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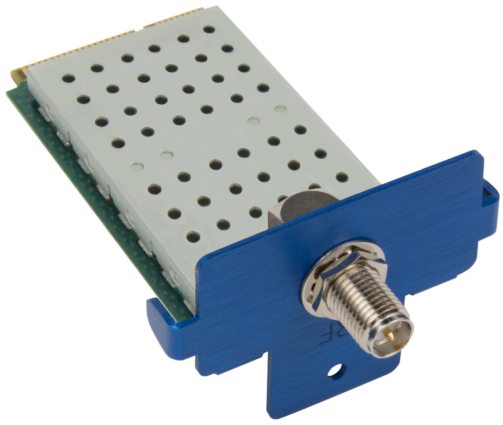

MTAC-003 Gateway Accessory Card Hardware Guide

MTAC-003 Gateway Accessory Card Hardware Guide

Models: MTAC-003

Part Number: S000799, Version 1.4 09/14/2023

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Contacting MultiTech

Country	Sales		Support	
Europe, Middle East, Africa:	sales@multitech.co.uk	+(44) 118 959 7774	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	sales@multitech.com	(800) 328-9717 or (763) 785-3500	support@multitech.com	(800) 972-2439 or (763) 717-5863

Website

www.multitech.com

Knowledge Base

For immediate access to support information and resolutions for MultiTech products, visit http://www.multitech.com/kb.go.

Support Portal

To create an account and submit a support case directly to our technical support team, visit: https://support.multitech.com.

Warranty

To read the warranty statement for your product, visit https://www.multitech.com/legal/warranty.

World Headquarters

Multi-Tech Systems, Inc.

2205 Woodale Drive, Mounds View, MN 55112

Contents

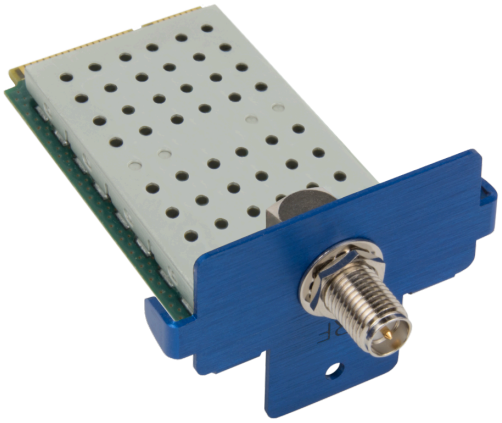
Chapter 1 – Overview

Introduction

The MTAC-003 gateway accessory card enables long range connectivity to distributed assets and sensors using the latest RF spread spectrum (LoRa) technology by Semtech®.

The accessory card features include:

- Network-based geolocation using time difference of arrival (TDOA) and fine timestamping (requires gateway with GPS receiver and GPS antenna)
- Improved coverage in dense LoRa networks
- ISM band scanning and asset management range with LoRa of up to 10 miles/15 km line of sight or 1-3 miles/2 km through buildings
- Listen Before Talk (LBT) capability
- Bi-directional communications from thousands of MultiTech Reveal™ LoRaWAN Wireless IoT Sensors or mDot™ or® xDot™ long-range RF modules to a single Conduit®



Documentation

Document	Description	Part Number
Hardware Guide	This document provides overview, safety and regulatory information, design considerations, schematics, and general hardware information.	S000799
mPower Edge Intelligence Software Guide	This document provides instructions and information on how to properly configure your device (for LoRaWAN) through its user interface.	S000727

Document	Description	Part Number
Developer Resources	Refer to online documentation regarding software usage and other info related to accessory cards. Documentation is available on the MultiTech Developer Resources website at: http://www.multitech.net/developer/products/multiconnect-conduit-platform/accessory-cards/mtac-003-lora-3-cards/ .	N/A

Product Build Options

Product	Description	Region
MTAC-003E00	868 MHz LoRa Card	Europe
MTAC-003U00	915 MHz LoRa Card	North America

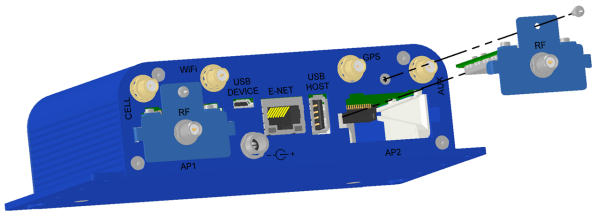
Installing the Accessory Card

You will need:

- Phillips-head screwdriver
- MTAC-003 accessory card
- Conduit

To install the accessory card:

1. Disconnect power to the device, if it is connected.
2. At the back of the device, locate the slot where you want the accessory card to be installed. You can install the card in the **AP1** or **AP2** slot.



3. Unscrew and remove the slot cover from the device. Save the removed screw for the next step. Slide the card into the open slot. You should feel the card connector seat in the internal connector.
4. Use a small Phillips-head screwdriver attaching the card bracket to the housing with the previous screw from the device slot cover.
5. Attach the LoRa antenna to the female SMA connector labeled **RF**.

Using Two LoRa Gateway Accessory Cards

NOTE: You may use two MTAC-003 cards or two MTAC-LORA-H cards within your Conduit device. But you cannot use the two different card models (one MTAC-003 card and one MTAC-LORA-H card) within the same device.

Chapter 2 – Hardware and Specifications

Hardware Specifications

MTAC-003 gateway accessory card

Category	Description
General	
Standards	LoRaWAN Specifications 1.0.1, 1.0.2, 1.0.3, 1.0.4
Radio Frequency	915 MHz ISM
Frequency Range (MTAC-003U00)	US915 Channel Plan (US, Canada): 902-928 MHz
	AU915 Channel Plan (Australia): 915-928 MHz
Power Requirements	
Operating Voltage	5 VDC and 3.3 VDC +/- 10%
Physical Description	
Weight	0.7 oz (19.8g)
Dimensions	2.483" x 1.614" x 1.148" (63.08 mm x 40.99 mm x 29.16 mm)
Environment	
Operating Environment	-30° to +70° C when installed in a Conduit gateway device (MTCDT). *
Storage Environment	-40° to +85° C
Relative Humidity	20% to 90% non-condensing
Certifications and Compliance	
EMC Compliance	FCC Part 15B
	ICES-003B
	FCC Part 15.247
	RCM (Australia)
	RSS 247 Issue 2
Safety Compliance	UL/cUL 60950-1 2nd ED
	UL/cUL 62368-1
	IEC 62368-1:2014 Second Edition

***NOTE:** Installation in outdoor locations or ambient temperatures above 70° C has not been evaluated by UL. UL Certification does not apply or extend to use in outdoor applications.

LoRa Transmission Output Power for MTAC-003

MTAC-003U00 (915 MHz)

Max output 27.4 dBm

Power	Frequency	Bandwidth
27.4 dBm	923.3 Mhz - 927.5Mhz	500 kHz

Power Draw

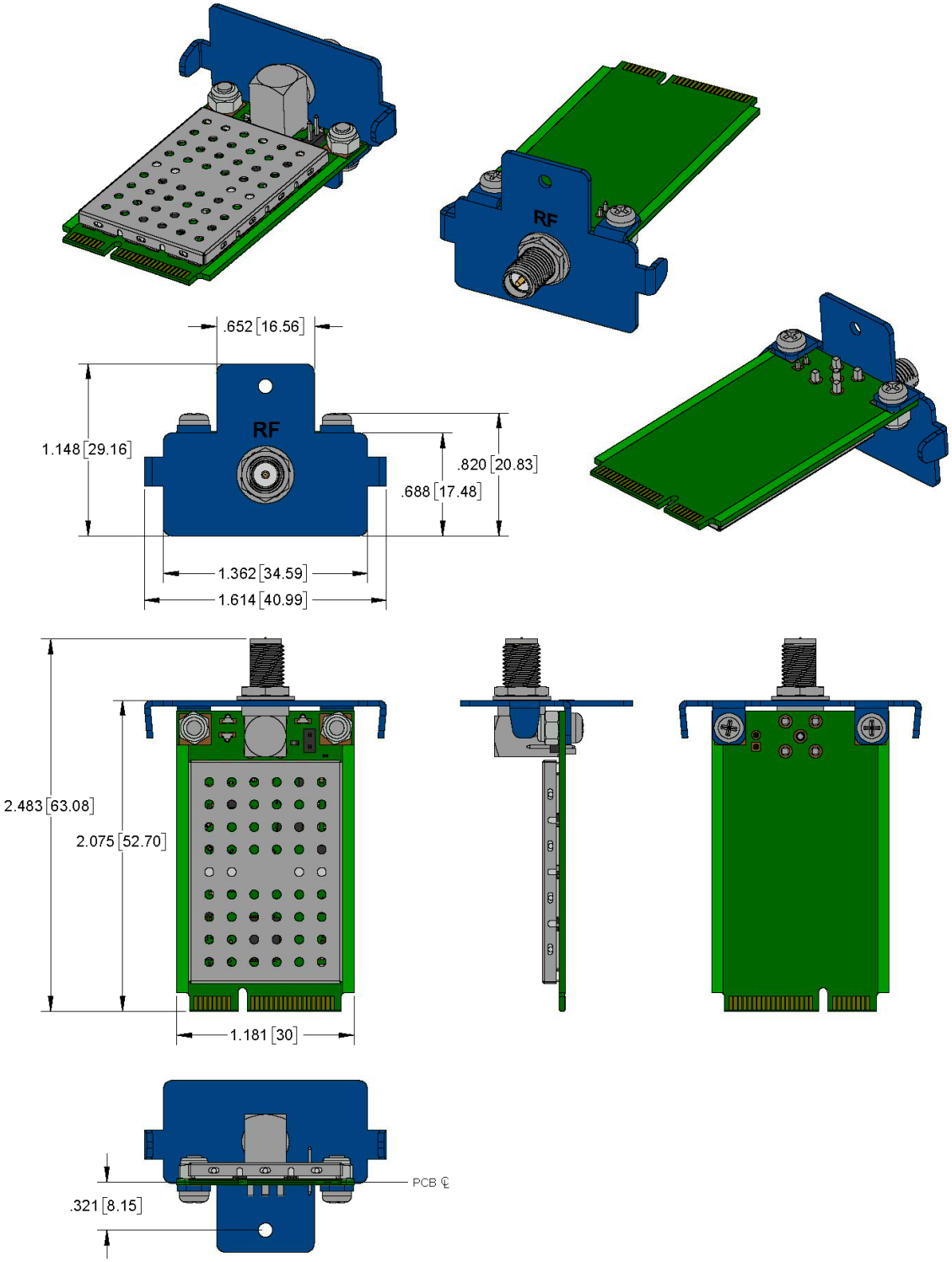
MTAC-003 card (US915) in Conduit with No Radio

Voltage	Peak Current	9 V Input MTCDT w/Card – Total Inrush Charge MilliCoulombs	12 V Input MTCDT w/Card-Total Inrush Charge MilliCoulombs	24 V Input MTCDT w/ Card-Total Inrush Charge MilliCoulombs
3.3 Volt Line	132 mA	3.5 mC	3.6 mC	3.8 mC
5.0 Volt Line	130 mA	3.5 mC	3.6 mC	3.8 mC

Note:

- These power draw values were measured with a MTAC-003U00 card (US915) installed in a Conduit gateway with no cellular radio.
- Transmit power accuracy is +/- 2 dBm.
- Inrush Charge: The total inrush charge at power on.

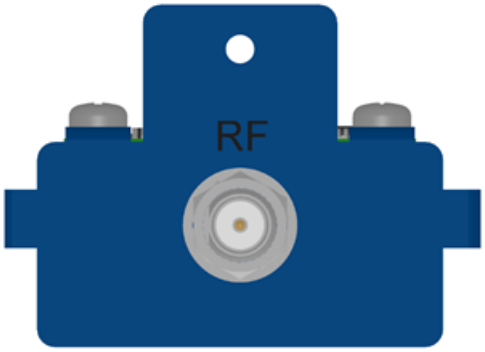
Dimensions



ALL DIMENSIONS IN INCHES [MILLIMETERS]

Chapter 3 – Antennas

Antenna Connector



Standard Gain Antenna

The following standard gain, LoRa antenna has been certified to operate with the MTAC-003 card

LoRa Antenna

Manufacturer:	Pulse Electronics
Description:	868-928 MHz RP-SMA Antenna, 8"
Model Number:	W1063

MultiTech ordering information:

Ordering Part Number	Quantity
AN868-915A-1HRA	1
AN868-915A-10HRA	10
AN868-915A-50HRA	50

LoRa Antenna Specifications

Category	Description
Frequency Range	868-928 MHz
Impedance	50 Ohms
VSWR	≤ 2.0
Gain	1.0 dBi
Radiation	Omni
Polarization	Vertical

High Gain Antenna

The following high-gain, LoRa antenna has been certified to operate with the MTAC-003 card in North America only. And is only for use on the MTCDTIP (IP67) model. Which requires professional installation. Contact Multi-Tech via our support portal at www.support.multitech.com for training material for installation for our IP67 products.

LoRa Antenna

Manufacturer:	PCTEL
Description:	902-928 MHz N-Male Antenna, 50.7"
Model Number:	MFB9155(NF)

LoRa Antenna Specifications

Category	Description
Frequency Range	902-928 MHz
Impedance	50 Ohms
VSWR	≤ 2.0
Gain	5.07 dBi
Radiation	Omni
Polarization	Vertical

No Trace Antenna for this design

Standard Outdoor Gain Antenna

The following LoRa antenna has been certified to operate with the MTAC-003 card in North America only. And is only for use on the MTCDTIP (IP67) model. Which requires professional installation. Contact Multi-Tech via our support portal at www.support.multitech.com for training material for installation for our IP67 products.

LoRa Antenna

Manufacturer:	Pulse Larsen
Description:	806-960Mhz N-Male Antenna,
Model Number:	R08063/21704 NM

LoRa Antenna Specifications

Category	Description
Frequency Range	806-960 MHz
Impedance	50 Ohms
VSWR	≤ 2.0
Gain	3 dBi
Radiation	Omni
Polarization	Vertical

Chapter 4 – Safety Information

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Device Maintenance

Do not attempt to disassemble the device. There are no user serviceable parts inside.

When maintaining your device:

- Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device and/or other equipment, or harm users.
- Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.
- Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause explosion or fire and may result in property damage, severe injury, and/or death.
- Do not expose your device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or fire. Refer to the device specifications regarding recommended operating temperature and humidity.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof. Exposure to liquids could result in damage to the device.
- Do not place the device alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with MultiTech's accessory specifications may invalidate the warranty.

If the device is not working properly, contact MultiTech Technical Support.

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle’s electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle’s lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did NOT evaluate this device for installation in a vehicle or other outdoor locations. UL Certification does not apply or extend to use in vehicles or outdoor applications.

Notice regarding Compliance with FCC and Industry Canada Requirements for RF Exposure

The antenna intended for use with this unit meets the requirements for mobile operating configurations and for fixed mounted operations, as defined in 2.1091 of the FCC rules for satisfying RF exposure compliance. This device also meets the European RF exposure requirements of EN 62311. If an alternate antenna is used, consult user documentation for required antenna specifications.

Compliance of the device with the FCC and IC rules regarding RF Exposure was established and is given with the maximum antenna gain as specified above for a minimum distance of 23 cm between the devices radiating structures (the antenna) and the body of users. Qualification for distances closer than 23 cm (portable operation) would require re-certification.

Wireless devices could generate radiation. Other nearby electronic devices, like microwave ovens, may also generate additional radiation to the user causing a higher level of RF exposure.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Switch OFF your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and is illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your wireless device in hospitals and any other place where medical equipment may be in use.

Sécurité relative aux appareils à radiofréquence (RF)

À cause du risque d'interférences de radiofréquence (RF), il est important de respecter toutes les réglementations spéciales relatives aux équipements radio. Suivez les conseils de sécurité ci-dessous.

- Utiliser l'appareil à proximité d'autres équipements électroniques peut causer des interférences si les équipements ne sont pas bien protégés. Respectez tous les panneaux d'avertissement et les recommandations du fabricant.
- Certains secteurs industriels et certaines entreprises limitent l'utilisation des appareils cellulaires. Respectez ces restrictions relatives aux équipements radio dans les dépôts de carburant, dans les usines de produits chimiques, ou dans les zones où des dynamitages sont en cours. Suivez les restrictions relatives à chaque type d'environnement où vous utiliserez l'appareil.
- Ne placez pas l'antenne en extérieur.
- Éteignez votre appareil sans fil dans les avions. L'utilisation d'appareils électroniques portables en avion est illégale: elle peut fortement perturber le fonctionnement de l'appareil et désactiver le réseau cellulaires. S'il

ne respecte pas cette consigne, le responsable peut voir son accès aux services cellulaires suspendu ou interdit, peut être poursuivi en justice, ou les deux.

- Éteignez votre appareil sans fil à proximité des pompes à essence ou de diesel avant de remplir le réservoir de votre véhicule de carburant.
- Éteignez votre appareil sans fil dans les hôpitaux ou dans toutes les zones où des appareils médicaux sont susceptibles d'être utilisés.

Interference with Pacemakers and Other Medical Devices

Potential interference

Radio frequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for pacemaker wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver the pulses irregularly.
- Cause the pacemaker to ignore the heart's own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don’t carry the device in a shirt or jacket pocket directly over the pacemaker).

Chapter 5 – Regulatory Information

47 CFR Part 15 Regulation Class B Devices

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 or more 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.

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

FCC Interference Notice

Per FCC 15.19(a)(3) and (a)(4) 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.

FCC Grant

FCC Part 15.247

FCC Identifier:	AU792U21K16868
Equipment Class:	Digital Transmission System
Notes:	MTAC-003U00
FCC Rule Parts:	15.247

FCC Rule Parts	Frequency Range (MHz)	Output Watts
15C	902-928	0.549

To Be only used on Multi-Tech Conduit products. Power output listed is conducted. This device is approved for mobile and fixed use with respect to RF exposure compliance. The antenna(s) used for this transmitter, as described in this filing, must be installed to provide a separation distance of at least 23 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures. Installers and end-users must be provided with operating conditions for satisfying RF exposure compliance. Maximum permitted antenna gain: 5.07 dBi.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada Technical Acceptance Certificate Information

Certification Number/No. de Certification	125A-0065
Type of Radio Equipment/Genre de Matériel	Spread Spectrum/Digital device, Modular Approval
Model/Modèle	MTAC-003U00
Specification/Cahier des Charges	RSS 247 Issue 2
Certification Type	Single

From Frequency/De Fréquences	To Frequency/Á Fréquences	Emmission Designation/Designation D'émission	RF Power	Antenna Information
902 MHz	928 MHz	621KGXD	0.549 W	5.04dBi

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the Industry Canada issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada. The equipment for which this certificate is issued shall not be manufactured, imported distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by Industry Canada.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance d'Industrie Canada et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada. Le matériel à l'égard duquel le présent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécifications techniques applicable publiées par Industrie Canada.

Industry Canada RSS-Gen Transmit Antenna

This radio transmitter, the MTAC-003 card [125A-0065], has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio, la carte MTAC-003 [125A-0065], a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna Type/Types d'Antenne	Maximum Gain/Gain Admissible Maximal	Impedance/Impédance
868-928 MHz PCTTEL dipole N-type	5.07 dBi	50 Ohms

Antenna Type/Types d'Antenne	Maximum Gain/Gain Admissible Maximal	Impedance/Impédance
868-928 MHz dipole RP-SMA Antenna	1.07 dBi	50 Ohms

Antenna Type/Types d'Antenne	Maximum Gain/Gain Admissible Maximal	Impedance/Impédance
868-928 MHz dipole N-type RB08063	3 dBi	50 Ohms

REACH Statement

Registration of Substances

Multi-Tech Systems, Inc. confirms that none of its products or packaging contain any of the Substances of Very High Concern (SVHC) on the REACH Candidate List, in a concentration above the 0.1% by weight allowable limit

The latest **197** substances restricted per the REACH Regulation were **last updated January 2019**. Refer to the following for the most current candidate list of substances: http://echa.europa.eu/candidate-list-table.

Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc.

Certificate of Compliance

2015/863

Multi-Tech Systems, Inc. confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2015/863 of the European Parliament (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment - RoHS 3).

These MultiTech products do not contain the following banned chemicals[1]:

- Lead, [Pb] < 1000 PPM
- Mercury, [Hg] < 100 PPM
- Cadmium, [Cd] < 100 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ethers, [PBDE] < 1000 PPM
- Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- Benzyl butyl phthalate (BBP): < 1000 ppm
- Dibutyl phthalate (DBP): < 1000 ppm
- Diisobutyl phthalate (DIBP): < 1000 ppm

Waste Electrical and Electronic Equipment Statement

Note: This statement may be used in documentation for your final product applications.

WEEE Directive

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all MultiTech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005