Installation manual of HRM1016

This document describes the guideance to install Bluetooth moduke HRM1016 (FCC ID:VIYHRM1016, IC:7305A-HRM1016) to customer's PWB.

1.Mount Form

76 solder bumps, 1.2 mm pitch, diameter is 0.8 mm.

2.Reflow Profile

Maximum reflow times : 2 times

Recommended reflow temperature profile is shown in Figure 1.

Points of this profile are as follows:

- Ramp up temperature for preheat stage is 1 to 3 deg C/sec
- Preheat stage is from 155 to 165 deg C, from 120 to 150 sec
- Ramp up temperature for solder reflow is from 2 to 3 deg C/sec
- Peak temperature is from 240 to 245 deg C
- Time over 217 deg C is from 40 to 60 sec
- Cooling down temperature is from 2 to 4 deg C/sec.

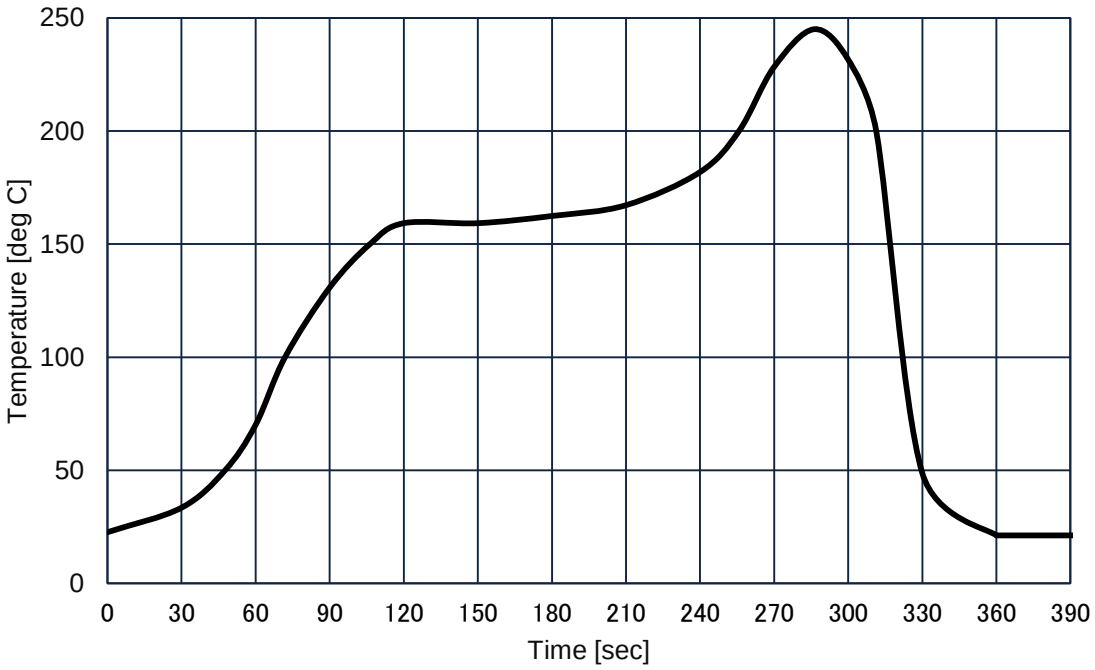


Figure 1: Recommended reflow temperature profile

3.Hardware information

3-1.Module size

23.60 x 13.30 x 2.60mm (include the height of shield case)

3-2.Pin Information

Number of GPIOs：29 ports maximum

Number of AIOs：2 ports

Supported interfaces：USB, SPI, UART and I2C

Audio interfaces：Analog audio input, analog audio output, I2S (PCM,SPDIF)

Others：Support for up to 6 capacitive touch sensor inputs

Pin assignment：As shown in Table 1.

BOTTOM VIEW

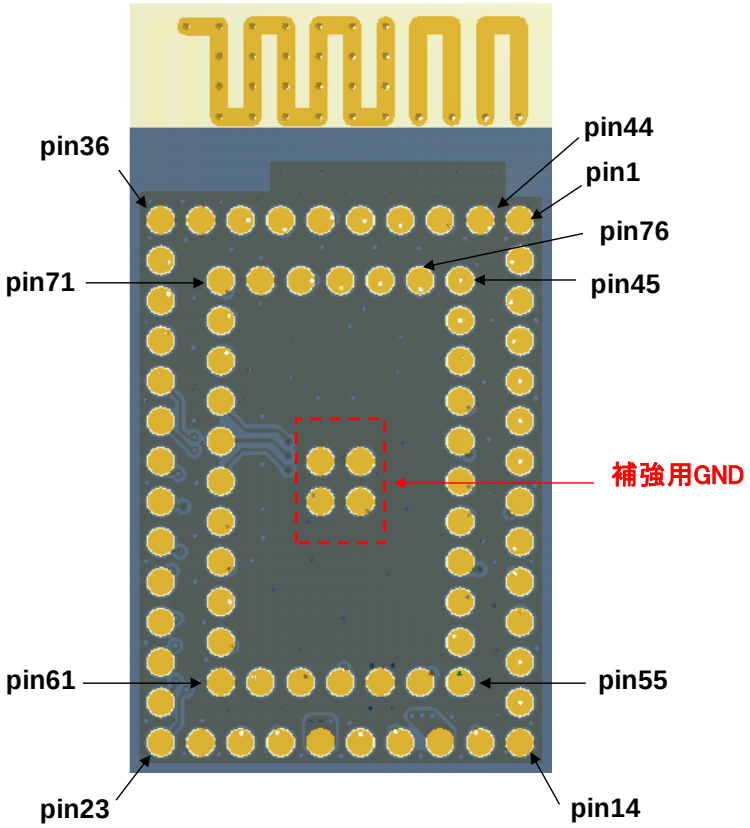


Table 1：Pin assignments

Pin No. ピンNo.	Name 名称	Functions 機能	Description 内容
1	GND	Power 電源	Ground (0V).
2	LED0	Open Drain オープンドレイン	LED driver. LEDドライバー
3	LED1	Open Drain オープンドレイン	LED driver. LEDドライバー
4	LED2	Open Drain オープンドレイン	LED driver. LEDドライバー
5	RST#	Digital I/O デジタル入出力	Reset if low. Input debounced so must be low for >5ms to cause a reset. 5ms以上のローでリセットします。
6	PIO[6]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
7	PIO[14]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
8	PIO[8]/NC	Digital I/O デジタル入出力	General purpose I/O pin. If wake up of CSR8670 BGA is required via the VREGENABLE pin, then the operation of PIO[8] is NC and should be left unconnected. 汎用入出力端子。VREGENABLE端子をウェイクアップとして使用する場合にはNCとする。
9	USB_P	Digital I/O デジタル入出力	USB data plus with selectable internal 1.5kΩ pull-up resistor. 内部プルアップ1.5kΩが選択可能なUSBデータプラス
10	USB_N	Digital I/O デジタル入出力	USB data minus. USBデータマイナス
11	PIO[10]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
12	PIO[11]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
13	PIO[9]/NC	Digital I/O デジタル入出力	If wake up of CSR8670 BGA is required via the VCHG pin, then the operation of PIO[9] is NC and should be left unconnected. 汎用入出力端子。VCHG端子をウェイクアップとして使用する場合NCとする。
14	GND	Power 電源	Ground (0V).

Pin No. ピンNo.	Name 名称	Functions 機能	Description 内容
15	VBAT_SENSE	Analog input アナログ入力	Battery charger sense input. 充電電圧検知端子
16	VBAT	Power 電源	Battery positive terminal 電池正極端子
17	CHG_EXT	Digital Output デジタル出力	External battery charger control 外部充電制御端子
18	VREGENABLE *1	Digital Input デジタル入力	Regulator enable input レギュレータイネーブル端子
19	VCHG	Power 電源	Battery charger input 電池充電入力端子
20	PIO[28]/QSPI_FLASH_IO[3]	Digital I/O デジタル入出力	General purpose I/O pin. Serial quad I/O flash data bit 3. 汎用入出力端子。SPI Flashデータ3端子
21	PIO[21]/QSPI_FLASH_CLK	Digital I/O デジタル入出力	General purpose I/O pin. SPI flash clock. 汎用入出力端子。SPI Flashクロック端子
22	GND	Power 電源	Ground (0V).
23	MIC_LN	Analog input アナログ入力	Microphone input negative, left. 左側マイクロホン入力負極端子
24	MIC_LP	Analog input アナログ入力	Microphone input positive, left. 左側マイクロホン入力正極端子
25	MIC_BIAS_A	Power 電源	Microphone bias A. マイクロホンバイアスA端子
26	MIC_BIAS_B	Power 電源	Microphone bias B. マイクロホンバイアスB端子
27	MIC_RN	Analog input アナログ入力	Microphone input negative, right. 右側マイクロホン入力負極端子
28	MIC_RP	Analog input アナログ入力	Microphone input positive, right. 右側マイクロホン入力正極端子
29	SP_RN	Analog output アナログ出力	Speaker output negative, right. 右側スピーカ出力負極端子
30	SP_RP	Analog output アナログ出力	Speaker output positive, right. 右側スピーカ出力正極端子
31	SP_LN	Analog output アナログ出力	Speaker output negative, left. 左側スピーカ出力負極端子
32	SP_LP	Analog output アナログ出力	Speaker output positive, left. 左側スピーカ出力正極端子

Pin No. ピンNo.	Name 名称	Functions 機能	Description 内容
33	CAP_SENSE1	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
34	CAP_SENSE3	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
35	CAP_SENSE4	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
36	GND	Power 電源	Ground (0V).
37	GND	Power 電源	Ground (0V).
38	PIO[0]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
39	PIO[1]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
40	PIO[2]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
41	PIO[3]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
42	PIO[4]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
43	PIO[5]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
44	GND	Power 電源	Ground (0V).
45	SPI_CLK	Digital input デジタル入力	SPI clock pin. SPIクロック端子
46	SPI_MOSI	Digital input デジタル入力	SPI data input pin. SPIデータ入力端子
47	SPI_MISO	Digital output デジタル出力	SPI data output pin. SPIデータ出力端子
48	SPI_CS#	Digital input デジタル入力	Chip select for SPI, active low. SPIチップセレクト端子、アクティブロー

Pin No. ピンNo.	Name 名称	Functions 機能	Description 内容
49	UART_RX	Digital input デジタル入力	UART data input. UARTデータ入力端子
50	UART_TX	Digital output デジタル出力	UART data output. UARTデータ出力端子
51	UART_RTS	Digital I/O デジタル入出力	UART request to send, active low. Alternative function PIO[16]. UART送信要求端子、アクティブロー。PIO[16]兼用。
52	UART_CTS	Digital input デジタル入力	UART clear to send, active low. UART送信許可端子、アクティブロー。
53	PIO[15]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
54	PIO[7]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
55	PIO[12]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
56	PIO[13]	Digital I/O デジタル入出力	General purpose I/O pin. 汎用入出力端子
57	GND	Power 電源	Ground (0V).
58	PIO[23]/QSPI_FLASH_CS#	Digital I/O デジタル入出力	General purpose I/O pin. SPI flash chip select. 汎用入出力端子。SPI Flashチップセレクト端子
59	PIO[25]/QSPI_FLASH_IO[0]	Digital I/O デジタル入出力	General purpose I/O pin. Serial quad I/O flash data bit 0. 汎用入出力端子。SPI Flashデータ0端子
60	PIO[27]/QSPI_FLASH_IO[2]	Digital I/O デジタル入出力	General purpose I/O pin. Serial quad I/O flash data bit 2. 汎用入出力端子。SPI Flashデータ2端子
61	1.35V	Power 電源	1.35V switch-mode regulator output. 1.35Vスイッチングレギュレータ出力
62	PIO[22]/QSPI_SRAM_CLK	Digital I/O デジタル入出力	General purpose I/O pin. SPI RAM clock. 汎用入出力端子。SPI RAMクロック端子
63	PIO[26]/QSPI_FLASH_IO[1]	Digital I/O デジタル入出力	General purpose I/O pin. Serial quad I/O flash data bit 1. 汎用入出力端子。SPI Flashデータ1端子
64	PIO[24]/QSPI_SRAM_CS#	Digital I/O デジタル入出力	General purpose I/O pin. SPI RAM chip select. 汎用入出力端子。SPI RAMチップセレクト端子

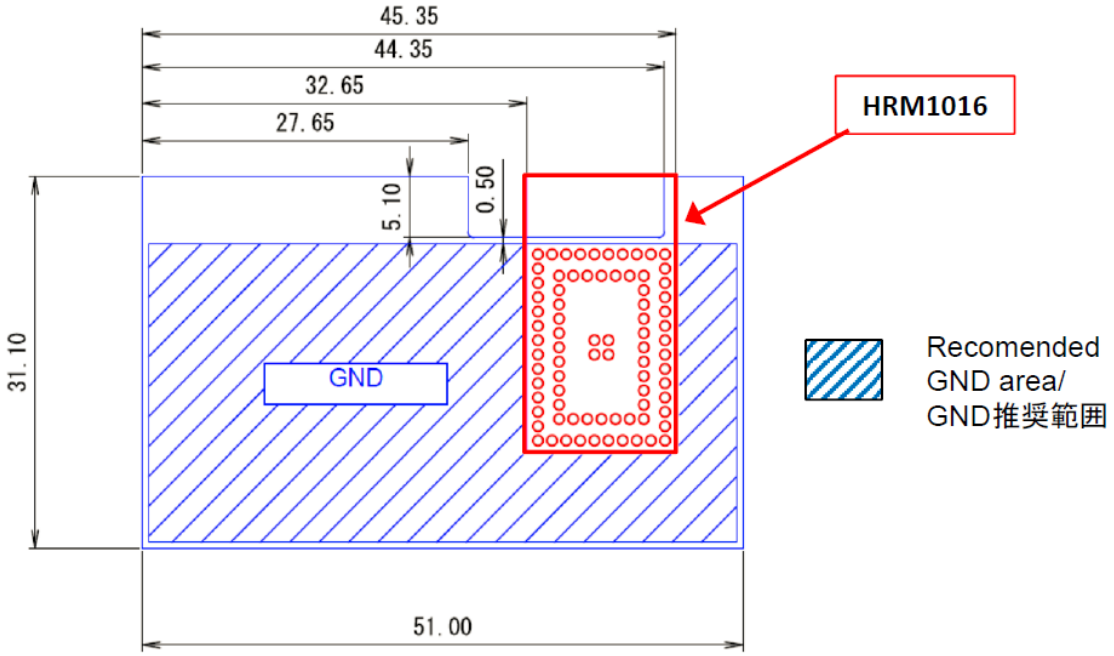
Pin No. ピンNo.	Name 名称	Functions 機能	Description 内容
65	PCM_SYNC	Digital I/O デジタル入出力	Synchronous data sync.Alternative function PIO[19]. PCM syncデータ端子。PIO[19]兼用
66	PCM_OUT	Digital I/O デジタル入出力	Synchronous data output.Alternative function PIO[18]. PCM データ出力端子。PIO[18]兼用
67	PCM_CLK	Digital I/O デジタル入出力	Synchronous data clock.Alternative function PIO[20]. PCM　クロック端子。PIO[20]兼用
68	PCM_IN	Digital I/O デジタル入出力	Synchronous data input.Alternative function PIO[17]. PCM　データ入力端子。PIO[17]兼用
69	CAP_SENSE0	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
70	CAP_SENSE2	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
71	CAP_SENSE5	Analog input アナログ入力	Capacitive touch sensor input. 静電タッチセンサー入力端子
72	GND	Power 電源	Ground (0V).
73	AIO[0]	Analog I/O アナログ入出力	Analogue programmable I/O pin. アナログ入出力端子
74	AIO[1]	Analog I/O アナログ入出力	Analogue programmable I/O pin. アナログ入出力端子
75	1.8V	Power 電源	1.8V switch-mode regulator output. 1.8Vスイッチングレギュレータ出力
76	VDD_PADS	Power 電源	1.7V to 3.6V positive supply input for input/output ports. 入出力端子用電源入力端子

*1 Switchless applications, VREGENABLE is not just pulled up directly to VBAT.
VREGENABLE must be held low during power up and released when the power supplies are stable.

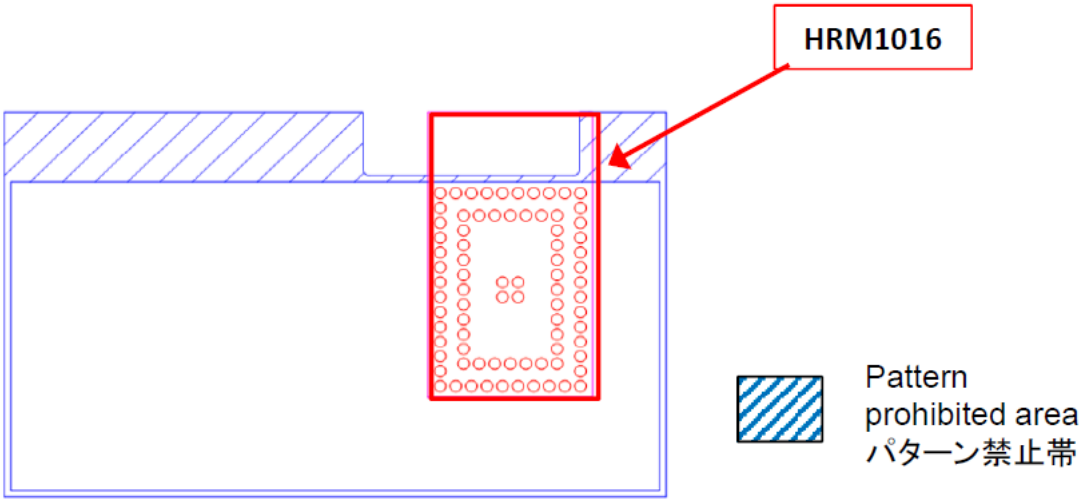
*1 VREGENABLE端子を電源スイッチとして使用しない場合は、VBATと直接つないではいけません。
VBATの電圧供給時、VREGENABLEはローに保持して、VBAT電源が安定してから解放してください。

4.PCB layout of the evaluation board

4-1.PCB shape and ground plane of the evaluation board



4-2.Pattern prohibited area



User manual

Product: Bluetooth Module
Model: HRM1016

For OEM integration only – device cannot be sold to general public.
Therefore we will not supply the User's manual, the installation manual is the official for OEM.

FCC ID: VIYHRM1016
IC: 7305A-HRM1016

■Operational Information

This module has been tested and found to comply with the limits for a Class B digital device pursuant to Part15 of FCC rules. This module complies with Part15 subpart C of the FCC rules. Customers should check Part15 subpart B compliance with their own final products and conduct certification if needed.

■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.

■Requirement of Labeling

Please describe the following item on the final product including this module:

Contains Transmitter Module FCC ID: VIYHRM1016	or	Contains FCC ID: VIYHRM1016
Contains Transmitter Module IC: 7305A-HRM1016	or	Contains IC: 7305A-HRM1016

■Requirement of User's Manual Statement

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

Federal Communication Commission Interference 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.

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

Radiation Exposure Statement:

The product complies with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

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

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

As long as 1 condition above are 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

IMPORTANT NOTE: In the event that these conditions can not 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 can not 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: VIYHRM1016”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

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.

Industry Canada Statement

This device complies with ISED's licence-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d' ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

The product comply with the Canada portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

Déclaration d'exposition aux radiations:

Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé.

Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible.

This device is intended only for OEM integrators under the following conditions: (For module device use)

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

As long as 1 condition above are 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: (Pour utilisation de dispositif module)

1) 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 can not 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 ID can not 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'ID 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: 7305A-HRM1016”.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 7305A-HRM1016".

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.

Product Specification

<Bluetooth overview>

- core specification version: v4.1
- support RF-PHY to GATT layer for BLE mode

<Electrical functions>

Operating voltage:	DC2.8V to DC4.25V Typ:DC3.7V
Operating temperature range:	-30℃～85℃

<Radio specifications>

Output power:	+4dBm typical
Frequency range:	2,400MHz - 2,483.5MHz
Operation frequency range:	2,402MHz - 2,480MHz
Channel list:	2,402 + N MHz (N=0,1,2,.....78)
	1MHz step, 79channels (BDR and EDR mode)
	2,402 + 2N MHz (N=0,1,2….39)
	2MHz step, 40channels (BLE mode)
Modulation method:	FHSS GFSK (BDR and BLE mode)
	FHSS π/4 DQPSK (EDR mode)
	FHSS 8DPSK (EDR mode)
Data rate:	305kbps max. (GFSK, BLE mode)
	723.2kbps max. (GFSK, BDR mode)
	1448.5kbps max. (π/4 DQPSK, EDR mode)
	2178.1kbps max. (8DPSK, EDR mode)
Implemented antenna:	λ/4 printed inverted F antenna
Antenna gain:	-1.5dBi max.