

USER MANUAL

802.11 b/g/n, 1T1R 2.4GHz Wi-Fi + BLE 5.0 BT Module

Model: NIU6

NXP 88MW322 + NXP QN9030HN

Version 1.1

Electrolux ANC: A24559604A



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PRODUCT FEATURES

- Compact Form Factor: 30x44x1mm (PCB) ± 0.1 mm
- HF/RoHS compliance

WIFI

- IEEE 802.11b/g/n, 1x1 SISO 2.4 GHz
- Integrated CPU, memory, MAC, DSSS/OFDM baseband, direct conversion RF radio, encryption
- CMOS and low-swing sine wave input clock
- Low-power with deep sleep and standby modes
- Integrated T/R switch, PA, and LNA

BT

- Bluetooth Low Energy 5.0 compliant
- Bluetooth Low Energy 5.0 2Mbps high data rate
- Improved co-existence with WiFi
- 1.9 V to 3.6 V supply voltage
- 32 MHz XTAL cell with internal capacitors, able with suitable external XTAL to meet the required accuracy for radio operation over the operating conditions integrated RF balun
- Integrated ultra Low-power sleep oscillator
- Deep Power-down current 350 nA (with wake-up on IO)
- 128-bit, 192-bit or 256-bit AES security processor

PRODUCT SPECIFICATIONS

MAIN CHIPSET

NXP 88MW322-A0-NXUE/AZ
NXP QN9030HN

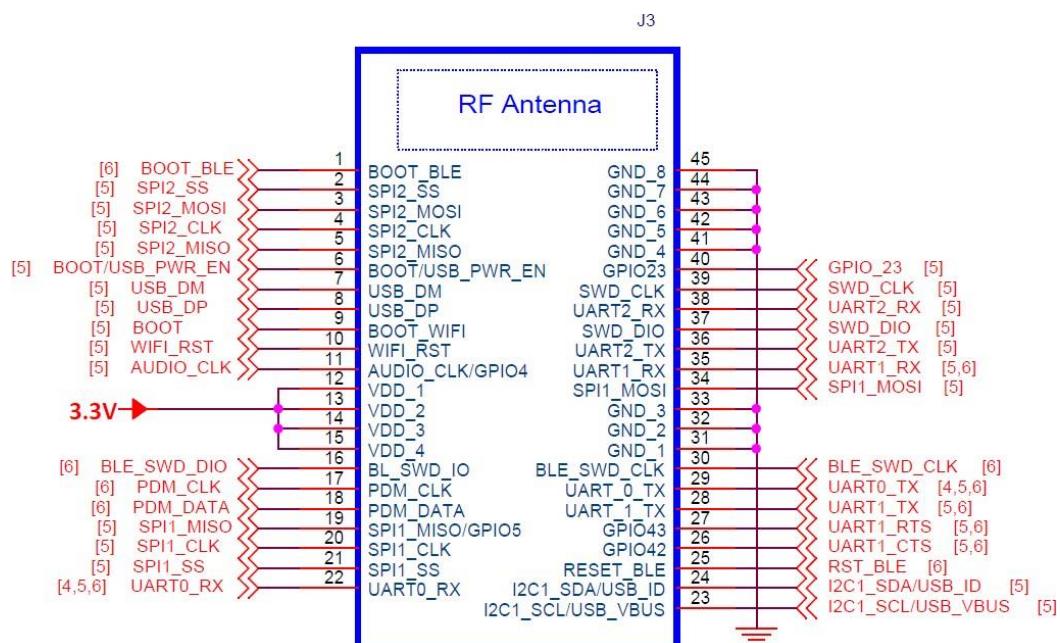
FUNCTIONAL SPECIFICATIONS

BT Function	
Standard	Bluetooth V5.0 with BLE (BT low energy)
Bus Interface	UART
Data Rate	1 Mbps, 2Mbps
Modulation Scheme	GFSK
Frequency Range	2.402~2.480 GHz
Transmit Output Power	3dBm ≤ Output Power ≤ 7dBm
Receiver Sensitivity	LE : 1M at -90dBm , 2M at -87dBm

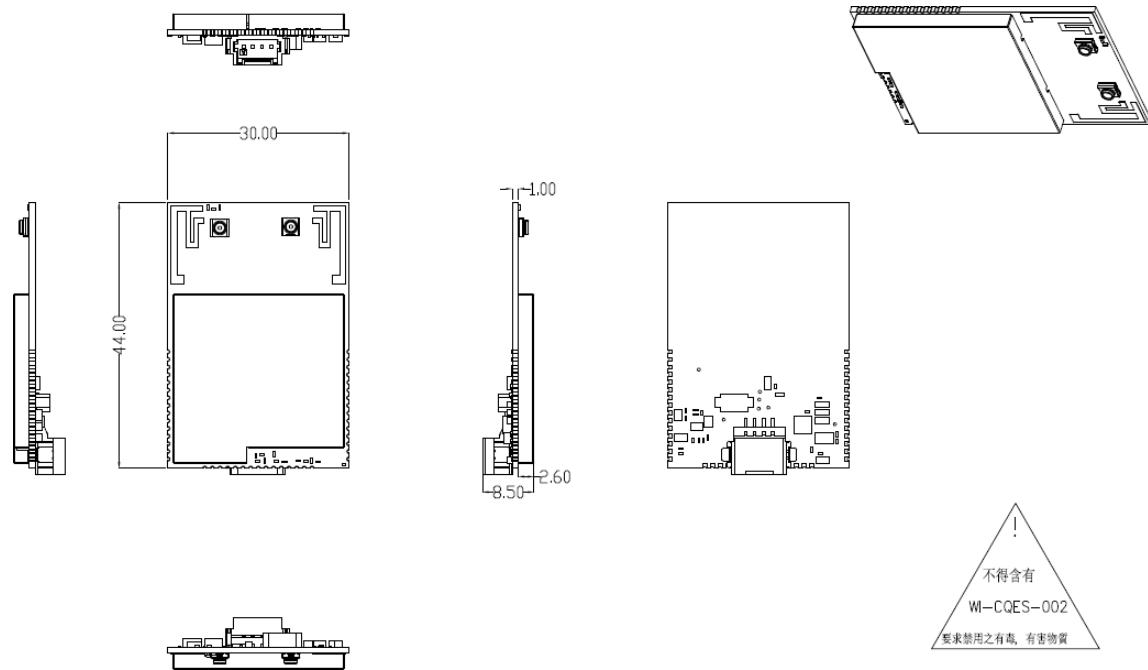
WiFi Function	
Standard	IEEE802.11b; IEEE 802.11g; IEEE 802.11n
Bus Interface	UART
Data Rate	<p>802.11b: 11, 5.5, 2, 1 Mbps</p> <p>802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps</p> <p>802.11n: MCS 0 to 7</p>
Media Access Control	CSMA/CA with ACK
Modulation Techniques	<p>802.11b: CCK, DQPSK, DBPSK</p> <p>802.11g: 64QAM, 16QAM, QPSK, BPSK</p> <p>802.11n: BPSK, QPSK, 16QAM, 64QAM</p>
Network Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode
Operation Channel	<p>2.4GHz</p> <p>11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan</p>
Frequency Range	<p>802.11bg</p> <p>2.412 ~ 2.462 GHz</p>

Transmit Output Power – 1x1 (Tolerance: +1.5dBm)	802.11b: 1M~11M :16dBm																																													
	802.11g: 6M~18M :16dBm 24~54M: 15dBm																																													
	802.11n: MCS0~MCS7 :13dBm																																													
Receive Sensitivity	802.11b: (IEEE Standard < -76dBm) typical: -87.5dBm(11M)																																													
802.11g: (IEEE Standard < -65dBm) Typical: -73dBm(54M)	802.11n: 20MHz (IEEE Standard < -64dBm) Typical: -71dBm(MCS7)																																													
Security	WPA, WPA2, WPS, WEP 64/128, IEEE 802.11x, IEEE 802.11i																																													
Operating Voltage	5V ± 5% supply voltage																																													
Power Consumption	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Item</th><th style="text-align: left; padding: 2px;">Mode</th><th style="text-align: left; padding: 2px;">Meas.(A)</th><th style="text-align: left; padding: 2px;">Peak(A)</th><th style="text-align: left; padding: 2px;">Peak(W)</th></tr> </thead> <tbody> <tr> <td style="text-align: left; padding: 2px;">1</td><td style="text-align: left; padding: 2px;">Power on only</td><td style="text-align: left; padding: 2px;">0.063</td><td style="text-align: left; padding: 2px;">0.064</td><td style="text-align: left; padding: 2px;">0.320</td></tr> <tr> <td style="text-align: left; padding: 2px;">2</td><td style="text-align: left; padding: 2px;">Tx continuous, 802.11b/CH6/17dBm</td><td style="text-align: left; padding: 2px;">0.132</td><td style="text-align: left; padding: 2px;">0.151</td><td style="text-align: left; padding: 2px;">0.755</td></tr> <tr> <td style="text-align: left; padding: 2px;">3</td><td style="text-align: left; padding: 2px;">Tx continuous, 802.11g/CH6/16dBm</td><td style="text-align: left; padding: 2px;">0.128</td><td style="text-align: left; padding: 2px;">0.147</td><td style="text-align: left; padding: 2px;">0.735</td></tr> <tr> <td style="text-align: left; padding: 2px;">4</td><td style="text-align: left; padding: 2px;">Tx continuous, 802.11n/CH6/13dBm</td><td style="text-align: left; padding: 2px;">0.122</td><td style="text-align: left; padding: 2px;">0.130</td><td style="text-align: left; padding: 2px;">0.650</td></tr> <tr> <td style="text-align: left; padding: 2px;">5</td><td style="text-align: left; padding: 2px;">WIFI Rx continuous only</td><td style="text-align: left; padding: 2px;">0.063</td><td style="text-align: left; padding: 2px;">0.064</td><td style="text-align: left; padding: 2px;">0.320</td></tr> <tr> <td style="text-align: left; padding: 2px;">6</td><td style="text-align: left; padding: 2px;">Tx continuous, BLE_1M/CH19/10dBm</td><td style="text-align: left; padding: 2px;">0.073</td><td style="text-align: left; padding: 2px;">0.074</td><td style="text-align: left; padding: 2px;">0.365</td></tr> <tr> <td style="text-align: left; padding: 2px;">7</td><td style="text-align: left; padding: 2px;">Tx continuous, BLE_2M/CH19/10dBm</td><td style="text-align: left; padding: 2px;">0.069</td><td style="text-align: left; padding: 2px;">0.070</td><td style="text-align: left; padding: 2px;">0.345</td></tr> <tr> <td style="text-align: left; padding: 2px;">8</td><td style="text-align: left; padding: 2px;">BLE Rx continuous only</td><td style="text-align: left; padding: 2px;">0.065</td><td style="text-align: left; padding: 2px;">0.066</td><td style="text-align: left; padding: 2px;">0.325</td></tr> </tbody> </table>	Item	Mode	Meas.(A)	Peak(A)	Peak(W)	1	Power on only	0.063	0.064	0.320	2	Tx continuous, 802.11b/CH6/17dBm	0.132	0.151	0.755	3	Tx continuous, 802.11g/CH6/16dBm	0.128	0.147	0.735	4	Tx continuous, 802.11n/CH6/13dBm	0.122	0.130	0.650	5	WIFI Rx continuous only	0.063	0.064	0.320	6	Tx continuous, BLE_1M/CH19/10dBm	0.073	0.074	0.365	7	Tx continuous, BLE_2M/CH19/10dBm	0.069	0.070	0.345	8	BLE Rx continuous only	0.065	0.066	0.325
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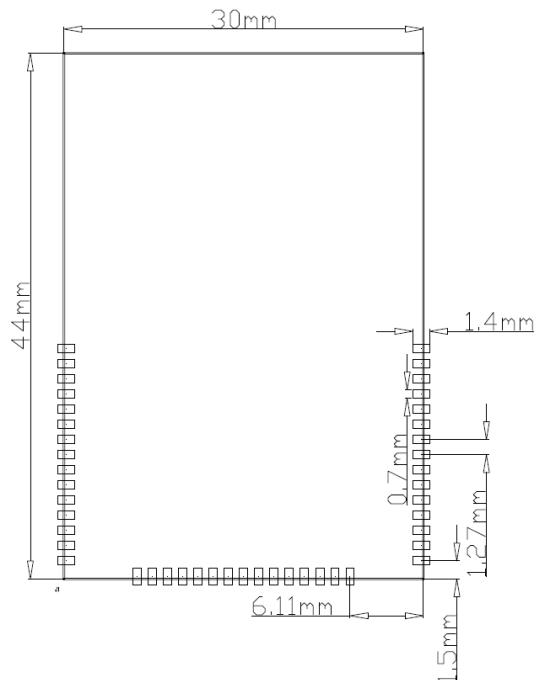
PIN DEFINITION



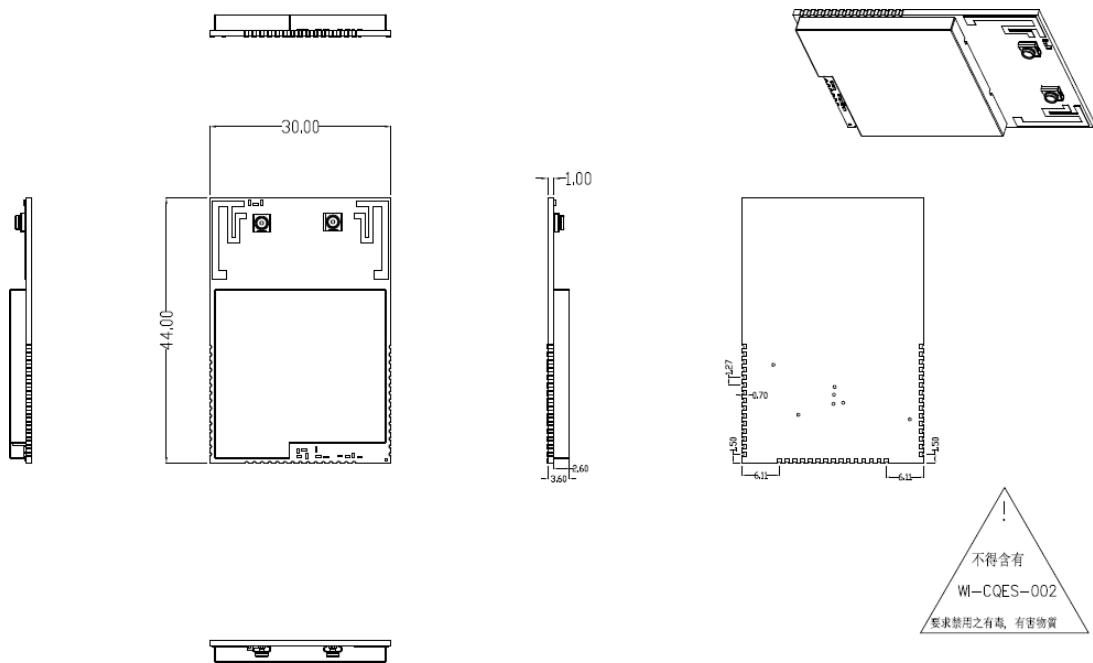
N.O	PIN NAME	N.O	PIN NAME	N.O	PIN NAME
1	BOOT_BLE	16	BLE_SWD_DIO	31	GND
2	SPI2_SS	17	PDM_CLK	32	GND
3	SPI2_MOSI	18	PDM_DATA	33	GND
4	SPI2_CLK	19	SPI1_MISO	34	SPI1_MOSI
5	SPI2_MISO	20	SPI1_CLK	35	UART1_RX
6	BOOT/USB_PWR_EN	21	SPI1_SS	36	UART2_TX
7	USB_DM	22	UART0_RX	37	SWD_DIO
8	USB_DP	23	I2C1_SCL/USB_VBUS	38	UART2_RX
9	BOOT	24	I2C1_SDA/USB_ID	39	SWD_CLK
10	WIFI_RST	25	RST_BLE	40	GPIO23
11	AUDIO_CLK	26	UART1_CTS	41	GND
12	3v3	27	UART1_RTS	42	GND
13	3v3	28	UART1_TX	43	GND
14	3v3	29	UART0_TX	44	GND
15	3v3	30	BLE_SWD_CLK	45	GND

MECHANICAL for 5V

Unit : mm ; Tolerance : +/- 0.1mm

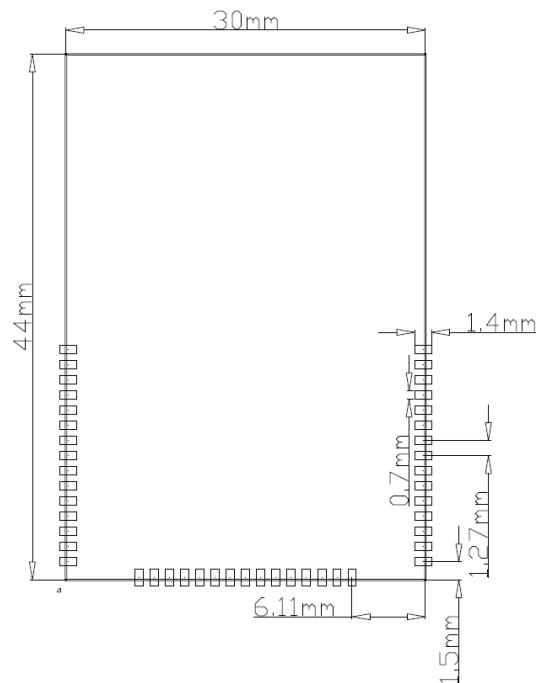
RECOMMEND FOOTPRINT

MECHANICAL for 3.3V



Unit : mm ; Tolerance : +/- 0.1mm

RECOMMEND FOOTPRINT



ENVIRONMENTAL

Operating

Operating Temperature: 0 to 70 °C

Relevant Humidity: 5-90% (non-condensing)

Storage

Temperature: -40 to 85 °C

Relevant Humidity: 5-95% (non-condensing)

WARNINGS**FCC 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 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.

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

FCC 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.

ISED 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.

ISED Radiation Exposure Statement:

This equipment complies with IC RSS-102 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.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

The transmitter module may not be co-located with any other transmitter or antenna.

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This module is intended for OEM integrators under the following conditions:

1. Ensure that the end-user has no manual instructions to remove or install module.
2. This module is certified pursuant to Part 15 rules section 15.247 and RSS-247.
3. This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated.

Antenna Number	Brand Name	Model Name	Ant. Type	Connector	Support	Max Peak Gain
Antenna 1	LITEON	WCBN3601M	Printed Ant	Murata	2.4G	2.3 dBi
Antenna 2	LITEON	WCBN3601M	Printed Ant	Murata	BT	1.6 dBi

4 Label and compliance information

Label of the end product:

FCC

The host product must be labeled in a visible area with the following " Contains FCC ID: 2AIBX-NIU6L".

The end product shall bear the following 15.19 statement: 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.

ISED

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains transmitter module IC: 21700-NIU6L" or "Contains IC: 21700-NIU6L"

Contient le module d'émission IC: 21700-NIU6L

5. Information on test modes and additional testing requirements

This module has been approved under stand-alone configuration.

OEM integrator has be limited the operation channels in channel 1-11 for 2.4GHz band.

The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093/RSS-102 and different antenna configurations

The information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host can be found at KDB Publication 996369 D04.

OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC/ISED authorization is no longer considered valid and the FCC/IC No. cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC/ISED authorization.

6. Additional testing, Part 15 Subpart B and ICES-003 disclaimer

Appropriate measurements (e.g. Part 15 Subpart B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacturer.

This module is only FCC/ISED authorized for the specific rule parts 15.247, RSS-247 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC/ISED rules that apply to the host product as being Part 15 Subpart B/ICES-003 compliant.

7. The user manual of the end product should include:

FCC:

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

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

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.

The antenna(s) used for this transmitter must not transmit simultaneously with any other antenna or transmitter.

ISED:

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:

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ISED Radiation Exposure Statement:

This equipment complies with IC RSS-102 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.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

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Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

WARNING BRAZIL:

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL – www.anatel.gov.br")