



MK107 BLE to WIFI Gateway

Product Specification

Version V1.0

Contents

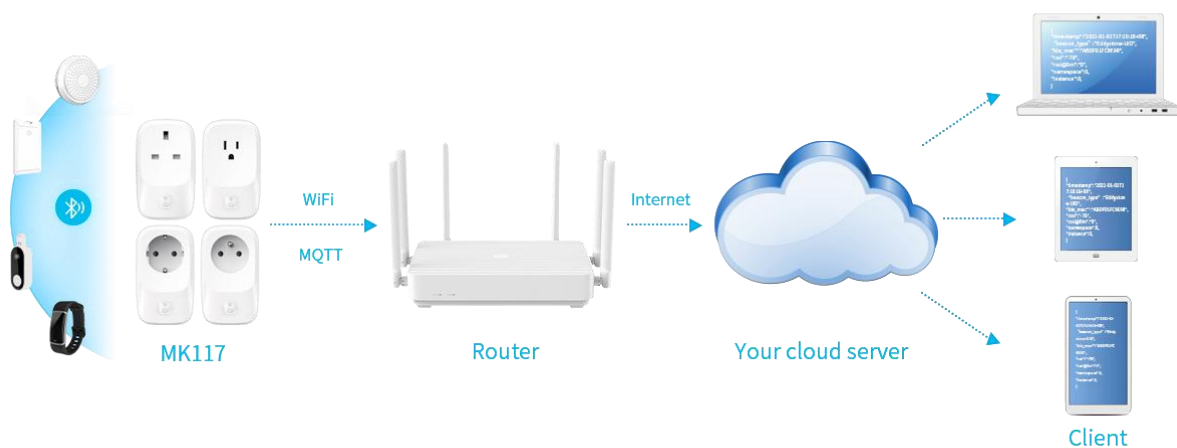
1. Product Introduction.....	2
1.1 Overview.....	2
1.2 Model List.....	2
2. Features.....	3
3. Application.....	3
4. Product Appearance.....	5
4.1 Appearance.....	5
4.2 Dimensions.....	5
4.3 LED Patterns.....	5
5. Product Specification.....	6
6. User Guide.....	7
6.1 How to Install The Gateway?	7
6.2 How to Configure The Gateway?	7
7. Main Function.....	8
7.1 Bluetooth Advertises.....	8
7.2 Bluetooth Connection.....	9
7.3 Scan BLE Devices.....	9
7.3.1 Data Filtering.....	9
7.3.2 Date Decoding.....	9
7.4 Connection to Customer Server.....	9
7.5 Data Upload.....	9
7.6 OTA.....	9
7.7 Restore to Factory Settings.....	10
8. Development Document.....	10
9. Certification.....	10
10. Revision History.....	10

1. Product Introduction

1.1 Overview

MK107 series product is a Bluetooth Low Energy (BLE) 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 realize indoor positioning service, centralized asset tracking and real-time status monitoring in a low-cost way.

MK107 gateway supports the connection of standard MQTT broker (such as EMQTT, Mosquito) and other servers that support the MQTT protocol, also can work with AWS iot and Ali iot. All data of the gateway will be directly uploaded to your own server, convenience for your further application development.



1.2 Model List

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

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

MK107DPro-B	RTL8720	NRF52833	US type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
MK107DPro-G	RTL8720	NRF52833	UK type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
MK107DPro-F	RTL8720	NRF52833	EU type, supports 2.4GHz & 5GHz WIFI and BLE 5.0
MK107DPro-E	RTL8720	NRF52833	FR type, supports 2.4GHz & 5GHz WIFI and BLE 5.0

Note: D - Dual Frequency;

Pro - The hardware has a separate Bluetooth module and WIFI module.

2. Features

- Support wide range of voltage input
- Support AC power output
- Supports connection to customer's server
- Multiple data filter mechanisms to help you obtain target beacon easily
- Duplication data filter mechanism, effectively saving server resources
- Locally decode iBeacon, Eddystone(UID/URL/TLM) and all MOKO beacon raw data
- The communication module can be replaced quickly to realize other communication methods, Also supports the flexible combination of master and slave modules.
- FCC&UL&CE certified

3. Application

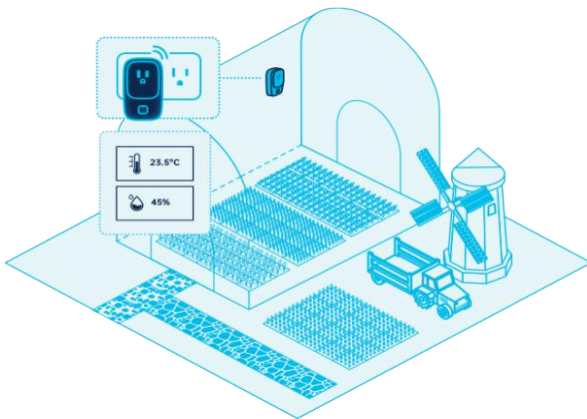
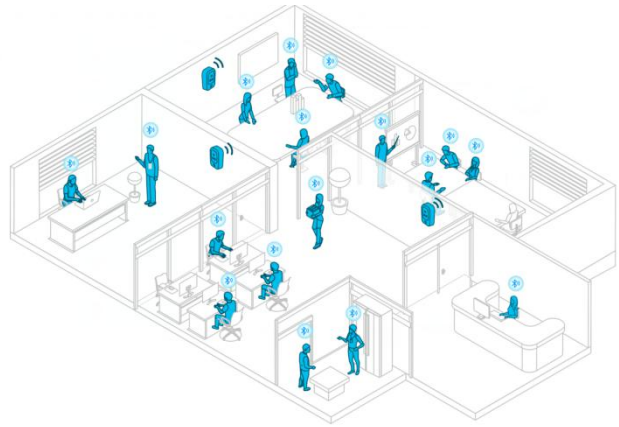


1. Indoor positioning and navigation

Deploy the gateway in the museum/exhibition, visitors who enter wear a beacon. The gateway scans the advertising data of the beacon and uploads the data to the server. According to RSSI, MAC address and other information, the real-time location of the visitor can be calculated and located on the server, and the navigation route can be provided.

Scenario 2: Smart Workplace

Deploy the gateway in the workplace, the personnel need to wear an ID card (Beacon), the gateway scans the advertising data of the card and uploads it to the server. You can know the employee's attendance status, working hours and interaction at any time on the server.

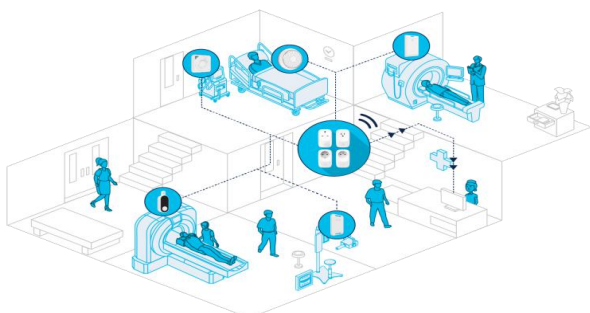
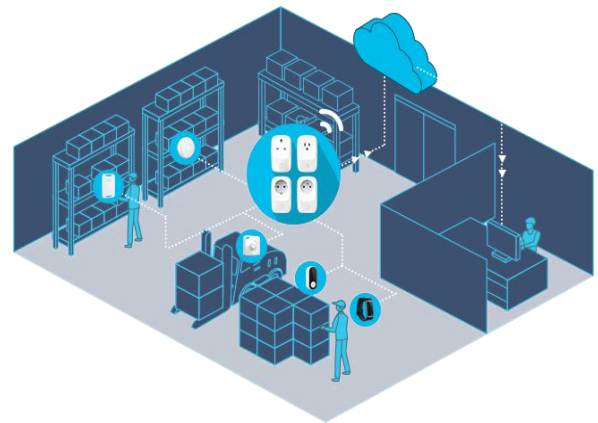


Scenario 3: Smart Farm

Deploy the gateway in the greenhouse, it can work with the temperature and humidity sensors. The gateway scans the advertising data of the sensor and uploads the data to your server. Generate the T&H change trend report on the server and send a notification when the temperature or humidity exceeds the appropriate range, so that the farmer can make timely adjustments.

Scenario 4: Smart Factory

Deploy the gateway in the factory, and deploy beacons on some important equipment, goods and forklifts. The gateway will scan the advertising data of the beacon and upload it to your server. The server can compute and locate the real-time position of the goods, generate motion trajectory reports, so as to understand the utilization rate of the goods. It also can send a notification when the goods are not scanned for a period of time.



Scenario 5: Smart Healthcare

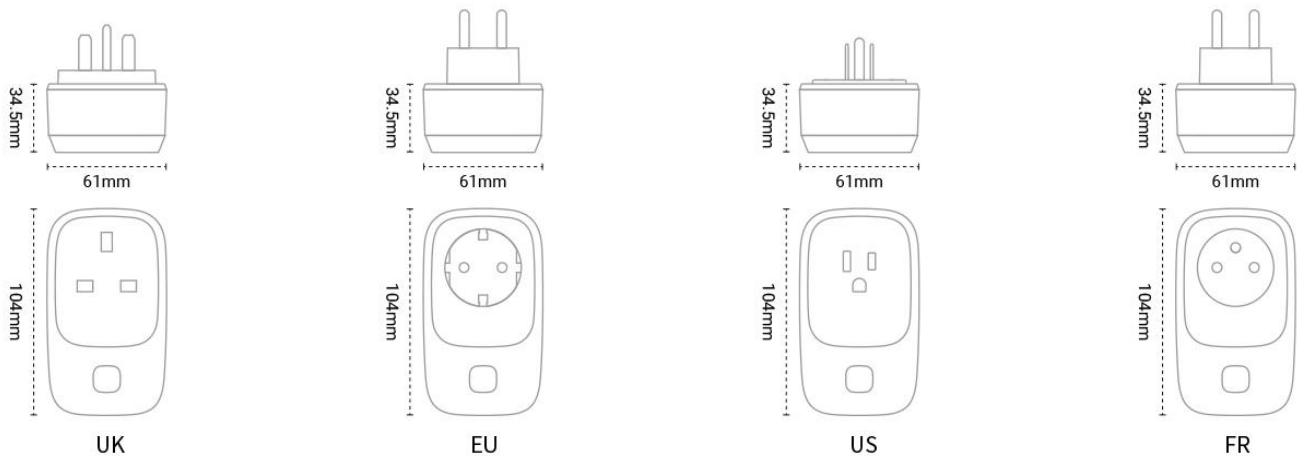
Deploy the gateway in the hospital and deploy the beacon on some important and often used medical equipment. The gateway will scan the advertising data of the beacon and upload the data to the server. The server can compute and locate the real-time position based on the timestamp, RSSI, mac address and other messages, so as to realize asset tracking and management.

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

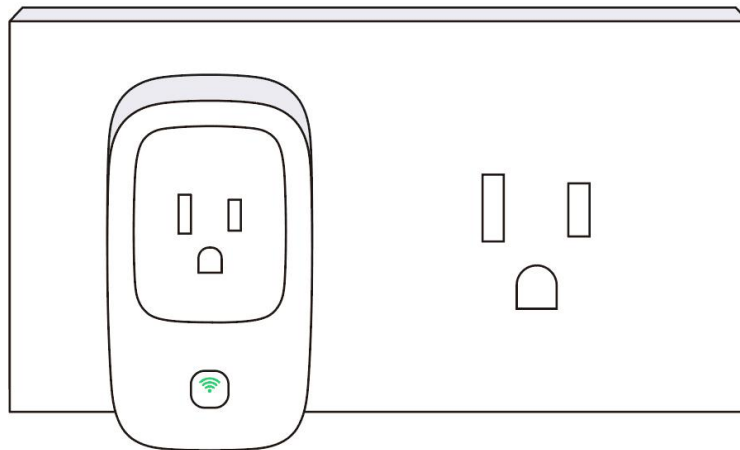
Electronic	
Plug type	US/UK/EU/FR
Power supply	100-240VAC, 50/60Hz
Output capacity	US type: 15A UK type: 13A EU/FR type: 16A
Reset button	Press the reset button for 10 seconds and then release, the gateway will restore the factory settings
LED indicator	Used to indicate device status
Physical	
Material	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 MK107(D) Pro: BLE 5.0
Scanning distance	Above 100 meters in an open space
Antenna	Onboard antenna
WIFI	
Bandwidth	MK107(Pro): 2.4GHz MK107DPro : 2.4GHz/5GHz
Protocol	MK107(Pro): 802.11 b/g/n MK107DPro: 802.11 a/b/g/n
Security	OPEN/WEP/WPA_PSK/WPA2_PSK/WPA_WPA2_PSK
Antenna	Onboard antenna

6. User Guide

6.1 How to Install The Gateway?

Just plug the gateway into a power socket, the gateway can 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 [MK107 User Manual](#)



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. Continuously advertises data with the name of MK107-XXXX (the last two bytes of the MAC address), and the advertising raw data is as below:

Raw data:

```
0x020106041603AA000B094D4B3130
372D383838360FFF03AA76312E302E
33F008D1D98886
```

Details:

LEN.	TYPE	VALUE
2	0x01	0x06
4	0x16	0x03AA00
11	0x09	0x4D4B3130372D38383836
15	0xFF	0x03AA76312E302E33F008D1D98886

The data in the red box is advertising packet, and 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 (0x00)
2~21	0x09	Advertising name, the default is MINI-01-XXXX(The last 2 bytes of the MAC)

Response packet:

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

7.2 Bluetooth Connection

Users can use the MOKO APP to scan the gateway Bluetooth and establish a connection. The connection password is **Moko4321**.

After the APP is successfully connected with the gateway Bluetooth, the APP sends the WIFI and server information to the gateway via Bluetooth, and the gateway will connect the certain WIFI and server.

7.3 Scan BLE Devices

After the gateway successfully connects with the server, it will automatically scan for nearby BLE devices. The user can set the scan switch and time through the MOKO APP, and the gateway will start or stop scanning according to the settings.

7.3.1 Data Filtering

The gateway has multiple data filtering mechanisms to help you easily obtain target beacon data:

- Filter by RSSI, Mac address, advertising name and advertising raw data
- Filter duplicate data, only reports one of the duplicate data to the server in a filtering period

7.3.2 Date Decoding

The gateway can locally decode the scanned Bluetooth advertising data, and then upload 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 Connection to Customer Server

The server information is configurable, and it supports to connect with 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.

Customer server can be MQTT brokers (such as EMQTT, Mosquito) and other servers that support the MQTT protocol, it can also be AWS iot and Ali iot.

7.5 Data Upload

The gateway uploads the scanned Bluetooth data packet to the server through the WIFI network. The data uploaded to server includes timestamp, device type, RSSI, raw data and MAC address. The data content can be selected, you can configure the gateway to report only the information you need, which can effectively save server and network resources.

7.6 OTA

The gateway has the ability to upgrade the firmware over the air. If the gateway firmware is updated, MOKO can provide the upgrade file, and customers can upgrade the gateway firmware by a wireless method.

7.7 Restore to Factory Settings

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

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 products and develop their own firmware/APP, and supports flash custom firmware during production.

File	Version	Description
<i>MK107 Product Specification</i>	V1.0	This document mainly introduces MK107 series product and guide users to operate the gateway.
<i>MK107 User Manual</i>	V1.0	This document instructs users how to configure the gateway with MOKO APP and scan beacon data.
<i>MK107 Communication Protocol</i>	V1.0	This document contains the Bluetooth and WIFI communication protocols, provided for your test.
<i>APP SDK</i>	V1.0	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 and instructs users to the SDK. Customers can quickly develop their own APP with it.
<i>Schematic diagram and test points description</i>	V1.0	This document contains the ESP32 schematic diagram and the test points related to flashing firmware. With this document, you can develop and flash your own firmware to the MOKO hardware.


9. Certification

The product is on the process of FCC, UL and CE certification, this section will be updated when the certificates obtained.

10. Revision History

Revision	Description	Editor	Date
V1.0	Initial Version based on firmware V1.0.3	Weiguifen	2021.8.28

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>

