

# BLE module operation description

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## Approvals

Name	Date	Signature

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# Contents

- 1. Overview:..... 4
  - 1.1 Modem Overview:..... 4
  - 1.2 Key Features: ..... 4
- 2. Modem Pin Definitions: ..... 4
  - 2.1 Block Diagram:..... 4
  - 2.2 Power supplier(powered by host PCBAs):..... 5
  - 2.3 Current Consumption:..... 5
  - 2.4 RF specification: ..... 5
  - 2.5 Antenna specification: ..... 6
- 3. Specifications ..... 6
  - 3.1 Physical Characteristics:..... 6
- 4. Regulatory..... 7

# 1. Overview:

## 1.1 Modem Overview:

The Honeywell BLE is a highly-integrated Bluetooth low-energy (BLE) module, which offers a complete solution containing all hardware features necessary for development of wireless application.

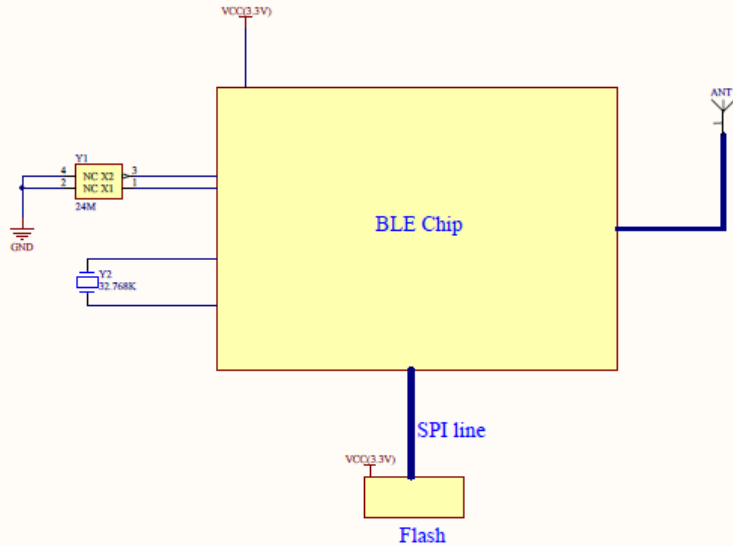
The transmitted data are divided into packets and each packet is transmitted on one of the 40 channels with the channel spacing of 2 MHz. The first channel starts at 2402 MHz and continues up to 2480 MHz. It offers superior radio performance, based on TI CC2640R2F.

## 1.2 Key Features:

- Ultra-compact size (46\*26\*1.6 mm)
- BLE 5.0
- UART interfaces
- Low power consumption
- Embedded antenna design
- FCC and CE compliant
- RoHS compliant, certified lead-free and halogen-free

# 2. Modem Pin Definitions:

## 2.1 Block Diagram:



**2.2 Power supplier(powered by host PCBAs):**

Symbol	Min	Typ	Max	Unit
<b>3.3V</b>	1.9	3.3	3.6	V

**2.3 Current Consumption:**

	Test condition	Min	Typ	Max	Unit
<b>Peak</b>	Sending data package		8		mA
<b>Average</b>	Low power mode		80		uA

**2.4 RF specification:**

	Test condition	Min	typ	Max	Unit
<b>Frequency Range</b>		2402		2480	MHz
<b>Channel Space</b>			2		MHz
<b>TX power</b>	RBW=1M VBW=3M		3	4	dBm
<b>Rx sensitivity</b>	PER 1%		-85		dBm

## 2.5 Antenna specification:


"High Frequency Ceramic Solutions"

2.45 GHz wide band, small form factor SMD chip antenna      P/N 2450AT43F0100  
 Detail Specification: 4/22/2018      Page 1 of 5


General Specifications			
Part Number	2450AT43F0100	Reel Quantity	2,000 pcs
Operating Frequency (MHz)	2400 - 2500 Mhz	Operating Temperature	-40 to +85°C
Peak Gain (XZ-total)	2.1 dBi typ.	Recommended Storage Conditions	+5 ~ +35 °C, Humidity 45~75%RH 12 months
Average Gain (XZ-total)	1.0 dBi typ.	Power Capacity	2W max. (CW)
Impedance	50 Ω		

Part Number Explanation			
P/N Suffix	Packing Style	Bulk	Suffix = S      eg. 2450AT43F0100S
		T & R	Suffix = E      eg. 2450AT43F0100E
		100% Tin	Suffix = E or S      eg. 2450AT43F0100 (E or S)
	Evaluation Board	Bulk	2450AT43F0100-EB1SMA (with female SMA connector)

Mechanical Dimensions		Terminal Configuration	
	In	mm	No.
L	0.236 ± 0.008	6.00 ± 0.20	1
W	0.079 ± 0.008	2.00 ± 0.20	2
T	0.047 0.2 +.004 / -.008	1.20 + 0.1 / -0.2	
a	0.020 ± 0.012	0.50 ± 0.30	



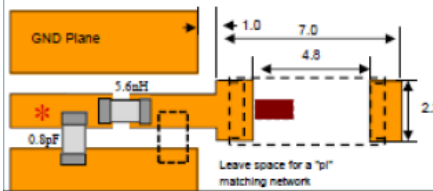
No.	Function
1	Feeding Point
2	NC



**Mounting Considerations**

Mount these devices with brown mark facing up. Units: mm

\*Line width should be designed to provide 50 Ω impedance matching characteristics.



It is recommended that the designer leave available slots for a "pi" (or shunt-series-shunt) network. The antenna matching network values above are used when antenna is mounted on Johanson's evaluation board. The matching values on client's PCB will be different. Go to: [www.johansontechnology.com/tuning.html](http://www.johansontechnology.com/tuning.html) and see how to obtain the new values.

Leave space for a "pi" matching network

## 3. Specifications

### 3.1 Physical Characteristics:

	Parameter	Unit
Dimension	18.8*13.5*1	mm
Operation temperature	-40 to +55	°C

## 4. Regulatory

### Caution:

**4.1. This device complies with Part 15 of the FCC Rules / Industry Canada licence-exempt RSS standard(s). 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'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'en compromettre le fonctionnement.**

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

**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.

**Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.**

**Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.**

#### **4.2. The module is limited to OEM installation ONLY.**

**The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.**

**When the FCC identification number or ISED certification 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 FCC ID: SU3RMBLEB" or "Contains IC: 20969-RMBLEB" and the information should be also contained in the devices' user manual.**

**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. This device is intended only for OEM integrators under the following conditions: 1) The antenna must be installed such that 20 cm is maintained between the antenna and user. 2) The transmitter module may not be co-located with any other transmitter or antenna.**