
1 Product introduction

1.1 Product description

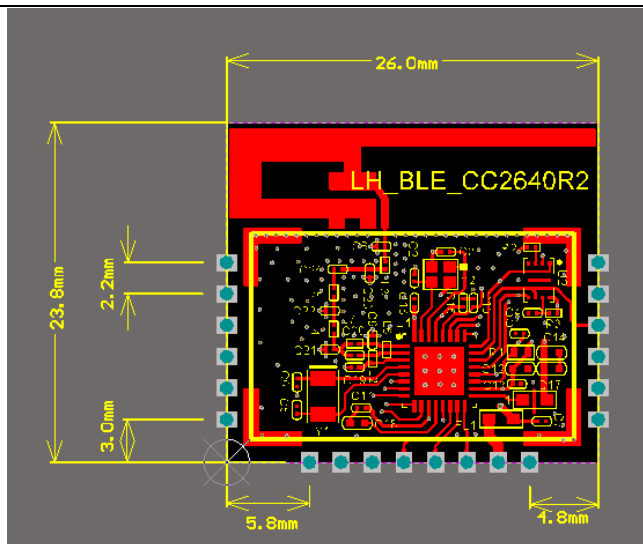
CC2640R2F device is a wireless microcontroller (MCU), which is mainly suitable for Bluetooth® 4.2 and Bluetooth 5 low-power application. This device belongs to the SimpleLink™ CC26xx series, which is an ultra-low power consumption 2.4ghz RF device, with extremely low active RF and MCU currents and low power mode current consumption, it ensures excellent battery life and is suitable for small button battery power and energy acquisition applications.

SimpleLink Bluetooth The low-power CC2640R2F device contains a 32-bit ARM Architecture ®-M3 kernel (operating at the same frequency as the main processor) and has a rich set of peripheral features, including a unique ultra-low-power sensor controller. The sensor the controller is ideal for connecting external sensors and for autonomously collecting analog and digital data while the rest of the system is in sleep mode. Therefore, CC2640R2F device becomes an ideal choice for various applications that focus on battery life, small size and simple practicality.

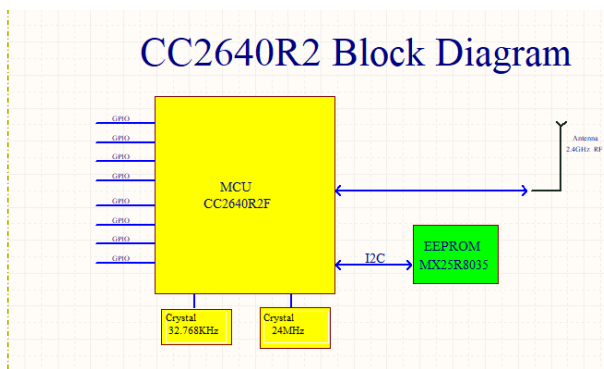
CC2640R2F module adopts PCB onboard antenna, with an 8M flash outside, which is more convenient for product development and expansion.



Picture 1.1 Appearance of product



Picture 1.2 Dimensions of product



Picture 1.3 Bblock Diagram of product

2 Features and Superiority

2.1 Superiority

- Microminiature module solution
- Ready for product development quickly
- Minimizes product development time

2.2 Module Features

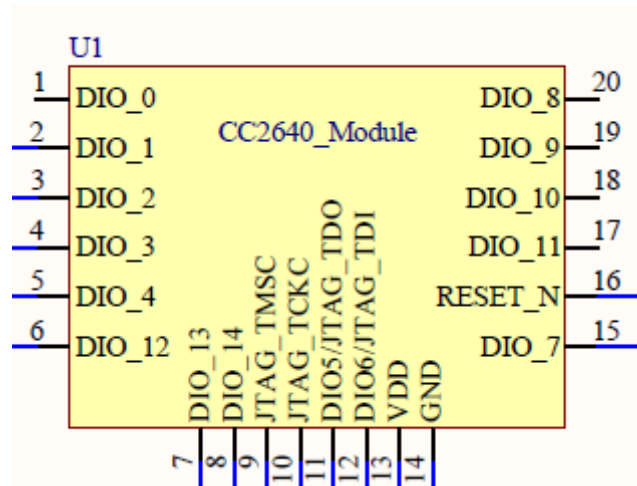
- ◆ Working on 2.4 GHz frequency band
- ◆ Dimensions:30mm*16mm
- ◆ Integrated on board antenna
- ◆ TX power:5 dBm

- ◆ Current 9.1mA at TX power 5 dBm
- ◆ Current 5.9 mA at RX
- ◆ Operation voltage 2.8V~3.8V
- ◆ Receiver sensitive: -97dBm
- ◆ Internal temperature sensor

3. Hardware description

3.1 Pin description

Pins layout for CC2640R2 module as shown on below picture 3.3, module designed with three rows of stamp hole patch interface with 20 pins, and pin spacing is 2.2mm.



Picture 3.3 Module pin distribution

Pin	Symbol	Function	Describe
1	DIO_0	Digital I/O	GPIO, Sensor Controller
2	DIO_1	Digital I/O	GPIO, Sensor Controller
3	DIO_2	Digital I/O	GPIO, Sensor Controller, high-drive capability
4	DIO_3	Digital I/O	GPIO, Sensor Controller, high-drive capability
5	DIO_4	Digital I/O	GPIO, Sensor Controller, high-drive capability
6	DIO_12	Digital/Analog I/O	GPIO, Sensor Controller, Analog

7	DIO_13	Digital/Analog I/O	GPIO, Sensor Controller, Analog
8	DIO_14	Digital/Analog I/O	GPIO, Sensor Controller, Analog
9	JTAG_TMSC	Digital I/O	JTAG TMSC, high-drive capability
10	JTAG_TCKC	Digital I/O	JTAG TCKC
11	DIO5	Digital I/O	GPIO, High drive capability, JTAG_TDO
12	DIO6	Digital I/O	GPIO, High drive capability, JTAG_TDI
13	VDD	Power	1.8-V to 3.8-V DC-DC supply
14	GND	Power	Ground
15	DIO7	Digital I/O	GPIO, Sensor Controller, high-drive capability
16	RESET_N	Digital input	Reset, active-low. No internal pull-up.
17	DIO11	GPIO	SPI Flash used, Leave it float
18	DIO10	GPIO	SPI Flash used, Leave it float
19	DIO9	GPIO	SPI Flash used, Leave it float
20	DIO8	GPIO	SPI Flash used, Leave it float

Table 3.1 Definition of module pin

3.2 operating conditions

To ensure normal work of the module, operating condition must be complied with following table 3.2

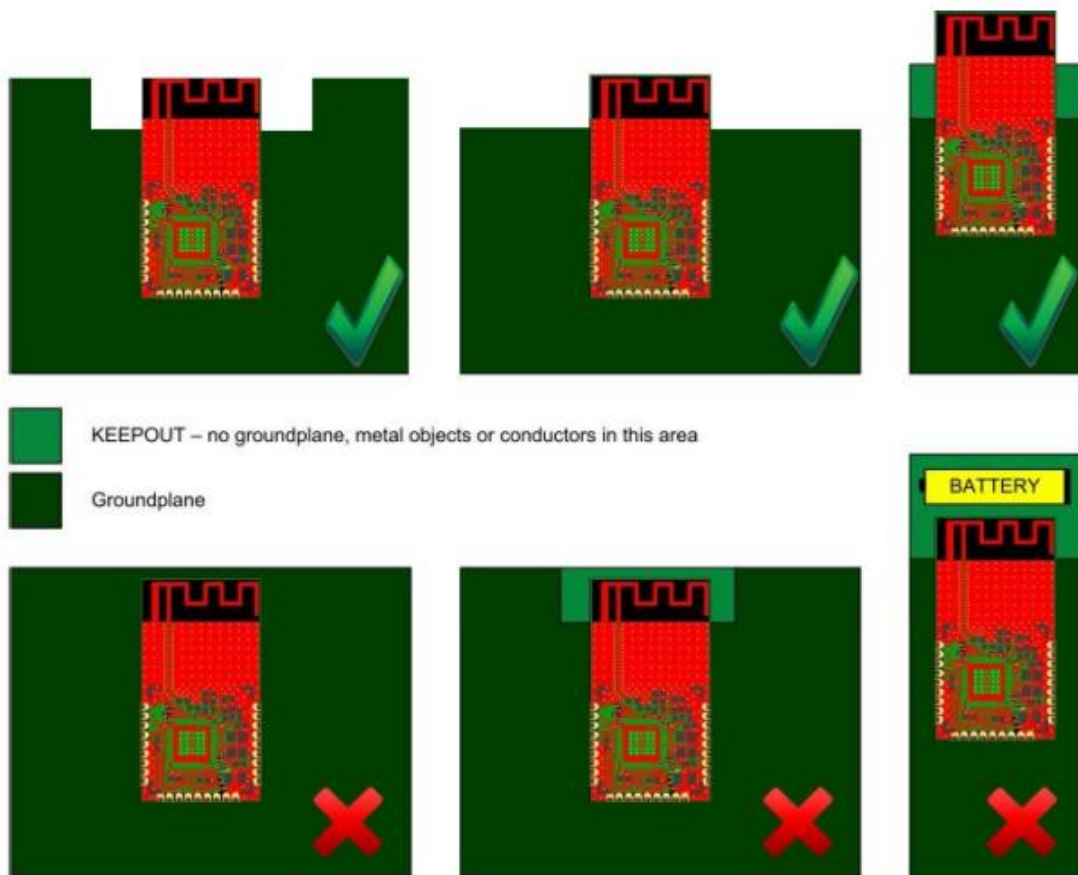
Table 3.2 Module operating conditions

Symbol	Parameter	Min	Max	Unit	Describe
VDD	Input voltage	1.8	3.8	V	
Tamb	ambient temperature	-40	+85	°C	

4. Antenna layout specification

The CC2640R2 module is designed with a PCB onboard antenna with a vertical polarization near omnidirectional radiation. This provides the effect of wireless signal radiation without any additional ground plane, but it is important to note that the specification is followed when installing this type of module to another PCB.

The area around the antenna must be kept at least 20 mm with wires or other metal objects. This applies to all layers of a PCB, not just the top layer. Any conductive object near the antenna may seriously damage the performance of the PCB antenna's radiation signal, resulting in a significant decrease in the communication effectiveness. As shown in the figure below, the top three layouts are correct and the bottom three are against the specification.



Picture 4.4 Antenna layout specification

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.

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 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.

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

FCC Radiation Exposure Statement

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

FCC Part 15.247.

2.3 Specific operational use conditions

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 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.

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. 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 shown in this manual.

2.4 Limited module procedures

Additional testing and certification is necessary when specific host originally granted with this module.

2.5 Trace antenna designs

The module may be operated only with the PCB antenna with which it is authorized.

2.6 RF exposure considerations

Co-located issue shall be met as mentioned in "Specific operational use conditions".

Product manufacturer shall provide below text in end-product manual

"Radiation Exposure Statement:

The product complies with the US portable RF exposure limit set forth for an uncontrolled environment and is 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."

2.7 Antennas

Model name	Antenna type	Antenna gain
LH2640R2	PCB	3.3dBi

2.8 Label and compliance information

Product manufacturers need to provide a physical or e-label stating

"Contains FCC ID: 2AAMN-2640R2" with finished product

2.9 Information on test modes and additional testing requirements

Test tool: LCD Display and Mode Information SW1 to switch mode shall be used to set the module to transmit continuously

2.10 Additional testing, Part 15 Subpart B disclaimer

The module is only FCC authorized for the specific rule parts listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.