



## Package Content



RAK2013 board  
(1x)



LTE Antenna  
(1x/2x)



GPS Antenna  
(1x only for BG96)



Micro USB cable  
(1x)

## Product Description

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.

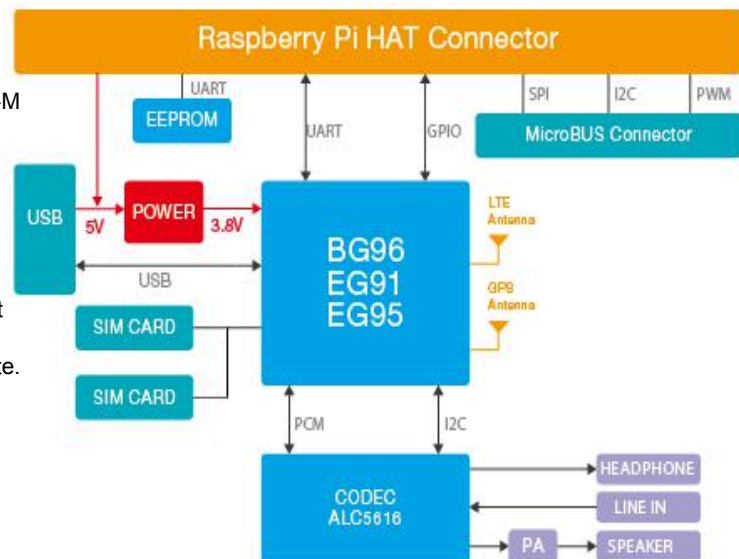
It also supports connector to extend sensor board. The sensor board connector follows MikroBus standard, MikroBus has many kinds of sensor board, such as temperature, humidity, 3 axis sensor, light sensor etc. It is easy to get sensor data through MikroBus interface and can transmit the sensor data through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

## Main Features

- Compatible with Raspberry Pi 3B+ edition specification.
- 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 optional for LTE and GPS.
- Supports I2C, GPIOs, UART and ADC interfaces for Raspberry board.
- Supports EEPROM to configure IOs automatically.

## Block Diagram





# WisLink-Cellular RAK2013

NB-IOT/CAT-M/CAT 1/CAT 4 with VoLTE supported

Raspberry Pi HAT Edition



**RAK**

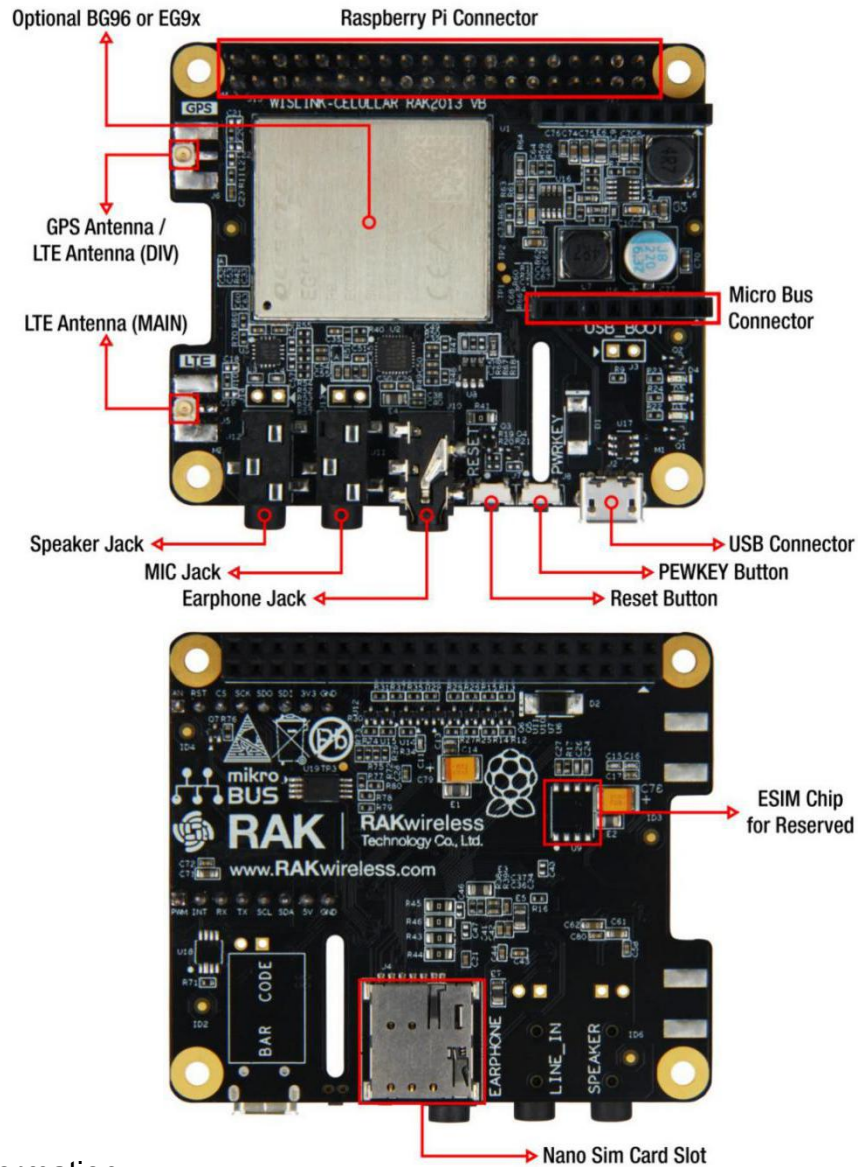
RAKwireless  
Technology Co.,Ltd.

## Key Features

<b>Cellular Module</b>	<ul style="list-style-type: none"> <li>Optional Quectel BG96 or EG91 or EG95</li> </ul>
<b>Cellular Standard and Bands</b>	<ul style="list-style-type: none"> <li>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</li> <li>With EG91:LTE CAT 1 / With EG95:LTE CAT 4</li> <li>Variant for Europe LTE FDD: B1/B3/B7/B8/B20/B28A; WCDMA: B1/B8; GSM: 900/1800MHz</li> <li>Variant for North America LTE FDD: B2/B4/B5/B12/B13; WCDMA: B2/B4/B5</li> </ul>
<b>Data Rate</b>	<ul style="list-style-type: none"> <li><b>With BG96</b> 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)</li> <li><b>With EG91</b> 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)</li> <li><b>With EG95</b> 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)</li> </ul>
<b>Voice</b>	<ul style="list-style-type: none"> <li>VoLTE (Cat M1 Only)</li> </ul>
<b>SMS</b>	<ul style="list-style-type: none"> <li>Point-to-point MO and MT; SMS Cell Broadcast; Text and PDU Mode</li> </ul>
<b>GNSS (optional)</b>	<ul style="list-style-type: none"> <li>GPS(only for module with BG96)</li> </ul>
<b>Peripheral Interface</b>	<ul style="list-style-type: none"> <li>40-pins Raspberry connector header</li> <li>Micro USB; MikroBus Connector</li> <li>Earphone Jack; MIC Jack; Speaker Jack</li> <li>RESET Button; PWRKEY Button</li> <li>Nano Sim Card slot; USB boot jumper</li> </ul>
<b>LED</b>	<ul style="list-style-type: none"> <li>Green: Board Power-on Indication</li> <li>Blue: Cellular Module Power-on Indication</li> <li>Red: Cellular Module Network Status Indication</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>Min 10mA in Power off mode</li> <li>Typical 300mA in CAT M mode</li> <li>Max 2000mA in GSM mode</li> </ul>
<b>Software</b>	<ul style="list-style-type: none"> <li>Enhanced AT Commands</li> <li>Protocol: PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT</li> <li>Driver Support for Windows, Linux</li> </ul>
<b>Physical Dimension</b>	<ul style="list-style-type: none"> <li>Dimension: 65.0 x 56.0 x 19.5 mm (LxWxH, ±2mm)</li> <li>Weight: Approximately 0.99 oz (±0.1oz)</li> </ul>
<b>Temperature Range</b>	<ul style="list-style-type: none"> <li>Operation Temperature: -35° C ~ +75° C</li> <li>Extended Temperature: -40° C ~ +85° C</li> <li>Storage Temperature: 40° C ~ +90° C</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>FCC, CE</li> </ul>



### Hardware Interfaces



### Order Information

Part Number	Package	Description
RAK2013-00-R01	1x RAK2013 with 2x LTE Antenna and 1x USB Cable	EG95-E version for Europe region
RAK2013-10-R01	1x RAK2013 with 2x LTE Antenna and 1x USB Cable	EG95-NA version for North America region
RAK2013-20-R01	1x RAK2013 with 1x LTE Antenna, 1x GPS Antenna and 1x USB Cable	BG96 version for global region



#### About RAKwireless:

RAKwireless is the pioneer in providing innovative and diverse cellular and LoRa connectivity solutions for IoT edge devices. It's easy and modular design can be used in different IoT applications and accelerate time-to-market turnover. For more information, please visit Rakwireless website at [www.rakwireless.com](http://www.rakwireless.com).

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