

## HY-DTU03L-S BLE Gateway User Manual

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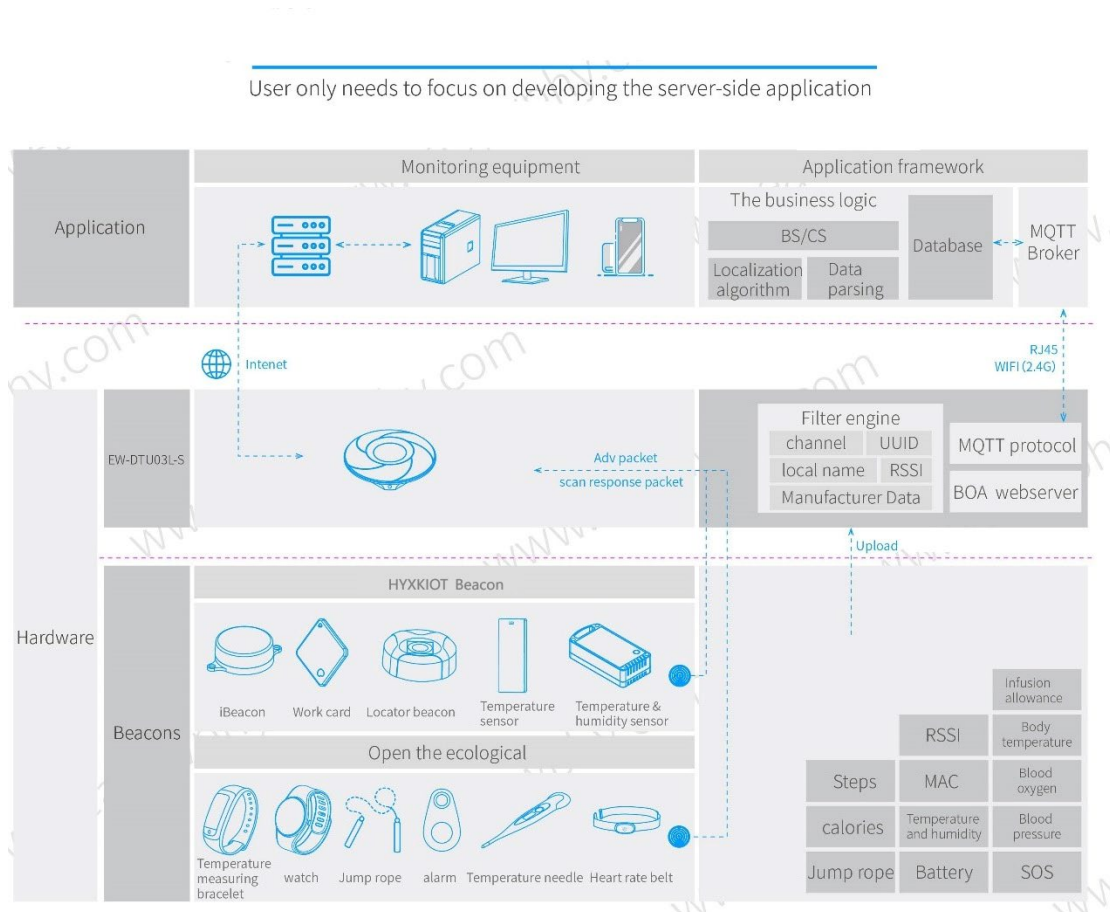
## 1.Overview

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HY-DTU03L-S BLE gateway is convenient for users to get the data of Beacons of any manufacturer, and upload to the target server. It can upload the data to the server via MQTT protocol. Users can modify gateway parameters by accessing the console UI of the gateway in the same way as using a WIFI router.

HY-DTU03L-S can be installed on the ceiling or wall. Using POE power supply or Type-c power supply, the cost is very advantageous. HY-DTU03L-S is easy to use and can easily connect to the user' s own MQTT server. The configuration control interface is open to the user, which greatly simplifies the application of the user and also meets the user' s requirements for data privacy.

Here is the manual to introduce how to use network to upload Bluetooth(Beacon) data to a server via MQTT.



## 2. Operating Procedures

**STEP 1.** Power on the gateway.

If you have a POE switch, use a network cable directly to connect the switch to the gateway, and the gateway will work properly. If you do not have a POE switch, you can use the supplied Type-C cable to power the gateway. Note that the power supply parameter of the power adapter is 5V 2A, which is optimal.

**STEP 2.** Connect the gateway to the Internet through Ethernet or Wi-Fi (Ethernet and WIFI cannot be used together). The gateway accesses the network by automatically obtaining an IP address, you can also configure a static IP address to access the network.

## Ethernet to Internet

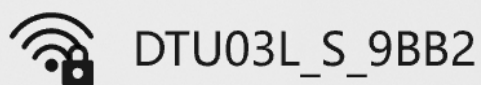
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If the router or switch does not have a static IP address, use a network cable to connect the router or switch to the gateway so that the gateway can access the network normally.

## WIFI to Internet

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The gateway supports access to 2.4GHz WIFI. You need to login to the controller UI of the gateway to configure WIFI parameters. When your computer or phone is connected to the gateway' s WIFI, use a browser to open the default IP address [10.10.18.1](http://10.10.18.1). See the figure below for details.



## Login to the gateway console UI

EasyWayPhy\_G

### Authorization Required

Please enter your username and password.

Username

Password

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- **Default Parameters**

No.	Item	Default Value	Remark
1	WLAN SSID	DTU03L-S-XXXX	XXXX is the last 2 bytes of the gateway MAC address
2	WLAN Password	12345678	Modifiable
3	LAN IP	10.10.18.1	Modifiable
4	User name	root	Unmodifiable
5	Password	root	Modifiable

**STEP 3.** After configuring the gateway WIFI parameters, restart the gateway.

**STEP 4.** Login to the gateway console UI again, find "Diagnostics" in the menu, and ping any unexpected network address to diagnose whether the gateway is normally connected to the Internet. See the figure below for details.

**STEP 5.** Set MQTT server parameters, restart the gateway.

**STEP 6.** Subscribe the publish topic of the gateway, you will see json data pushed by the gateway to the MQTT server.

## 3.WIFI setting

You can modify the SSID of the gateway, whether to hide the SSID, the name of the WIFI to be accessed, the password, the encryption mode, and the password.

After the configuration is complete, the gateway restarts for the configuration to take effect. In particular, the WIFI access to the gateway only supports 2.4GHz.

The screenshot shows the 'EasyWayPhy\_G' web interface. The top navigation bar includes 'Status', 'System', 'Network', and 'Logout'. The main heading is 'Gateway WiFi configuration' with a sub-note: '-Configuration complete, please restart'. The configuration form includes the following fields:

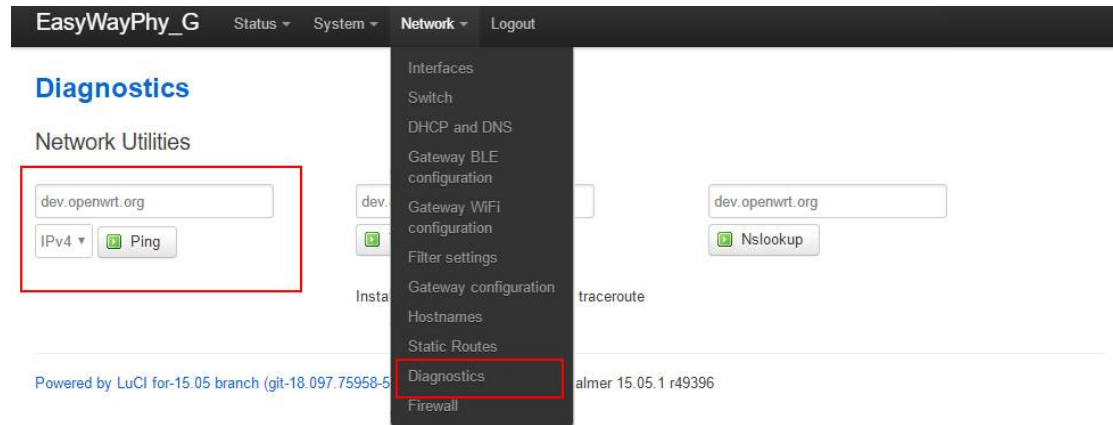
- WIFI name: DTU03L\_S\_BEAA
- WIFI password: 12345678
- Connection WiFi Name: TP-LINK\_YW
- Connection WiFi password: .....
- Connection WiFi encryption type: AES
- Connection WiFi verification mode: WPA2PSK
- WiFi enable: Open

A navigation menu is open, listing various settings: Interfaces, Switch, DHCP and DNS, Gateway BLE configuration, Gateway WiFi configuration (highlighted with a red box), Filter settings, Gateway configuration, Hostnames, Static Routes, Diagnostics, and Firewall.

At the bottom right, there are three buttons: 'Save & Apply', 'Save', and 'Reset'.

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## 4. Network Diagnosis



## 5. Gateway publish topic

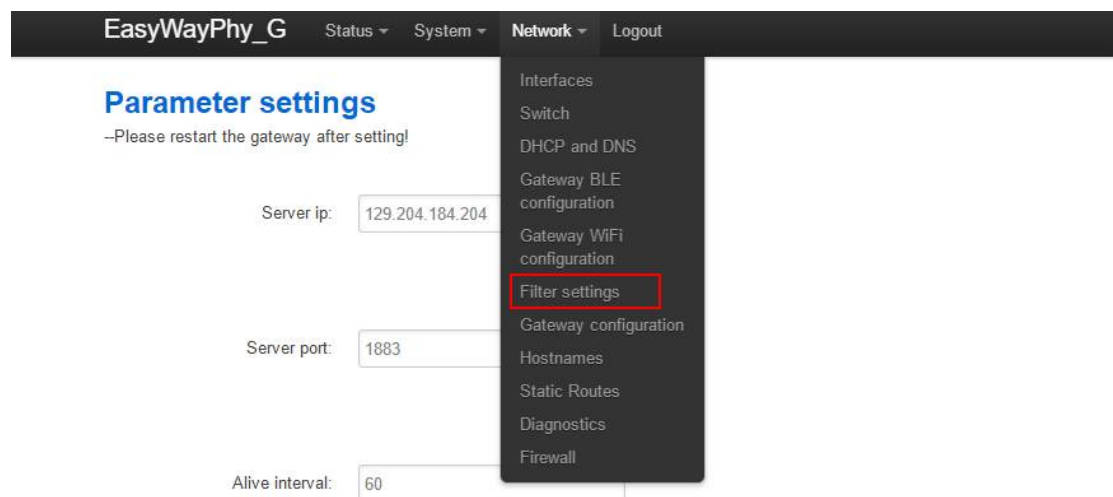
No.	Item	Default Value	Remark
1	Gateway publish topic	Default : /{MAC}/connect_packet/adv_publish {MAC} is the BLE MAC for each device, users should replace it with the MAC of the device.	Gateway pushes data to the MQTT broker
2	Heart Beat publish topic	Default : /{MAC}/connect_packet/hds_publish {MAC} is the BLE MAC for each device, users should replace it with the MAC of the device.	Used by the MQTT broker to determine whether the client is online. It pushes once every second, it also can be turned on and off.

- Remark: HY-DTU03L-S mainly uses the above two topics, and other topics are not explained here.

## 6.Filter settings

The gateway provides a lot of filtering options. Users can not only select the appropriate features according to the ADV Data of Beacon to set the filtering conditions, but also filter the RSSI and adv channel, and can set up to 10 groups of different filtering conditions. So that users can receive a variety of beacons with completely different characteristics.

### Console UI of filter settings





## Gateway filtering parameter configuration

--Configuration complete, please restart

Signal strength:	<input type="text" value="127"/>
Channel:	<input type="text" value="Unfiltered channel"/>
ADV Flog field[0]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[0]:	<input type="text" value="No filtering"/>
Filter data[0]:	<input type="text" value="0"/>
ADV Flog field[1]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[1]:	<input type="text" value="No filtering"/>
Filter data[1]:	<input type="text" value="0"/>
ADV Flog field[2]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[2]:	<input type="text" value="No filtering"/>
Filter data[2]:	<input type="text" value="0"/>
ADV Flog field[3]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[3]:	<input type="text" value="No filtering"/>
Filter data[3]:	<input type="text" value="0"/>
ADV Flog field[4]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[4]:	<input type="text" value="No filtering"/>
Filter data[4]:	<input type="text" value="0"/>
ADV Flog field[5]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[5]:	<input type="text" value="No filtering"/>
Filter data[5]:	<input type="text" value="0"/>
ADV Flog field[6]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[6]:	<input type="text" value="No filtering"/>
Filter data[6]:	<input type="text" value="0"/>
ADV Flog field[7]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[7]:	<input type="text" value="No filtering"/>
Filter data[7]:	<input type="text" value="0"/>
ADV Flog field[8]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[8]:	<input type="text" value="No filtering"/>
Filter data[8]:	<input type="text" value="0"/>
ADV Flog field[9]:	<input type="text" value="BLE_GAP_AD_TYPE_COMPLE"/>
Filtering method[9]:	<input type="text" value="No filtering"/>
Filter data[9]:	<input type="text" value="0"/>

## 7. Adv packet Field Description

No.	Item	HEX	CJSON	Remark
1	BLE_GAP_AD_TYPE_FLAGS	0x01	"type"	\
2	BLE_GAP_AD_TYPE_16BIT_SERVICE_UUID_MORE_AVAILABLE	0x02	"u16"	\
3	BLE_GAP_AD_TYPE_16BIT_SERVICE_UUID_COMPLETE	0x03	"u16"	\
4	BLE_GAP_AD_TYPE_32BIT_SERVICE_UUID_MORE_AVAILABLE	0x04	"u32"	\
5	BLE_GAP_AD_TYPE_32BIT_SERVICE_UUID_COMPLETE	0x05	"u32"	\
6	BLE_GAP_AD_TYPE_128BIT_SERVICE_UUID_MORE_AVAILABLE	0x06	"u128"	\
7	BLE_GAP_AD_TYPE_128BIT_SERVICE_UUID_COMPLETE	0x07	"u128"	\
8	BLE_GAP_AD_TYPE_SHORT_LOCAL_NAME	0x08	"name"	Device short name
9	BLE_GAP_AD_TYPE_COMPLETE_LOCAL_NAME	0x09	"name"	Device complete name
10	BLE_GAP_AD_TYPE_TX_POWER_LEVEL	0x0A	"tpr"	\
11	BLE_GAP_AD_TYPE_CLASS_OF_DEVICE	0x0D	"class"	\

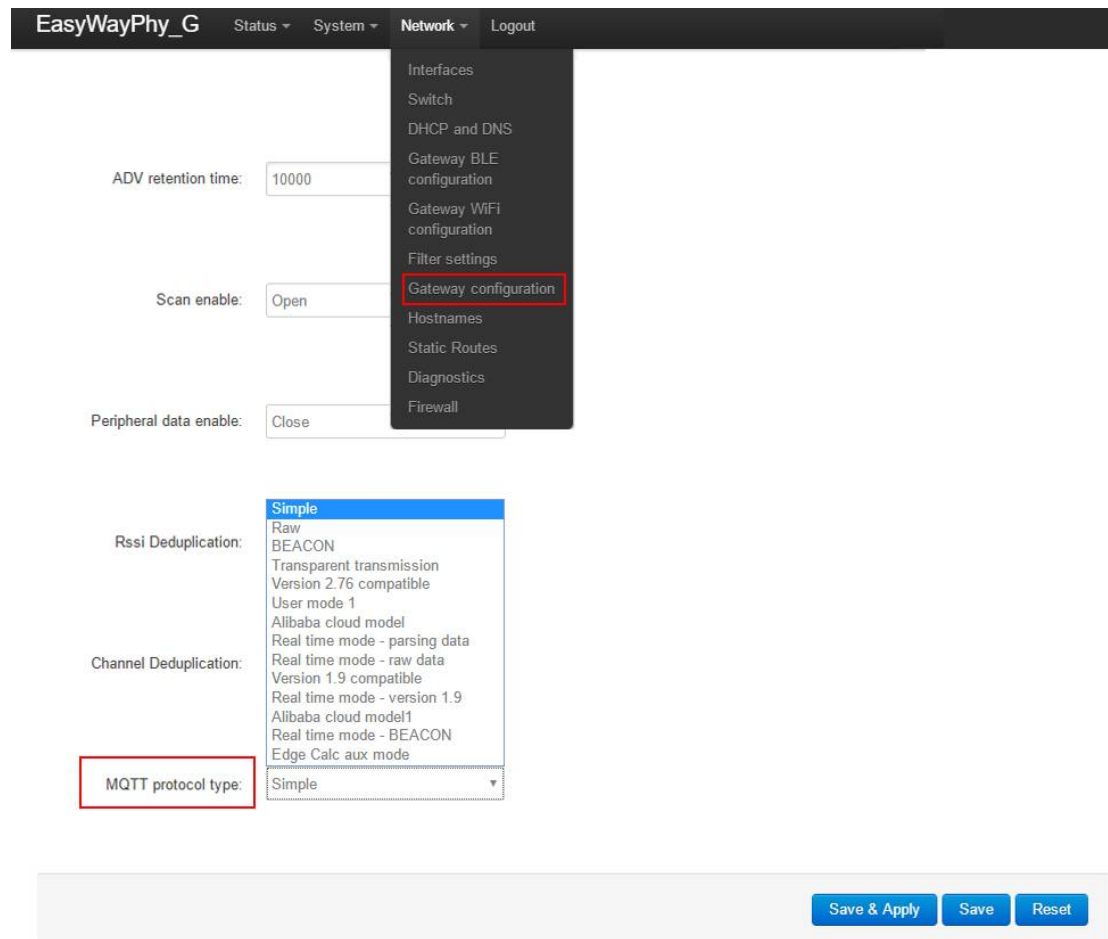
No.	Item	HEX	CJSON	Remark
12	BLE_GAP_AD_TYPE_SIMPLE_PAIRING_HASH_C	0x0E	"hash"	\
13	BLE_GAP_AD_TYPE_SIMPLE_PAIRING_RANDOMIZER_R	0x0F	"pair"	\
14	BLE_GAP_AD_TYPE_SECURITY_MANAGER_TK_VALUE	0x10	"TK"	\
15	BLE_GAP_AD_TYPE_SECURITY_MANAGER_OOB_FLAGS	0x11	"OOB"	\
16	BLE_GAP_AD_TYPE_SLAVE_CONNECTION_INTERVAL_RANGE	0x12	"int_rg"	\
17	BLE_GAP_AD_TYPE_SOLICITED_SERVICE_UUIDS_16BIT	0x14	"s16"	\
18	BLE_GAP_AD_TYPE_SOLICITED_SERVICE_UUIDS_128BIT	0x15	"s128"	\
19	BLE_GAP_AD_TYPE_SERVICE_DATA	0x16	"sdata"	Service Data
20	BLE_GAP_AD_TYPE_PUBLIC_TARGET_ADDRESS	0x17	"addr"	\
21	BLE_GAP_AD_TYPE_RANDOM_TARGET_ADDRESS	0x18	"addr"	\
22	BLE_GAP_AD_TYPE_APPEARANCE	0x19	"Appearance"	\
23	BLE_GAP_AD_TYPE_ADVERTISING_INTERVAL	0x1A	"int"	\

No.	Item	HEX	CJSON	Remark
24	BLE_GAP_AD_TYPE_LE_BLUETOOTH_DEVICE_ADDRESS	0x1B	"daddr"	\
25	BLE_GAP_AD_TYPE_LE_ROLE	0x1C	"role"	\
26	BLE_GAP_AD_TYPE_SIMPLE_PAIRING_HASH_C256	0x1D	"h256"	\
27	BLE_GAP_AD_TYPE_SIMPLE_PAIRING_RANDOMIZER_R256	0x1E	"r256"	\
28	BLE_GAP_AD_TYPE_SERVICE_DATA_32BIT_UUID	0x20	"suid"	\
29	BLE_GAP_AD_TYPE_SERVICE_DATA_128BIT_UUID	0x21	"suid"	\
30	BLE_GAP_AD_TYPE_LESC_CONFIRMATION_VALUE	0x22	"CC"	\
31	BLE_GAP_AD_TYPE_LESC_RANDOM_VALUE	0x23	"Ran"	\
32	BLE_GAP_AD_TYPE_URI	0x24	"URI"	\
33	BLE_GAP_AD_TYPE_3D_INFORMATION_DATA	0x3D	"3D"	\
34	BLE_GAP_AD_TYPE_MANUFACTURER_SPECIFIC_DATA	0xFF	"MFR" or "MFR0" or "MFR1"	Manufacturer Data

- Remark: Refer to this table for filtering Settings and JSON field descriptions.

## 8. Advertising Data Format

The gateway offers a choice of up to 13 data formats that are pushed to the MQTT server. See the figure below for details.



### MQTT protocol type

No.	Item	Remark
1	Simple	Default setting (Recommended)
2	Raw	available
3	BEACON	Available

No.	Item	Remark
4	Transparent transmission	\
5	Version 2.76 compatible	\
6	User mode 1	\
7	Alibaba cloud model	Available
8	Real time mode - parsing data	Available
9	Real time mode - raw data	Available
10	Version 1.9 compatible	\
11	Real time mode - version 1.9	\
12	Alibaba cloud model1	\
13	Real time mode - BEACON	Available
14	Edge Calc aux mode	\

## Data format Sample

### “Simple” Model

In this mode, the data received by the gateway will be pushed to the MQTT server according to the preset push period (1S by default).

```
[  
  {  
    "time": "2022/01/19 15:36:49.491582",
```

```
"id": "E525484B761A",
"total": "2"
},
{
  "mac": "80ECCACD48A6",
  "channel": "37",
  "rssi": "-67",
  "type": "06",
  "MFR": "004C02150112233445566778899AABBCCDDEEFF027165A10C3"
},
{
  "mac": "80ECCACD86F2",
  "channel": "38",
  "rssi": "-60",
  "type": "06",
  "MFR": "004C02150112233445566778899AABBCCDDEEFF0271637D0C3"
}
]
```

## “Raw” Model

In this mode, the data received by the gateway will be pushed to the MQTT server according to the preset push period (1S by default).

```
[
  {
    "time": "2022/01/19 16:16:53.384178",
    "id": "E525484B761A",
    "total": "2"
  },
  {
    "mac": "80ECCACDEE47",
    "ch": "37",
    "rssi": "-57",
    "adv": "0201061AFF4C0002150112233445566778899AABBCCDDEEF64271652CFC3",
    "rsp": "1107ADE8F3D4B88494A0AAF5E20F23155A950C084557383045434341434400"
  },
  {
    "mac": "80ECCACD9B4E",
    "ch": "38",
    "rssi": "-67",

```

```
"adv": "0201061AFF4C0002150112233445566778899AABBCCDDEEFF000010001C3",  
"rsp": "1107ADE8F3D4B88494A0AAF5E20F23155A950C084557383045434341434400"  
}  
]
```

## “Beacon” Model

In this mode, the data received by the gateway will be pushed to the MQTT server according to the preset push period (1S by default).

```
[  
  {  
    "time": "2022/01/19 16:24:58.297523",  
    "id": "E525484B761A",  
    "total": "2"  
  },  
  {  
    "mac": "80ECCACD50D7",  
    "channel": "38",  
    "rssi": "-59",  
    "BLE_type": "06",  
    "Company": "76",  
    "Type": "2",  
    "UUID": "0112233445566778899AABBCCDDEEF64",  
    "Major": "10006",  
    "Minor": "21917",  
    "RSSI_at_1m": "-61dBm"  
  },  
  {  
    "mac": "80ECCACDDEE2A",  
    "channel": "37",  
    "rssi": "-63",  
    "BLE_type": "06",  
    "Company": "76",  
    "Type": "2",  
    "UUID": "0112233445566778899AABBCCDDEEF64",  
    "Major": "10006",  
    "Minor": "21212",  
    "RSSI_at_1m": "-61dBm"  
  }  
]
```



]

## “Alibaba cloud MQTT” Model

In this mode, the data received by the gateway will be pushed to the MQTT server according to the preset push period (1S by default).

```
{
  "base_info": {
    "time": "2022/01/19 16:43:59",
    "total": "2",
    "timestamp": "819592",
    "id": "E525484B761A"
  },
  "upload_datas": [
    {
      "mac": "CC4BCF6C89B7",
      "channel": "37",
      "rssi": "-38",
      "name": "EWCC4BCF6C89B7",
      "type": "06",
      "u16": "1000",
      "MFR": "0001CC4BCF6C89B7"
    },
    {
      "mac": "80ECCACDEE28",
      "channel": "39",
      "rssi": "-71",
      "type": "06",
      "MFR": "004C02150112233445566778899AABBCCDDEEF64271652E0C3"
    }
  ]
}
```

## “Real time mode - parsing data” Model

In this mode, the data received by the gateway is synchronously pushed to the MQTT server in real time.

```
{
  "base_info": {
    "time": "2022/01/19 16:51:42",
    "total": "1",
    "timestamp": "766042",
    "id": "E525484B761A"
  },
  "upload_datas": [
    {
      "mac": "80ECCACD4F83",
      "channel": "37",
      "rssi": "-63",
      "type": "06",
      "MFR": "004C02150112233445566778899AABBCCDDEEF64271653C7C3"
    }
  ]
}
```

## “Real time mode - raw data” Model

In this mode, the data received by the gateway is synchronously pushed to the MQTT server in real time.

```
{
  "base_info": {
    "time": "2022/01/19 16:57:17",
    "total": "1",
    "timestamp": "478976",
    "id": "E525484B761A"
  },
  "upload_datas": [
    {
      "mac": "80ECCACD85E7",
      "ch": "38",
      "rssi": "-45",
      "adv": "0201061AFF4C00021500000000000020C50101180000000064271635DFC3",
      "rsp": "1107ADE8F3D4B88494A0AAF5E20F23155A950C0845573830454341434400"
    }
  ]
}
```