

WisLink NB-IoT Board  
**RAK2013**



## **RAKwireless RAK2013 Cellular Raspberry Pi HAT**

The RAK2013 is a Raspberry Pi 3B+ edition cellular communications module that supports Low-Power Wide-Area (LPWA) technology for networking Internet-of-Things (IoT) devices. It can support optional BG96 / EG91 / EG95 for 4G/LTE, NB-IoT, CAT-M, CAT1 or CAT 4 cellular protocol. The RAK2013 integrates audio codec and audio amplifier on it, with carrier operator's network, it also supports Voice-over-LTE (VoLTE) for high definition (HD) and uninterrupted voice calls. For easy use, there are earphone connector, MIC connector and speaker connector with audio amplifier.

It also supports a connector to extend sensor board. The sensor board connector follows MikroBus standard, MikroBus has many kinds of the sensor board, such as temperature, humidity, 3 axis sensors, light sensor, etc. It is easy to get sensor data through MikroBus interface and can transmit the sensor data through a cellular network to your server.

The RAK2013 can connect to RAK2245 Pi Hat board directly, which is RAK's LoRa concentrator module following Raspberry Pi 3B+ edition. It is easy to make a LoRaWAN gateway by plugging them to a Raspberry Pi board, it can transmit LoRa data to cloud server by a cellular network.

### Package contains

- RAK2013 cellular Raspberry Pi HAT
- LTE Antenna IPEX
- GPS Antenna IPEX (For BG96 only)
- microUSB cable

### Main Features

- Compatible with Raspberry Pi 3B+
- Support optional cellular module (Quectel BG96 or EG91 or EG95) for NB-IOT / CAT-M / CAT1 LTE / CAT4 LTE.
- Supports Voice over CAT-M or VoLTE.
- Supports Nano SIM card or eSIM card.
- Integrates audio codec and audio amplifier.
- Integrates MikroBus interface to support sensor extended board.
- Can be added to another Pi HAT to support LoRa concentrator.
- Supports USB connector for higher data rate.
- Supports GPS function(only for BG96 module)
- SMA/IPEX antenna is optional for LTE and GPS.
- Supports I2C, GPIOs, UART and ADC interfaces for Raspberry board.
- Supports EEPROM to configure IOs automatically.

### Key Features

- **Cellular Module:** Optional Quectel BG96 or EG91 or EG95
- **Cellular Standard and Bands**

- **With BG96:** NB-IOT/ CAT-M Cat M1/Cat NB1: LTE FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28 LTE TDD: B39 (For Cat M1 Only); EGPRS: 850/900/1800/1900MHz
- **With EG91:** LTE CAT 1 / With EG95:LTE CAT 4
- **Variant for Europe LTE FDD:** B1/B3/B7/B8/B20/B28A; WCDMA: B1/B8; GSM: 900/1800MHz
- **Variant for North America LTE FDD:** B2/B4/B5/B12/B13; WCDMA: B2/B4/B5

#### **Data Rate**

**With BG96 Cat M1:** Max. 300Kbps (DL), Max. 375Kbps (UL) Cat NB1: Max. 32Kbps (DL), Max. 70Kbps (UL) EDGE: Max. 296Kbps (DL), Max. 236.8Kbps (UL) GPRS: Max. 107Kbps (DL), Max. 85.6Kbps (UL)

**With EG91 LTE:** LTE FDD: Max 10Mbps (DL)/Max 5Mbps (UL) UMTS: DC-HSDPA: Max 42Mbps (DL) HSUPA: Max 5.76Mbps (UL) WCDMA: Max 384Kbps (DL)/Max 384Kbps (UL) GSM: EDGE: Max 296Kbps (DL)/Max 236.8Kbps (UL) GPRS: Max 107Kbps (DL)/Max 85.6Kbps (UL)

**With EG95 LTE:** LTE FDD: Max 150Mbps (DL)/Max 50Mbps (UL) UMTS: DC-HSDPA: Max 42Mbps (DL) HSUPA: Max 5.76Mbps (UL) WCDMA: Max 384Kbps (DL)/Max 384Kbps (UL) GSM: EDGE: Max 296Kbps (DL)/Max 236.8Kbps (UL) GPRS: Max 107Kbps (DL)/Max 85.6Kbps (UL)

**Voice:** VoLTE (Cat M1 Only)

**SMS:** Point-to-point MO and MT; SMS Cell Broadcast; Text and PDU Mode

**GNSS (optional):** GPS(only for module with BG96)

#### **Peripheral Interface:**

- 40-pins Raspberry connector header
- Micro USB; MikroBus Connector
- Earphone Jack; MIC Jack; Speaker Jack
- RESET Button; PWRKEY Button
- Nano Sim Card slot; USB boot jumper

## **LED**

- Green: Board Power-on Indication
- Blue: Cellular Module Power-on Indication
- Red: Networkk Status Indication

## **Power Consumption**

- Min 10mA in Power off mode
- Typical 300mA in CAT M mode
- Max 2000mA in GSM mode

## **Software**

- Enhanced AT Commands
- Protocol:  
PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT •
- Driver Support for Windows, Linux

## **Physical Dimension**

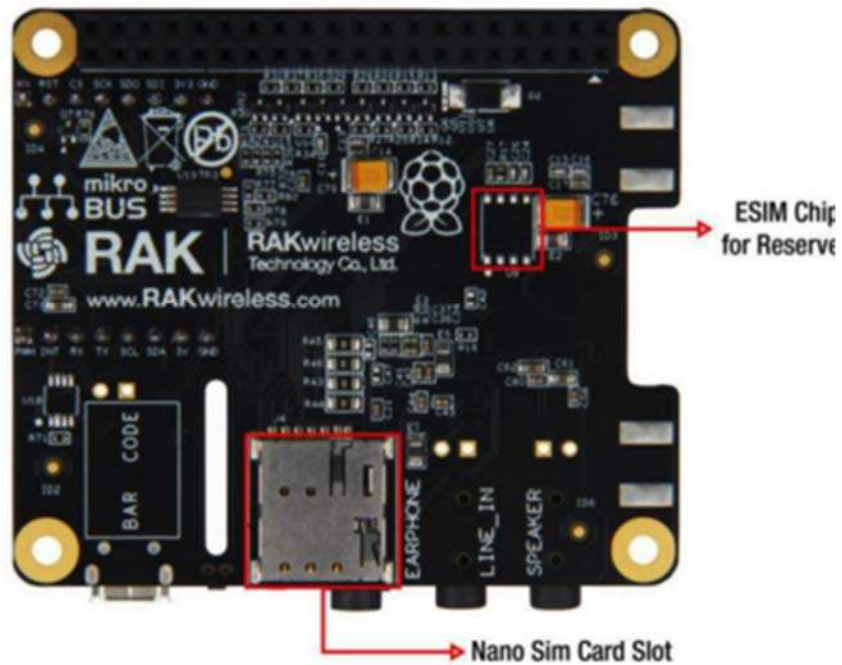
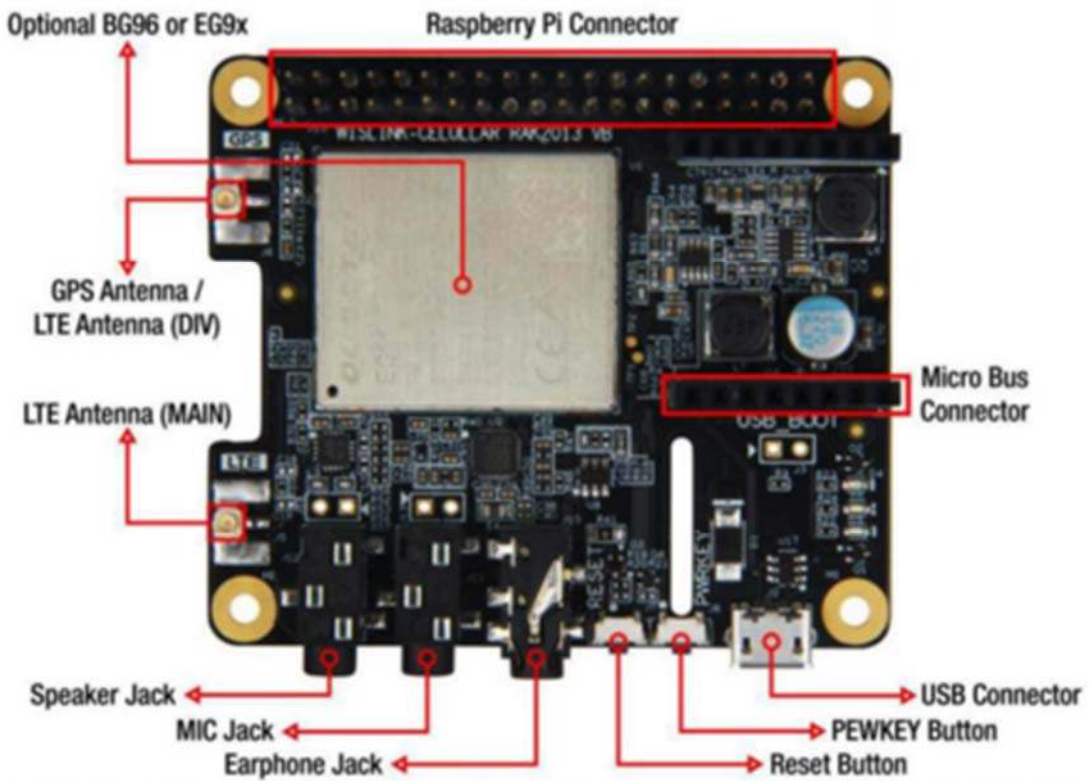
- Dimension: 65.0 x 56.0 x 19.5 mm (LxWxH,
- Weight: Approximately 0.99 oz (±0.1oz)

## **Temperature Range**

- Operation Temperature: -35° C ~ +75° C
- Extended Temperature: -40° C ~ +85° C
- Storage Temperature: 40° C ~ +90° C

**Certification:** FCC, CE

## Hardware interfaces





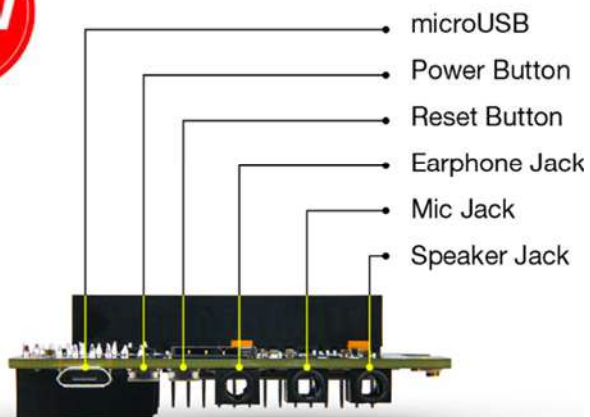
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CE FC



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