



MK107 Series BLE to WIFI Gateway

Product Specification

Version V1.3

Contents

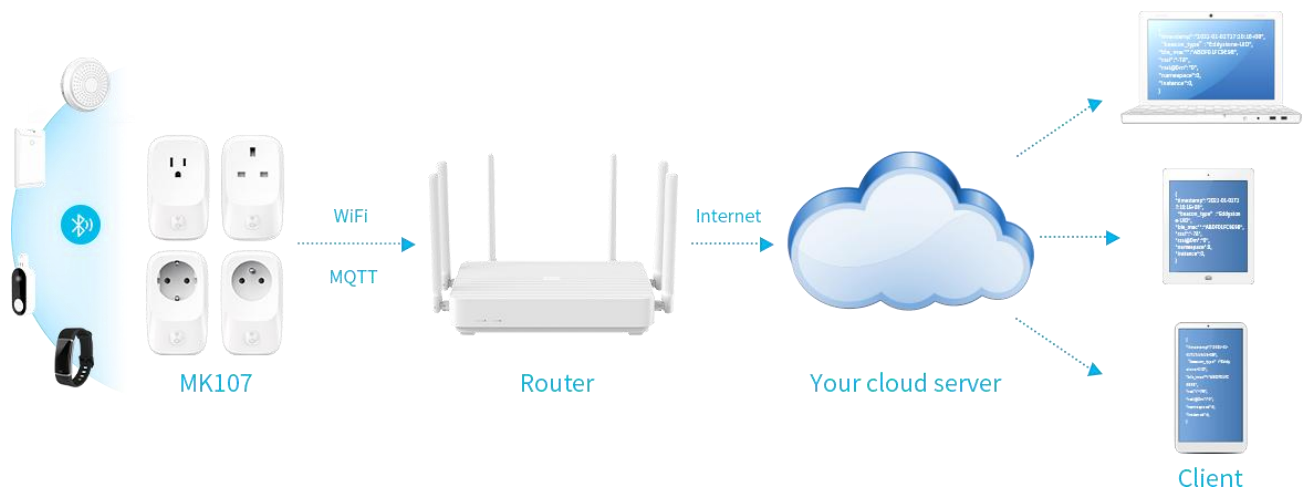
1. Product Introduction	1
1.1 Overview	1
1.2 Model List	1
2. Features	2
3. Application	2
4. Product Appearance	4
4.1 Appearance	4
4.2 Dimensions	4
4.3 LED Patterns	4
5. Product Specification	5
6. User Guide	6
6.1 How to Install the Gateway?	6
6.2 How to Configure the Gateway?	6
7. Main Function	6
7.1 Bluetooth Advertises	6
7.2 Bluetooth Connection	7
7.3 Scan BLE Devices	7
7.3.1 Data Filtering	7
7.3.2 Date Decoding	8
7.4 Connecting to Customer Server	8
7.5 Data Upload	8
7.6 OTA	8
7.7 Restore to Factory Settings	8
8. Development Document	8
9. Revision History	9

1. Product Introduction

1.1 Overview

MK107 series product is a BLE (Bluetooth Low Energy) to WIFI gateway, which works as a data bridge between your beacon and cloud server. It scans and collects the advertising data of the surrounding beacon through Bluetooth, and uploads the Bluetooth data packet to your server through the WIFI network, effectively realizes indoor positioning service, centralized asset tracking and real-time status monitoring in a low-cost way.

MK107 series gateway supports connecting to standard MQTT broker (such as EMQTT, Mosquitto) and other your MQTT servers, also can work with AWS iot and Aliyun iot. All Beacon data will be directly uploaded to your own server through the gateway, convenience for your further application development.



1.2 Model List

The MK107 series contains several product models, the product model list is as below:

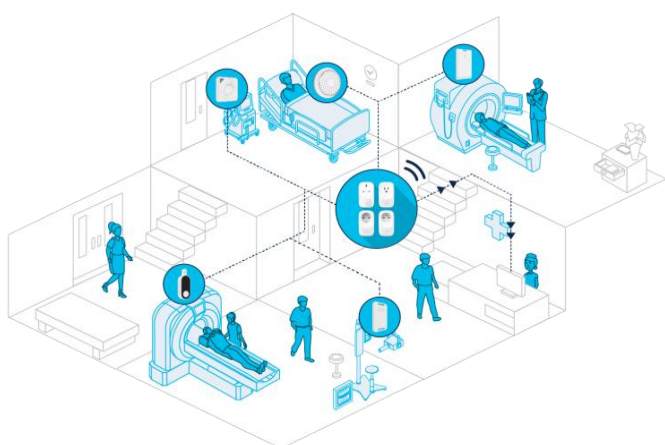
Series Model	Master	Slave	Model	Description
MK107	ESP32	/	MK107- B	US type, supports 2.4GHz WIFI and BLE 4.2
			MK107- G	UK type, supports 2.4GHz WIFI and BLE 4.2
			MK107- F	EU type, supports 2.4GHz WIFI and BLE 4.2
			MK107- E	FR type, supports 2.4GHz WIFI and BLE 4.2
MK107Pro	ESP32	NRF52833	MK107Pro- B	US type, supports 2.4GHz WIFI and BLE 5.0
			MK107Pro- G	UK type, supports 2.4GHz WIFI and BLE 5.0

MK107D Pro	RTL8720	NRF52833	MK107Pro- F	EU type, supports 2.4GHz WIFI and BLE 5.0
			MK107Pro- E	FR type, supports 2.4GHz WIFI and BLE 5.0
			MK107D Pro- B	US type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
			MK107D Pro- G	UK type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
MK107D Pro	RTL8720	NRF52833	MK107D Pro- F	EU type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
			MK107D Pro- E	FR type, supports 2.4GHz & 5GHz WIFI and BLE 5.0

2. Features

- Support wide range of voltage input and AC power output
- Support connecting to customer's own server
- Support multiple data filter methods to help you obtain target beacon easily
- Support filtering out duplicate data, effectively saving server resources
- Locally decode iBeacon, Eddystone (UID/URL/TLM) and all MOKO beacon raw data
- FCC&UL&CE&UKCA certified

3. Application



Scenario 1: Smart Healthcare

Deploy the gateway in the medical place, and deploy beacons on the valuable/frequently used medical equipment. The gateway scans the beacon advertising data and uploads it to the server. With the server positioning algorithm, users can obtain the real-time position of the instrument, so as to realize asset tracking and management.

When emergency situation requires a medical equipment, the required equipment can be located in time without affecting or delaying patient care.

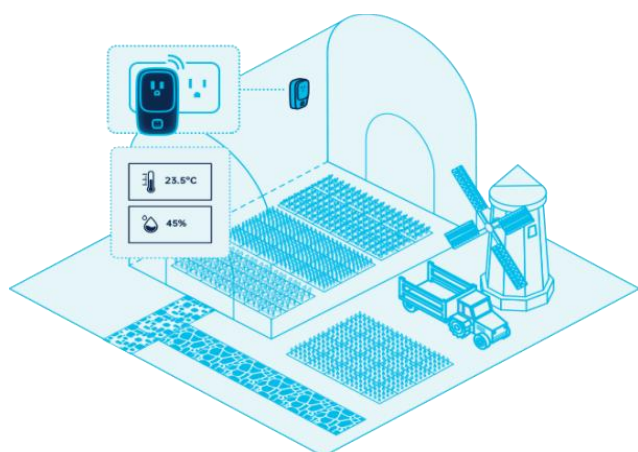
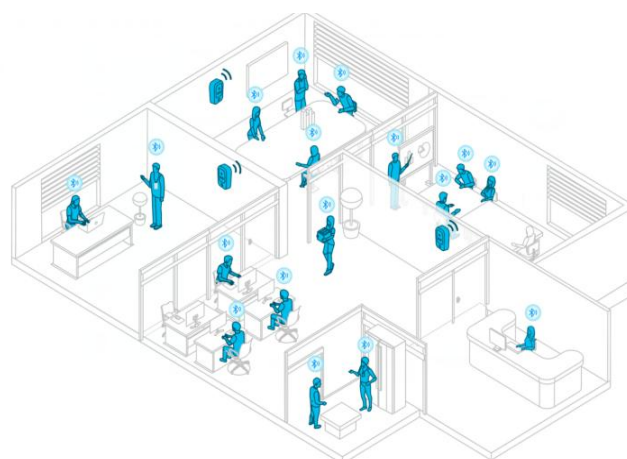
When an instrument is not detected for a period of time, a notification will be triggered, prompting the manager to find the device in time to reduce the risk of instrument loss.

Scenario 2: Smart Workplace

In the smart office, the gateway only needs to scan the employee's ID card (Beacon) and upload the data to the server to easily realize intelligent attendance and employee interaction.

By deploying beacon on public office equipment, the gateway can also well track and manage office equipment, perform location query for public equipment, and reduce manual search time.

You can also know the occupancy of the meeting room in real time and arrange the meeting time reasonably.



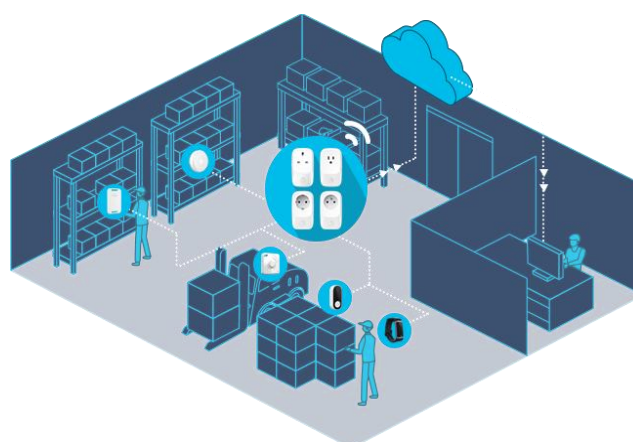
Scenario 3: Smart Farm

Deploying the gateway in the greenhouse and it can work with temperature and humidity sensors, easily realize real-time monitoring of the environment. Users can do data analysis on the server, generate temperature and humidity trend change reports, and understand hourly or even minutely environmental changes. When there is an abnormal change in the environment, such as temperature/humidity exceeding the appropriate range, a notification will be triggered immediately, prompting the farmer to adjust the ambient temperature/humidity in time.

Scenario 4: Smart Factory

The gateway can be used in the smart factory to track important goods/equipment/ vehicles. The real-time acceleration data of beacon indicates whether the equipment is moving or stationary at a certain location, and it can be judged whether the equipment is in use or not.

If a certain equipment has not been detected for a period of time, a notification will be sent to the manager in time, so as to search in time and reduce losses.

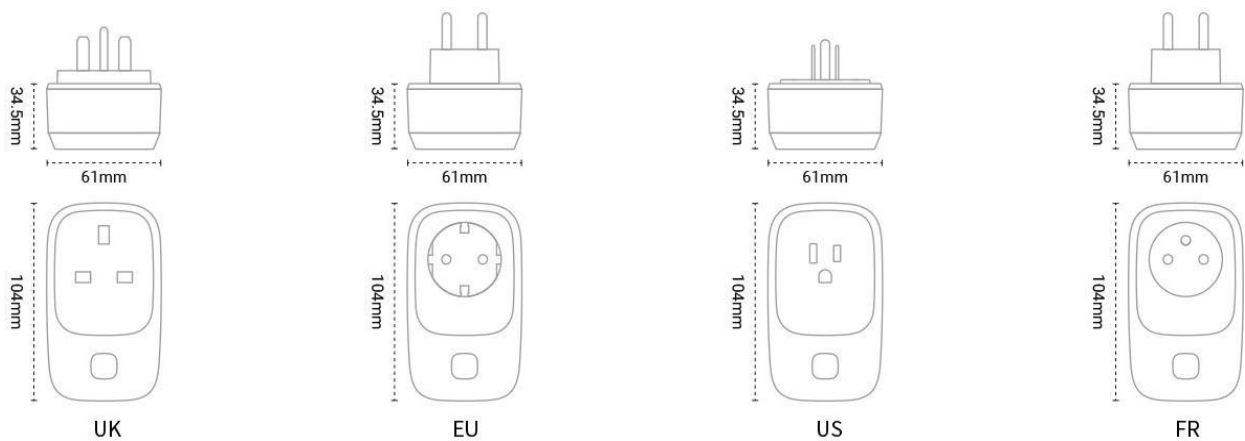


4. Product Appearance

4.1 Appearance



4.2 Dimensions



4.3 LED Patterns

Function	Action	LED Patterns
Bluetooth status	Bluetooth is advertising	Flash green
	Bluetooth is connected	Solid green
WIFI status	Connecting to the router and server	Flash blue
	Connected to the server successfully	Solid blue
Restore to factory settings	Press and hold the button for 10 seconds, the gateway will restore to factory settings, then Bluetooth advertises.	Flash blue and green once
OTA status	OTA process	Flash yellow
	OTA succeed	Solid yellow
	OTA failed	Solid red

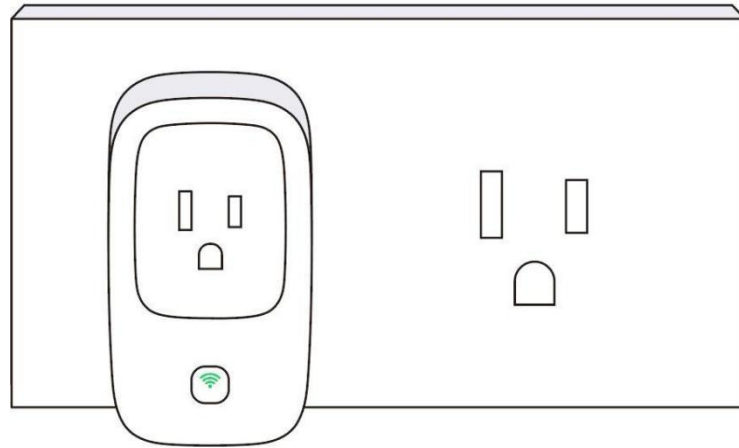
5. Product Specification

Electronic	
Plug type	US/UK/EU/FR
Power supply	100-240VAC, 50/60Hz
Output capacity	US type: 15A UK type: 13A EU/FR type: 16A
Button	1* reset button
LED indicator	2* LED indicators
Physical	
Material	ABS + PC
Color	White
Dimension	104mm*61mm*34.5mm
Environment	
Operating temperature	0 °C~ 40 °C
Operating humidity	0%~95% (No condensation)
Storage temperature	-10 °C~ 50 °C
Communication	
Protocol	MQTT V3.1.1
Encryption	TCP/SSL
Data format	JSON
Bluetooth	
Protocol	MK107: BLE 4.2 MK107Pro/ MK107D Pro: BLE 5.0
Scanning Range (In an open space)	MK107: 110 meters MK107Pro/ MK107D Pro: 400 meters with coded PHY (BLE long range), 150 meters with 1M PHY
Scanning Rate	MK107: 50 Bluetooth advertising packets per second MK107Pro/ MK107D Pro: 317 Bluetooth advertising packets per second
WIFI	
Band	MK107/MK107 Pro: 2.4GHz MK107D Pro: 2.4GHz & 5.0 GHz
Protocol	MK107/MK107 Pro: 802.11 b/g/n MK107D Pro: 802.11 a/b/g/n
Security	OPEN/WEP/WPA_PSK/WPA2_PSK/WPA_WPA2_PSK

6. User Guide

6.1 How to Install the Gateway?

Just plug the gateway into a power socket, the gateway will start working immediately.



6.2 How to Configure the Gateway?

Scan the QR code below to download the MKScannerPro APP. You can also search for the app and download it from Google play or APP store. For detailed configuration steps, please refer to the [User Manual](#) document.



7. Main Function

7.1 Bluetooth Advertises

If the gateway is configured for the first time, its Bluetooth will advertise after the power is supplied, and the advertising raw data is as below:

Raw data:		
0x020106041603AA020F094D4B3130 372050726F2D394639320FFF03AA76 312E302E347C9EBD5D9F92		
Details:		
LEN.	TYPE	VALUE
2	0x01	0x06
4	0x16	0x03AA02
15	0x09	0x4D4B3130372050726F2D39463932
15	0xFF	0x03AA76312E302E347C9EBD5D9F92

The data in the red box is advertising packet, the data in the blue box is response packet. The data format of advertising packet and response packet are as below:

Advertising packet:

Length	Type	Data
2	0x01	0x06
4	0x16	0xAA03 + device type (MK107: 0x00/MK107 Pro: 0x02/MK107D pro: 0x04)
2~21	0x09	Advertising name

Response packet:

Length	Type	Data
15	0xFF	0xAA03 + Firmware version (6 bytes) + MAC (6 bytes)

7.2 Bluetooth Connection

When the gateway Bluetooth is advertising, it can be scanned and connected by MOKO APP. After the APP is successfully connected with the gateway's Bluetooth, users can send WIFI and MQTT information to the gateway with the APP, and then the gateway will automatically connect to the certain WIFI and MQTT server.

7.3 Scan BLE Devices

After the gateway successfully connects with the MQTT server, it will automatically scan for nearby BLE devices. Users can configure the scan switch and time via the MOKO APP, then the gateway will start or stop scanning according to the configuration.

7.3.1 Data Filtering

The gateway supports multiple data filtering methods to help you easily obtain target beacon data:

- Filter by RSSI, MAC address, advertising name and advertising raw data
- Filter out duplicate data, reports only non-duplicate data to your server in a filtering period

7.3.2 Date Decoding

The gateway can locally decode the scanned Bluetooth advertising data, then uploads the decoded data to the server. Users can directly obtain the desirable information on the server.

- Support iBeacon, Eddystone (UID/URL/TLM) raw data decoding
- Support all MOKO beacon raw data decoding

7.4 Connecting to Customer Server

The server information is configurable, and it supports connecting to customer's own server. MOKO provides a Demo APP used for quickly configure the gateway, users just need fill in your server information using the Demo APP.

The gateway supports MQTT brokers (such as EMQTT, Mosquito) and other servers that support MQTT protocol, it can also work with AWS iot and Aliyun iot.

7.5 Data Upload

The gateway uploads the scanned Bluetooth data packet to the server through WIFI. The data packet includes timestamp, device type, RSSI, raw data and MAC address.

The data content can be configured, you can configure the gateway to report only the information you need, which will effectively save your server and network resources.

7.6 OTA

The gateway has the ability to upgrade firmware over the air. MOKO can provide the latest firmware upgrade file with customers for their further test.

7.7 Restore to Factory Settings

The gateway is equipped with a button for reset operation. Press the button and hold for 10 seconds, the gateway will restore factory settings, and then it will enter Bluetooth advertising status.

Users can also send MQTT commands through the APP/server to reset the gateway.

8. Development Document

MOKO provides the following documents for customers to test the product and develop their own firmware/APP, also supports to flash custom firmware in production.

File	Description
MK107 Series Product Specification	This document mainly introduces MK107 series product and guide users to install and configure the gateway.

<i>User Manual</i>	This document instructs users how to configure the gateway with MOKO APP and scan beacon data.
<i>Communication Protocol</i>	This document describes the configuring commands and management commands supported on MK107 series product.
<i>APP SDK</i>	iOS: https://github.com/MKScannerPro/MKScannerPro_iOS.git Android: https://github.com/MKScannerPro/MKScannerPro_Android.git The APP SDK includes the source code of the MKScannerPro APP, customers can quickly develop their own APP with it.
<i>Development Document</i>	The document includes the schematic diagram and test points related to firmware development and download. With this document, customers can develop their own firmware and download the firmware to the MOKO hardware.

9. Revision History

Revision	Description	Editor	Date
V1.0	Initial version	Weiguifen	2021.8.28
V1.1	Add Bluetooth performance of different models	Weiguifen	2022.1.20
V1.2	Improve description	Weiguifen	2022.4.7
V1.3	Improve description	Weiguifen	2022.8.25

MOKO TECHNOLOGY LTD.

 4F, Building2, Guanghui Technology Park,
MinQing Rd, Longhua, Shenzhen, Guangdong, China

 Tel: 86-755-23573370-829

 sales@mokosmart.com

 <https://www.mokosmart.com>

