Low Power, Long Range Sub-1 GHz Module

Key Features

- Ultra low power Sub-1 GHz
- Supports 915 MHz
- Supports 2-GFSK modulation, both fixed channel mode and FHSS mode
- Supports WB-DSSS mode over 2-GFSK modulation
- Supports 30kbps, 60kbps, 120kbps, 240kbps data rate in WB-DSSS mode over 2-GFSK modulation
- Supports 5kbps, 50kbps, 200kbps data rate in FHSS mode over 2-GFSK modulation
- Powerful Cortex-M4F MCU for your IoT products
  - Clock Speed: up to 48MHz
  - Up to 352KB of In-System-Programmable Flash
  - 80KB of Ultra-Low-Leakage SRAM
  - 30 GPIOs
- RF performance
  - TX power: Up to +16 dBm
  - RX sensitivity: up to -121 dBm using Long-Range Mode, -110 dBm at 50 kbps (Sub-1 GHz)
- Communication range
  - At least 1000 meters (LOS) @ +16 dBm, 2.5 kbps
- Ultra-low power
  - Power supply: 1.8 V ~ 3.8 V
  - RX: 5.8 mA
  - TX @ +16 dBm: 24.9 mA
  - Standby: 0.85 uA (RTC running and RAM/CPU retention)
  - Shutdown: 150 nA (Wake up on external events)
- Antenna: UFL connector or Half-hole (Select by resistor on board)
- Small Size
  - 22 mm x 15 mm x 1.7 mm (Without Shielding)
  - 22 mm x 15 mm x 2.15 mm (With Shielding)
- FCC (FCC ID: 2ABRUBDRFM216),IC (IC ID: 25657-BDRFM216), CE, RoHS compliant

Descriptions

BDE-RFM216 is an ultra-low power, long-range Sub-1 GHz module targeted at low power sensors and long range applications.

BDE-RFM216 integrates a high performance RF core and also a powerful ARM cortex-M4F processor, which makes it suitable for certain products that need high performance MCU to deal with difficult applications.

The module supports 915 MHz bands, with the maximum output power up to 16 dBm, along with its Long-Range Mode feature, the module is to be the best choice for IoT products which utilize battery supply and require long range communication.

Applications

- Long-range sensor applications
- Smart grid and automatic meter reading
- Wireless healthcare applications
- Industry monitoring and control
- Home and building automation
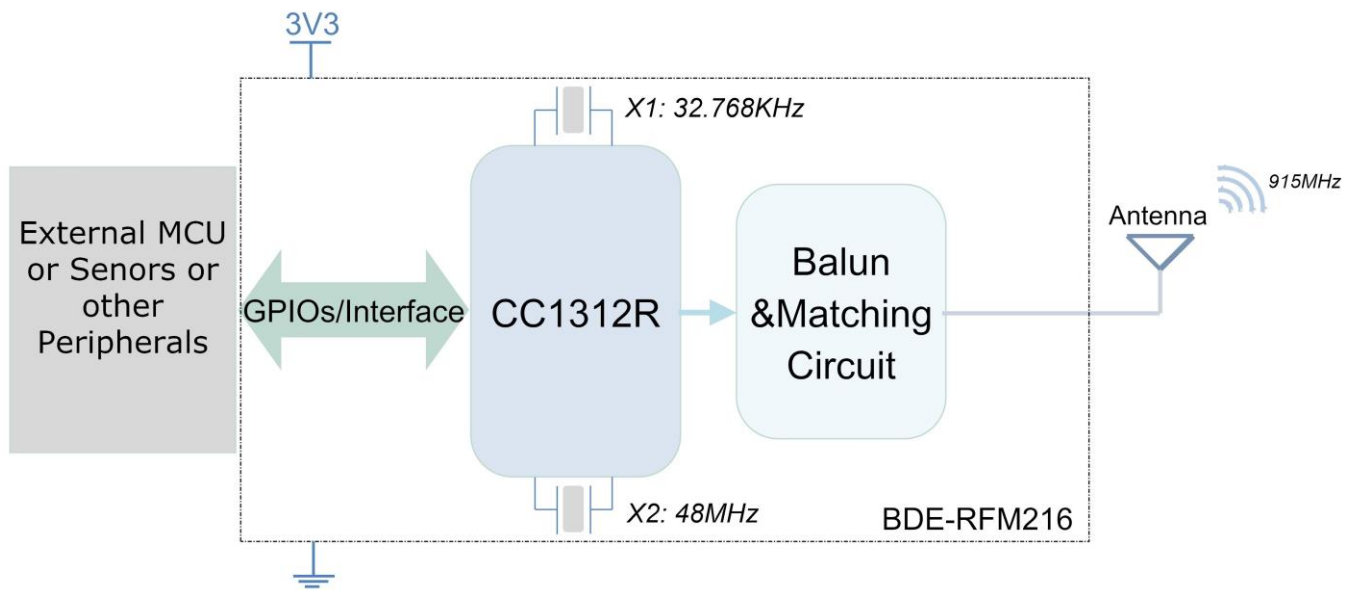- Energy-harvesting applications

Block Diagram

Fig. 1: The Block Diagram of BDE-RFM216

Electrical Characteristics

■ Absolute maximum rating

Rating	Min	Typ	Max	Unit
Storage Temperature	-40	-	125	℃
VDD	-0.3	-	4.1	V
Other Digital Terminals	-0.3	-	VDDS+0.3≤4.1	V

■ Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDD	1.8	3.3	3.8	V

Pinout

Fig. 2 shows the pinout of BDE-RFM216.
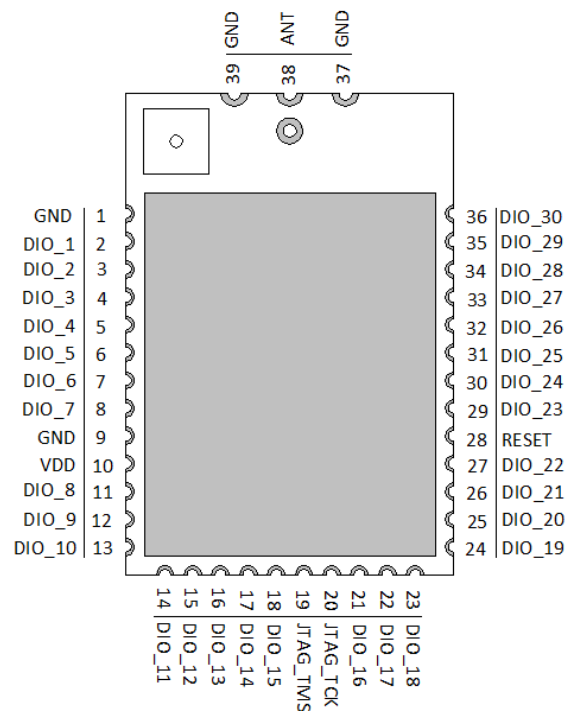
Fig. 2: The pinout of BDE-RFM216 (TOP VIEW)

Table 1: Pin definitions of BDE-RFM216

Pin Number	Pin Name	Definitions
1	GND	Power Ground
2	DIO_1	GPIO, Sensor Controller
3	DIO_2	GPIO, Sensor Controller
4	DIO_3	GPIO, Sensor Controller
5	DIO_4	GPIO, Sensor Controller
6	DIO_5	GPIO, Sensor Controller, high-drive capability
7	DIO_6	GPIO, Sensor Controller, high-drive capability
8	DIO_7	GPIO, Sensor Controller, high-drive capability
9	GND	Power Ground
10	VDD	Power Supply
11	DIO_8	GPIO
12	DIO_9	GPIO
13	DIO_10	GPIO
14	DIO_11	GPIO
15	DIO_12	GPIO
16	DIO_13	GPIO
17	DIO_14	GPIO
18	DIO_15	GPIO
19	JTAG_TMS	JTAG TMSC, high-drive capability
20	JTAG_TCK	JTAG TCKC
21	DIO_16	GPIO, JTAG_TDO, high-drive capability
22	DIO_17	GPIO, JTAG_TDI, high-drive capability
23	DIO_18	GPIO
24	DIO_19	GPIO
25	DIO_20	GPIO
26	DIO_21	GPIO
27	DIO_22	GPIO
28	RESET	Reset, active-low
29	DIO_23	GPIO, Sensor Controller, Analog
30	DIO_24	GPIO, Sensor Controller, Analog
31	DIO_25	GPIO, Sensor Controller, Analog
32	DIO_26	GPIO, Sensor Controller, Analog
33	DIO_27	GPIO, Sensor Controller, Analog
34	DIO_28	GPIO, Sensor Controller, Analog
35	DIO_29	GPIO, Sensor Controller, Analog
36	DIO_30	GPIO, Sensor Controller, Analog
37	GND	Power Ground
38	ANT	Antenna port (When disconnected with UFL, this port can be used)
39	GND	Power Ground

Overall Dimensions

Fig. 3 shows the overall dimensions of BDE-RFM216. The module measures 22 mm long by 15 mm wide by 2.15 mm high with the shield.
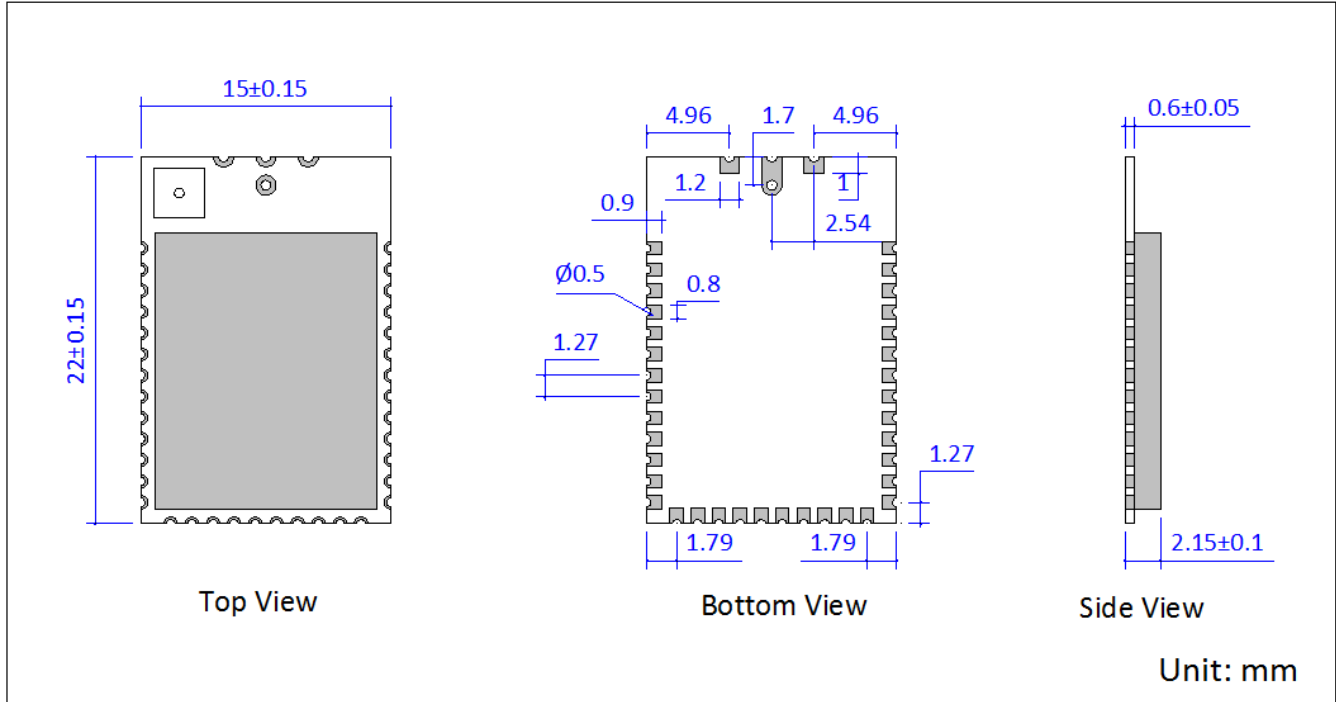

Fig. 3: Overall Dimensions of BDE-RFM216

Module Location

In order to get the best performance when integrating the module to your product, it is advised to use the recommended module location to the mother board.
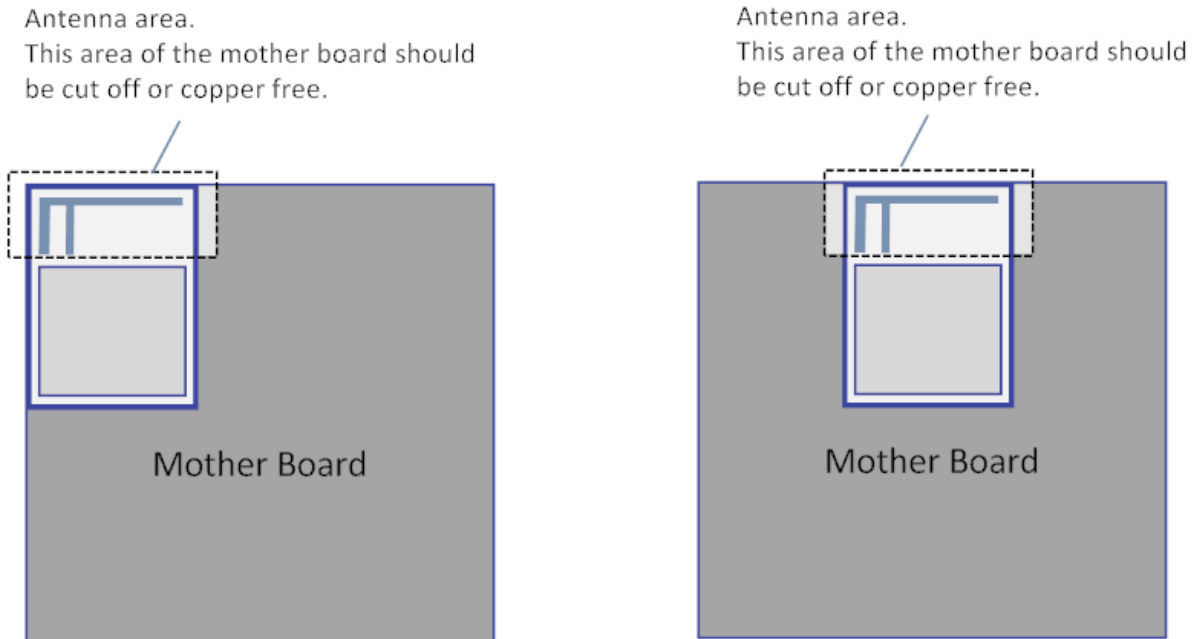
■   Location in X-Y plane

Antenna area.
This area of the mother board should
be cut off or copper free.

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This area of the mother board should
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Mother Board

Mother Board

Fig. 4: Recommended location in X-Y plane
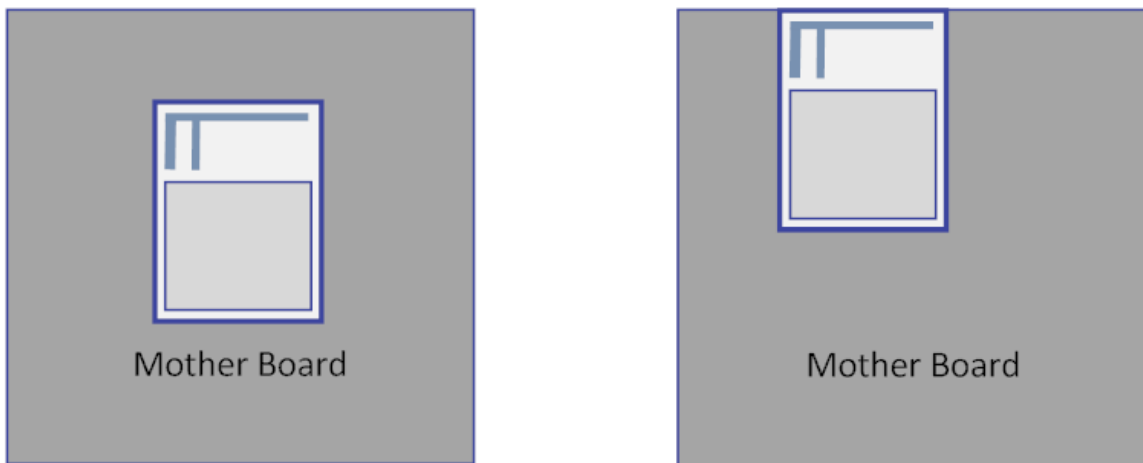
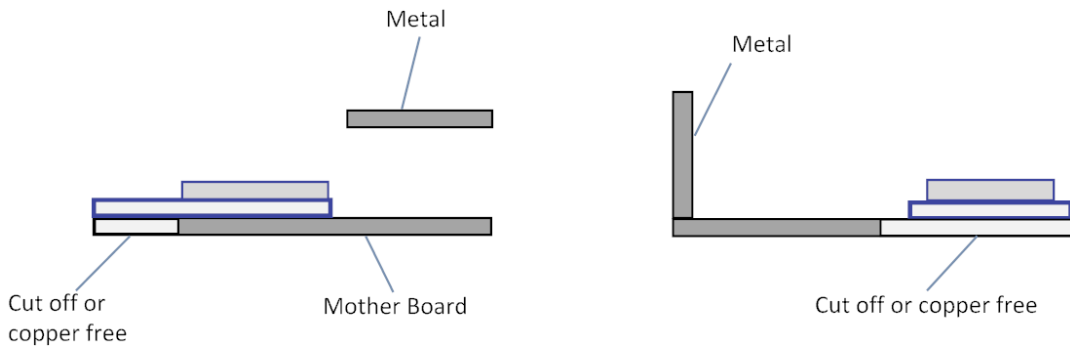Mother Board

Mother Board

Fig. 5: Not recommended location in X-Y plane

Fig. 6: Recommended location in Z plane
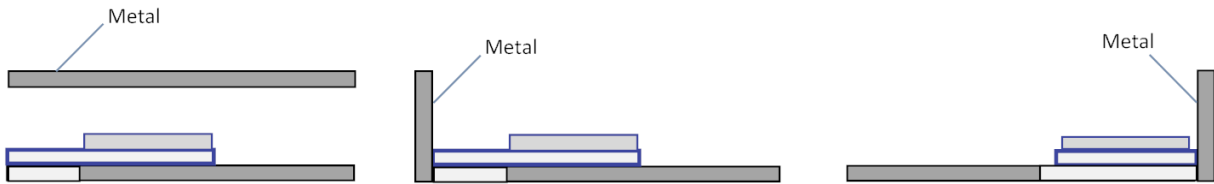
Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

BDE Technology Co., Ltd.
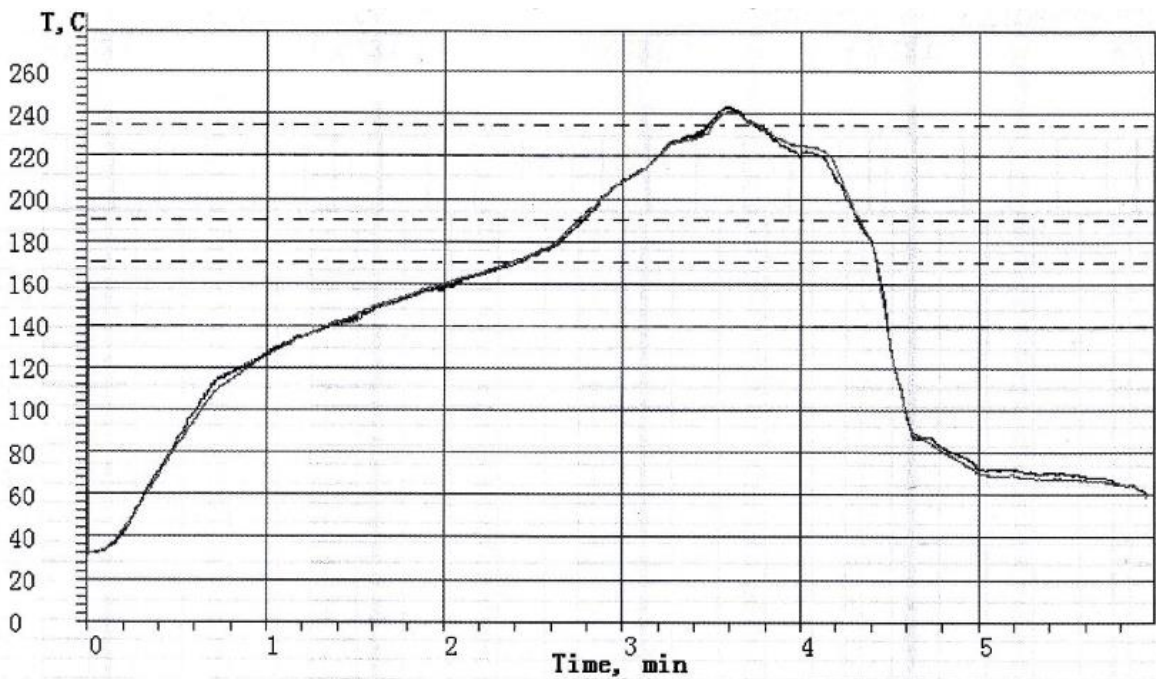
FCC statements:

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: The manufacturer is not responsible for any radio or TV interference caused by unauthorized

modifications or changes to this equipment. Such modifications or changes could void the user's

authority to operate the equipment.

ISED RSS Warning:
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 RF exposure statement:
The device is compliance with RF exposure guidelines, users can obtain Canadian information on RF exposure and compliance. The minimum distance from body to use the device is 20cm.

Après examen de ce matériel aux conformité ou aux limites d'intensité de champ RF ,les utilisateurs peuvent sur l'exposition aux radiofréquences et la conformité and compliance d'acquérir les informations correspondantes. La distance minimale du corps à utiliser le dispositif est de 20cm .

ISED Label Instructions:
The ISED certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the ISED certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:
"Contains IC: 25657-BDRFM216"

BDE Technology Co., Ltd.

Contacts

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