User Manual for

Indoor LoRa Gateway

WisDevice Series

RAK7258

Version 1.3 | March, 2019

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12 PAGES

Table of Contents

List of Tables

List of Figures

1 General Description

1.1 Product Description

RAK7258 is an indoor LoRa gateway device. Gateway uplink connects the LoRa cloud platform by a standard Ethernet cable, making LoRaWAN wireless to internet forwarding a breeze.

RAK7258 supports 2.4G WiFi, WiFi clients can access this gateway and setup the gateway by wireless. It supports optional NB-IoT /Cat M module, in the absence of a wired network, it can readily use the celullar’s network uplink data to the LoRa server when there is no local Ethernet.

Our built-in software is based on the OpenWRT development for LoRaWAN transmission / forwarding. It is designed for all kinds of network environment, parameter configuration and firewall functions. Configurations and management of gateway devices are made easy for users through the web configuration management system.

RAK7258 is built-in heat sink to dissipate the heat from the LoRa concentrator which can withstand hot and cold environments. It can be installed on a wall and has a Power-over-Ethernet (POE) supply mode, making it convenient for site construction and installation.

1.2 Product Features

- LoRa supports 8RX 1TX channels
- Supports 2.4G WiFi
- 100Mbase-T Ethernet with POE
- Muiti uplink backup with Ethernet, WiFi
- OpenWRT software supports LoRaWAN gateway and network configuration
- Heat sink to dissipate heat
- Can integrate with both private and public(TTN) Network Servers
- Supports TF card for storage
- Indoor operation temperature
- Supports optional for NB-IoT /Cat M cellular network

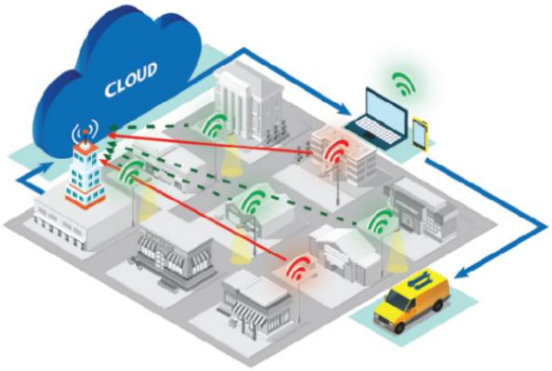

***Figure 1** | Network Architechture*

2 Product Specifications

2.1 Main Specifications

Feature	Specifications
Computing	• MT7628, DDR2RAM 128MB
WIFI Feature	• **Frequency:** 2.400-2.4835GHz(802.11b/g/n) • **RX Sensitivity:** -95dBm (Min), • **Operation Channels:** 2.4GHz: 1-13
LoRa Feature	• SX1301 Mini PCIe card • 8 Channels • **RX Sensitivity**: -142 dBm (Min) • **Frequency**: EU868 / US915
Cellular	• Extended NB-IoT /Cat M, nonsupport by default
Power Supply	• DC 12V-1A • POE (IEEE 802.3af), 42~57VDC
Power Consumption	• 12W (typical)
ETH	• RJ45(100M)
Console	• RJ45 (RS232)
Antenna	• LoRa: RP-SMA Female Connector • WiFi: Internal Antenna
LEDs	• LoRa LED(1), Cellular LED (2), • POWER LED(1), ETH LED(1), • WiFi LED(1)
Enclosure Material	• Plastics
Weight	• 0.3kg
Dimension	• 180mm x 120mm x 43mm
Operating Temp.	• -10 to 40 ˚C
Installation method	• Wall mounting
Version	• Hardware Version: VA • Firmware Version: 1.1.0037_Release

Table 1 | *Main Specifications*

2.2 RF Specifications

2.2.1 WiFi Radio Specifications

Feature	Specifications
Wireless Standard	• IEEE 802.11b/g/n
Operating Frequency	• ISM band: 2.412~2.472(GHz)
Operation Channels	• 2.4GHz: 1-13
Receiver Sensitivity (Typical)	• 802.11b -95dBm@ 1Mbps -88dBm @11Mbps • 802.11g -90dBm @6 Mbps -75dBm@54Mbps • 802.11n(2.4G) -89dBm@MCS0 (HT20) -72dBm @MCS7(HT20) -86dBm @MCS0(HT40) -68dBm @MCS7(HT40)

Table 2 | WiFi Radio Specifications

2.2.2 LoRa Radio Specifications

Feature	Specifications
Operating Frequency	• EU433 / CN470 / EU868 / US915 / AS923 / AU915 / IN865 / KR920
Receiver Sensitivity	• -142 dBm (Min)

Table 3 | LoRa Radio Specifications

2.3 Software Specifications

2.2.3 LoRa

- Supports class A, C
- Supports LoRa package forward
- Supports country code setup
- Supports TX power setup
- Supports data logger
- Supports statistic
- Supports location setup

- Supports server address & port setup

2.2.4 Network

- Supports WiFi AP mode
- Supports LTE APN setup
- Supports uplink backup
- Supports 802.1q
- Supports DHCP Server/Client
- Supports router module NAT
- Supports firewall

2.2.5 Management

- Supports WEB management
- Supports SSH2
- Supports firmware update
- Supports NTP

2.4 Main Electronic Circuit Board

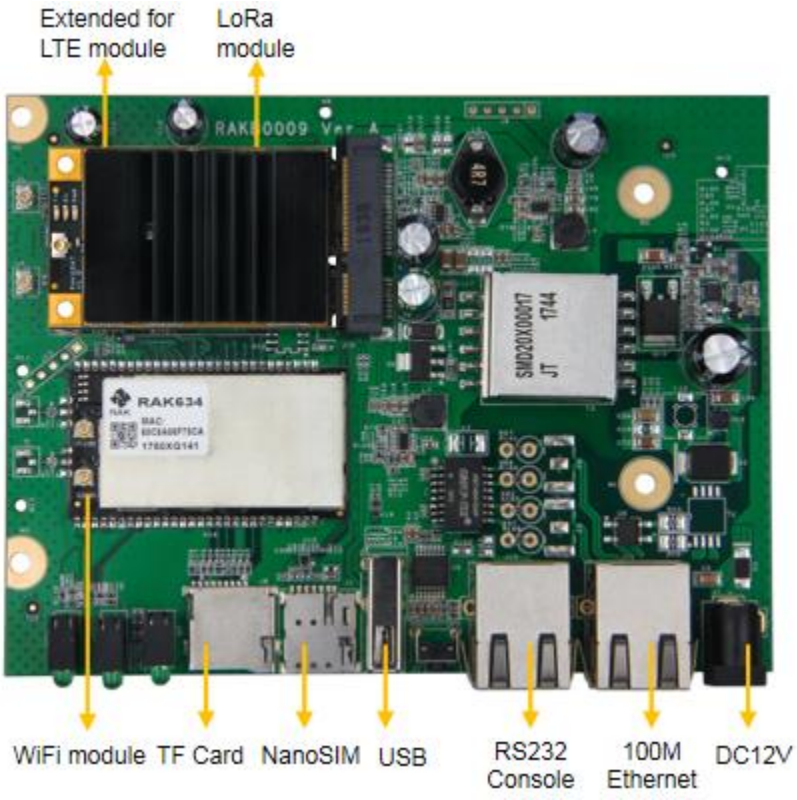

Figure 2 | *Circuit Board*

2.5 Hardware Interfaces

The hardware interfaces of RAK7258 gateway include DC 12V, ETH interface, Console interface, Reset key, USB port, Nano SIM slot, TF Card slot, Status indicator LEDs(6), LoRa Antenna connector etc. As shown in the following figure.

Figure 3 | *Hardware Interfaces*

The function of the Reset key is as follows:

Short press: Restart the Gateway;

Long press (5s and above): Restore Factory Settings;

The status of the LEDs is described as below:

LEDs	Status Indication Description
PWR	• Power Indicator, Led on when device power on
ETH	• **ON** - linkup • **OFF** - linkdown • **Flash** - Data Transmitting and Receiving
LoRa	• **ON** - LoRa1 is working • **OFF** - LoRa1 is not working • **Flash** - Indicate that LoRa1 Packet receiving and sending
ACT	• Expanded Led indicator, useless
STAT	• Expanded Led indicator, useless
WLAN	• **AP Mode** : **ON** - WLAN is working; **Flash** - Data Transmitting and Receiving • **STA Mode** : **Slow Flash**(1Hz) - Connection Disconnected; **ON** - Connection Successful; • **Flash** - Data Receiving and Sending;

Table 4 | LEDs Status Description

3 Declaration of Conformity

FCC Caution:

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

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 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:

4 Contact Information

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5 Revision History

Revision	Description	Date
1.0	Initial Release	2018-12-20
1.1	Update the right context, photos	2019-01-10
1.2	Modify the WEB configuration guide chapter	2019-03-11
1.3	Add the LEDs Status Indication Description	2019-03-13

6 Document Summary

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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.