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MerryIoT 5G Gateway

User Manual



Revision History

Revision	Date	Description	Author
.001	Oct. 12, 2022	First release	



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Chapter 1 – Introduction

Purpose and Scope

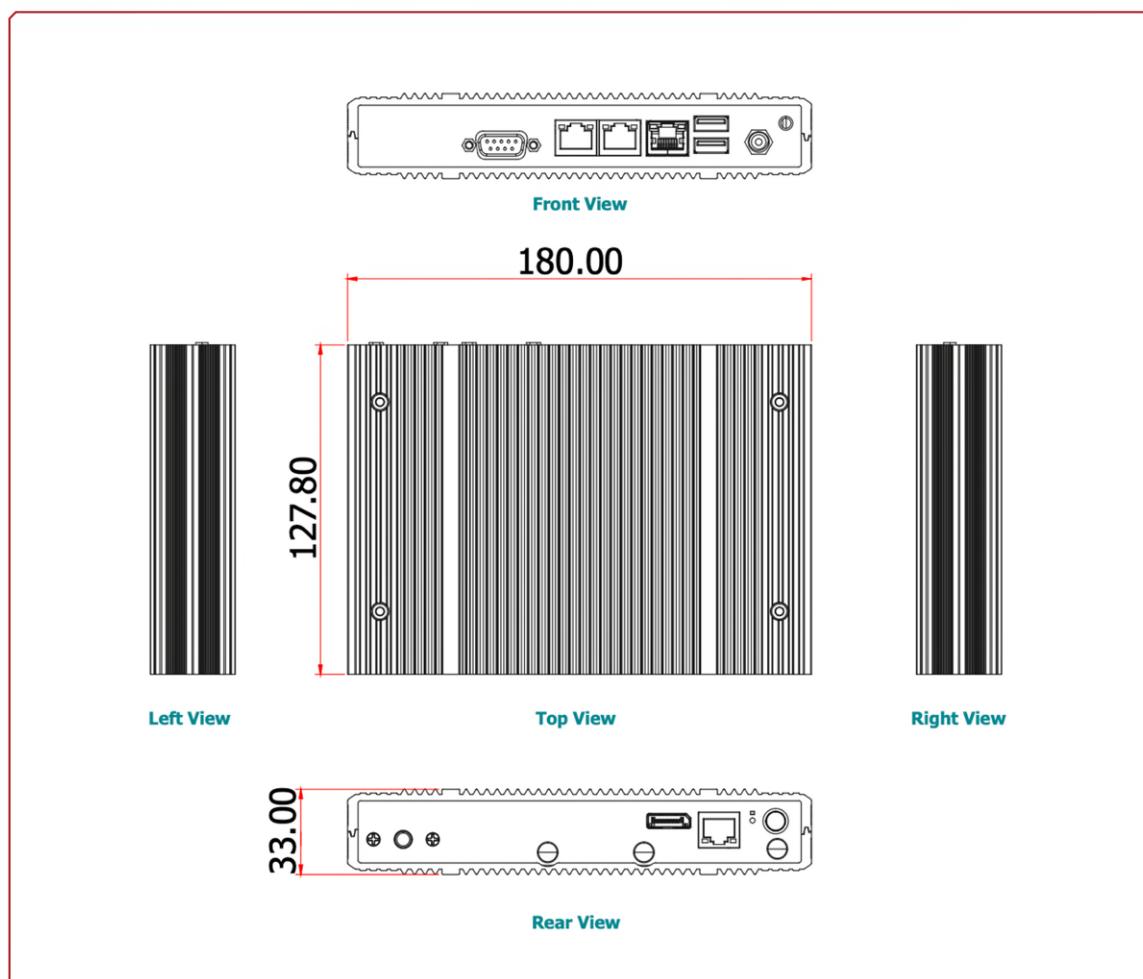
MerryIoT 5G Gateway is designed for edge computing applications in IoT, Smart Manufacturing, Automation, Blockchain and etc, to support high performance, high reliability and high throughput for the heavy data processing demand.

MerryIoT 5G Gateway is targeting at AIoT applications with quad cores Intel Atom hardware, based on Linux distribution. IoT solution providers can easily integrate advanced and stable functions for their application-centric development on their own IoT projects.

Product Design

The dimension of L0009 MerryIoT 5G Gateway is with the dimension of 180 x 127 x 33 mm, and with four LAN port, two USB port, One RS232 port, one HDMI and 12V5A power input, one POWER LED indicators, and one push button.

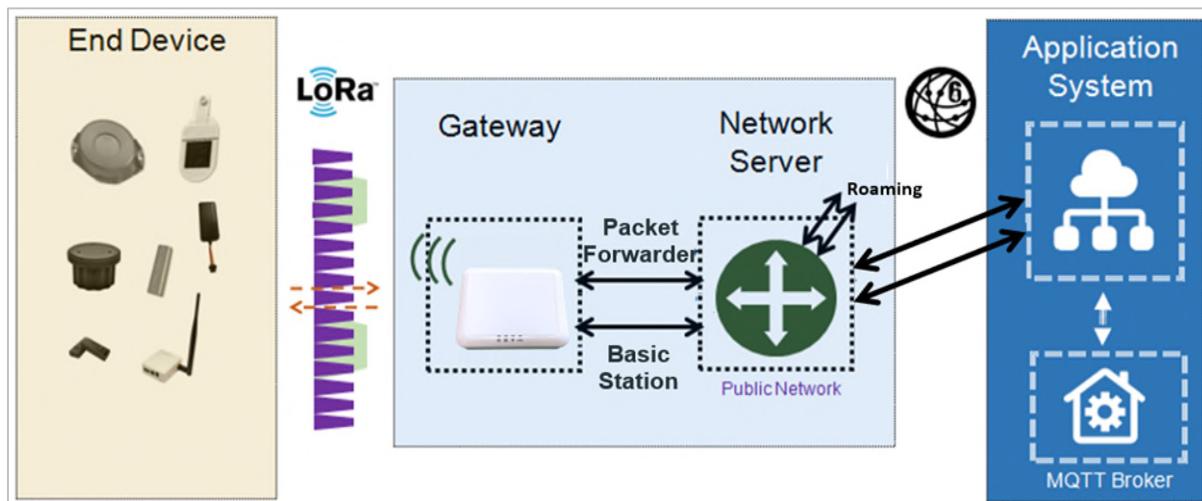
► Dimensions



Product Features

- Up to 8 concurrent channels for LoRa transmission
- Support LoRaWan 1.0.3 packet forwarder and Basic Station mode
- Support BROWAN OTA
- External antennas for LoRa

System Architecture



Definitions, Acronyms and Abbreviations

Item	Description
LPWAN	Low-Power Wide-Area Network
LoRaWAN™	LoRaWAN™ is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery-operated Things in a regional, national or global network.
ABP	Activation by Personalization
OTAA	Over-The-Air Activation
TBD	To Be Defined

Reference

Document	Author
LoRaWAN Specification v1.0.3	LoRa Alliance
RP002-1.0.1 LoRaWAN Regional Parameters	LoRa Alliance
LoRaWAN Backend Interfaces Specification v1.0	LoRa Alliance

Chapter 2 – Hardware Details

LED Indicators

LED sequence: Power(System), Status



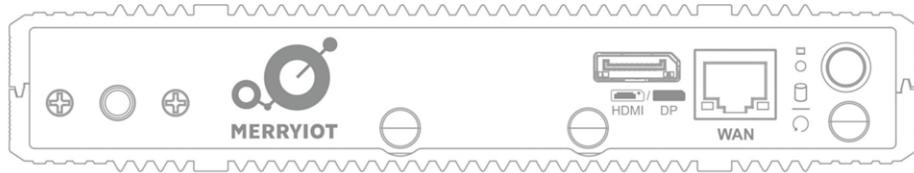
Figure 1 – I/O Ports

I/O Ports

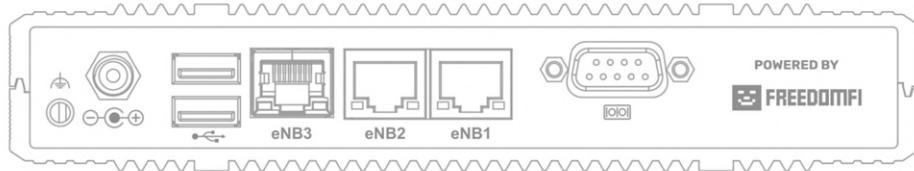
Port	Count	Description
POWER Bottom	1	
RJ45	4	WAN port, eNB1,eNB2,eNB3
PUSH Bottom	1	
USB	2	USB3.0 Type A
RS232	1	
HDMI	1	



Figure 2 – IO Ports



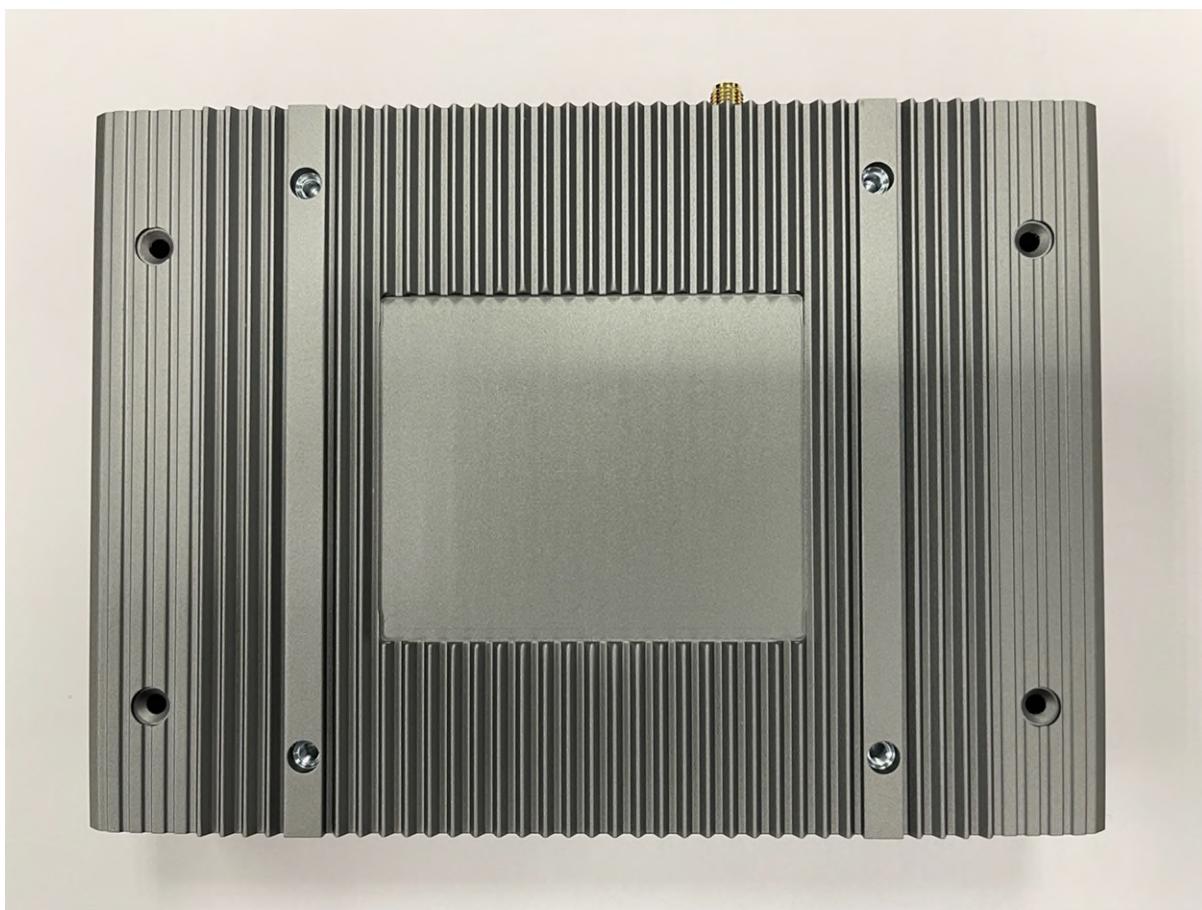
Front View



Rear View

Back Label

The marking information is located at the bottom of apparatus.



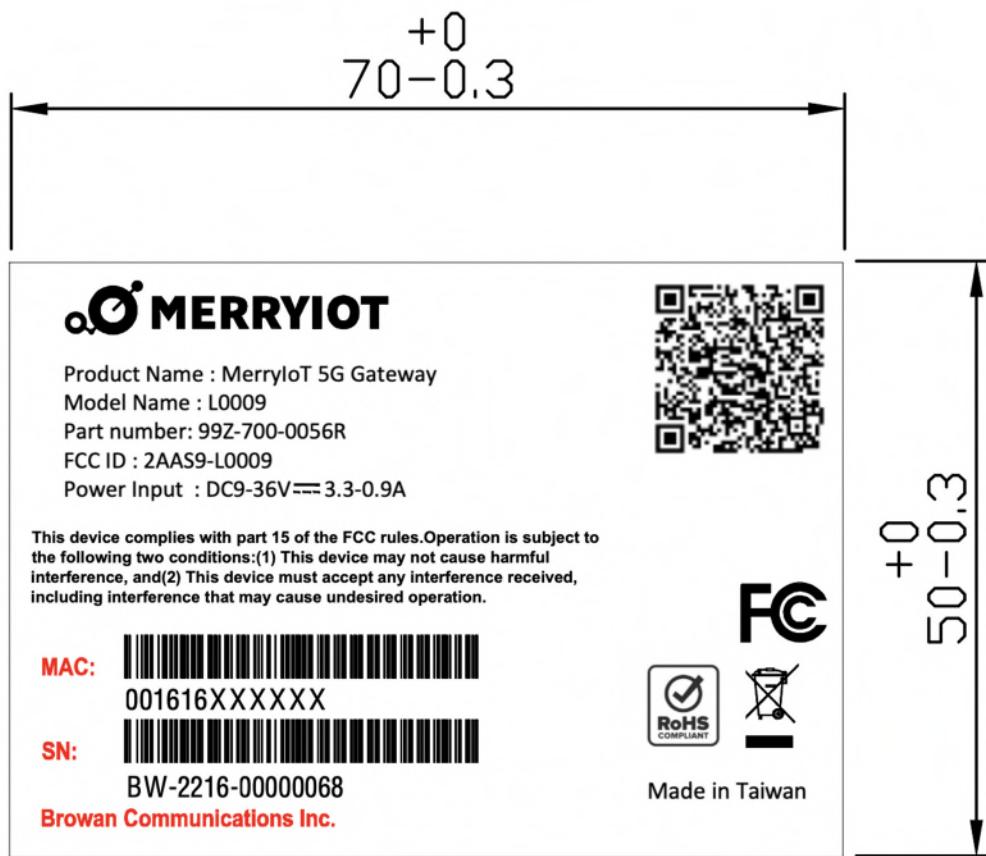


Figure 3 – Back Label

Package Label

N o.	Item	Description
1	Product BOX	Gift Box
2	Labeling	Model/ MAC/ Serial Number/ Type Approval

Package Content

N o.	Description	Quantity
1	MerryIoT 5G Gateway	1
2	Power adapter (12V/5A)	1
3	LoRa Antenna and Base	1

Chapter 3 – System Specification

Hardware Specification

No.	Item	Description
1	CPU	<ul style="list-style-type: none"> - Intel Atom - Quad-core up to 2.0GHz
2	Memory	<ul style="list-style-type: none"> - DDR3/4 4GB
3	Storage	<ul style="list-style-type: none"> - 64GB SSD
4	System	<ul style="list-style-type: none"> - Ubuntu 20.04
5	Display	<ul style="list-style-type: none"> - HDMI port
7	Crypto chip	<ul style="list-style-type: none"> - TPM2.0
8	Front I/O	<ul style="list-style-type: none"> - 1 x Power button - 1 x HDMI - 1 x GbE RJ45 - 1 x RP-SMA female antenna connector (LoRa) - 1 x LED indicators
9	Rear I/O	<ul style="list-style-type: none"> - 3 x GbE RJ-45 - 1 x RS-232 (DB-9) - 2 x USB 3.0 (type A) - 1 x Push button - 1 x DC jack
10	USB	<ul style="list-style-type: none"> - External USB-A 3.0 connector - Reserved for future use
11	LEDs	<ul style="list-style-type: none"> ■ Power
12	Button	<ul style="list-style-type: none"> - Push button (GPIO)
13	Console	<ul style="list-style-type: none"> - RS232
14	Environment	<ul style="list-style-type: none"> - Operating temperature: -20 to 60°C (with SSD or mSATA-mini) - Storage temperature: -20 to 85°C - Relative humidity: 5 to 95% RH (non-condensing) -
16	Size	<ul style="list-style-type: none"> - 180x127x33 mm
17	Power	<ul style="list-style-type: none"> - DC jack - DC12V 5A
Note		

LoRa Specification

No.	Item	Description																																									
1	Channels	US915 (known as US902-928)																																									
2	Chipset	SX1302+SX1250 (x2)																																									
3	Bandwidth	125KHz/ 500KHz																																									
4	Power	5VDC, 500mA (typical)																																									
5	Antenna	1 ipex connector on board for external antenna																																									
6	Interface	SPI for data communication																																									
7	GPIOs	To control SX1262 (chip select)																																									
8	Form Factor	<ul style="list-style-type: none"> - Mini-PCIe - 40 x 50 (w/golden pins) x 3 mm 																																									
9	Channel Plan -US915	<ul style="list-style-type: none"> - Uplink <table> <thead> <tr> <th>Frequency (MHZ)</th> <th>Spreading Factor</th> </tr> </thead> <tbody> <tr> <td>■ 903.9</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.1</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.3</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.5</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.7</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.9</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 905.1</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 905.3</td> <td>SF7BW125 to SF10BW125</td> </tr> <tr> <td>■ 904.6</td> <td>SF8BW500</td> </tr> </tbody> </table> - Downlink <table> <thead> <tr> <th>Frequency (MHZ)</th> <th>Spreading Factor</th> </tr> </thead> <tbody> <tr> <td>■ 923.3</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 923.9</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 924.5</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 925.1</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 925.7</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 926.3</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 926.9</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 927.5</td> <td>SF7BW500 to SF12BW500 (RX1)</td> </tr> <tr> <td>■ 923.3</td> <td>SF12BW500 (RX2)</td> </tr> </tbody> </table> 		Frequency (MHZ)	Spreading Factor	■ 903.9	SF7BW125 to SF10BW125	■ 904.1	SF7BW125 to SF10BW125	■ 904.3	SF7BW125 to SF10BW125	■ 904.5	SF7BW125 to SF10BW125	■ 904.7	SF7BW125 to SF10BW125	■ 904.9	SF7BW125 to SF10BW125	■ 905.1	SF7BW125 to SF10BW125	■ 905.3	SF7BW125 to SF10BW125	■ 904.6	SF8BW500	Frequency (MHZ)	Spreading Factor	■ 923.3	SF7BW500 to SF12BW500 (RX1)	■ 923.9	SF7BW500 to SF12BW500 (RX1)	■ 924.5	SF7BW500 to SF12BW500 (RX1)	■ 925.1	SF7BW500 to SF12BW500 (RX1)	■ 925.7	SF7BW500 to SF12BW500 (RX1)	■ 926.3	SF7BW500 to SF12BW500 (RX1)	■ 926.9	SF7BW500 to SF12BW500 (RX1)	■ 927.5	SF7BW500 to SF12BW500 (RX1)	■ 923.3	SF12BW500 (RX2)
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Software Specification

3.1 Configuration/Performance/Capability

Req. #	Features	Description	comment
PR-0001	Network Configuration	<ul style="list-style-type: none"> • Ethernet switch Configuration 	
PR-0003	OTA	<ul style="list-style-type: none"> • OTA daily check • Browan OTA • 	

PR-0004	Gateway Config	<ul style="list-style-type: none"> • Network setting • Helium on boarding 	
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3.2 Basic Features

Req. #	Features	Description	comment
PR-1001	Onboarding Button	<ul style="list-style-type: none"> • Over 6 seconds then trigger Onboarding 	
PR-1002	LED	<ul style="list-style-type: none"> • 1 LED <ul style="list-style-type: none"> ◦ Power LED 	
PR-1003	Ethernet	<ul style="list-style-type: none"> • Ethernet connection 	
PR-1006	Debug port	<ul style="list-style-type: none"> • UART for debug 	
PR-1007	OTA	<ul style="list-style-type: none"> • OTA agent 	
PR-1008	SW Monitor	<ul style="list-style-type: none"> • Monitor packet forwarder • Monitor Helium Miner • Monitor Gateway Config 	
PR-1009	HW Watchdog	<ul style="list-style-type: none"> • Monitor system 	

3.3 LoRaWAN features

Req. #	Features	Description	comment
PR-2001	Packet Forwarder	<ul style="list-style-type: none"> • Compatible with Semtech LoRa Packet Forwarder 	
PR-2002	Miner Application	<ul style="list-style-type: none"> • Miner Application 	
PR-2003	gateway_mfr	<ul style="list-style-type: none"> • Swarm key provision 	
PR-2004	Gateway config	<ul style="list-style-type: none"> • Helium on boarding 	

Regulatory Specification

No	Item	Standard
.		



1	FCC/IC
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Reliability Specification

No.	Item	Specification
1	MTBF	300,000 @ 40 °C



Federal Communication Commission Interference Statement

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

Operation of this device is restricted to indoor use only



Industry Canada statement:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference
- (2) This device must accept any interference, including interference that may cause undesired operation of the device

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:
Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.