Date	June 24, 2024

NISSHINBO

Released

- Specification -

Ku-band 4W BUC

Model No. NJT8304 series

RF Frequency	Local Frequency	IF Frequency
13.75 to 14.5 GHz	12.8 GHz	950 to 1,700 MHz
14 to 14.5 GHz	13.05 GHz	950 to 1,450 MHz

Output Power @ 1dB G.C.P.: +36 dBm (4W)
IF Input Interface: N-type / F-type, Female Connector
DC Power / Ref. (10MHz) Input: IF Connector
RF Output Interface: Waveguide, WR-75
DC Power Voltage Range: +12 to +30 V

Caution

1. While Nisshinbo Micro Devices Inc. (NISD) continually strives to improve the quality and reliability of our products, failures will occur in microwave products over time. For this reason, it is important that customers fulfill their responsibilities to ensure designed-in safety – including failsafe functions, redundancy, and measures to prevent malfunctions and the spread of fire – in order to avoid injuries, accidents, or social repercussions resulting from the failure of any products related to satellite communications on this document (hereinafter, "the product"). Customers must pay careful attention to ensuring the safety of their equipment.
2. The product is designed and tested to function in accordance with its specifications. Do not use under conditions that deviate from the product specifications included in the delivery specifications. NISD assume no responsibility and shall not be liable for any injuries, accidents, or social repercussions resulting from the product being in a poor or damaged state because it was used under conditions that depart from the specifications.
3. The product is covered by a warranty for one year following delivery unless otherwise stipulated in the contract or delivery conditions. In the event of a failure for which NISD are responsible occurring during the warranty period, NISD undertake to repair or replace the product free of charge. Note, however, that the warranty does not cover failures such as those listed here (see bullets below), even if they occur within the warranty period. In addition, in the case of a product being repaired or replaced by us, the starting date for the warranty period is still the original delivery date of the product.
   - Failure due to the product being used in conditions other than those stipulated in the data sheet, specification sheet, etc.
   - Failure due to modifications or repairs carried out by some entity other than our company
   - Failure determined to be the result of unsuitable maintenance or replacement of a consumable item that requires due maintenance
   - Failure due to circumstances that were unforeseeable given the scientific/technological standards at the time of shipment
   - Other failures due to external factors such as fire, earthquake, flood and power supply anomalies for which NISD are not responsible

   In addition, the product warranty is limited to the provision of repair services or replacement at no cost. It does not cover secondary damage (to equipment, business opportunities, profits, etc.) or any other damage that may have resulted from failure of the product.
4. The product must be handled appropriately to ensure its continued reliability. Since it can be damaged by the intrusion of water, dust, oil, chemicals, etc., it must be given appropriate protection. Even in the case of a product with an airtight construction, avoid using it in an environment that exceeds the stated levels of waterproofing/dustproofing. Also, be sure to use connectors and waveguides properly.
   If replacement parts such as fans are included, proper maintenance is necessary. To maintain product performance and functionality, it is necessary to conduct inspections and maintenance at appropriate intervals and exchange replacement parts when necessary. Improper inspections or maintenance may result in failure.
   In addition, the warranty does not cover the use of the product in areas where salt damage can be expected or where there is a substantial presence of corrosive gases such as Cl_2, H_2S, SO_2, and NO_2. If the product is to be used in such areas, at the time of installation you must take appropriate steps to protect the product.
5. If the product is to be used with equipment/systems that must meet special quality and reliability standards (aerospace equipment, medical equipment, power generation control equipment, automotive/railway transportation equipment, safety equipment, disaster prevention and security equipment, etc.), please consult with our sales staff in advance.
6. Some products contain gallium arsenide (GaAs), classified as a harmful substance. To avoid danger, do not incinerate, crush, or chemically treat the product in such a way that gases or dust are released. When disposing of the product, comply with all applicable laws and regulations and do not treat it as general industrial waste or household waste.
7. When exporting a product or technology, observe export laws and regulations such as those governing foreign exchange and foreign trade, and obtain any necessary licenses for export, service transactions, etc.
   NISD request that you do not use our products or the technical data published on this document for developing weapons of mass destruction or for any other military purposes or applications.
8. The product specifications in this document are subject to change without notice. If you are considering using a product, delivery specifications must first be settled.

＊Above Specifications are subject to change without notice.

Scope

This BUC is designed for the block up-converter intended for the satellite communication data uplink application in Ku-band. It can transmit an RF signal (Ku-band: 14.0 to 14.5 GHz or 13.75 to 14.5 GHz) output with up to 4W (+36 dBm) linear as output power @ 1 dB G.C.P. (P1dB). It is combined a GaAs high power amplifier and a block up-converter with a phase locked local oscillator (13.05 GHz or 12.8 GHz) which is synchronized with external 10MHz reference.

The BUC receives a reference signal (10 MHz) and an IF signal (L-band: 950 to1,450 MHz or 950 to 1,700 MHz) input and transmits an RF signal (Ku-band: 14.0 to 14.5 GHz or 13.75 to 14.5 GHz) output. It is operated by +24 V DC power (Range: +12 to +30 V) input.

The BUC comes in a single, weatherized housing rated for outdoor use and has either an N-Type or F-type female connector as IF input, a WR-75 waveguide flange as RF output.

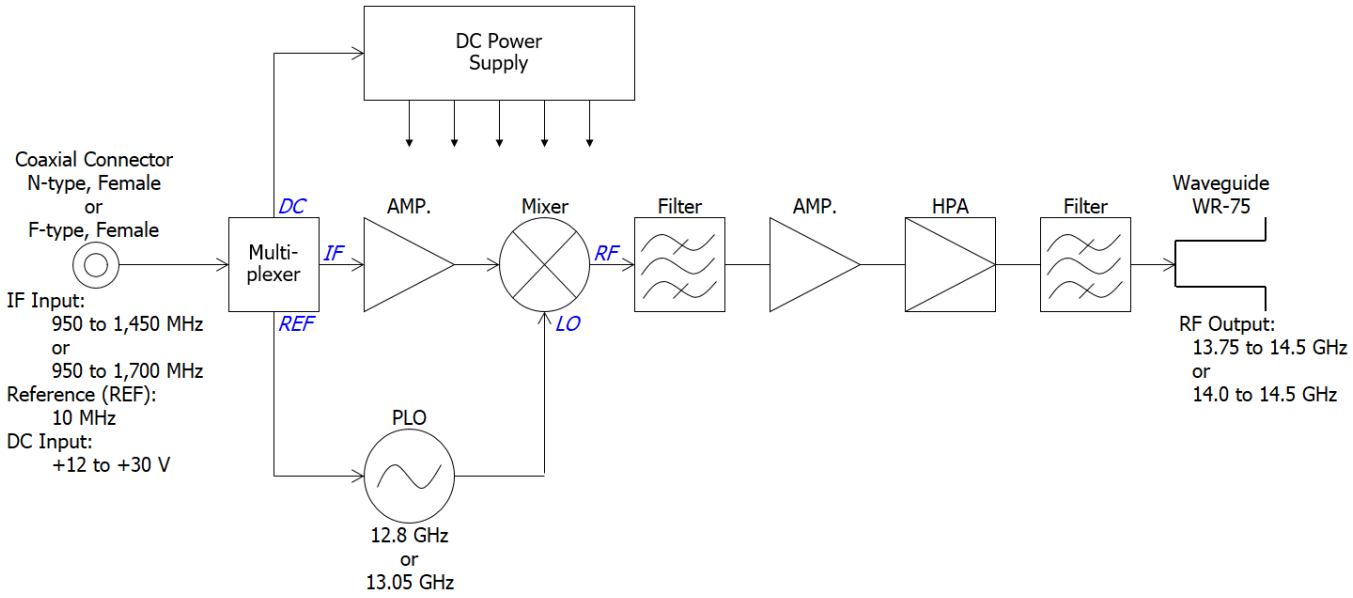

Fig.1 Functional Block Diagram

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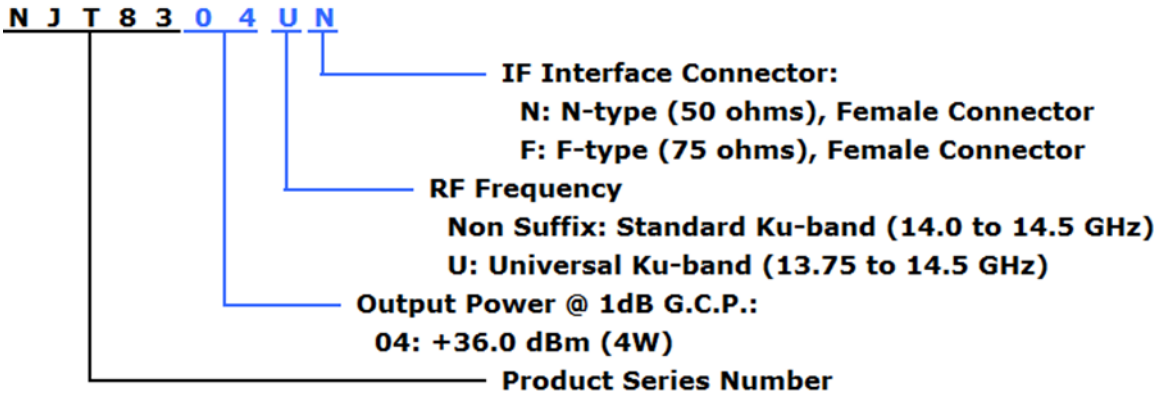
Series Model Number

- Numbering System



- Line-up

Model No.	RF Frequency	Local Frequency	IF Frequency	Output Power @ P1dB	IF Connector	Power Supply
NJT8304N	14.0 to 14.5GHz (Standard Ku-band)	13.05 GHz	950 to 1,450 MHz	4W Linear (+36dBm min.)	N-type	+12 to +30 V DC Power
NJT8304F					F-type	
NJT8304UN	13.75 to 14.5GHz (Universal Ku-band)	12.80 GHz	950 to 1,700 MHz		N-type	
NJT8304UF					F-type	

＊Above Specifications are subject to change without notice.

1. Electrical Specifications

#	Items	Specifications
1.1.	Output RF Frequency Range	
	<Universal Ku-band>	13.75 to 14.5 GHz
	<Standard Ku-band>	14 to 14.5 GHz
1.2.	Input IF Frequency Range	
	<Universal Ku-band>	950 to 1,700 MHz
	<Standard Ku-band>	950 to 1,450 MHz
1.3.	Maximum IF Input Level (without damage)	+13 dBm max.
1.4.	Conversion Type	Single, fixed L.O.
1.5.	L.O. Frequency	
	<Universal Ku-band>	12.8 GHz
	<Standard Ku-band>	13.05 GHz
1.6.	Frequency Sense	Positive
1.7.	Output Power @ 1dB G.C.P. (P1dB)	+36.0 dBm min. over temperature
1.8.	Linear Gain	62 dB nom., 56 dB min.
1.9.	Gain Variation over frequency @ fixed temperature	
	<Universal Ku-band>	5 dBp-p max. over 750 MHz 2 dBp-p max. over any 54 MHz
	<Standard Ku-band>	5 dBp-p max. over 500 MHz 2 dBp-p max. over any 54 MHz
1.10.	Gain Stability over temperature @ fixed frequency	5 dBp-p max. 2 dBp-p typ.
1.11.	ACPR	-26 dBc typ. @ Pout = +35.5 dBm
1.12.	Requirement for External Reference [Frequency] [Input Power] [Phase Noise]	 10 MHz (sine-wave) -5 to +5 dBm @ Input port -120 dBc/Hz max. @ 100 Hz -130 dBc/Hz max. @ 1 kHz -140 dBc/Hz max. @ 10 kHz
1.13.	L.O. Phase Noise	-60 dBc/Hz max. @ 100 Hz -70 dBc/Hz max. @ 1 kHz -80 dBc/Hz max. @ 10 kHz -90 dBc/Hz max. @ 100 kHz -100 dBc/Hz max. @ 1MHz

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#	Items	Specifications
1.14.	Spurious @ Pout = +36 dBm	
	[In-band]	-50 dBc max. @ RF Frequency
	[Receive band]	-70 dBm max. @ 10.95 to 12.75 GHz
	[Out-of-band]	-50 dBc max.
1.15.	Receive Band Noise Density	
	<Universal Ku-band>	* In case of RF Freq.:14 to 14.5 GHz -156 dBm/Hz max. @10.95 to 12.25 GHz * In case of RF Freq.:13.75 to 14 GHz -156 dBm/Hz max. @10.95 to 12.25 GHz -142 dBm/Hz max. @12.25 to 12.75 GHz
	<Standard Ku-band>	* In case of RF Freq.:14 to 14.5GHz -156 dBm/Hz max. @ 10.95 to 12.75 GHz
1.16.	Noise Figure	18 dB nom., 23 dB max.
1.17.	Input Impedance	
	<N-type Model>	50 ohms nom
	<F-type Model>	75 ohms nom.
1.18.	Input V.S.W.R.	2 : 1 max.
1.19.	Output V.S.W.R.	2 : 1 max.
1.20.	Output Load V.S.W.R.	
	[Recommendation]	1.3 : 1 max.
	[Non Damage]	Infinite : 1
1.21.	DC Power Requirement	
	[Voltage Range]	+24 VDC (+12 to +30 VDC)
	[Power Consumption]	28 W typ., 32 W max. @ Pout = +36 dBm 20 W max. @ No IF, +25 ºC 2 W max. @ 10 MHz reference off (Mute on)
1.22.	Mute	Shut off the HPA in case of L.O. unlocked or no 10 MHz reference signal.

＊Above Specifications are subject to change without notice.

2. Mechanical Specifications

#	Items	Specifications
2.1.	Input Interface	IF / Ref. / DC Power Input:
	<N-type Model>	N-type female connector, 50 ohms
	<F-type Model>	F-type female connector, 75 ohms
2.2.	Output Interface	Waveguide, WR-75 (with Grooved)
2.3.	Dimension & Housing	98 (L) × 98 (W) × 42.5 (H) mm [3.86" (L) x 3.86" (W) x 1.67" (H)] without interface connectors and screws
2.4.	Weight	500 g [1.1 lbs]

3. Environmental Specifications

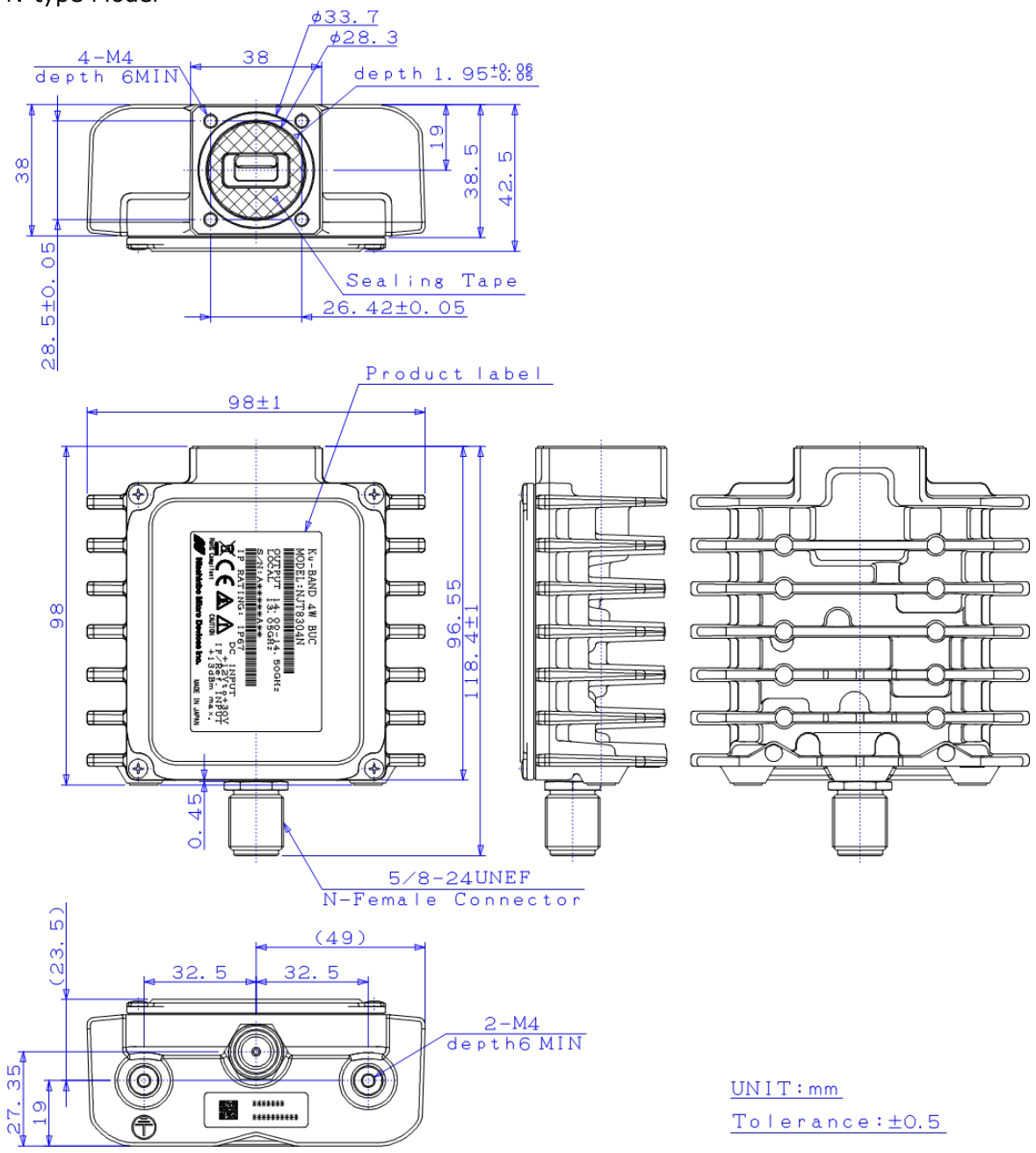
#	Items	Specifications
3.1.	Temperature Range (ambient) [Operating] [Storage]	 -40 to +60 ºC *1 -40 to +75 ºC
3.2.	Humidity	0 to 100 % RH
3.3.	Altitude	15,000 feet (4,572 m)
3.4.	Vibration	5 G [49.03 m/s^2] (3 axis, 50 Hz to 2 kHz) 1 mm p-p (3 axis, 5 to 50 Hz)
3.5.	Shock	30 G [294.20 m/s^2] (3 axis)
3.6.	Waterproof / Dustproof (IP Code)	IP 67
3.7.	Regulations	EU Directive (CE Marking) RE - 2014/53/EU EMC - 2014/30/EU RoHS - 2011/65/EU + (EU)2015/863 Safety: EN62368-1, EN60950-22

*1: Conditioned on connection with waveguide.

＊Above Specifications are subject to change without notice.

4. Outline Drawing

4.1. N-type Model



CAUTION

Items	Description
Sealing Tape	Do not remove the sealing tape on the waveguide. If the sealing tape is removed, it will lose the performance of waterproof and also it will become out-of-warranty.
Hot Surface	Whole of body and heat sink is hot when this unit is powered, and even after power is disconnected until it is cooled down. Do not touch hot surface to avoid a burn hazard.
RF Radiation	A radiation hazard exists if this unit is operated with its RF signal output unterminated. Do not operate this unit without a load or termination attached to the RF signal output.

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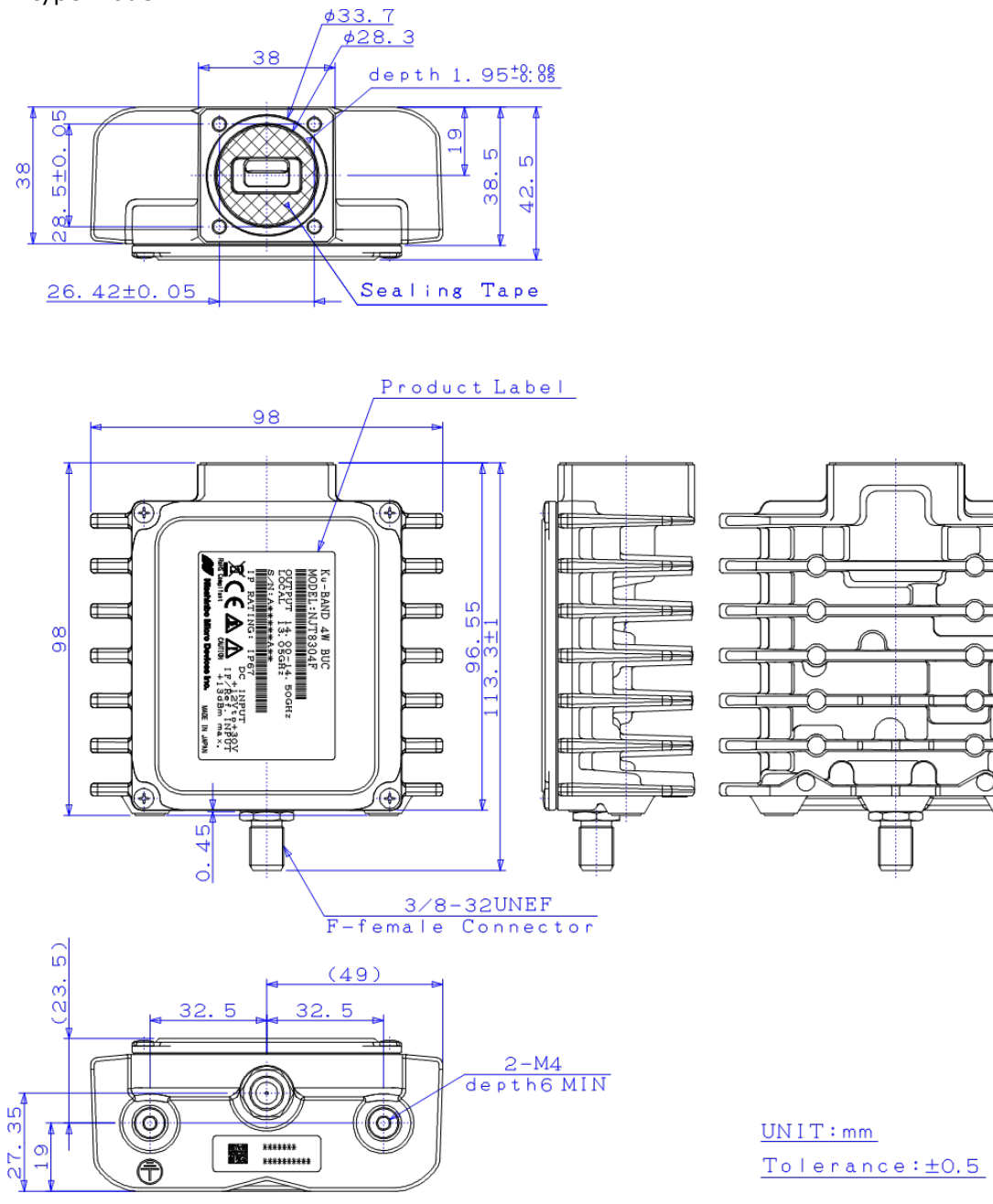
4.2. F-type Model



5. CAUTION

Items	Description
Sealing Tape	Do not remove the sealing tape on the waveguide. If the sealing tape is removed, it will lose the performance of waterproof and also it will become out-of-warranty.
Hot Surface	Whole of body and heat sink is hot when this unit is powered, and even after power is disconnected until it is cooled down. Do not touch hot surface to avoid a burn hazard.
RF Radiation	A radiation hazard exists if this unit is operated with its RF signal output unterminated. Do not operate this unit without a load or termination attached to the RF signal output.

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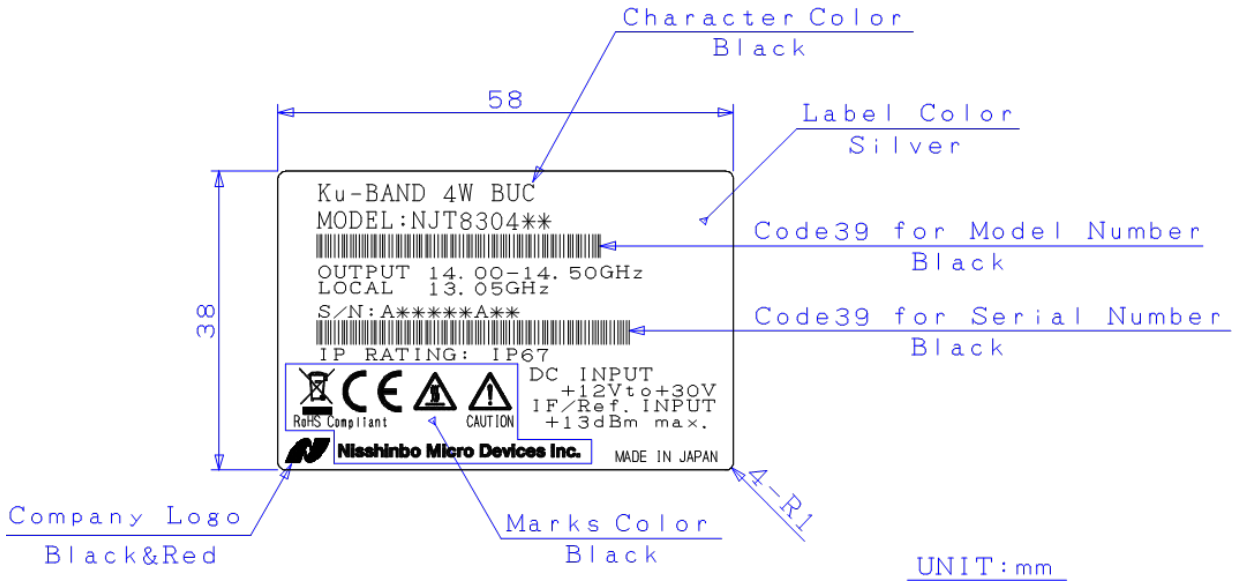
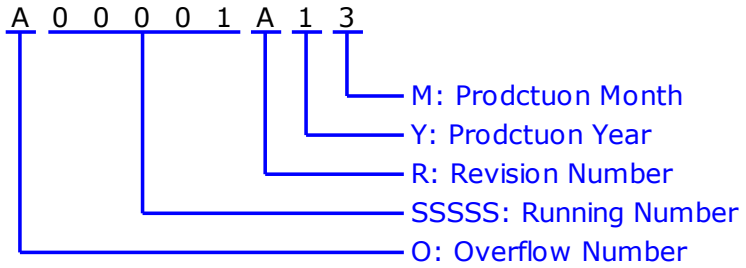
6. Label

6.1. Label Outline



6.2. Definitions

Serial Number (OSSSSSRYM) - ALPHANUMERIC (9 characters)



O: Overflow Number - ALPHABET (1 character)
"A" to "T" except "I" and "O", e.g.: A99999 ⇒ B00001
"V" to "Z": Specified Numbers

SSSSS: Running Number - NUMBER (5 digits)
"00001" to "99999"

R: Revision Number - ALPHABET (1 character)
"A" to "Z" except "I", "O", and "U"

Y: Prodctuon Year - NUMBER (1 digits)
"0" to "9", Last Digit of Calender Number
e.g.: 2021:"1", 2022:"2", 2023:"3"・・・・

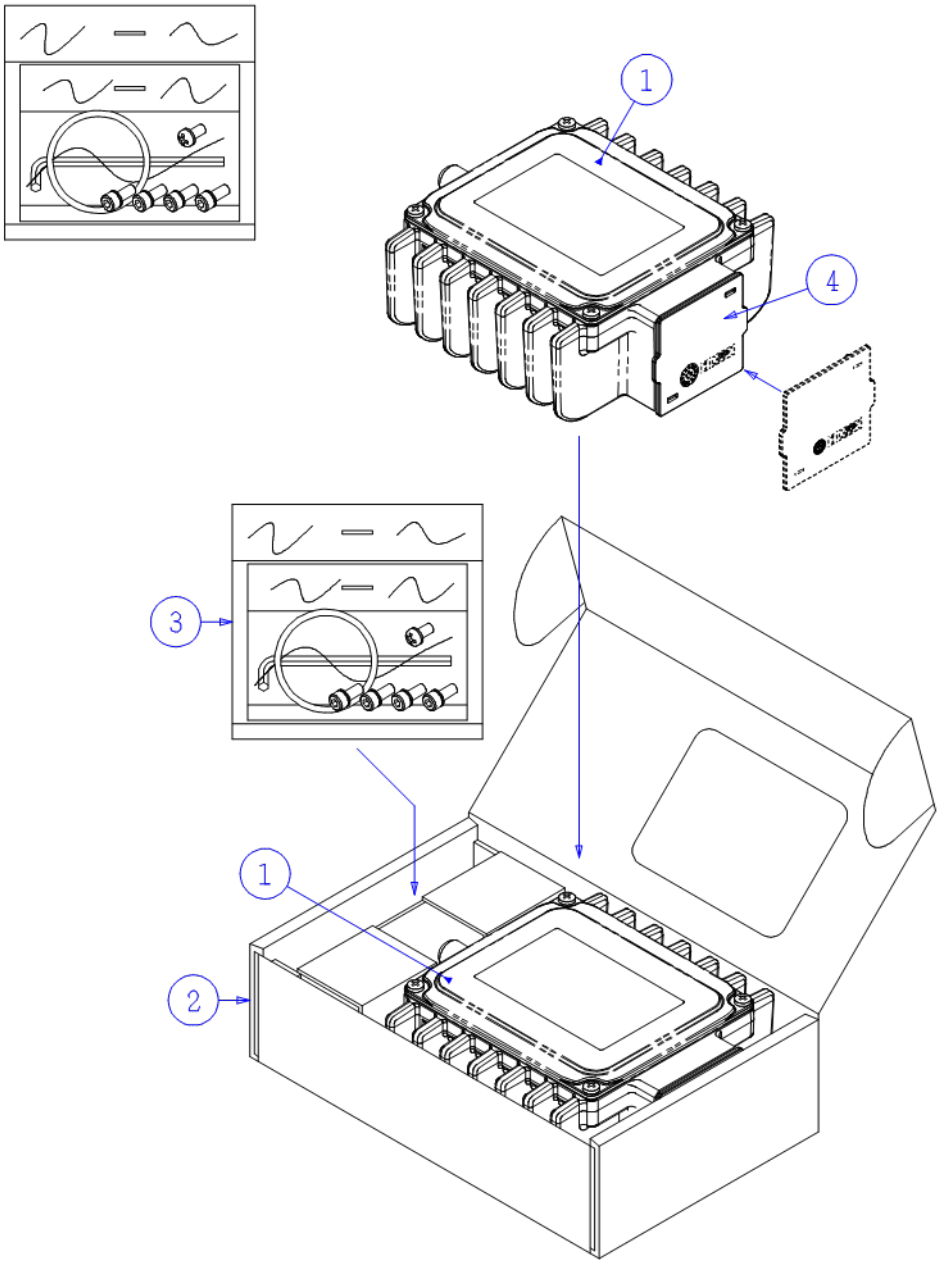
M: Prodctuon Month - ALPHANUMERIC (9 characters)
"1" to "9", "X" as October, "Y" as November, "Z" as December

＊Above Specifications are subject to change without notice.

7. Package

7.1. Individual Package

Accessories
・O-ring
・Cross Recessed Head Screws
M4×6 1 piece(SUS, SW) for Ground Hole
・Hexagon Socket Head Bolts
M4×10 4Pieces(SUS, SW and W) for Waveguide Flange Holes
・Hexagon Wrench Keys(M4Type)

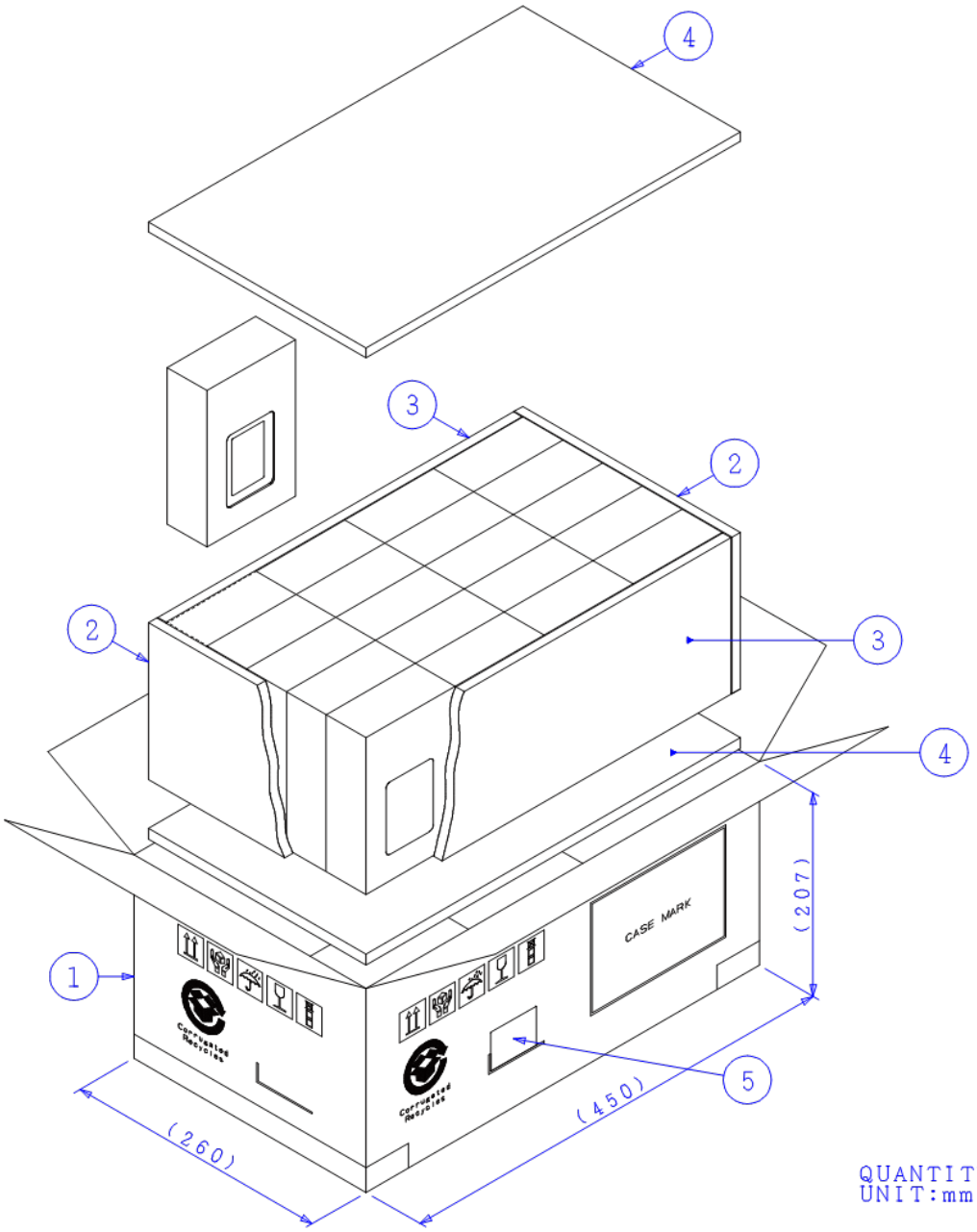


①:BUC
②:Single Wall Corrugated Fiberboard
③:Accessories
④:Polypropylene Flange Cover

UNIT:mm

＊Above Specifications are subject to change without notice.

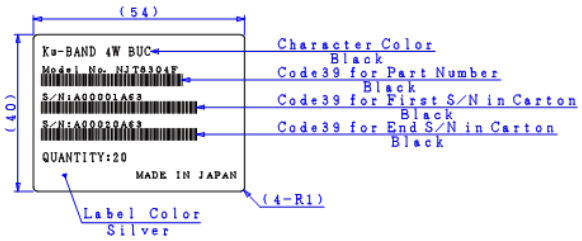
7.2. Shipping Package



QUANTITY:20
UNIT:mm

Pictorial Marking for Handling of Goods

Package Label



①:Double Wall Corrugated Fiberboard
②:Polystyrene Foam for Package Cushioning
③:Polystyrene Foam for Package Cushioning
④:Polystyrene Foam for Package Cushioning
⑤:Package Label

＊Above Specifications are subject to change without notice.

8. Handling Precautions

8.1. DANGER

This statement indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Items	Description
Input Voltage	Only input a DC voltage within the range indicated in specifications. Do operate with the input voltage range between +12 and +30 V DC power. When applying higher voltage than specifications (+30 V as maximum voltage in DC power requirement), it will not only cause this unit failure, but it may also result in electric shock and fire.
Disassembling	Do not disassemble the unit. Disassembling will not only cause this unit failure, but it may also result in electric shock.

8.2. WARNING

This statement indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Items	Description
RF Radiation	A radiation hazard exists if this unit is operated with its RF signal output unterminated. Do not operate this unit without a load or termination attached to the RF signal output.
Hot Surface	Whole of body and heat sink is hot when this unit is powered, and even after power is disconnected until it is cooled down. Do not touch hot surface to avoid a burn hazard.

8.3. CAUTION

This statement indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. The statement may also be used to indicate other unsafe practices or risks of property damage.

Items	Description
Disposal	This unit contains gallium arsenide (GaAs), classified as a harmful substance. To avoid danger, do not incinerate, crush, or chemically treat the unit in such a way that gases or dust are released. When disposing the unit, comply with all applicable laws and regulations and do not treat it as general industrial waste or household waste.

8.4. NOTE

This statement is used to notify of installation, operation, or maintenance information that is important, but not hazard-related.

Items	Description
Mounting	Do not block fins of this unit to keep the heat dispassion performance. Normally the unit should be mounted with long fins face up.
Grounding	To reduce the risk of damage or broken by lightning surge, the unit should be grounded by connecting the ground wire.
Torque Management	Do not tighten with excessive torque when attaching screws/bolts and connectors. The following value as tighten torque is recommended. ■ Screws/Bolts - M4: 1.52 ± 0.152 N·m ■ IF Connector (N-type / F-type): 0.68 to 1.13 N·m (3.92 N·m as maximum allowable torque. When over this torque, connector may be damaged.)
Weatherproof	The unit mounted in outdoor should be conducted with adequately weatherproof procedure. Do seal all of cable connection points from the connector to the cable sheath by usage of self-amalgamating tape. Ensure the waveguide connection is properly assembled with the enclosed o-ring gasket as accessories. The o-ring gasket is full-type and it is assumed to connect the unit to a flat waveguide flange.
Waveguide Sealing Tape	Do not remove the sealing tape on the waveguide. If the sealing tape is removed, it will lose the performance of waterproof and also it will become out-of-warranty.

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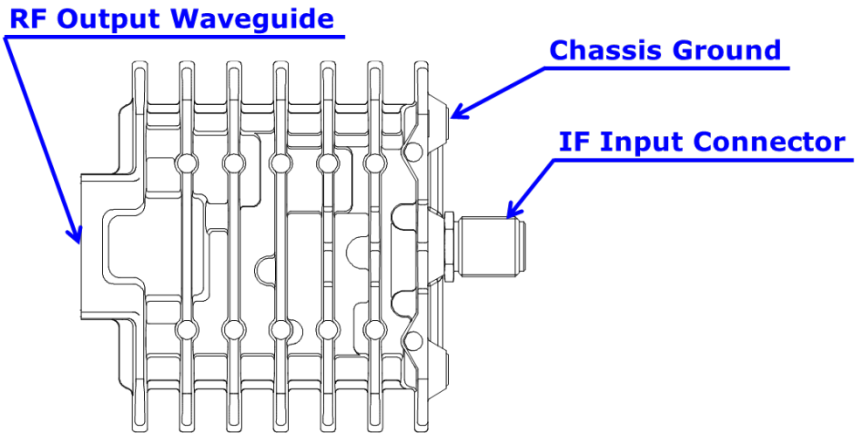
Items	Description
Input Voltage	Do operate with the input voltage range between +12 and +30 V DC power. Avoid applying more than the maximum voltage in this range (including ripple voltage) under any conditions.
Input IF Signal Power	Do not supply the input IF signal over the maximum level (+13 dBm), which is indicated on the product label.
Input 10MHz Signal Power	The 10 MHz reference signal should be supplied with the range between -5 and +5 dBm with sine-wave for correctly operation. Do not supply the signal level of more than +13 dBm, which is indicated on the product label.
High Temperature Operation	It may cause damage and/or degradation of reliability / lifetime to operate the unit in a condition where the ambient temperature exceeds the maximum value, +60 °C, at operating temperature described in the specifications.
Vibration / Shock	When vibration and/or shock impact exceeding the conditions described in the specifications is applied, internal parts may be damaged.
Warranty	The unit is covered by a warranty for one(1) year following delivery unless otherwise stipulated in the contract or delivery conditions. Repairs may be possible under payment of charge even for the unit whose warranty period has expired. Opening, removing, disassembling and modifying any parts and components (including the product label, sealing tape and screws) without fan equipment will immediately void the warranty. In any case, the unit of invalid warranty cannot be repaired.

＊Above Specifications are subject to change without notice.

8. Instructions Manual

8.1 Descriptions

This section describes the information of connectors and etc.



Items	Description	Purpose
RF Output Waveguide	Waveguide: WR-75 Flange: Square Cover Grooved (Equivalent to PBR 120)	The BUC transmits an RF signal of Ku-band (13.75 to 14.5 GHz, or 14 to 14.5 GHz) output with up to 4W (+36 dBm) linear as output power @ 1 dB G.C.P. (P1dB) via this waveguide.
Chassis Ground	M4 Screw	Common chassis ground / frame ground.
IF Input Connector	F-type Female Coaxial Connector, 75 Ohms OR N-type Female Coaxial Connector, 50 Ohms	The BUC inputs an IF signal of L-band (950 to 1,450 MHz, or 950 to 1,700 MHz), and requires to supply +12 to +30 V DC power and a 10 MHz reference signal via this connector.

8.2 Connection and Installation

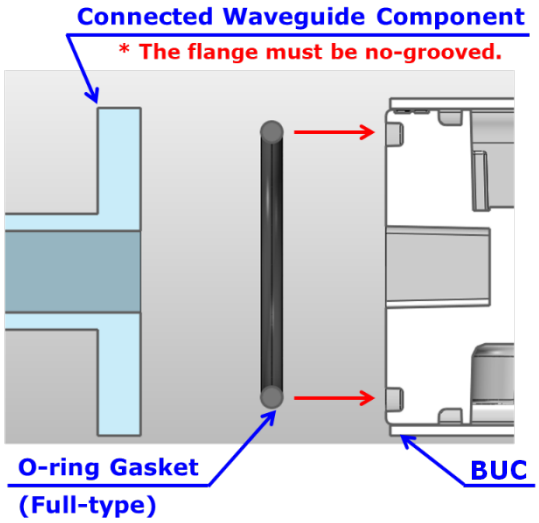
This section describes basic installation for the BUC.

8.2.1 Mounting Configuration

The Unit can be mounted with OMT or the waveguide filter of the satellite antenna.

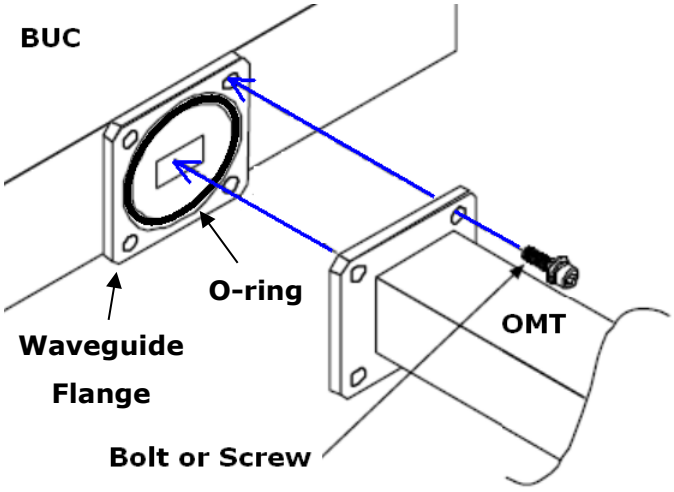
When mounting with the OMT or the waveguide filter, the following steps should be complied:

Step 1: Verify that the groove on the waveguide flange for a gasket is clean.
The enclosed o-ring gasket as accessories is full-type and it is assumed to connect the BUC to a flat waveguide flange (non-grooved waveguide flange). Insert the o-ring gasket the groove as shown in the figure on the right. The o-ring gasket and flange groove dimensions is customized and optimized for this BUC; therefore any other o-ring gasket than the enclosed accessory is not permitted for using.



Step 2: Secure the OMT or the filter to the BUC by tightening the enclosed Phillips head screws (M4 x 10 mm) with 1.52 ± 0.152 N·m torque as shown in the figure below, when the thickness of the flange of the OMT or filter is assumed to be 3 to 5 mm. The enclosed washers as accessory must be inserted to bolts before tightening bolts.
When the thickness is exceed 5 mm, the appropriate length screws or bolts based should be prepared on the table on the right.

Flange Thickness of OMT/Filter	Screw Length
3 to 5 mm	10 mm
5 to 7 mm	12 mm
7 to 9 mm	14 mm
9 to 11 mm	16 mm



NOTE

✓ The BUC must be adequately weatherproofed to place in outdoor.
Ensure that the waveguide joint is properly sealed with the enclosed o-ring gasket.

＊Above Specifications are subject to change without notice.

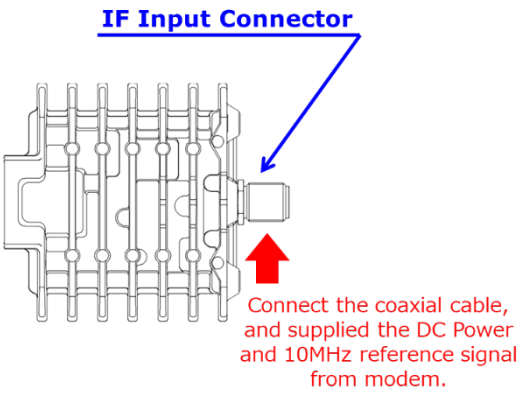
8.2.2 Connecting Coaxial Cable

The BUC is connected the modem with a coaxial cable, and requires to supply +12 to +30 V DC power and a 10 MHz reference signal from the modem.

The connection of coaxial cable should be complied with the following steps:

Step 1: Connect the coaxial cable with the N or F-type male connectors to the coaxial connecter equipped with the BUC which is shown in the figure on the right below under 0.68 to 1.13 N·m tighten torque.

Step 2: Use self-amalgamating tape to seal connector and cable entry points from the connector to the cable sheath.



Do not power on the modem before finishing all of steps of Connecting Coaxial Cable.

NOTE

✓ The BUC must be adequately weatherproofed to place in outdoor.
Do seal all of cable connection points from the connector to the cable sheath by usage of self-amalgamating tape.

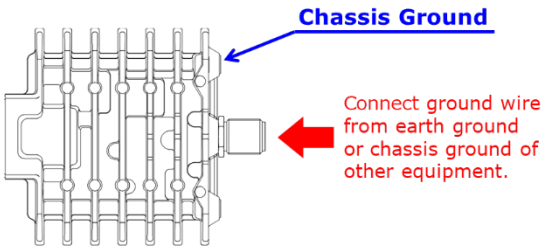
8.2.3 Connecting Ground Wire for Chassis Ground

The BUC can be had the chassis ground of the other equipment (e.g. modem) in common.

Connecting wire for common chassis ground from the chassis ground of the other equipment should be complied with the following step:

Tools Required: #2 Phillips screwdriver

Step: Connect the ground wire from earth ground or chassis ground of other equipment to the chassis ground with M4 x 6 mm Philips pan head screw under 1.52 ± 0.152 N·m tighten torque.



NOTE

✓ To reduce the risk of damage or broken by lightning surge, the unit should be grounded by connecting the ground wire.

＊Above Specifications are subject to change without notice.

8.2.4 Start-up

Start-up will be immediately performed with the following step:

Step: Power on the modem and supply the DC voltage and 10 MHz reference from modem.

DANGER

✓ Only input a DC voltage within the range indicated in specifications.
Do operate with the input voltage range between +12 and +30 V DC power.
When applying higher voltage than specifications (+30 V as maximum voltage in DC power requirement), it will not only cause this unit failure, but it may also result in electric shock and fire.

NOTE

✓ The 10 MHz reference signal should be supplied with the range between -5 and +5 dBm with sine-wave for correctly operation.
Do not supply the signal level of more than +13 dBm.

✓ Do not power on the modem before finishing all of steps of Connection and Installation.