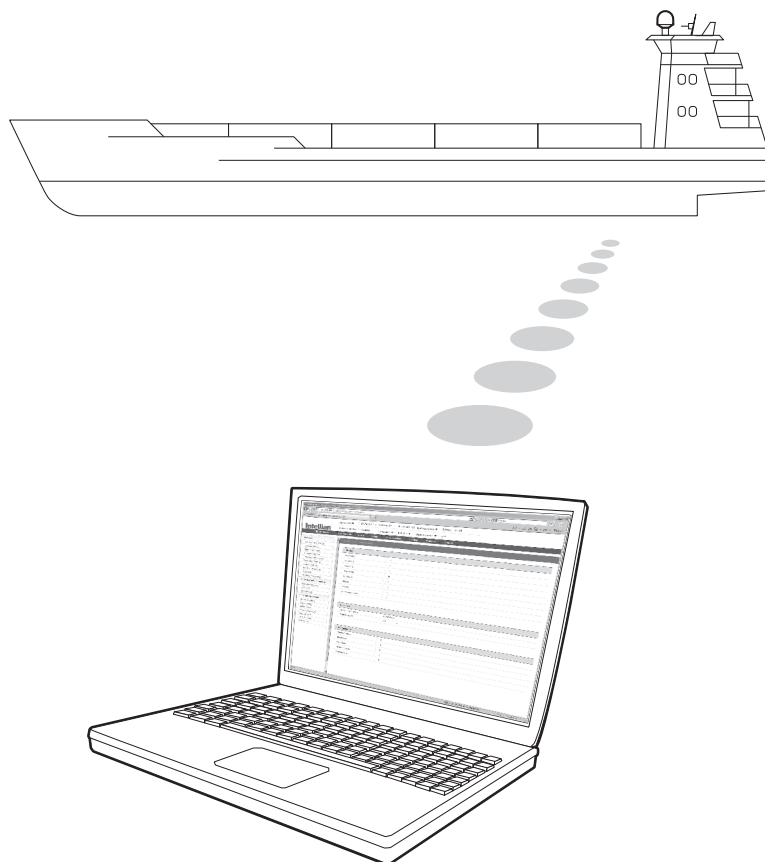
9.1.1 How to access Aptus Web for ACU

1. Connect an Ethernet Cable from the Management LAN port on the front of the ACU to the LAN port of the PC.
2. Enter the ACU's IP address (**192.168.2.1**) into your web browser's address bar to login to the ACU's internal HTML page if this system has not been changed from the ACU's factory default. You'll be able to access this page in approximately 30 seconds after the Mediator's power- on.



NOTE

Aptus Web can be displayed on Internet Explorer 8 or later and is also compatible with Firefox and Chrome web browsers.



9.2 Main Page

9.2.1 Page Login

1. Choose either to Control & Monitor the ACU (Control & Monitoring) or Only Monitor the ACU (Monitoring Only).
2. Log into the ACU by typing in User Name and Password information. If this system has not been changed from the factory default:
 - **User Name: intellian**
 - **Password: 12345678**

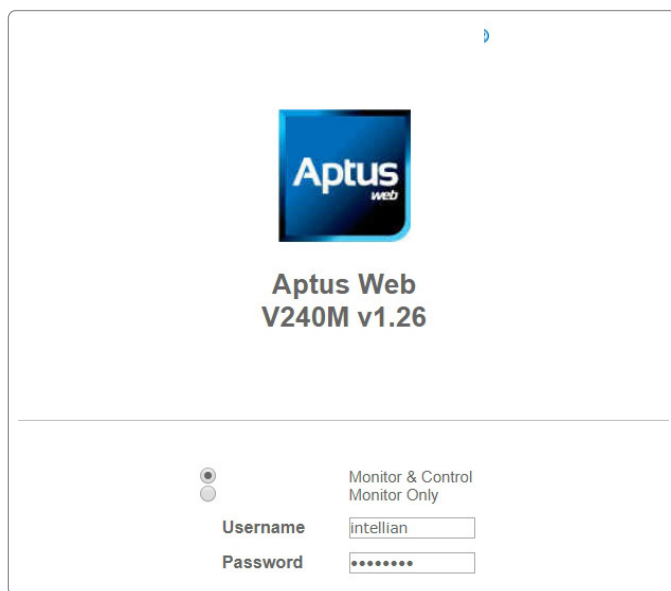


Figure 96: Enter User Credentials



NOTE

- The Control & Monitoring Mode will be switched to the Monitoring Only Mode in the following cases:
 - If PC Software (Aptus) is connected using TCP/IP Communication while Aptus Web Control is in use.
 - If Control & Monitoring Mode is accessed while the PC Software is running via a TCP/IP Communication. In this case, the web page will display a pop-up message asking if you want to disconnect the PC Software network connection. If you select **No**, the Control & Monitoring Mode will be switched to Monitoring Only Mode.
- After entering the default password, the user must change the default password to a new password for security.

9.2.2 Top Menu

After you have logged in, the following information and menus are displayed.

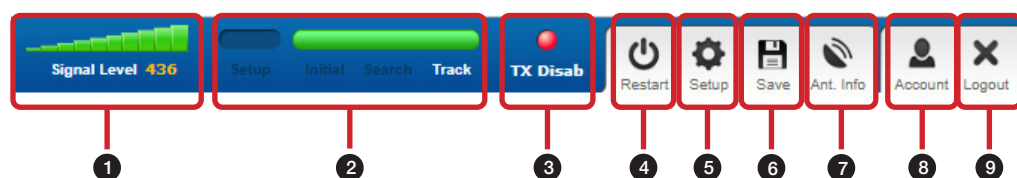


Figure 97: Aptus Top Menu

No.	Item	Description
①	Signal Level	Displays the current signal level.
②	Antenna status	• Setup: displays whether or not the antenna is in SETUP mode. The indicator shows Blue in the SETUP mode. • Initial: the antenna or ACU is initialized. • Search: the antenna is searching a target satellite. • Track: the antenna is tracking the target satellite.
③	Tx Enable/ Tx Disable	Displays whether or not the antenna can transmit the data
④	Restart	Restarts the antenna system.
⑤	Setup	Enters the SETUP mode.
⑥	Save	Saves the current satellite settings. Bow offset will be adjusted and saved automatically.
⑦	Ant. Info	Obtains the current antenna information.
⑧	Account	Shortcut to User Management menu. Changes login ID and Password.
⑨	Logout	Logs out of the ACU's web page.

9.2.3 Dashboard & Information

On the left side of the page, the Dashboard and Information menus are displayed as Figure below to provide quick monitoring of the antenna status and settings. Other menus are displayed only in the Control & Monitoring mode and their functions will be described in the following sections.

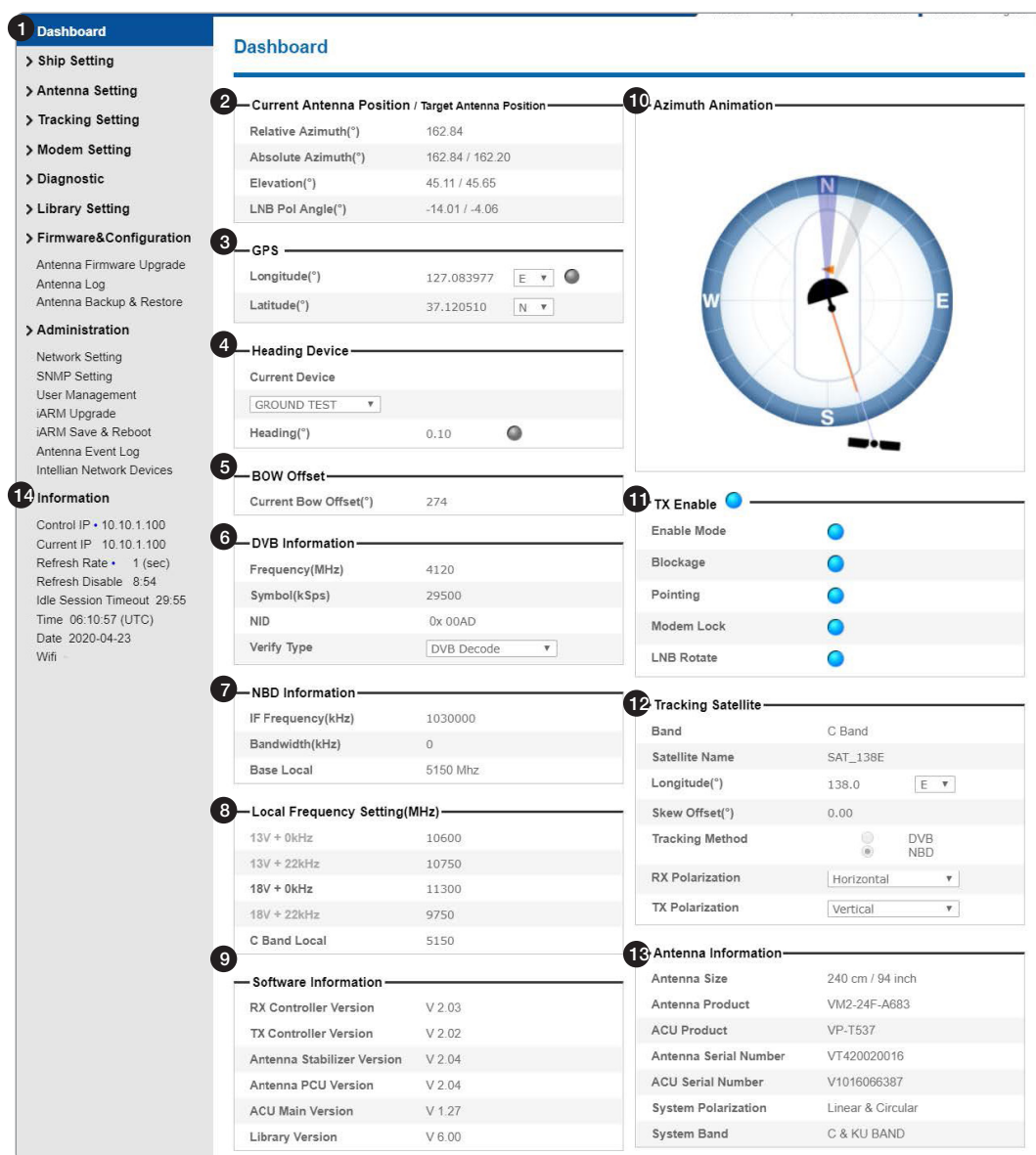


Figure 98: Dashboard and Information

No.	Item	Description
①	Dashboard	Displays current antenna status to be quickly monitored.
②	Current Antenna Position / Target Antenna Position	Displays current antenna position. - Relative Azimuth: displays antenna relative AZ angle. - Absolute Azimuth: displays antenna absolute AZ angle. - Elevation: displays antenna elevation angle.
③	GPS	Displays current GPS information. - Longitude (East / West) - Latitude (North / South)

No.	Item	Description
④	Heading Device	Displays current Heading Device: NONE, NMEA, NMEA 2000, GROUND Test If the ship's gyrocompass input is anything other than NMEA, the separate purchase of a Converter is required. • Heading: displays ship's heading information.
⑤	BOW Offset	Displays current bow offset.
⑥	DVB Information	Displays DVB tracking mode's current tracking information. • Frequency: displays tracking frequency. • Symbol rate: displays symbol rate. • NID: displays network ID. • Verify type: displays verification type (AGC, DVB, DVB Decode, DSS Decode)
⑦	NBD Information	Displays NBD tracking mode's current tracking information. • IF Frequency: displays tracking IF frequency. • Bandwidth: displays detection bandwidth. • Base Local: displays base local frequency.
⑧	Local Frequency Setting (MHz)	Displays current LNB's local frequency and voltage.
⑨	Software Information	Displays current Antenna and ACU firmware versions and Satellite Library version installed on the system. • Antenna POL Version: displays the antenna POL version. • Antenna Stabilizer Version: displays the antenna stabilizer version. • Antenna PCU Version: displays the antenna PCU version. • ACU Main Version: displays the ACU Main version. • Library Version: displays the Library version.
⑩	Azimuth Animation	Shows a graphical representation of the current antenna position to identify whether or not the antenna is aligned properly to the target satellite or is in a block zone.
⑪	Tx Enable	Displays whether or not the antenna is able to transmit data. The Tx function will be enabled (shows Blue dot) only if all of the factors listed below show a Blue dot (Exception: If "Use Tx Mute" is set to NO , the Tx function will be enabled regardless of whether or not the factors listed below show a Gray dot or a Red dot.). The function below will be enabled with a Blue dot displayed as listed below: • Enable Mode: the antenna is not in SETUP mode. • Blockage: the antenna is not facing the predefined block zone(s). • Pointing: the antenna is pointing to the target satellite. • Modem Lock: the satellite modem is sending a logic input to the ACU to identify when the antenna tracks on the correct satellite. • LNB Rotate: the LNB is not rotating.
⑫	Tracking Satellite	Displays current tracking mode. • Satellite: displays satellite name. • Longitude: displays satellite orbit position. • Skew Offset: displays Skew offset. • Tracking Method: displays current tracking mode (DVB/ NBD). • Rx Polarization: displays current Rx polarization. • Tx Polarization displays current Tx polarization.

No.	Item	Description
⑬	Antenna Information	Displays the antenna product information. • Antenna Size: displays the antenna size. • Antenna Product: displays the antenna product name. • ACU Product: displays the ACU product name. • Antenna Serial Number: displays the antenna serial number. • ACU Serial Number: displays the ACU serial number. • System Polarization: displays the system polarization. • System Band: displays the system band.
⑭	Information	• Control IP: displays current IP that controls the ACU. • Current IP: displays current IP address. • Refresh Rate: displays screen refresh rate (default: 1 sec.) • Refresh Disable: displays time out. The screen will not refresh once the time-out shows 0:00 (Exception: If the Refresh Disable Time is set to OFF in the Network Setting page, then the clock will show "--:--" and the system will keep monitoring all activities regardless of the timeout.). • Time: displays UTC time. • Date: displays UTC date. • Wifi: displays Wi-Fi on/off switch status.

9.3 Antenna Settings

9.3.1 Ship Setting

The screenshot shows the 'Ship Setting' interface. The sidebar menu on the left includes: Dashboard, Ship Setting (selected), Antenna Setting, Tracking Setting, BUC Setting, Modem Setting, Diagnostic, Library Setting, Firmware&Configuration (with sub-items: Antenna Firmware Upgrade, Antenna Log, Antenna Backup & Restore), Administration (with sub-items: Network Setting, SNMP Setting, User Management, iARM Upgrade, iARM Save & Reboot, Antenna Event Log), and Information (with sub-items: Control IP, Current IP, Refresh Rate, Refresh Disable, Idle Session Timeout, Time, Date). The main content area is titled 'Ship Setting' and contains five numbered sections:

- 1 Ship Setting**: (Selected)
- 2 GPS**: Longitude(°) 127.083504 E, Latitude(°) 37.120701 N, Set GPS button.
- 3 BOW Offset**: Current Bow Offset(°) 185, Set Bow Offset button.
- 4 Heading Device**: Current Device GROUND TEST, Set Device button, Heading(°) 0.00, Set Heading button.
- 5 Blockage**: BL1, BL2, BL3, BL4, BL5 checkboxes, AZ Start(°) 190 0 0 0 90, AZ End(°) 235 0 0 0 115, EL(°) 66 0 5 55 90, Set Block Zone button.

Figure 99: Ship Settings

No.	Item	Description
①	Ship Setting	Sets the ship information and block zone.
②	GPS	Sets the GPS information. • Longitude (East/West) • Latitude (North/South)
③	Bow Offset	Sets the bow offset if needed.
④	Heading Device	Sets the ship's heading device (NONE, NMEA, NMEA2000, GROUND Test) and the ship's heading information.
⑤	Blockage	Sets up to five antenna block zones by azimuth and elevation sectors. The AZ. START is where the relative azimuth starts and AZ. END is where the relative azimuth ends (Range: 0 - 360°). EL is where the elevation blockage starts (Range 0 - 90°).



NOTE

Check the box before modifying the settings. After configuration, click the **Set ...** button to submit the settings.

9.3.2 Antenna Setting

Figure 100: Antenna Settings



NOTE

Check the box before modifying the settings. After configuration, click the **Set ...** button to submit the settings.

No.	Item	Description
①	Antenna Setting	Sets the current antenna position and Search and Tracking parameters. These parameters should only be changed by an authorized service technician. Improper setting of these parameters will render your system inoperable.
②	Current Antenna Position/ Target Antenna Position	Displays the current antenna position. - Relative Azimuth: displays the antenna relative AZ angle. - Absolute Azimuth: displays the antenna absolute AZ angle. - Elevation: displays the antenna elevation angle. - Heading: displays the ship's heading information.
③	Manual Movement	Moves the antenna azimuth and the elevation angles.

No.	Item	Description
④	LNB Pol Sensor Calibration	Calibrates the LNB pol angle when the control board, skew motor or belt is replaced. • Sat Skew Offset: Displays the satellite skew offset value Each satellite has its own skew offset. Contact your service provider or satellite operator to get the designated satellite skew offset value. To change the Satellite Skew Offset manually: Go to Tracking Setting → Tracking Satellite → Skew Offset and enter the value. • Mechanical Offset: Displays the antenna skew offset value which was set by the factory as a default value (usually 0, 1 or 2) depending on the antenna assembly condition. The color next to the value box indicates the status of Mechanical Skew Offset. (Blue: Less than $\pm 10^\circ$ / Red: More than $\pm 10^\circ$) • Consolidated Skew Offset: Displays the consolidated skew offset value of Sat Skew Offset and Mechanical Offset. (Consolidated Skew Offset= Mechanical Offset-Sat Skew Offset) • Mechanical Skew Offset Reset: Resets the Mechanical Offset to "0".
⑤	Elevation Adjust	Adjusts the elevation to offset the angle difference between the mechanical elevation angle and the actual elevation angle.
⑥	Conical Range	Sets the relative force of the motors controlling azimuth and elevation.
⑦	Idle Mode	Release the elevation and cross-level motor brakes while the antenna is in SETUP mode. The antenna can be moved manually during the mode.
⑧	Reboot	Reboot the system.
⑨	Search & Tracking Parameter Setting	Sets the options below for each band in use (C-band, Ku-band, and Ka-band). • DVB Detect and Tracking Level Threshold: sets the current detect level threshold and tracking level threshold when DVB tracking mode is chosen. • NBD Detect and Tracking Level Threshold: sets the current detect level threshold and tracking level threshold when NBD tracking mode is chosen. • Tx Enable Threshold: sets the enabled Tx threshold. Sets the options below for each satellite in use (GEO and MEO). • Wait time: sets the time-out for automatic initiation of a search after the signal level drops below the pre-defined threshold value. • Search Step: sets the increment step size. • Search 1 & 3 Range: sets the Search 1 & 3 search range. Search is conducted in a two-axis pattern consisting of alternate movements in azimuth and elevation forming an expanding square. • Search 2 Range: is reserved for future use.
⑩	Tilt Sensor Bias	Adjusts the two solid-state tilt sensors used to provide absolute cross-level tilt of the antenna and elevation feedback to eliminate long-term pointing drift (error). Tilt bias is required to be adjusted when the antenna control board or sensor box is replaced. Check to see whether or not the bubble is located at the center of the level vial.
⑪	Rate Sensor Adjust	Calibrates the DC voltage output from the three rate sensors used to sense antenna motion in the azimuth, elevation and cross-level axes. During the calibration process, the antenna should avoid any motion as it can affect the antenna's performance.

9.3.3 Tracking Setting

Figure 101: Tracking Settings

No.	Item	Description
①	Tracking Setting	Sets the current tracking mode and tracking frequency of the target satellite.
②	Local Frequency Setting (MHz)	Sets the LNB's local frequencies. Displays the current LNB local frequency, band, and voltage that are in use.
③	Current Satellite Setting	Sets the current satellite setting.
④	Tracking Satellite	Sets the current tracking mode. - Band: sets the band. (C-band, Ku-band, and Ka-band) - Satellite: sets the satellite name. - Longitude: sets the satellite orbit position. - Skew Offset: sets the skew offset. - Tracking Method: sets the current tracking mode. (DVB/ NBD) - Rx Polarization: sets the current Rx polarization. - Tx Polarization: sets the current Tx polarization.
⑤	DVB Information	Sets the DVB tracking mode's information. - Frequency: sets the tracking frequency. - Symbol rate: sets the symbol rate. - NID: sets the network ID. - Verify type: sets the verification type. (AGC, DVB, DVB Decode, DSS Decode)
⑥	NBD Information	Sets the NBD tracking mode's information. - IF Frequency: sets the tracking IF frequency. - Bandwidth: sets the detection bandwidth. - Base Local: displays the base local frequency.



NOTE

Check the box before modifying the settings. After configuration, click the **Set ...** button to submit the settings.

9.3.4 Modem Setting

Modem Setting

1. Modem Setting

2. Modem

3. iDirect Modem Monitor

View Information

Figure 102: Modem Settings

No.	Item	Description
①	Modem Setting	Sets the modem interface.
②	Modem	- Use Mediator: enable the usage of the Mediator if the antenna is connected to the Intelligent Mediator. Selects a mediator type. (NO, Mediator-ANT, Mediator-Modem, Mediator-ALL) NOTE: When using multi-band mediator, select the Mediator-ALL type. - Select Modem: selects the proper data communication port and protocol on the ACU to interface with the satellite modem. The settings related to the modem interface will be set automatically when the modem type is selected (USER SETTING, IPSTAR_SOTM, INMARSAT G5). However; if USER SETTING is selected, you must set the related settings separately. - Modem Port: selects the proper data communication port on the ACU to interface with the satellite modem (RS-232/RS422/ Ethernet). - Modem Protocol: selects the proper communication protocol on the ACU to interface with the modem (I/O Console, Open AMIP, Serial GPS, ROSS, VACP, ELEKDualKOM AMIP, GILAT, SOTM, G5). - GPS Out Sentence: selects the GPS out sentence type (GPGLL/GPGGA/ Simple GPGGA). - USE Tx Mute: selects whether or not to use the Tx mute function from the satellite modem.

No.	Item	Description
②	Modem	• USE Modem Lock: selects whether or not to use the external lock signal from the satellite modem. • Tx Mute: a transmit inhibit output from the ACU to disable/ mute the modem transmit through a 5V (High) or 0V(LOW) current whenever the antenna is blocked, searching, or is 0.5° off from the peak satellite position. • Modem Lock: the modem lock output from the modem which provides a logic input through a 5V (High) or 0V(LOW) current to the ACU to identify when it is on the correct satellite. • Use Modem Lock Verify: verifies the target satellite using the modem lock signal. NOTE: Tx Mute and Modem Lock items will only be activated when the modem protocol is set to I/O Console.
③	iDirect Modem Monitor (Open AMIP Modem Only)	Displays iDirect Modem status and control connection. This menu appears only when IDIRECT-AMIP protocol is selected into Modem Setting page. • Connection: controls modem connection. - Modem IP: iDirect modem IP. - Port: connection port number. - ID: connection ID for telnet. - Password: connection password for telnet. - Start(Stop): connect to telnet or disconnect. - Auto Connect: enabling Auto Connect and rebooting the ACU will save the connection data and will auto connect once ACU is powered on next time. • Status: displays iDirect modem status. - Last Update Date: displays the last updated data and the time of the iDirect modem data. - Connect: displays connection status (INACTIVE, CONNECTING, LOGGEDIN, blank data indicates the INACTIVE state). - Rx SNR: displays Rx SNR data. - View Detail Information: when clicking the button, the "View Information" window will appear. You can view detailed information including: · Status: displays last update date and connection status. · Option File Information: displays information about VERSION, MOBILE, LOCAL and ACU PORT. · Information: displays Rx SNR, Tx POWER, Tx POWER MIN, Rx POWER, Tx POWER MAX, Tx POWER REF and LATLONG. · Graph (Rx SNR): displays Rx SNR Graph.

**NOTE**

Check the box before modifying the settings. Select the **Set Modem Configuration** to confirm the settings configured.

9.3.5 Diagnostic

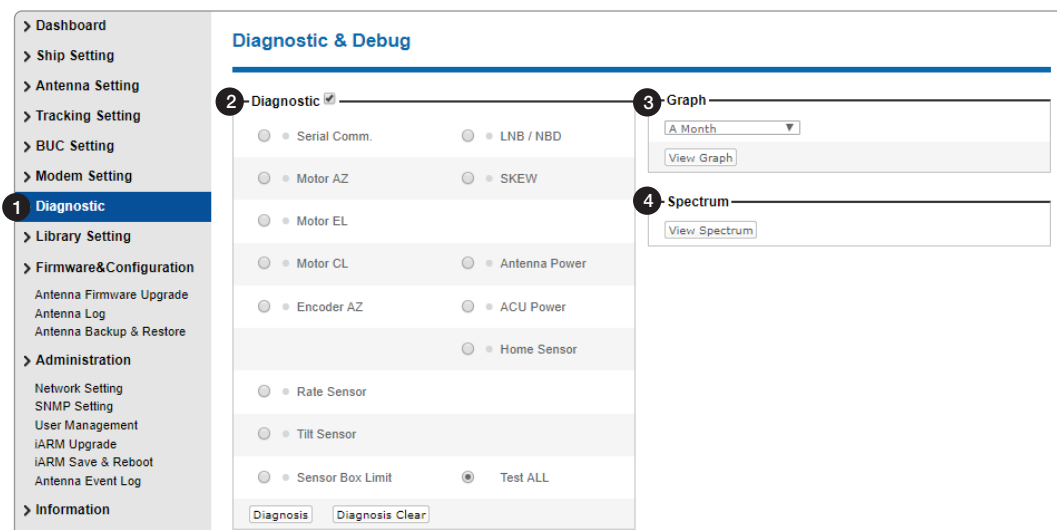


Figure 103: Diagnostic Settings

No.	Item	Description
①	Diagnostic	Executes the antenna diagnostic test.
②	Diagnostic	Selects to run a full diagnostic test or a single diagnostic test. - Serial Comm: tests the data communication between the antenna and the ACU. - Motor AZ: tests the azimuth motor. - Motor EL: tests the elevation motor. - Motor CL: tests the cross-level motor. - Encoder AZ: tests the azimuth encoder. - Rate Sensor: tests the rate sensor. - Tilt Sensor: tests the tilt sensor. - Sensor Box Limit: tests the sensor box motor. - LNB/NBD: tests the LNB. - SKEW: tests the LNB pol motor. - Antenna Power: tests the antenna power. - ACU Power: tests the ACU power. - Test ALL: tests all devices.
③	Graph	Select to view a graph of the AZ Absolute, AZ Relative, EL and Heading data of the antenna. - A Month: displays all data within a month. - A Week: displays all data within a week. - A Day: displays all data in a day. - Real-time: displays data in real-time. Press the F5 key to refresh. - View Graph: select to view the data graph.
④	Spectrum	Select to view a current spectrum graph and to set the spectrum display options.



NOTE

Click the check box before modifying the settings. Click the Diagnosis button to execute the diagnostic test. To clear previous diagnosis results, Click the Diagnosis Clear button.

9.3.6 Library Setting

Figure 104: Library Setting

No.	Item	Description
①	Library Setting	Sets the satellite library information.
②	Library	• Get Library from ACU: obtains the satellite information installed in the ACU. • Open Library from PC: opens the satellite library file from the supplied Intellian CD or an external hard drive/PC. (File format: *.ilf) • Upload Library to ACU: uploads the satellite library file to the ACU. • Save as Library to PC: saves the current library setting to the PC.
③	Load Satellite	Select the satellite that you wish to track and press the Load Satellite button to load the selected satellite.
④	Selected Satellite Setting	Displays the selected satellite information.
⑤	Tracking Satellite	Displays the tracking satellite information. • Band: displays the current band. • Satellite: displays the satellite name. • Longitude: displays the satellite orbit position. • Skew offset: displays the skew offset. • Tracking method: displays the current tracking mode. (DVB/NBD) • Rx polarization: displays the current Rx polarization. • Tx polarization: displays the current Tx polarization.

No.	Item	Description
⑥	DVB Information	Displays the DVB tracking mode's information. • Frequency: displays the tracking frequency. • Symbol rate: displays the symbol rate. • NID: displays the network ID. • Verify type: displays the verification type. (AGC only, DVB lock, DVB decode, DSS decode)
⑦	NBD Information	Displays NBD tracking mode's tracking information. • IF Frequency: displays tracking frequency. • Bandwidth: displays detection bandwidth. • Base Local: displays base local frequency.
⑧	Local Frequency Setting (MHz)	Displays LNB local frequency (MHz) and voltage.

9.4 Firmware & Configuration

9.4.1 Antenna Firmware Upgrade

Antenna Firmware Update

2—New Antenna Firmware

Upgrade Method: Manual Upgrade

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.
Upload an incorrect firmware file may cause serious damage to your antenna and ACU.

Browse and select the firmware file to upload.

BROWSE

Start Upload Cancel

3—Current Running Version

Current Firmware Version		
RX CONTROLLER	v2.03	
TX CONTROLLER	v2.02	
Antenna STABILIZER	v2.04	
Antenna PCU	v2.04	
ACU Main	v1.27	
Library	v6.00	

4—Cold Rollback

Previous Package Version		
RX CONTROLLER	v2.03	Rollback
TX CONTROLLER	v2.02	
Antenna STABILIZER	v2.04	
Antenna PCU	v2.04	
ACU Main	v1.27	
Latest Package Version		
RX CONTROLLER	v2.03	Rollback
TX CONTROLLER	v2.02	
Antenna STABILIZER	v2.04	
Antenna PCU	v2.04	
ACU Main	v1.27	

Figure 105: Antenna Firmware Upgrade

No.	Item	Description
①	Antenna Firmware Upgrade	Selects to update antenna firmware.
②	New Antenna Firmware	Choose between the "Manual Upgrade" and "Automatic Upgrade" upgrade methods. With the "Auto Upgrade" option selected, Click the Check button to check automatically if there is new firmware available from the server. With the "Manual Upgrade" option selected, browse and select the firmware package file to upload and click the Start Upload button. NOTE: When using the "Manual Upgrade" method, refer to the following "Antenna Firmware Update (Manual Upgrade method) procedures" page for more details.
③	Current Running Version	Displays current firmware versions (Antenna POL, Antenna STABILIZER, Antenna PCU, ACU Main, Library).
④	Live Rollback	Displays previous/latest package version and factory default version. (Antenna POL, Antenna STABILIZER, Antenna PCU, ACU Main). When clicking the rollback button, the system will be upgraded. Other functions cannot be operated while rollback is in progress.

Antenna Firmware Upgrade(Manual Upgrade method) procedures:

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

New Antenna Firmware

Upgrade Method 1 Manual Upgrade

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.
Upload an incorrect firmware file may cause serious damage to your antenna and ACU.

2 Select the firmware file to upload.
파일 선택 확인 파일 없음

3 Start Upload Cancel

2. After the package file is transferred, it will show “upgrade from vx.xx Version to vx.xx Version”. Enable the checkbox to select the firmware file that you wish to upgrade. After selecting the firmware files, click on the **Start Upgrade** button.

Antenna Firmware Update

1 The Firmware Package Update Ready

RX CONTROLLER	Update From v2.03 To v2.03 From 0x018B To 0x018B	☒
TX CONTROLLER	Update From v2.02 To v2.02 From 0x018C To 0x018C	☒
Antenna STABILIZER	Update From v2.04 To v2.04 From 0x018D To 0x018D	☒
Antenna PCU	Update From v2.04 To v2.04 From 0x018E To 0x018E	☒
ACU MAIN	Update From v1.27 To v1.27 From 0x0124 To 0x0124	☒

2 Start Upgrade

3. During the upgrade process, the window will display process status.

Antenna Firmware Update

The Firmware Package v190701 Update Status

RX CONTROLLER	Update From v2.00 To v2.00 40 %
TX CONTROLLER	Update From v2.00 To v2.00 Ready
Antenna STABILIZER	Update From v2.01 To v2.01 Ready
Antenna PCU	Update From v2.01 To v2.01 Ready
ACU MAIN	Update From v2.01 To v2.01 Ready

Back to main page

4. If the firmware is successfully upgraded, it will display “The firmware update is completed.” Click on **Back to main page** to go out of the screen. To verify the upgraded firmware version, go to Dashboard → Software Information.

The Firmware Package v190701 Upgrade Complete

RX CONTROLLER "2.00" "Success"
TX CONTROLLER "2.00" "Success"
Antenna STABILIZER "2.01" "Success"
Antenna PCU "2.01" "Success"
ACU MAIN "2.01" "Success"

The firmware update is completed. **1**
If you encounter any firmware upgrade error, please try again.
Please refer to the User Guide if you have trouble connecting to the antenna.

Back to main page **2**



NOTE

To roll back to the previous firmware package version or latest package version, select Live Rollback Upgrade menu on the Antenna Firmware Upgrade page.

9.4.2 Antenna Log

Antenna Log

2 GPS Log Option **5**
Enable [Help](#)
Submit Cancel

3 Antenna Log Download
You can download the log of up to 3 Months.
Start Date: End Date:
Start Download ☒ Include Backup/Report File

4 Antenna Firmware Log

Date/Time(UTC 00:00)	RX CONTROL	TX CONTROL	STAB	PCU	Main
Tue, 25 Jun 2019 06:10:55	2.00 Success	2.00 Success	2.01 Success	2.01 Success	2.01 Success
Mon, 24 Jun 2019 04:40:41	2.00 Success	2.00 Success	2.01 Success	2.01 Success	2.00 Success
Mon, 24 Jun 2019 00:02:27	2.00 Success	2.00 Success	2.01 Success	2.01 Success	2.00 Success
Sun, 23 Jun 2019 23:38:07	2.00 Success	2.00 Success	2.01 Success	2.01 Success	2.00 Success
Fri, 21 Jun 2019 00:18:34	Ready	2.00 Skip	2.01 Success	2.01 Success	2.00 Success
Tue, 18 Jun 2019 07:55:49	2.00 Success	2.00 Success	2.01 Success	2.01 Success	2.00 Success

1 Antenna Firmware Upgrade
Antenna Log
Antenna Backup & Restore
Administration
Network Setting
SNMP Setting
User Management
iARM Upgrade
iARM Save & Reboot
Antenna Event Log
Information
Control IP • 172.22.1.13
Current IP • 172.22.1.13
Refresh Rate • 1 (sec)
Refresh Disable 8:06

Figure 106: Enter User Credentials

No.	Item	Description
①	Antenna Event Log	Displays the antenna log data
②	GPS Log Option	Disable/Enable to save GPS information in the antenna log file.
③	Antenna Log Download	Selects the file transfer protocol HTTP Download method. Any log data within 3 months can be downloaded with HTTP download option selected. Select the start and end date by manual input or mouse scrolling on the calendar view. Start Download: select the Start Download button to download the antenna log file. Downloads the back up/report file by clicking the Include Backup/Restore File check box.
④	Antenna Firmware Log	Displays the log information of firmware upgrade.
⑤	Auto Copy Logs & Backup File to USB	Disable/Enable to copy antenna logs & backup files to the USB storage device automatically.

9.4.3 Antenna Backup & Restore



Figure 107: Enter User Credentials

No.	Item	Description
①	Antenna Backup & Restore	Enters the backup & restore page (Setup mode is required).
②	Backup & Restore	• Target: backs up the antenna information to the PC or restores the antenna by using the saved information from the PC. • Backup: backs up the antenna information. • Restore: restores the antenna information.

9.5 Administration

9.5.1 Network Setting

Figure 108: Network Setting

No.	Item	Description
①	Network Setting	Enters the network settings page.
②	Modem Port Configuration	Modifies ACU's Internal IP addresses, routing, and ports. When complete, press the Submit button at the bottom of the page. Go to the Save & Reboot page and press the Save & Reboot button to validate the changes. • IP Address: factory default (Primary:192.168.0.223)/(Secondary:10.10.1.1). • Subnet Mask: factory default (255.255.255.0). • Gateway: factory default (192.168.0.254). • DNS: current default DNS Address. • NAT Routing: enable/disable NAT routing. • TCP Modem Protocol Port: TCP port number for modem protocols using TCP as transport. • UDP Modem Protocol Port: UDP port number for modem protocols using UDP as transport.

No.	Item	Description
③	Management Interface Configuration	Modify the Management Port's network configuration and press the Submit button at the bottom of the window. Go to the Save & Reboot page and press the Save & Reboot button to validate the changes. • IP Address: ACU front network port /Factory default. (192.168.2.1) • Subnet Mask: factory default. (255.255.255.0) • Lease Start Address: lease IP address start range. • Lease End Address: lease IP address end range. • Lease Time: lease IP address update time.
④	Network Service Configuration	• Telnet Service: enable/disable telnet login support. • HTTPS Port: HTTPS port number. • SSH Service: enable/disable CLI access through SSH protocol.
⑤	Sys Log Configuration	Sets the system log configuration. The antenna sends log messages according to the emergency level. Enabling this function sends the message to your management server. • Management Server: sys log function enable/disable. • Server IP: management server IP address. • UDP Port: management port. • Message Type: selects the message type (Intellian message level) to send to the management server. A lower number indicates a higher emergency. • Syslog Target Level: if this target level is selected the management server receives log message equal to or less than this level.
⑥	Radius Configuration	This menu is used when a network administrator needs to authorize user connections via Web, SSH, PC Port, Telnet, or Console using RADIUS server. • Client: select to enable RADIUS authentication. • Server IP: RADIUS server IP Address. • Timeout: timeout value in seconds for the authentication process. • Server Secret: Pass-Phase. This should be matched between server and ACU.
⑦	Browser Configuration	Set refresh rate and refresh disable time. • Refresh Rate: sets the browser refresh rate. (Default: 1 second, Range: 1~99) • Refresh Disable Time: sets the browser idle timeout. (Default: 9 minutes, Range: 0~9) To use this function, check the checkbox.

9.5.2 SNMP Setting

Figure 109: SNMP Setting

No.	Item	Description
①	SNMP Setting	Sets SNMP configuration.
②	SNMP Agent Setting	Sets the SNMP configuration. • SNMP V1/V2 Status: sets the SNMP mode (Use AtDualbution Disable, Read Only or Read Write). • V1/V2 Community Name: sets the SNMP V2 community name. • V3 Authentication Type: sets the SNMP V3 authentication mode. • V3 Authentication Encoding: sets the SNMP V3 authentication encoding. • V3 Username: sets the V3 username and password of the SNMP agent. The password must be at least an 8 character sDualng. • V3 Private Encoding: sets the SNMP V3 private encoding. • V3 Private Password: sets the V3 password of the SNMP agent. The password is must be at least an 8 character sDualng. • TRAP IP/Port: sets the V3 password of the SNMP agent. The Password must be at least an 8 character sDualng. • TRAP Parameter: sets the SNMP to trap specific parameter.

9.5.3 User Management

Figure 110: User Management

No.	Item	Description
①	User Management	Changes the login ID and Password to access the Aptus Web. This setting can be also accessed by the "Account" icon on the top menu.
②	Change ID & Password	Changes your login ID (username) and password.
③	Change ID	Enter your current login ID (username) and new login ID. Click the Submit button to validate the changes that are made to the login ID.
④	Change Password	Enter your current login password and new login password. Click the Submit button to validate the changes that are made to the login password.
⑤	Change User Settings	Changes the User Password Expire in days and Idle session timeout.
⑥	Password Expire Timeout	Sets the number of effective days for password.
⑦	Idle Session Timeout	Sets console and network timeout.
⑧	Guest Session Access	Enable or disable the access to Web or CLI using guest ID.

9.5.4 iARM Upgrade

Figure 111: iARM Upgrade

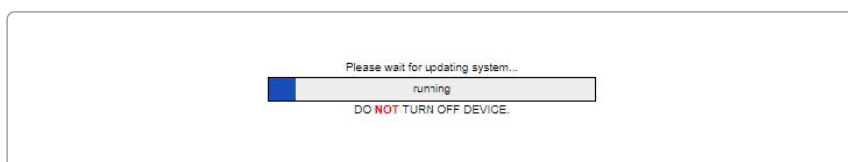
No.	Item	Description
①	iARM Upgrade	Upgrade the firmware of iARM module.
②	New iARM Firmware	Select between the "Manual Upgrade" or the "Auto Upgrade" upgrade methods. With the "Auto Upgrade" option selected, click the Check button to check automatically if there is new firmware available from the server. With the Manual Upgrade option selected, browse and select the firmware file to upload and click the Start Upgrade button. NOTE: Refer to the following "iARM Upgrade (Manual Upgrade method) procedures" page for more details.
③	Bootstrap/Bootloader	Displays current bootstrap and bootloader version.
④	Kernel/File System	The mediator has 3 storage parts: sys0, sys1, and Factory Default. Displays kernel and file system version and current Activated part Information.

iARM Upgrade (Manual Upgrade method) procedures:

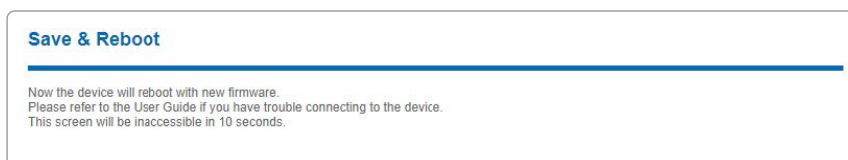
1. Choose Manual Upgrade from the drop-down Upgrade Method menu. Browse and select the iARM firmware file(.tgz) that you wish to upgrade. Click on the Start Update button to update the iARM firmware. Wait until the page is loaded.

**NOTE**

When checking the box "Ignore warnings during installation and force the installation to continue" before performing the upgrade, the warning messages will not appear during the upgrade.



2. Once the update starts, a page will indicate the upgrade status. Do not turn off the device power if the firmware upgrade page is displayed. It should take around 2 minutes to complete the firmware upgrade.



3. Click on the **Start Update** button to update the iARM firmware. Wait until the page is loaded.

9.5.5 iARM Save & Reboot

iARM Upgrade

2 New iARM Firmware

Upgrade Method: Manual Upgrade

☒ Ignore warnings during installation and force the installation to continue

3 Browse and select the firmware file to upload.

파일 선택 | 선택된 파일 없음

Start Upgrade | Cancel

Bootstrap/Bootloader

Bootstrap	Main	v1.10
	Factory Default	v1.10
Bootloader	Main	v1.10
	Factory Default	v1.10
	Active Bootloader	Main

Kernel/File System

Sys0	Kernel	v1.85	Activate
------	--------	-------	----------

Figure 112: iARM Save & Reboot

No.	Item	Description
①	iARM Save & Reboot	Save settings to the mediator and reboot or reboot the system without saving.
②	Save & Reboot	Save the modified settings and reboot the system. Click the Save & Reboot button.
③	Reboot without Saving	Reboot the system without saving the modified settings. Click the Reboot Only button.

9.5.6 Antenna Event Log

Antenna Event Log

2 Query Filter

Severity: Category:
 Time Frame: Sorting Order: ☒ Descending ☐ Ascending

3 Event Log

Date/Time(UTC)	Severity	Category	Log
2020-04-23 06:22:51	Major	Antenna	[P1] TX Enable
2020-04-23 06:22:51	Major	Antenna	[P1] TX Disable : 1 1 1 0 1 1000
2020-04-23 06:14:59	Normal	Access	Remote Control Login through WEB from 10.10.1.100 using ID intellian
2020-04-23 06:12:02	Major	Antenna	[P1] TX Disable : 1 1 1 0 1 1000
2020-04-23 06:11:27	Major	Antenna	[P1] TX Disable : 1 1 1 0 1 1000
2020-04-23 06:11:27	Major	Antenna	[P1] TX Enable
2020-04-23 06:11:14	Major	Antenna	[P1] TX Enable
2020-04-23 06:11:13	Major	Antenna	[P1] TX Disable : 1 1 1 0 1 1000
2020-04-23 06:11:08	Major	Antenna	[P1] TX Enable
2020-04-23 06:11:06	Major	Antenna	[P1] TX Enable
2020-04-23 06:11:06	Major	Antenna	[P1] TX Disable : 1 1 1 0 1 1000

Figure 113: 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 filter options. - Severity: sets the urgency level. - Server IP: RADIUS server IP Address. - Time Frame: sets the time limit that you want to show. - Sorting Order: sorting based on date (descending or ascending).
③	Event Log	Sets the Log message filter options. Save Event Log: saves log messages to your PC.

9.5.7 Intellian Network Devices

Intellian Network Devices

1 - Intellian Network Devices

Control IP • 192.168.2.2
Current IP 192.168.2.2
Refresh Rate • 1 (sec)
Refresh Disable 6:39
Idle Session Timeout 27:40
Time 10:14:54 (UTC)
Date 2014-07-03
Wifi

2 - Intellian Network Configuration

Ethernet IP Configuration

Enable ☐ [Help](#)

IP Address (Eth0) 192.168.3.1 [Help](#)

Subnet Mask (Eth0) 255.255.255.0 [Help](#)

[Submit](#) [Cancel](#)

Intellian LAN IP Configuration

Enable ☐ [Help](#)

IP Address (Eth1) 192.168.3.1 [Help](#)

Subnet Mask (Eth1) 255.255.255.0 [Help](#)

[Submit](#) [Cancel](#)

Intellian Network Port Status ☐

Intellian Device Enable ☐ [Setting](#)

3 - Add Network Device Address

IP Address 192.168.3.6 [HTTP](#) 20041 [HTTPS](#) 20042 [SSH](#) 20043 [PC PORT](#) 20044 [SPECTRUM PORT](#) 20045 [Add Device](#) Please input port numbers between 20000 and 25000

4 - Network Data View

Address	HTTP	HTTPS	SSH	PC PORT	SPECTRUM PORT	Connection	
192.168.3.1	20001	20002	20003	20004	20005	UP	Delete Device
192.168.3.2	20011	20012	20013	20014	20015	Unknown	Delete Device
192.168.3.3	20021	20022	20023	20024	20025	Unknown	Delete Device
192.168.3.4	20031	20032	20033	20034	20035	Unknown	Delete Device

5 - Detailed Information

192.168.3.1

TYPE		ANTENNA INFORMATION		ACU INFORMATION	
240 cm / 84 inch	/			DCI-Mid / PVP19030439	
SATF1 I TF NAME	SATF1 I TF I ONGITUDE	GPS I ONGITUDE	GPS I ATTITUDE	HEADING	
0.0 W	0.00 E	0.00 E	0.00 N	217.2	
STATUS	SIGNAL/LOCK	AZ/REL/ABS	EL	POL	
Communication Error	0/UNLOCK	0.00/0.00	0.00	0.00	
TRACKING METHOD	LOCAL FREQUENCY	TRACKING FREQUENCY	POLARIZATION	BOW OFF SET	
NBD	0 MHz	0 kHz	RX-V/TX-V	0	
MODEM		TX STATUS			
IDIRECT-AMIP	Mute				
TX ENABLE MODE	TX BLOCKAGE	TX POINTING	TX MODEM LOCK	TX LNB ROTATE	
Disable	Enable(Out of block)	Disable	UNLOCK	Disable	

Figure 114: Intellian Network Devices

No.	Item	Description
①	Intellian Network Devices	Add up to 4 Intellian devices (t-series ACU only) which are connected through Ethernet network for real time monitoring.
②	Intellian Network Configuration	- Ethernet IP Configuration (Eth0): Enable or disable the Eth0 port for the Intellian Network function. Set up IP address and subnet mask for Eth0 port. - Intellian LAN IP Configuration (Eth1): Enable or disable the Eth1 port for the Intellian Network function. Set up IP address and subnet mask for Eth1 port. - Intellian Network Port Status : Select the check box to activate the Intellian Network Device function. Enable or disable Eth0/Eth1 ports for the Intellian Network Device monitoring.
③	Add Network Device Address	Add Intellian network devices and enter the IP address and port information of each device. Click Add Device to add a device to the list (max. 4 devices). - IP Address : Enter the IP address of the device to be monitored. - Port Number (HTTP, HTTPS, SSH, PC, Spectrum) : Enter the port number (2000~2500) of each network service for the device.
④	Network Data View	Displays the real time connection status for each device. (IP address, HTTP, HTTPS, SSH, PC, Spectrum). Click the HTTP/HTTPS port number to open the web interface of the device. Click Delete Device to delete the device from the list.
⑤	Detailed Information	Displays detailed information of each device (antenna information, modem settings, satellite information etc.). The information refreshes every 3 seconds.

Chapter 10. Specification

10.1 Technical Specification

Dimensions		
Satellite Antenna Unit (with Base Frame)	3.9 m x 4.3 m (153.54” x 169.29”)	
Reflector size	2.4 m offset antenna	
	Height	Diameter
Radome (154-in.)	With Base Frame: 4,307 mm (169.56-in.) Without Base Frame: 3,762 mm (148.11-in.)	Ø3,912mm (154.01-in.)
Radome Frame Typ.	Short leg and long leg supported	
Antenna Control Unit	431 mm x 380 mm x 44.4 mm (16.96-in. x 14.96-in. x 1.74-in.)	
Weight		
Satellite Antenna Unit	595 kg (1,311.75 lbs)	
Radome (with base and Air conditioner Frame)	538 kg (1,186.09 lbs)	
ADU total weight	1,133 kg (2,497.84 lbs)	
Radome Weight (Not Included base frame)	222 kg (489.43 lbs)	
Antenna Control Unit	3.5 kg (7.7 lbs)	
Antenna System Performance		
Platform	Three Axis: Azimuth, Elevation, Cross-level	
Positioning	3-axis Velocity Mode Servo Control: Azimuth, Elevation, Cross-Level	
Pedestal Motion Range	Azimuth	Unlimited
	Elevation	-15° to +120°
	Cross-Level	Up to ±30°
Ship Motions	Roll	±20° at 8 ~ 12 second
	Pitch	±10° at 6~ 12 second
	Yaw	±8° at 15 ~ 30 second
	Turning rate	Up to 12° /sec, 5°/sec²
Time for Cold Start	Less than 2 minutes	
Tracking Error	±0.2° for Ku-band 0.7 dB ~ 1.0 dB RMS (under ship motion)	
Power Source	220 V AC, 50 ~ 60 Hz	
Power Consumption	Max. 2500 W	
Ship’s Gyro Interface	NMEA 2000, NMEA 0183	
ADU to ACU Communication	FSK (400 MHz, 433 MHz)	
ADU to ACU RF Interface	Coaxial	
BUC M&C Interface	RS-232, Ethernet	
PC Serial Interface	RS-232 (57,600 bps, 8, N, 1)	
Modem Interface	RS-232/RS-422, I/O Console, Ethernet	

RF Specification		
C-band	Rx Frequency	3.625 GHz ~ 4.2 GHz
	Rx Gain	38.0 dBi @ 3.91 GHz
	Tx Frequency	5.85 GHz ~ 6.425 GHz
	Tx Gain	41.6 dBi @ 6.14 GHz
	G/T (EL deg. = 30°)	Min. 18.0 dB/K @ 3.91 GHz (Min. 19.0 dB/K by calculation)
	EIRP	64 dBW (250W BUC)
	CPI (Tx)	Circular: 25 dBc, Linear 28 dBc
	Polarization	Circular • Tx-RHCP and Rx-LHCP • Tx-LHCP and Rx-RHCP Linear • Tx-V and Rx-H • Tx-H and Rx-V
	Tx to Rx Isolation	80 dBc
	Radar rejection	DC to 3.1 GHz 60dB min. 4.5 to 4.9 GHz 60dB min.
	Radiation Patterns	FCC 25-209 and 1st side lobe : 17 dBc over 2 degrees
Ku-band	Rx Frequency	10.7 GHz ~ 12.75 GHz
	Rx Gain	47.3 dBi @ 11.85 GHz
	Tx Frequency	13.75 GHz ~ 14.5 GHz
	Tx Gain	48.2 dBi @ 14.25 GHz
	EIRP	67.5 dBW (125W BUC)
	CPI (Tx)	30 dBc
	G/T (EL deg. = 30°)	Min. 27.0 dB/K @ 12.75 GHz (28 dB/K by calculation)
	Polarization	Linear (Co-pol, Cross-pol) • Tx-V and Rx-H • Tx-H and Rx-V
	Tx to Rx Isolation	80 dBc
	Radar rejection	DC to 10 GHz 70 dB min.
	Radiation Patterns	FCC 25-209
Antenna Control Unit (ACU)		
Display		2 Line 40 Character Graphic VFD
Key		Touch Keys
LED Indicator		3 LEDs for Power, Tracking, Error
USB Port		PC Connection Firmware Upgrade Logs Download
RF Interface		Coaxial (Antenna Rx: N-type, Modem Rx: F-type)
Ship's Gyrocompass Interface		NMEA 2000, NMEA 0183
GPS		NMEA In, NMEA Out

PC Serial Interface	RS-232 (57,600 bps, 8, N, 1)
BUC M&C Interface	RS-232, Ethernet
Modem Interface	RS-232/RS-422, I/O Console, Ethernet
Ethernet Port	RJ 45, TCP/IP connection, Intellian LAN, Connection with iDirect modem (OpenAMIP)
Communication with ADU	FSK (400 MHz, 433 MHz)
ACU Installation	19-inch Rack Bracket Typ.
Link Gain	0 dB typ. (±3 dB)
Link Gain Ripple (any 216MHz)	<2 dB p-p
Input / Output Impedance	50 Ω
Power Source	110 ~ 220 V AC

10.2 Environmental Specification

Test	Intellian Standard		
Vibration	- MIL-STD-167A-1 - IEC 60945		
Shock	According to MIL-STD-810, IEC 60068-2-27 (10g/11ms, 20g/7ms)		
Temperature	Operational	Survival	Storage
	-25 °C ~ +55 °C	-40 °C ~ +85 °C	-40 °C ~ +85 °C
Damp Heat	- Preconditioning (3 hours (±30 min)) - Temp.: 25 °C ± 3 °C - Humidity: more than 95 % 9 hours (±30 min) at 55 °C ±2 °C, 93 % ±3 % (humidity) 3 to 6 hours temperature fall 9 to 6 hours at 25 °C ±3 °C, more than 95 % (humidity) 2 cycles		
Salt Mist	- Number of spraying: 4 - Storage period in damp chamber: 7days after each spraying, 28 days total - Spraying duration: 2 Hour - Temperature: 25 °C ±10 °C - Saline solution: 5 %NaCl, PH6.5 to 7.2 at 20 °C ±2 °C - Storage temperature: 40 °C ±2 °C - Humidity in chamber during storage: 93 % +2 %, -3 % - IEC-60068-2-52		
Cold Test	2 hours at -40 °C ±2 °C		
Solar Radiation	Operational at +32 °C ambient air temperature with the addition of 670 Watt/m ² of solar radiation per IEC 60945-Annex B.		
Humidity	Operational per IEC 60068-2-30, Test Db, Variant 1		
Altitude	In a stowed configuration for shipping, shall survive without damage when exposed to altitudes to 15,000 feet or 4572 meters.		
Dry Heat	- Relative Humidity: Max. 55 % 16 hours at 55 °C +2 hours at 70 °C - Tolerances: Temp.: ±2 °C - Humidity: ±10 %		
Waterproof	Resistant to water penetration sprayed from any direction Standard: IPX6		
Wind Speed	125 mph		
Packaging	Comply with ISTA 3. Additionally, packaging shall be designed with proper mechanical bracing to prevent Terminal equipment damage from shipment per ISTA 3.		
MTBF	At least 40,000 hours		

Chapter 11. Warranty

Intellian systems are warranted against defects in parts and workmanship, these warranties cover THREE (3) 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, or date of installation which is come sooner. Providing maximum 6 months Warranty additionally if submission of authorized form which is described installation occurs within 6 months from the shipment date.

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/disDualbutor 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/disDualbutor 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. Power Switch Unit

Connect the power to the Power Switch Unit for the antenna and Air-Conditioner unit.

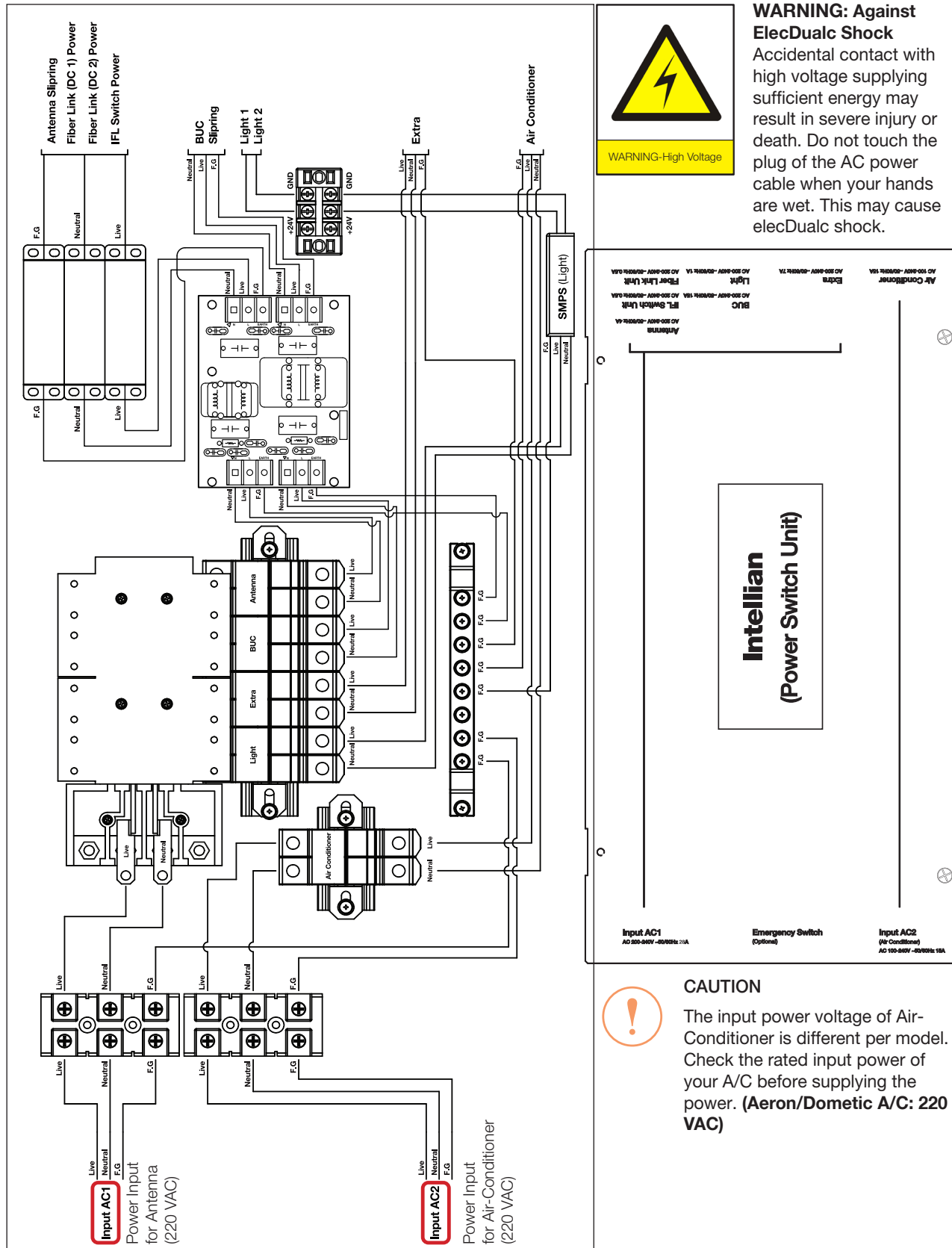


Figure 115: Power Switch Unit

12.3 Appendix C. Fiber Link Options

If you need to extend the connection from the below deck unit (ACU) to the antenna beyond 120 m distance, you can use Intellian Fiber Link which supports up to 2 km length connection with no signal loss.

12.3.1 Introduction of Fiber Links

Intellian Fiber Link is an optical communication system providing a connection between the VSAT antenna and Antenna Control Unit (ACU) with a lossless signal transmission. It reduced two standard RF cables (TX & RX) into a single Fiber Optic cable which is extendable up to 2 km distance. Compact and durable Fiber Optic cables are supplied for the simple installation of the Fiber Link system. SC-APC type Fiber Optic connectors are quick, easy, and secure to connect.

The Fiber Link consists of a Above Deck Unit (ADU) and a Below Deck Unit (BDU). The ADU is a Fiber Link Module which is mounted on the Air-Conditioner frame of the Antenna. The BDU is either Fiber Link Module or Fiber Link Integrated ACU. The Fiber Link Module is a 1U Rack type of unit and operates with an ACU and a modem through cable connections. The Fiber Link Integrated ACU is a combined unit of Fiber Link BDU Module and ACU.

12.3.2 Fiber Link Products

Fiber Link Model No.	Above Deck Unit (ADU)	Below Deck Unit (BDU)		Applicable Antenna Models
	ADU Module	BDU Module	Fiber Link Integrated ACU	
*FO-1V16 Recommended for v240M 2	● Model: FO-1V26	● Model: FO-1V36	N/A	v240C, v240K, v240M, v240M 2
*FO-1V46		N/A	● Model: VP-T53J	
*FO-1V56		N/A	● Model: VP-T53B	v240MT P/N: VM2-243-xxxx VM2-247-xxxx
*FO-1V67	● Model: FO-1V27	N/A	● Model: VP-T53G	v240MT P/N: VM2-24E-xxxx VM2-24F-xxxx

NOTE

* : Includes one ADU and one BDU of Fiber Link.

ADU module, BDU module and Fiber Link integrated ACU models can be ordered separately for replacement.

12.3.3 Cable Connection of v240M 2 with Fiber Link (FO-1V16)

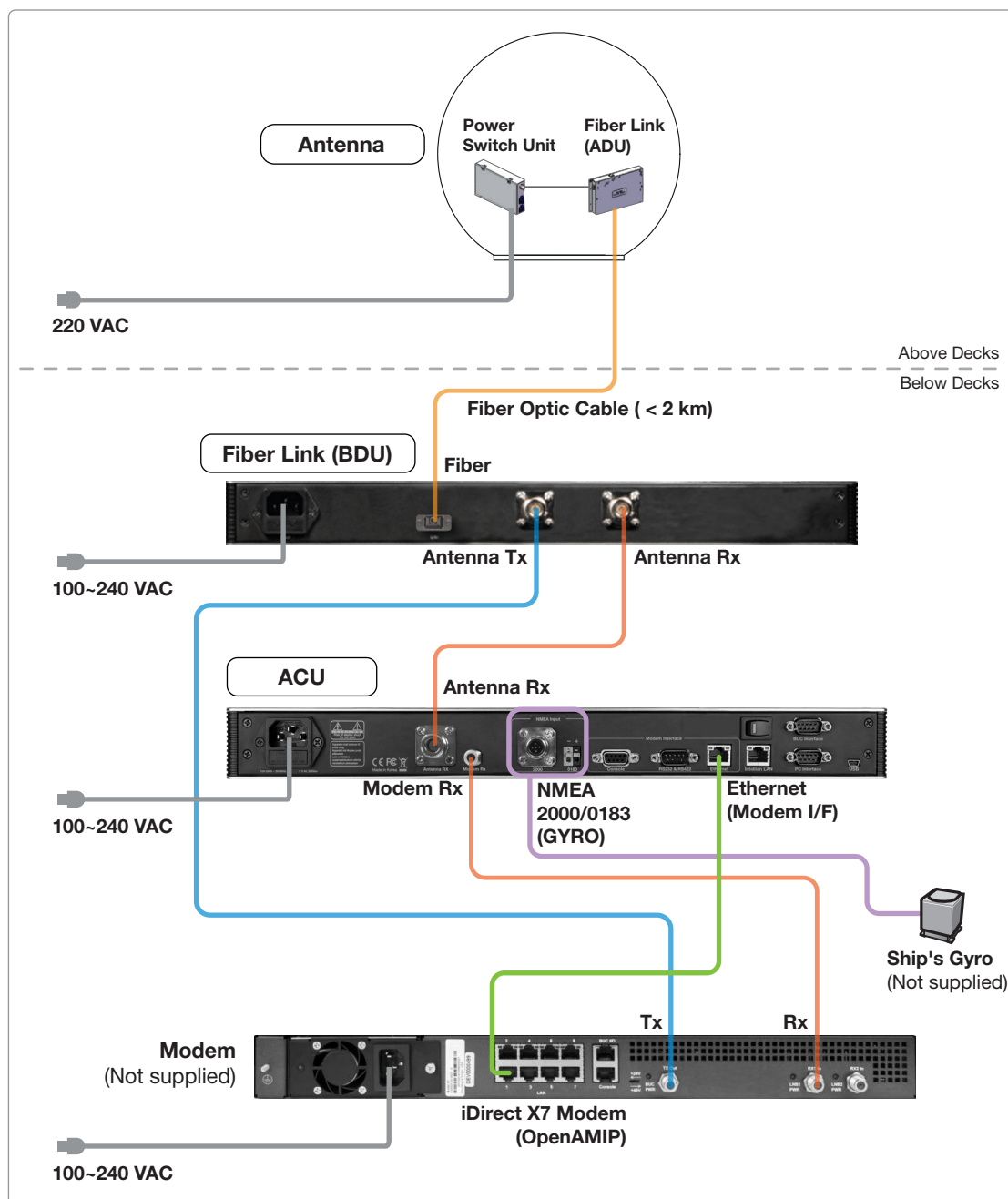


Figure 116: Cable Connection of Antenna System with Fiber Link

12.4 Appendix D. Glossary

Term	Meaning
ACU	Antenna Control Unit
ADE	Above Decks Equipment
ADU	Above Deck Unit
AIU	ATC/LTE Interface Unit
APC	Angled Physical Contact
ATA	Analog Telephone Adapter
ATC	Ancillary Terrestrial Component (rejection circuit)
AZ	Azimuth
BAT	BGAN Application Tester
BDE	Below Decks Equipment
BDU	Below Deck Unit
BGAN	Broadband Global Network
BMCP	BGAN Multi Channel Physical (layer tester)
BRM	BGAN Radio Module
BUC	Block UP Converter
CL	Cross Level
DDC	Dual Data Center
DVB	Digital Video Broadcasting
EIRP	Equivalent Isotropic Radiated Power
EL	Elevation
EoC	Ethernet over Coaxial
FB	Fleet Broadband
FC	Fiber Channel
FCC	Federal Communications Commission
FEM	Front End Module
GEO	Geostationary Earth Orbit
GND	Ground
GNSS	Global Navigation Satellite System
GPIO	General Purpose Input/Output
GPS	Global Positioning System
GUI	Graphic User Interface
IF	Intermediate Frequency
IFL	Interfacility Link
LEO	Low-Earth Orbit
LNB	Low Noise Block (downconverter)
LTE	Long-Term Evolution (rejection circuit)
M&C	Monitor and Control
MA	Micro-Antenna
MCU	Main Control Unit
MEO	Medium Earth Orbit
NBD	Narrow Band Detector

Term	Meaning
NID	Network ID
NMEA	National Marine Electronics Association
NOC	Network Operation Center
PBX	Private Branch Exchange
PC	Personal Computer
POTS	Plain Old Telephone Service
RF	Radio Frequency
R-USIM	Remote USIM
SDC	Single Data Center
SDK	Software Development Kit
SNMP	Simple Network Management Protocol
SNR	Signal to Noise Ratio
TFT	Tack Free Time
TVRO	Television Receive Only
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
VSAT	Very Small Aperture Terminal