TEKTELIC Communications Inc.
7657 10th Street NE Calgary, Alberta
Canada, T2E 8X2

KONA MACRO GATEWAY

User Guide

Document Type:	**User Guide**
Document Number:	**T0005158_UG**
Document Issue:	1.0
Document Status:	Released
Product Name:	**Kona Macro Gateway**
Product Code:	See Table 1
Issue Date:	August 8, 2022

TEKTELIC Communications Inc.
7657 10th Street NE
Calgary, AB, Canada T2E 8X2
Phone: (403) 338-6900

Document Revision

Revision	Issue Date	Status	Editor	Comments
0.2	Jan. 11, 2018	Draft	S. Morrison	First release
0.3	Feb, 01, 2018	Draft	S. Morrison	Added language translation
0.31	Feb. 13, 2018	Draft	T. Danshin	Updated Table 1 and Table 4 to only reference North American models
0.32	Feb. 13, 2018	Draft	T. Danshin	Updated product descriptions in Table 1 and 4
0.33	Feb 14, 2018	Approved	T. Danshin	Updated MPE information
0.34	Feb 14, 2018	Approved	T. Danshin	Updated Radio Compliance Statements
0.4	Feb 15, 2018	Approved	S. Morrison	Restore Table 1 and Table 4 to show all certified models. Removed Section 3.
0.5	Apr 24, 2019	Approved	Z. Herasymiuk	Added North American 2 variant products to T-Code Table Added Pt 27 FCC to Regulatory Table
0.6	Jul 30, 2019	Approved	Z. Herasymiuk	Added Proposition 65 Statements
0.7	Mar 03, 2021	Approved	TEKTELIC	Added models
0.8	Jul 16, 2021	Approved	K. Minderhoud	Updated document template Updated Table 1 -Added Ch. Plan column
0.9	Mar 16, 2022	Approved	H. Gutta	Added T-Code for NA LTE variant without geolocation in Table 1
1.0	Aug 8, 2022	Released	K. Minderhoud	Released status

Table of Contents

List of Tables

List of Figures

1 Product Description

1.1 Overview

The Kona Macro Gateway is an outdoor hardened LoRaWAN IoT gateway that supports the full range of LoRa WAN channels. The Gateway supports one external LoRa antenna, an internal GPS antenna, two power options including direct DC input power or Power over Ethernet (PoE), and two backhaul options including copper Ethernet or 3G/4G wireless. Table 1 presents the currently available Kona Macro Gateway models.

Table 1: Kona Macro Gateway Models

Product Code	Modem	Geolocation	Region	Mode
T0004937	LTE	No	North America	FDD
T0005129	LTE	Yes	North America	FDD
T0005130	LTE	No	Europe	TDD
T0005131	LTE	Yes	Europe	TDD
T0005169	LTE	No	China	470 FDD
T0005179	LTE	Yes	China	470 FDD
T0005180	LTE	No	Brazil	TDD
T0005181	LTE	Yes	China	780 TDD
T0005182	LTE	No	Japan	TDD
T0005183	LTE	Yes	Japan	TDD
T0005184	LTE	No	Singapore	TDD
T0005185	LTE	Yes	Singapore	TDD
T0005186	LTE	No	Australia	TDD
T0005187	LTE	Yes	Australia	TDD
T0005247	No	No	North America	FDD
T0005248	No	Yes	North America	FDD
T0005249	No	No	Europe	TDD
T0005250	No	Yes	Europe	TDD
T0005251	No	No	China	470 FDD
T0005252	No	Yes	China	470 FDD
T0005253	No	No	Brazil	TDD
T0005254	No	Yes	China	780 TDD
T0005255	No	No	Japan	TDD
T0005256	No	Yes	Japan	TDD
T0005257	No	No	Singapore	TDD

T0005258	No	Yes	Singapore	TDD
T0005259	No	No	Australia	TDD
T0005260	No	Yes	Australia	TDD
T0005261	No	No	New Zealand	TDD
T0005262	No	Yes	New Zealand	TDD
T0005263	LTE	No	New Zealand	TDD
T0005264	LTE	Yes	New Zealand	TDD
T0005265	No	No	BCIL	TDD
T0005266	No	Yes	BCIL	TDD
T0005267	LTE	No	BCIL	TDD
T0005268	LTE	Yes	BCIL	TDD
T0005269	No	No	Taiwan	TDD
T0005270	No	Yes	Taiwan	TDD
T0005271	LTE	No	Taiwan	TDD
T0005272	LTE	Yes	Taiwan	TDD
T0005273	No	No	Australia 2	FDD
T0005274	No	Yes	Australia 2	FDD
T0005275	LTE	No	Australia 2	FDD
T0005276	LTE	Yes	Australia 2	FDD
T0005277	No	Yes	Brazil	TDD
T0005278	LTE	Yes	Brazil	TDD
T0005279	LTE	No	Australia 2	TDD
T0005280	LTE	Yes	Australia 2	TDD
T0006031	No	No	North America 2	FDD
T0006032	No	Yes	North America 2	FDD
T0006033	LTE	No	North America 2	FDD
T0006034	LTE	Yes	North America 2	FDD
T0007035	LTE	Yes	International	TDD
T0007036	LTE	Yes	International	TDD
T0007037	LTE	Yes	International	TDD
T0007038	LTE	Yes	International	TDD
T0007039	LTE	Yes	International	TDD
T0007040	LTE	Yes	International	TDD
T0007041	LTE	Yes	International	TDD
T0007042	LTE	Yes	International	TDD
T0007043	LTE	Yes	International	TDD

T0007044	LTE	Yes	International	TDD

Figure 1 illustrates the Kona Macro Gateway external form-factor with the front view on the left and rear view on the right. All models share the same mechanical form-factor.

Figure 1: Kona Macro Gateway Common Dimensions

1.2 Physical Interfaces

Figure 2 illustrates the bulkhead layout for the Kona Macro Gateway. All models share the same bulkhead layout.

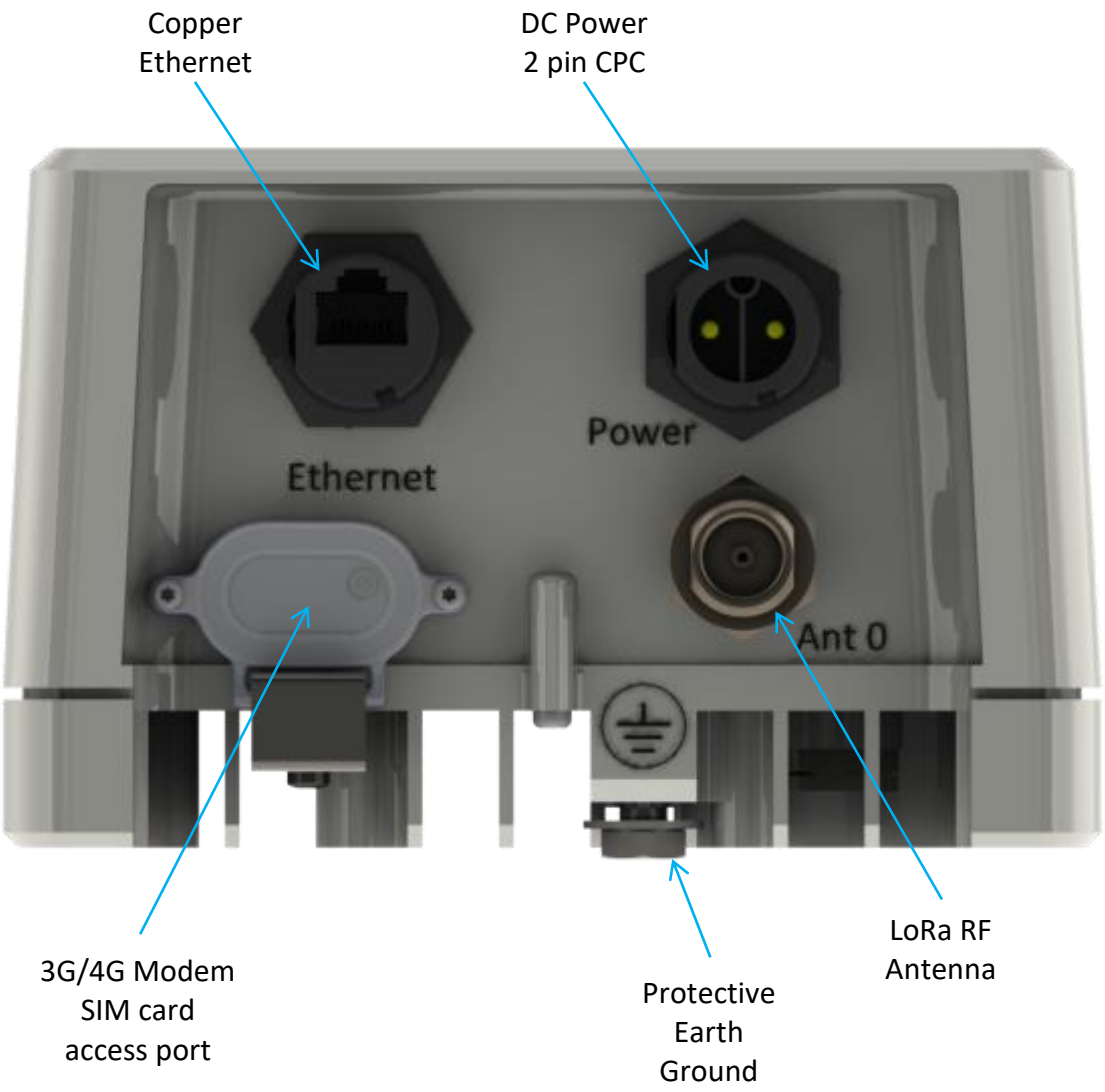

Figure 2: Kona Macro Gateway Bulkhead Layout

All Kona Gateway module interconnect is located on the bottom facing bulkhead. The RF connectors are water proof while un-mated but all other connectors must be terminated with mating connectors or covered with the supplied protective cap when not in use in order to be water tight. Connector types and their mating connectors are listed in Table 2.

Table 2: Kona Macro Gateway Interface Connector Types

Interface	Connector Type	Mating Connector
LoRa Antenna Ports	N-Type female	Industry standard N-Type male
3G/4G Modem SIM card	SIM card	Industry standard, located behind SIM card access port cover

Copper Ethernet Port	Threaded, circular, RJ-45	Shenzhen Chogori Technology Co., Ltd. approved mating connector (p/n 33000111-02 or equivalent)
Direct DC Power Input Port	Threaded, circular, 2 contact DC power	Shenzhen Chogori Technology Co., Ltd. approved mating connector (p/n 23002211-02, or equivalent)
Earth Ground	Chassis Protective Earth Ground terminal	Industry standard 2-hole lug, 1/4 x 0.75" spacing

1.3 Specifications

The Kona Macro Gateway specifications are listed in Table 3.

Table 3: Kona Macro Gateway Specifications

Attribute	Specification
Dimensions	222.2mm (8.7") wide x 101mm (4.0") deep x 287.3mm (11.3") tall
Weight	5.1 kg (11.3 lbs)
Operating Temperature	-40°C to 60°C (-40°F to 140°F) at sea level Including solar loading.
Relative Humidity	10% to 100%
Operating Altitude	-60 m to 4,000 m (-197 ft to 13,123 ft)
Power Input, Direct DC	48 VDC nominal, 37 to 57 VDC operating range. Positive or negative ground referenced feed. SELV source required. 5A recommended input overcurrent protection (2A minimum to 10A maximum allowed).
Power Input, PoE	802.3 at (Type 2 Class 4), Mode A or Mode B or 4-pair Mode.
Power Consumption	20 W maximum
Weather Tightness	UL Type 6 (IP-67)
Regulatory Compliance	CSA/UL 60950-1 & CSA/UL 60950-22, CE IEC 60950-1 FCC Pt. 15, RSS-247, EN 301 489-1 FCC Pt. 27 (North American 2 Variant Only)
Surge Protection	All interfaces are protected to primary levels.

2 Installation

2.1 Safety Precautions

- The Kona Macro Gateway must be installed in a restricted access location (such that touching of the Gateway by non-service persons is not likely).
- The Kona Macro Gateway may become hot to the touch during normal operation at elevated ambient temperatures.
- The Kona Macro Gateway has no internal field serviceable parts. The Gateway module must only be opened by an approved TEKTELIC service center.
- All installation practices must be in accordance with the local and national electrical codes.
- Do not work on the system during periods of lightning activity.
- The Kona Macro Gateway is considered permanently connected equipment. The Protective Earth Ground connection (that is, the two-hole lug to chassis ground) is always required.
- Ensure the Kona Macro Gateway Protective Earth Ground connection is properly terminated prior to the connection of any other interface.
- The Kona Macro Gateway contains primary lightning surge suppression on the Direct DC power port, the Copper Ethernet port, and the LoRa RF antenna port. The primary lightning protectors have the ability to bridge the interface to chassis isolation boundary during over-voltages. Ensure that the Protective Earth Ground connection is always in place.
- Ensure that the Kona Macro Gateway is secured to eliminate any physical hazard to people or property. The Gateway must be securely mounted according to the mounting instructions prior to any cable connection and operation.
- The Kona Macro Gateway does not contain a power disconnection device; a readily accessible disconnection device must be incorporated external to the Kona Macro Gateway.
- The direct DC powered Kona Macro Gateway shall be supplied through an input overcurrent protection device rated not more than 10 A. The overcurrent protection must have the appropriate current interrupt capacity for the power source and must be incorporated into the non-earthed conductor(s) of the Kona Macro Gateway DC supply.
- For the direct DC power input, the DC positive pin must be at positive potential relative to the DC negative pin. If the polarity is reversed, the unit will not sustain damage but will not operate until the connection polarity is corrected.

- Although the Kona Macro Gateway can be powered through either the direct DC input or the power over Ethernet (PoE) input, simultaneous application of power to both inputs may result in unexpected operation and shall be avoided.
- The Kona Macro Gateway power source must meet SELV requirements.
- Always ensure the 3G/4G Modem SIM card access port is properly sealed after installing a SIM card.

2.2 Unpacking and Inspection

The following should be considered during the unpacking of a new Kona Macro Gateway.

1. Inspect the shipping carton and report any significant damage to TEKTELIC.
2. Unpacking should be conducted in a clean and dry location when possible.
3. Do not discard the shipping box or foam inserts as they will be required if a unit is returned for repair or re-configuration.

2.3 Required Equipment for Installation

The following tools are required to install the Kona Macro Gateway module:

1. A 6 point metric socket set and torque wrench drive.
2. Anti-oxidant compound (NO-OX-ID, Penetrox, Noalox, Ox-Gard or equivalent).
3. A small wire brush.
4. A clean cloth.
5. Weatherproofing tape kit for the RF connector (Scotch Wireless Weatherproofing Kit, WK-101 recommended).
6. Appropriately sized pipe clamps for pole mounting or appropriate screws or bolts (four sized M8) with any required anchors according to the wall construction for wall mounting.

2.4 Kona Macro Gateway Mounting

Kona Macro Gateway is designed to be mounted to a vertical pole or wall using the supplied mounting bracket which attaches at the four screw locations on the back of the module illustrated in Figure 3.

Figure 3: Kona Macro Gateway Mounting Bracket Attachment Screw Locations

The mounting bracket is a single part that bolts to the back surface of the Gateway using supplied hardware (four M6x1.0 - 14 mm bolts with flat and star lock washers) as illustrated in Figure 4. The Gateway module must be oriented with the connector bulkhead facing down, towards earth.

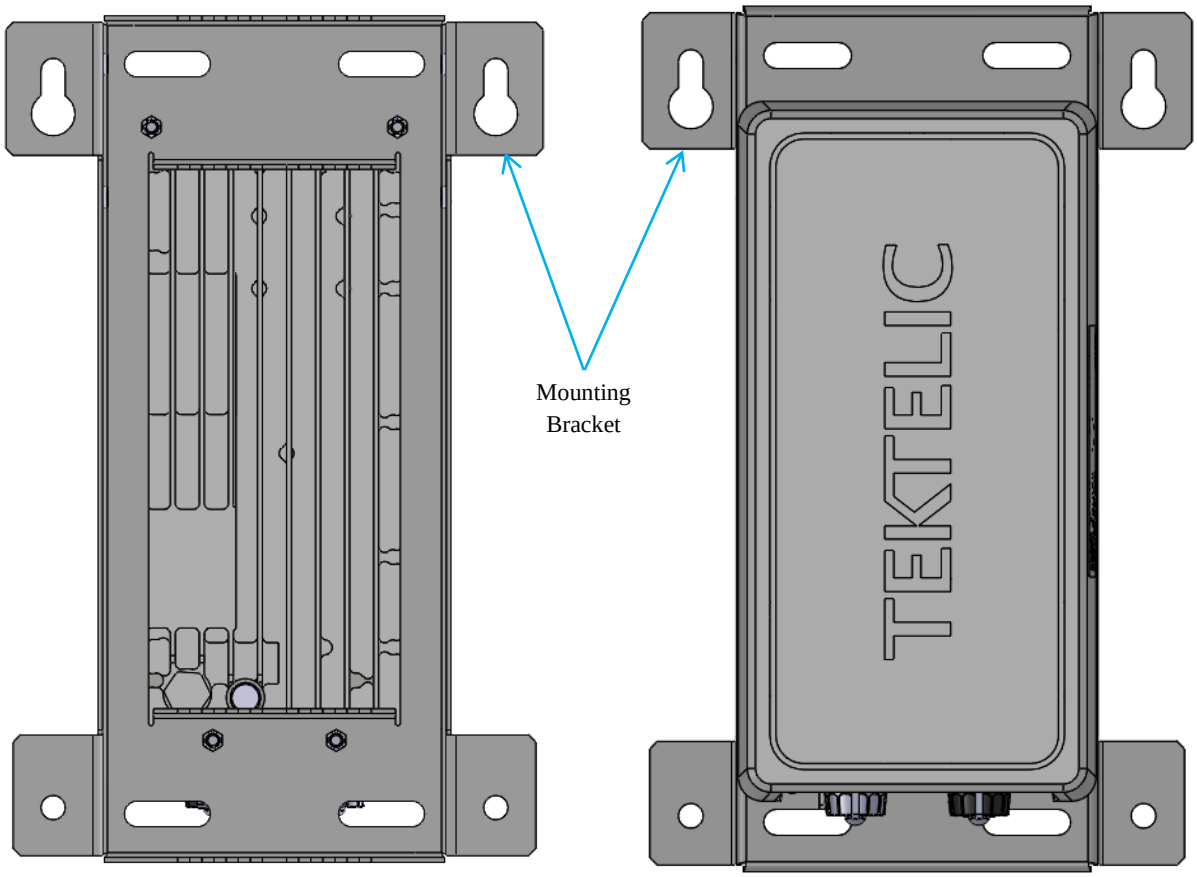

Figure 4: Kona Macro Gateway Module with Mounting Bracket

Ensure that the structure to which the Gateway is being mounted is secure and able to support a dead load of at least 136 kg (300 lbs). The area below must be free of any obstructions to cable ingress.

The Kona Macro Gateway wall mounting procedure is as follows:

1. Bolt the wall mounting bracket to the Gateway module using the supplied bolts and washers.
2. Install 2 site supplied M8 bolts into the wall at 139.7 mm (5.5”) center spacing, leaving the bold heads protruding with a 2mm gap from the wall surface.
3. Hang the Kona Macro Gateway with bracket from the two bolts by inserting the keyhole slots at the top of the bracket onto the 2 bolts and tightening the bolts.
4. Insert and tighten two additional site supplied M8 bolts through the holes at the bottom of the bracket.

The Kona Macro Gateway pole mounting procedure is as follows:

1. Bolt the wall mounting bracket to the Gateway module using the supplied bolts and washers.
2. While temporarily supporting the Gateway with bracket, install the two site supplied pipe clamps, one through each of the upper and lower slotted clamp mounting points.

2.5 Ground Cable Installation

The Kona Macro Gateway is considered Permanently Connected Equipment and requires a permanently connected Protective Earth Ground (PEG) conductor. The Protective Earth Ground connection is made through a 1/4 x 0.75” on center double hole lug to the ground termination point illustrated in Figure 5. The recommended ground cable gauge is #10 AWG.

The Kona Macro Gateway grounding system shall follow local and national electrical codes. The Protective Earth Ground conductor terminated at the double hole lug point is mandatory and must be the first connection made to the Kona Macro Gateway during installation. Proper routing and termination of this cable is key to robust lightning withstand performance; in high susceptibility installations, every effort shall be made to minimize connection inductance and ground bed resistance.

The ground cable installation steps are as follows:

1. Lightly abrade the surface of the casting ground area with a fine wire brush to remove the oxide layer.
2. Use a clean cloth to remove any debris from this surface.
3. Immediately coat the contact surface with a thin layer of anti-oxidant compound.
4. Install the ground cable through its 2-hole lug onto the chassis ground point using the two supplied 1/4 - 20 x 1/2” bolts with flat and star lock washers, torqued to 10.4 Nm (92 in·lbs).

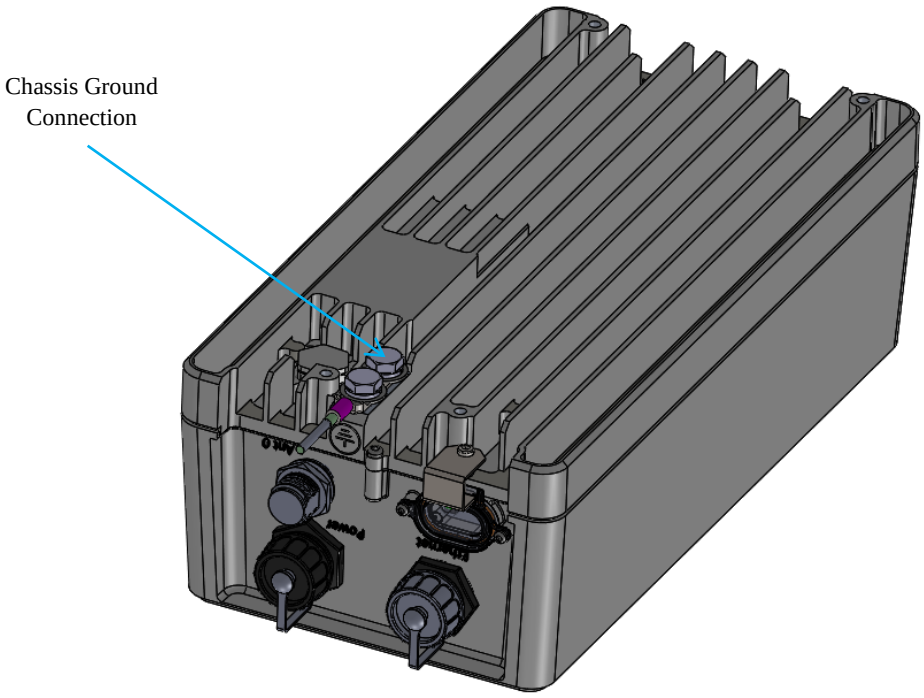

Figure 5: Chassis Ground Connection

2.6 Direct DC Power Cable Installation

The Kona Macro Gateway direct DC feed terminates at a dedicated two pin circular plastic connector (CPC) on the bulkhead. The direct DC power input is isolated from chassis (earth) with the exception of the primary surge suppressors. One lead of the DC power feed is normally earth referenced external to the Kona Macro Gateway (usually at the power source by convention).

The DC power cable shall be rated for outdoor application according to local and national electrical codes.

The CPC direct DC connector shall be as specified in Table 2 and shall follow the signal polarity identified in Figure 6.

Figure 6: Direct DC Power CPC Connector Connection Polarity

2.7 RF Cable Installation

The Kona Macro Gateway installation requires connection to a LoRa RF antenna. The RF cable attaches to the N-Type connector located on the bulkhead of the Gateway. Torque the connector to 1.7 to 2.3 Nm (15 to 20 in·lbs). The N-Type connector interface to a cable is not water proof and must be taped to be used outdoors. TEKTELIC recommends taping with Scotch Wireless Weatherproofing Kit, WK-101. Follow the taping procedures outlined by the supplier of this tape system.

Note that the 3G/4G modem antenna is internal to the Kona Macro Gateway.

2.8 Copper Ethernet Cable Installation

The Kona Macro Gateway Ethernet port may be used on a temporary basis for commissioning and maintenance or may be permanently connected for backhaul. When the port is not in use, the weatherproof protective cap must be installed. When the port is permanently connector for backhaul, the proper water-tight mating connector specified in Table 2 must be used.

The Ethernet cable must have minimum 24 AWG conductors and shall be rated for outdoor application according to local and national electrical codes.

2.9 Proposition 65 Statement

⚠ WARNING: This product can expose you to chemicals including lead, beryllium & nickel, which is known to the State of California to cause cancer, birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

3 Radio Compliance Statements

Federal Communications Commission

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To comply with FCC/IC RF exposure limits for general population / uncontrolled exposure, the antennas used for this transmitter must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This product must be installed by professional trained RF technicians.

Industry Canada

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This radio transmitter 22504-T0005158 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

The required antenna impedance is 50 ohms.

Only omnidirectional type antennas with maximum gain of 8dBi can be used for the LoRa radios of this product if the cable insertion loss at 900 MHz is 0.5dB or more for 1 carrier operation at 28.5dBm or 2dB or more for 2 carrier operation at 30dBm total. Antenna(s) shall be installed to location providing a separation distance of at least 13.8 inches (35 cm) from any human body.

During product operation, always keep a separation distance of at least 13.8 inches (35 cm) from any connected antenna(s). Before servicing the product, the antenna(s) or cables, turn off the transmission function or the unit power if you have to get closer than the minimum separation distance. This product must be installed by professional trained RF technicians.