

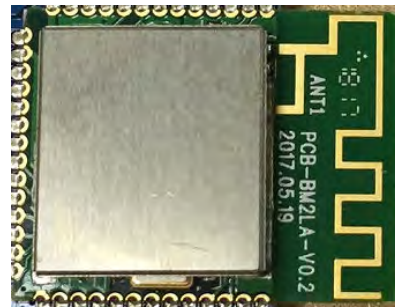
## Features:

- Bluetooth Spec V4.2 Dual mode Compliant
- Fully Integrated RF/PMU/BT/Audio/CPU
- Up to 400MHz ARMTM Cortex-M4F CPU
- Integrated 26MHz Crystal Oscillator for Low Power Operation
- Dual MICs Noise Reduction
- Echo Cancellation
- Voice recognition support
- Multi-Band EQ and Bass Enhancement
- Immersive Audio with 3D or Virtual Surround Sound
- External Micro SD Support
- HiFi Audio support with Sample Rate Up to 384KHz, 24bit Audio Processing, DAC: 105dB SNR
- Support 8M internal Flash
- Advanced 40nm Low Power Process
- Support for 802.11 Co-existence
- Size: 18.9±0.5mm x 14.6±0.5mm x 1.7±0.5mm
- Weight: 0.8g

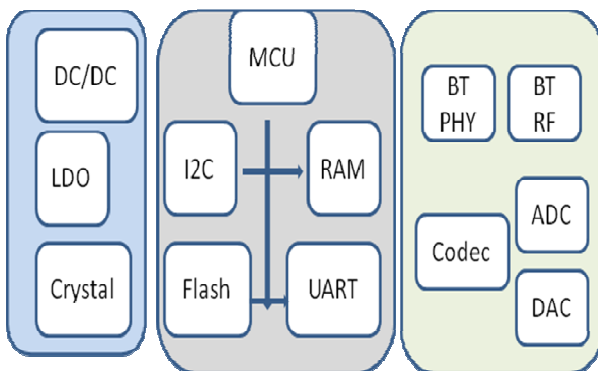
## BM20L Class 1 Multimedia Module



**BM20L**  
Jan 2018



(This Photos are for reference only)



System Architecture

## Product Description:

The BM20L series module consumer audio platform for wired and wireless applications fully Integrated RF/PMU/BT/Audio/CPU ,an ultra-low-power DSP and application processor with embedded flash memory, a high-performance stereo codec, a power management subsystem, LED and LCD drivers in a SOC IC. The dual-core architecture with flash memory enables manufacturers to easily differentiate their products with new features without extending development cycles.

## Applications:

- Wired or wireless soundbars
- Wired or wireless speakers and headphones
- Wearable audio with sensors
- Stereo headsets

## Specifications:

Operating Frequency Band	2.4GHz ~ 2.48GHz unlicensed ISM band
Bluetooth Specification	V4.2
Output Power Class	Class1 (BQB only )
Max. Output Power	8dbm
Date Rate	3Mbps
Channel No.	79
Modulation Type	GFSK $\pi/4$ DQPSK 8DPSK
Operating Voltage	3.3V
Host Interface	USB 2.0 or UART
Audio Interface	PCM, I2S, SPDIF
Flash Memory Size	8Mbits
Dimension	18.9mm (L) x 14.6 (W) mm x 1.7mm (H)

Specifications are subject to change without prior notice



## Electrical Characteristics

Absolute Maximum Rating	Min	Max
Storage Temperature	-30°C	+80°C

Recommended Operating Conditions	Min	Max
Operating Temperature Range	-20°C	+70°C
Supply Voltage, (V <sub>BAT</sub> )	3.1V (steady)	4.5V
Supply Voltage, (V <sub>CHG</sub> )	4.5V	5.75V

Power Consumption	Units	Average
SCO Connection HV3 (30ms interval sniff mode)	Ma	
SCO Connection HVI	Ma	17Ma
ACL Data Transfer 115.2Kbps UART no traffic (Master)	Ma	
ACL Data Transfer 115.2Kbps UART no traffic (Slave)	Ma	17Ma
<b>CODEC</b>		
Microphone inputs and ADC/channel	Ma	
DAC and loudspeaker driver, no signal/channel	Ma	
Digital audio processing subsystem	Ma	

V<sub>BAT</sub> = 4.2V; f = 2.441GHz; T=20°C

## RF Characteristics

Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm	-93	-91	-89	≤-70
Maximum Receiver Signal	dBm	-20	-10	-	≥-20
C/I Co-Channel	Db	-	6	11	≤11
Adjacent Channel Selectivity C/I -1MHz	Db	-	-6	0	≤0
2 <sup>nd</sup> Adjacent Channel Selectivity C/I -2MHz	Db	-	-38	-30	≤-30
3 <sup>rd</sup> Adjacent Channel Selectivity C/I -3MHz	Db	-	-45	-40	≤-40
Image Rejection C/I	Db	-	-16	-9	≤-9

V<sub>BAT</sub> = 4.2V; f = 2.4441GHz; T=20°C

Transmitter	Units	Min	Typ	Max	Bluetooth Spec
RF Output Power	dBm	0	2	3	0 to +3
RF Power Control Range	dB	16	24	-	> 16
RF Power Range Control Resolution	dB	-	0.5	-	-
20dB Bandwidth for Modulated Carrier	kHz	-	940	1000	<1000
2 <sup>nd</sup> Adjacent Channel Power (+/-2MHz)	dBm	-	-36	-20	≤-20
3 <sup>rd</sup> Adjacent Channel Power (+/-2MHz)	dBm	-	-45	-40	≤-40

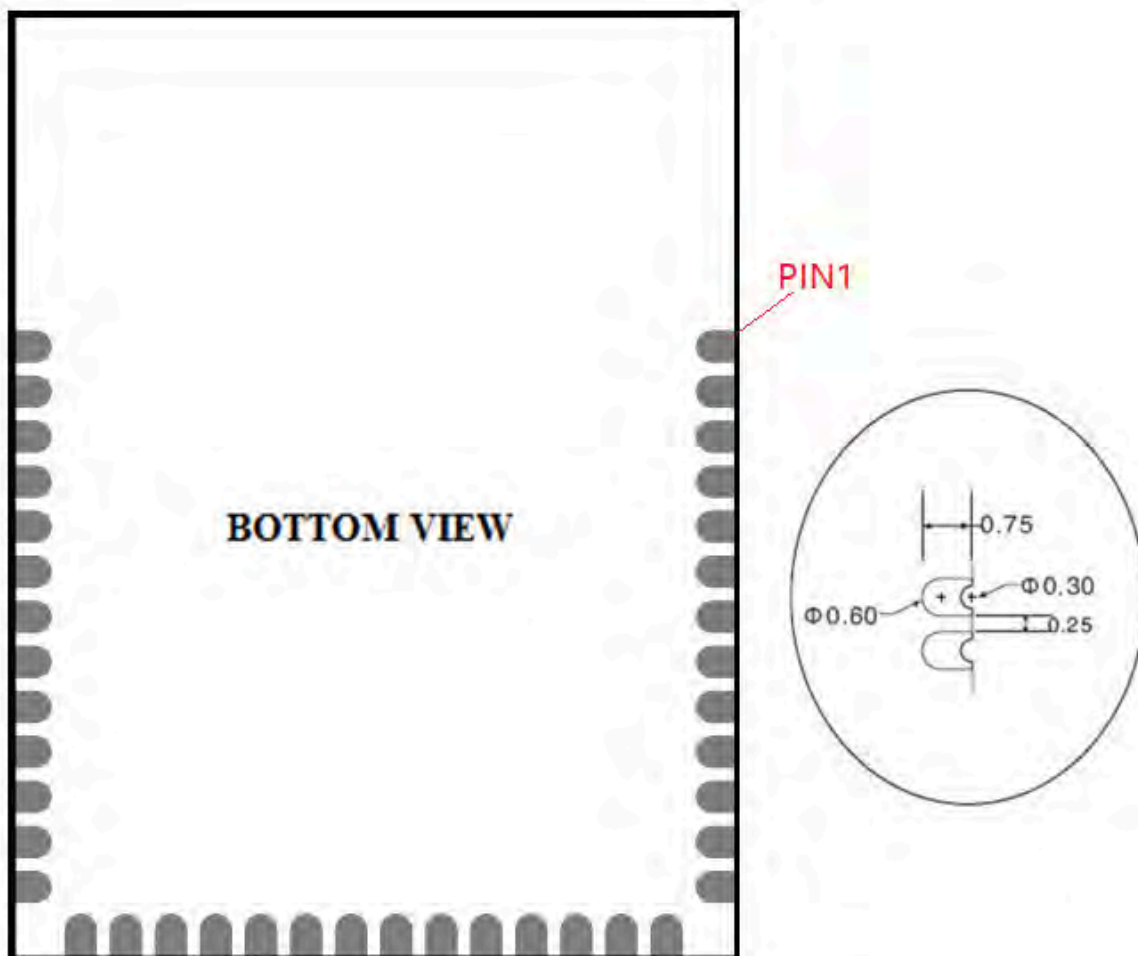
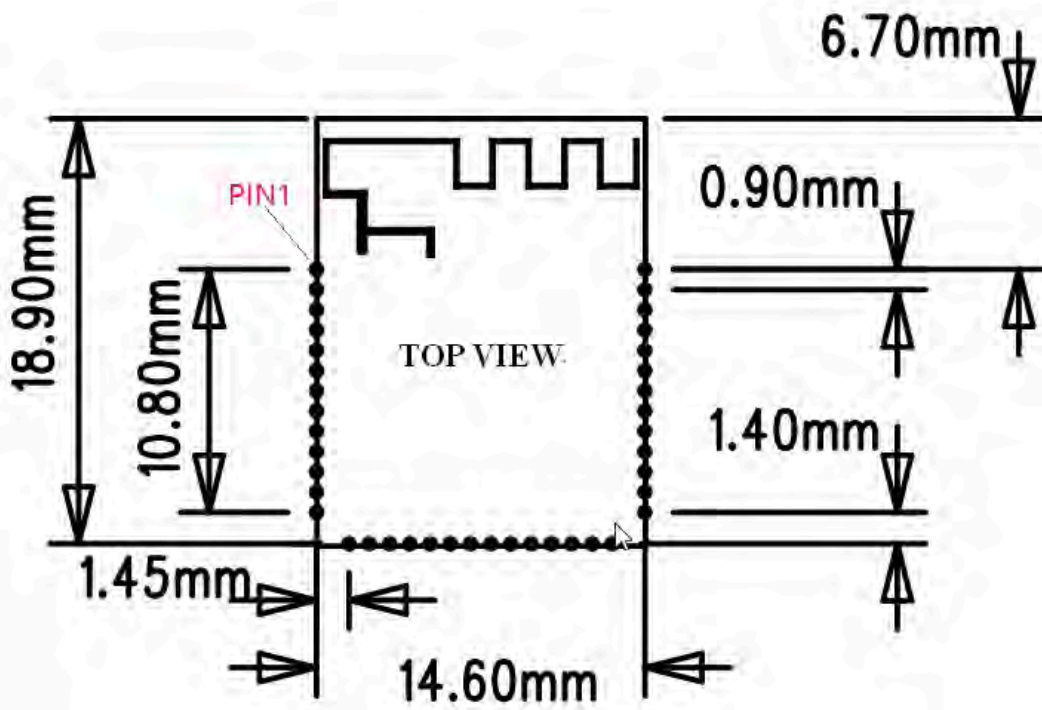
V<sub>BAT</sub> = 4.2V; f = 2.4441GHz; T=20°C

All specifications including pinouts and electrical specifications may be changed without prior notice

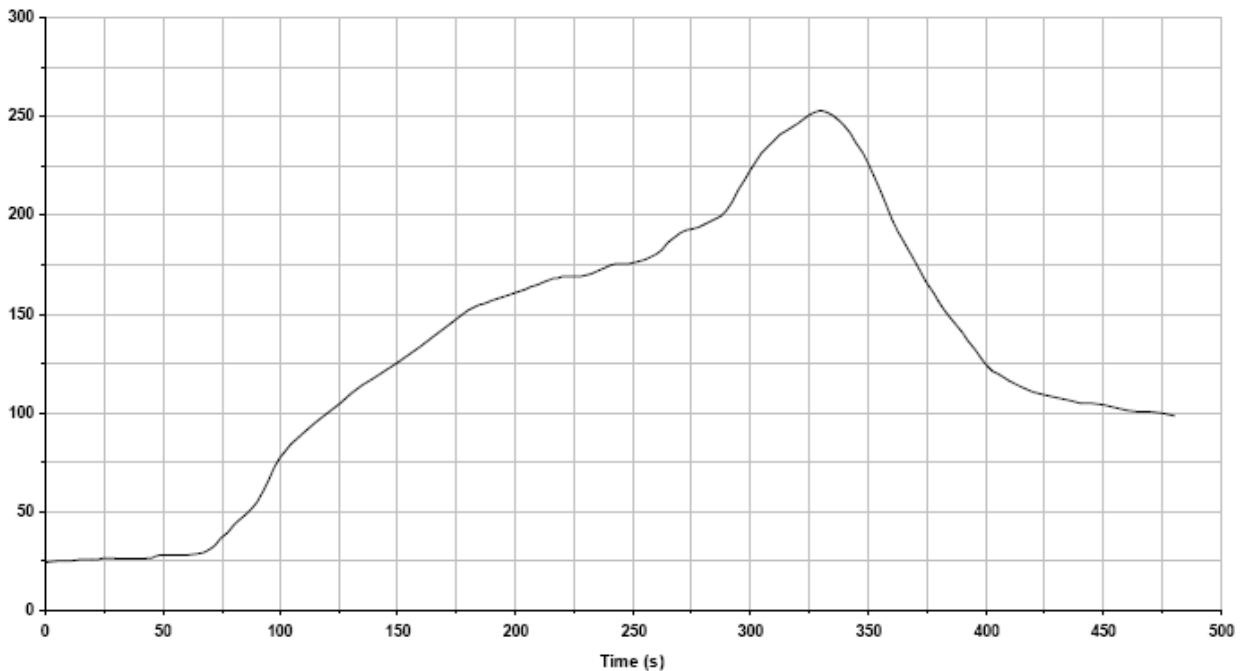
**Pin Configurations**

PIN NO.	NAME	TYPE	FUNCTION	RE-MARK
1	GND	GND	Ground	
2	RF	BT RF	Bluetooth RF output /receiver input	
3	GND	GND	Ground	
4	GPIO37	Bi-directional	Programmable input/output line	
5	GPIO36	Bi-directional	Programmable input/output line	
6	GPIO35	Bi-directional	Programmable input/output line	
7	GPIO34	Bi-directional	Programmable input/output line	
8	KEY_P	Key pad	Analog input	
9	KEY_Sense	Key pad sense	Analog input	
10	GND	GND	Ground	
11	RESET	CMOS input with weak internal pull-down	Chip reset pin, High is reset.	
12	PWR_Key	Analogue	Chip power on input, high level/ high pules(min 10ms) is active	
13	VBAT	Power	Battery positive terminal	
14	Vbat_Sense	Power detec	Battery temperature detect	
15	CHG_DET	CHG	Charge input detect	
16	VDDO	Power VDD	VDD power output	
17	ADC0	ADC	ADC input	
18	GND	GND	Ground	
19	GPIO07	Bi-directional	Programmable input/output line	
20	GPIO26	Bi-directional	Programmable Input/Output Line	
21	I2C_SDA	Bi-directional	I2C data	
22	I2C_SCL	Bi-directional	I2C Clock	
23	GPIO13	Bi-directional	Programmable Input/Output Line	
24	GPIO25	Bi-directional	Programmable Input/Output Line	
25	GPIO24	Bi-directional	Programmable Input/Output Line	
26	GPIO23	Bi-directional	Programmable input/output line	
27	GPIO22	Bi-directional	Programmable input/output line	
28	GND	GND	Ground	
29	Vcodec	Power Pin	Power of codec	
30	VMIC_1	Analogue out	Microphone bias 1	
31	MIC_1P	Analogue	Microphone input positive, right	
32	MIC_1N	Analogue	Microphone input negative, right	
33	MIC_2N	Analogue	Microphone input negative, right	
34	MIC_2P	Analogue	Microphone input positive, right	
35	VMIC_2	Analogue out	Microphone bias 2	
36	GND	GND	Ground	
37	SPK_LN	Analogue	Speaker output negative, left	
38	SPK_LP	Analogue	Speaker output positive, left	
39	SPK_RN	Analogue	Speaker output negative, right	
40	SPK_RP	Analogue	Speaker output positive, right	

Recommended Layout patterns:



## Recommended Reflow Temperature Profile:



Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 – 90 seconds
- Device absolute maximum reflow temperature: 250°C

## MAC Address:

Each Module has his MAC Address

0CA6 94 XXXXXX

Concerning the dimension and printing content of the tab:

- 1 line the last six letters of the LAP on the module
  - 2 line the software version
  - 3 line the customer material part number
- Qr code area, with 12 letters (MAC Address)

Length:14 \* Width:7 (mm)

The tab code pastes style:



(This Photos are for reference only)

## Standard Packing Information

### Module packing Box (Max 3000pcs module per box)

84pcs per tray, 10trays per ESD bag, sealed in ESD PE bag.

Maximum modules per ESD bag is 840pcs

Module packing bag dimension: 350.0mm x 195.0mm

### Delivering carton box

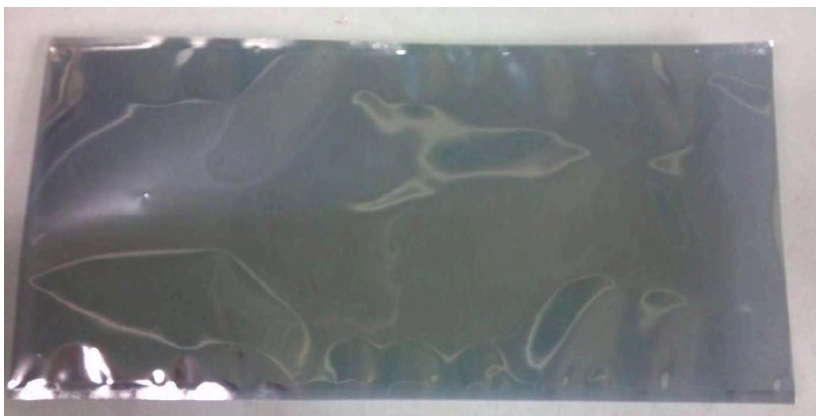
To hold of module carton box for shipment (Max 8400pcs modules per box)

Delivery Carton Box dimension: 320.0mm x 250.0mm x 190.0mm (W x D x H)

ESD tray dimension: 275.00mm x 127.00mm x 8mm(W x D x H)



ESD tray (to be packed in ESD PE bag).



ESD PE bag size: 350.0mm x 195mm

## QDL Certificate



## Ordering Information

No	Items	Ordering Code (Class 2)	Description
1	BM20L Module	BM20L	8Mbit Flash
2	BM2000 Module Test Kit	BM20L EVB	Test kit
<b>BM2000 Test Kit</b>			

## Document References

References	Version
Specifications of the Bluetooth System	Bluetooth Specification Version 4.0, 17 December 2009
BM2000-L Data Sheet	

## Document History

Revision	Date	History
Draft V0.1	2017-5-2	First release
V0.2	2017-08-15	Modify max VBAT supply voltage
V0.3	2017-12-12	Add QDL Certificate
V0.4	2017-12-14	Modify Module size
V0.5	2018-03-14	Updated Supply Voltage (V_BAT)
V0.6	2018-06-14	Base BM20L module add shielding case

## Contact Information

### Sunitec Enterprise Co., Ltd.

#### China Factory:

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E-mail: [sales@sunitec-cn.com](mailto:sales@sunitec-cn.com) or [keven.zhou@sunitec-cn.com](mailto:keven.zhou@sunitec-cn.com)

Http://www.sunitec-cn.com



**FCC 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.

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

NOTE: 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.

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 20 cm between the radiator and 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.

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna.

As long as the three conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

#### **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 authorization is no longer considered valid and the FCC ID 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 authorization.

#### **End Product Labeling:**

The final end product must be labeled in a visible area with the following "Contains FCC ID: A6RBM20L" If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following; Contains Transmitter Module FCC ID: [A6RBM20L](#)

#### **Manual Information to the End User:**

The OEM integrator has to be aware not provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

When the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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,

- 2) this device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

### **ISED Statement**

- English: 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. The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

- French: Le présent appareil est conforme aux CNR de l'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'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'empêcher 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.

This device is intended only for OEM integrators under the following condition:

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

As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

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

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

**Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC 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 Canada authorization.

**Note Importante:**

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l' IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

**End Product Labeling**

The final end product must be labeled in a visible area with the following: Contains IC: [740B-BM20L](#).

**Plaque signalétique du produit final**

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: [740B-BM20L](#).

**Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

**Manuel d'information à l'utilisateur final**

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.