

KBeaconPro App Instruction

Revision History

Version	Date	Change Description	Author
V1.0	2017/11/12	Initial draft for KBeaconTools	Adam
V1.1	2018/02/23	Name updating	Adam
V1.2	2018/03/08	Updating iBeacon/Eddystone URL/Eddystone UID/Eddystone TLM configuration	Adam
V1.2	2018/03/27	Updating RSSI value setting	Adam
V2.0	2018/10/02	App Interface updating	Claire
V3.0	2019/10/15	Name updating&App Interface updating	Claire
V4.0	2021/07/06	Name updating&App Interface updating	Claire
V4.1	2021/11/24	Adding Power off and Reset function	Claire
V4.2	2022/06/15	Adding trigger and sensor function	Elaine
V4.3	2022/11/2	Adding Power Profiler function	Elaine

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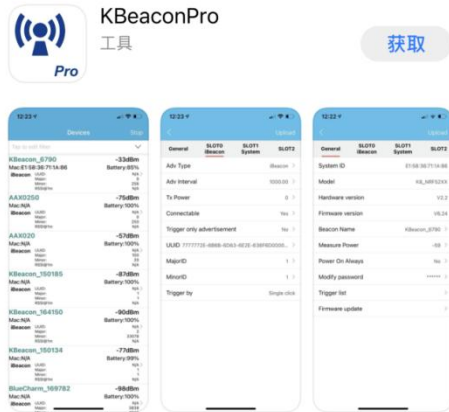
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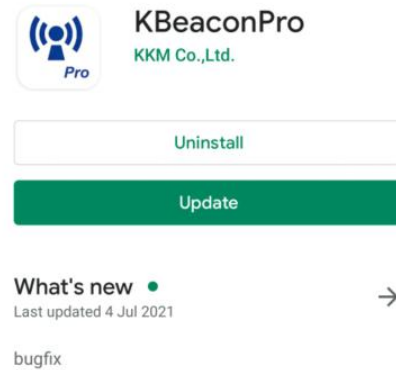
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1. Download KBeaconPro App

Download the App 'KBeaconPro' from iOS App Store or Android Google Play or scan the QR code below to download the App.



iOS APP



Android APP

Minimum requirements

A mobile phone with *Bluetooth* 4.0 support is needed. For Android devices, Android version 5.1 or newer. For iOS devices, iOS version 10.0 or newer.

Reminder: This instruction uses Android App to demonstrate. The iOS App interface is slightly different from Android App.

2. How to connect KBeacon device to KBeaconPro App

Kindly note: Please make sure your KBeacon device is with battery already. Enable your smart phone Bluetooth and run the App 'KBeaconPro'.

2.1 Turn on KBeacon

- **KBeacon with external or internal button (Including model K1/K11/K21/K23/K3/K4/K41/K4P/K5/K51/K5P/K6/K61/K6P/K7/K71/K8/K81/W59/F1/W3/W52/B1/B2/S1/P2)**

The factory setting of KBeacon with button is OFF.

Turn ON the device: Hold the button for 3 seconds, the LED starts flashing and the flashing lasts for 30 seconds.
Turn OFF the device: Hold the button for 5 seconds, the LED starts flashing and flash 8 times.

● **KBeacon without button (Including model K12/K15/K15A/K15L/W4/U1/K9/K91/K9P/W7/S2/P1)**

The factory setting of KBeacon without button is ON. K12/K15/K9/P1/W7 does not support turning off the power.

K1/K11	K21/K23	K12	K3
			
K4/K41/K4P	K5/51/K5p	K61/K6P series	K7/K71
			
K8/K81	K9/K91/K9P	W4	W59
			
U1	F1	W51	W52
			
W3	W7	B1	B2
			
S1	S2	P1	W8
			

			
K15/K15A/K15L	P2		
			

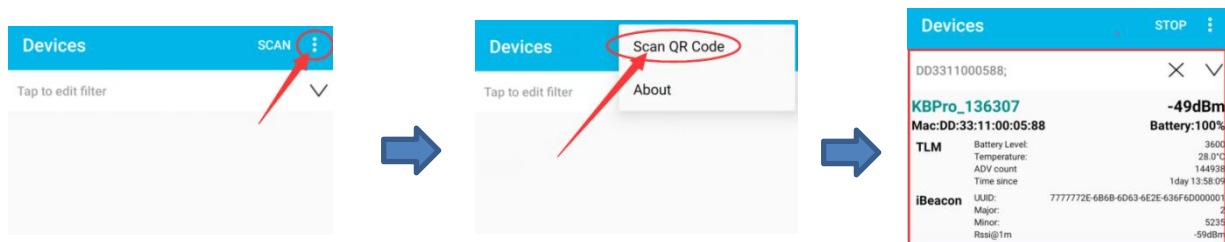
2.2 Connect KBeacon

Let's use a K9P (MAC: DD3311000588) to demonstrate, the MAC ID is printed on the device:



● Method 1: Scan QR code to connect

Run KBeaconPro App, Find 'Scan QR code' on the App, and then scan the QR code on the device to find this KBeacon device quickly.

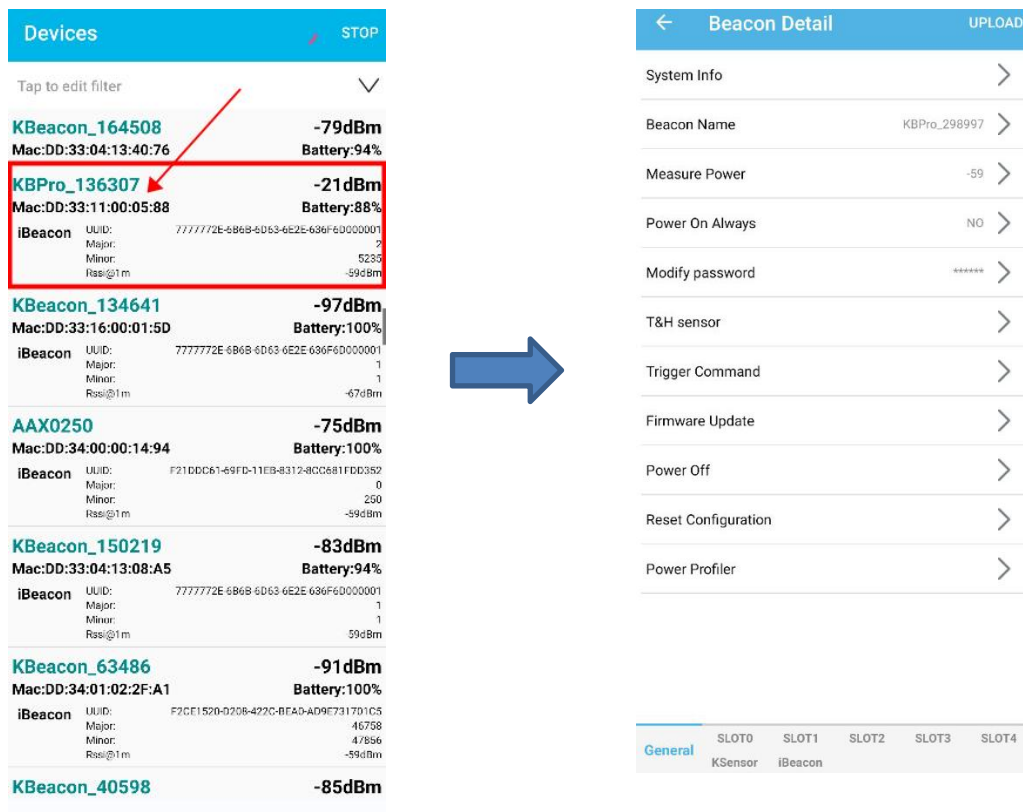


Reminder: iOS App filter the device by Device Name when use the 'Scan QR code' method. If the device name is not KBPro, the device can not be found on iOS App when scan the QR code.

● Method 2: Scan the Bluetooth signal to connect

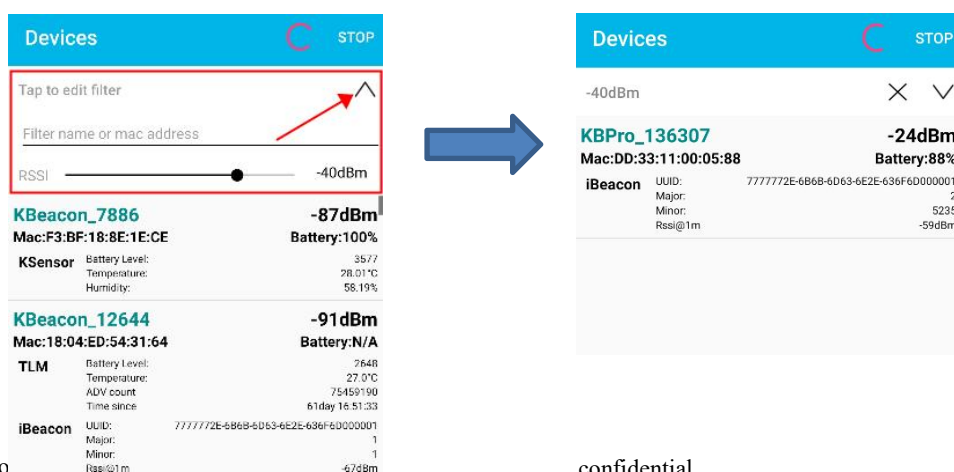
Run KBeaconPro App and tap 'SCAN' in the top right corner, the App can scan the device's Bluetooth signal, then the Beacon device will be displayed on the scan page.

Find the corresponding KBeacon device on the App according to its MAC ID, Tap it, it will start connecting and jump to the configuration page (see pictures below).



If there are too many devices found, filter by RSSI to find a certain Beacon quickly.

Put the KBeacon device close to your phone (within 10cm range). Slide the RSSI bar to set the RSSI value at -30~-40dBm, tap the arrow on the top right corner, then the nearest KBeacon can be found.

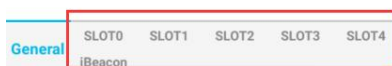
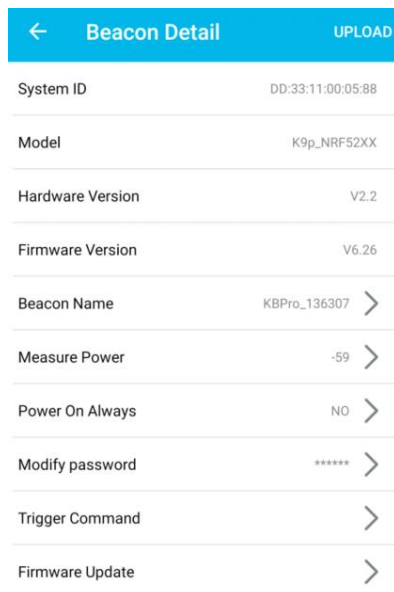


3. How to configure KBeacon

3.1 SLOT Definition

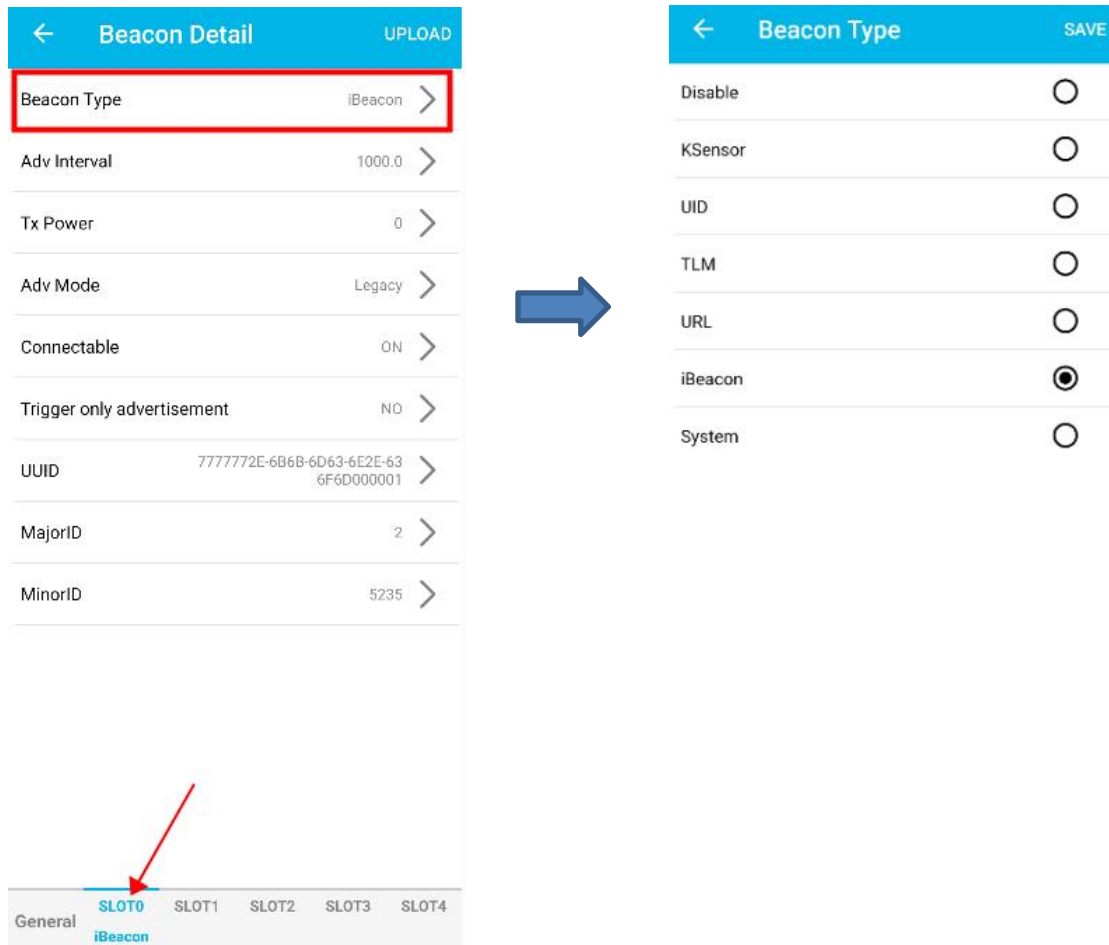
KBeacon supports total 5 SLOTS (SLOT0 to SLOT4). Each SLOT is independent and configurable. The Beacon type can be set for each SLOT. Beacon parameters such as Adv interval, Tx Power, Connectable enable/disable etc can be configured separately for each SLOT. They are independent of each other.

Each SLOT can be set to one Beacon type ONLY. For example, if you set SLOT0 to be iBeacon, set SLOT1 to be URL, set SLOT2 to be TLM, then the KBeacon device will broadcast iBeacon, URL and TLM simultaneously.



KBeacon supports the following Beacon types:

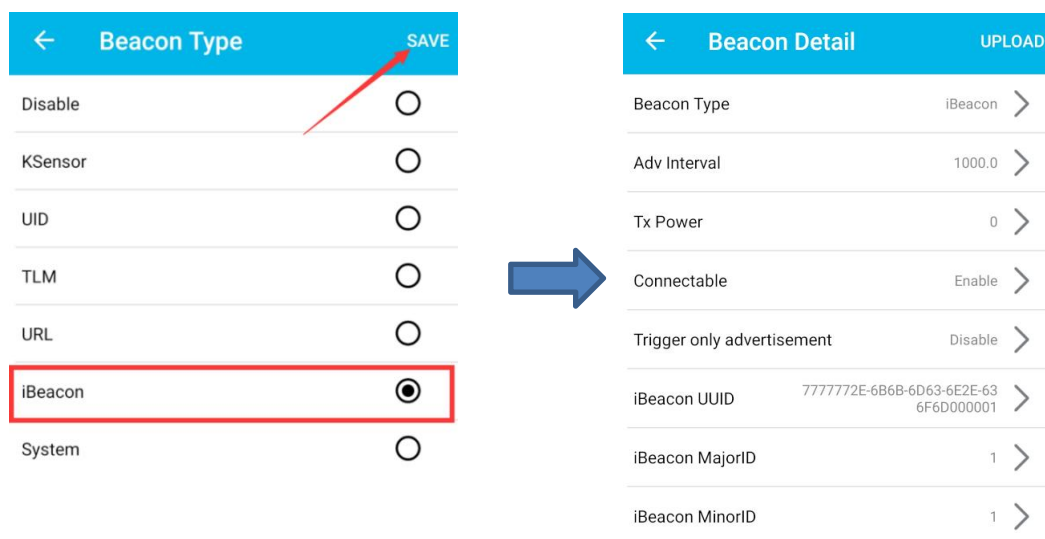
- **iBeacon**
- **Eddystone URL**
- **Eddystone UID**
- **Eddystone TLM**
- **KSensor:** KKM self-defined protocol, includes battery level and sensor information
- **System:** Including the KBeacon device info such as System ID (ie.MAC ID), Model name.



3.2 How to configure iBeacon and Eddystone

(Take iBeacon as an example)

Tap: Beacon Type—> iBeacon—> Save—> Return



iBeacon parameters (UUID, Major ID, Minor ID, Adv Interval, Tx power etc.) can also be configured in the App.

Eddystone URL, UID, TLM, can be configured by the same steps above.

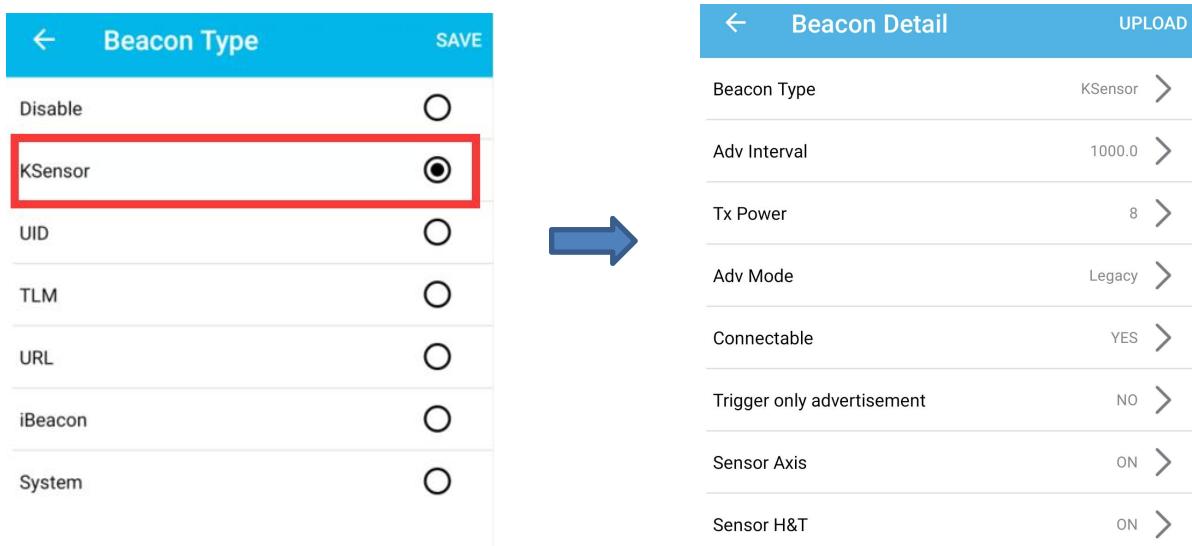
Reminder: After the parameters are modified, you need to tap: **UPLOAD** —> **OK**, then all the parameters configured can be loaded to the device successfully.



3.3 How to configure KSensor and System

KSensor is KKM self-defined protocol, it includes battery level and sensor information (for example temperature&humidity sensor, acceleration sensor etc).

Tap: Beacon Type—> KSensor—> Save—> Return

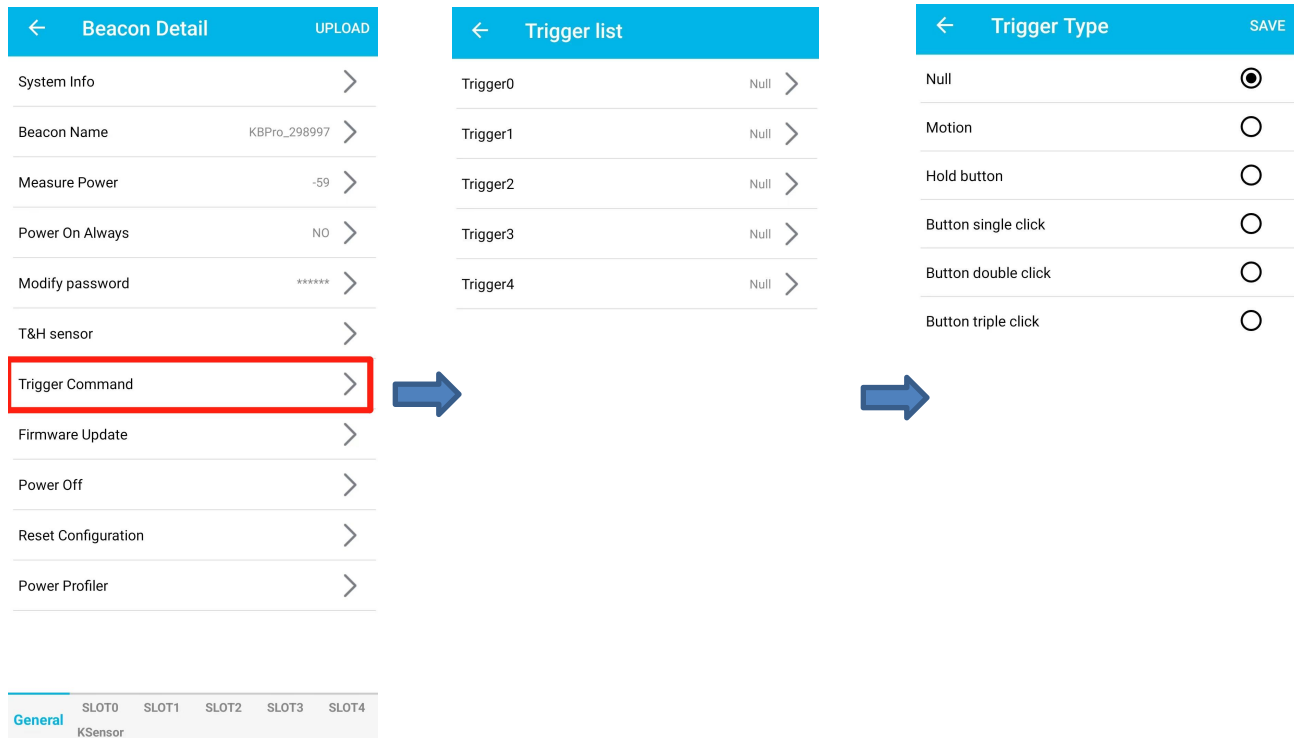


‘System’ can also be configured by the same steps above.

3.4 How to configure Trigger Command

Reminder: The Trigger Command function can be configured ONLY when the KBeacon device has a push button or has sensor such as accelerometer, temperature-humidity sensor.

Tap: Trigger Command—>Trigger Type



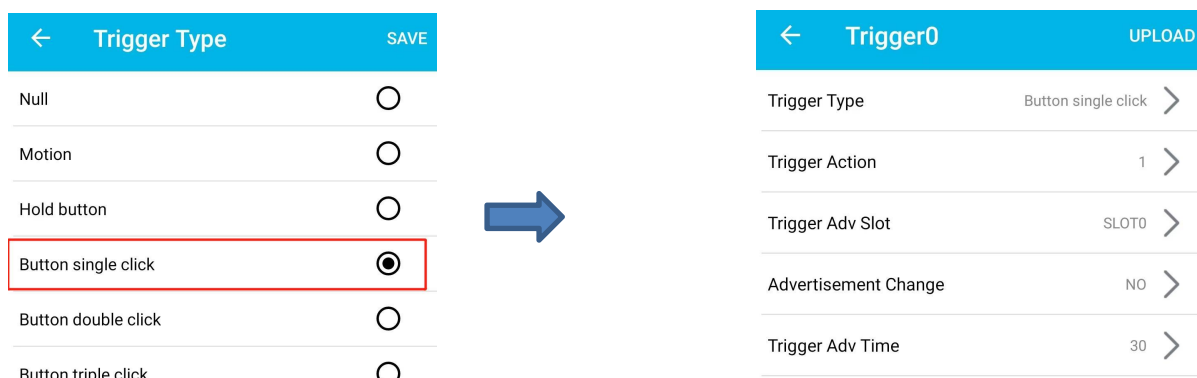
The diagram illustrates the navigation path for configuring the trigger command. It starts with the 'Beacon Detail' screen, where the 'Trigger Command' option is highlighted with a red box. A blue arrow points to the 'Trigger list' screen, which shows a list of triggers (Trigger0 to Trigger4) with 'Null' as the trigger type. Another blue arrow points to the 'Trigger Type' screen, which lists various trigger types: Null (selected with a radio button), Motion, Hold button, Button single click, Button double click, and Button triple click.

Beacon Detail		Trigger list		Trigger Type	
	UPLOAD				SAVE
System Info	>	Trigger0	Null >	Null	<input checked="" type="radio"/>
Beacon Name	KBPro_298997 >	Trigger1	Null >	Motion	<input type="radio"/>
Measure Power	-59 >	Trigger2	Null >	Hold button	<input type="radio"/>
Power On Always	NO >	Trigger3	Null >	Button single click	<input type="radio"/>
Modify password	***** >	Trigger4	Null >	Button double click	<input type="radio"/>
T&H sensor	>			Button triple click	<input type="radio"/>
Trigger Command	>				
Firmware Update	>				
Power Off	>				
Reset Configuration	>				
Power Profiler	>				

General SLOTO SLOT1 SLOTO2 SLOTO3 SLOTO4
KSensor

(Take 'Button single click' as an example)

Tap: Button single click—> Save—> Return



The diagram illustrates the configuration steps for the 'Button single click' trigger. It starts with the 'Trigger Type' screen, where 'Button single click' is selected with a radio button and highlighted with a red box. A blue arrow points to the 'Trigger0' configuration screen, which shows the following settings: Trigger Type (Button single click), Trigger Action (1), Trigger Adv Slot (SLOTO), Advertisement Change (NO), and Trigger Adv Time (30).

Trigger Type		Trigger0	
	SAVE		UPLOAD
Null	<input type="radio"/>	Trigger Type	Button single click >
Motion	<input type="radio"/>	Trigger Action	1 >
Hold button	<input type="radio"/>	Trigger Adv Slot	SLOTO >
Button single click	<input checked="" type="radio"/>	Advertisement Change	NO >
Button double click	<input type="radio"/>	Trigger Adv Time	30 >
Button triple click	<input type="radio"/>		

Return to the trigger page, and then you can see the trigger parameters such as Trigger Action, Trigger Adv Slot, Advertisement Change, Trigger Adv Time can be configured.

- **Trigger Action:** What the Beacon device would do when the trigger event happens

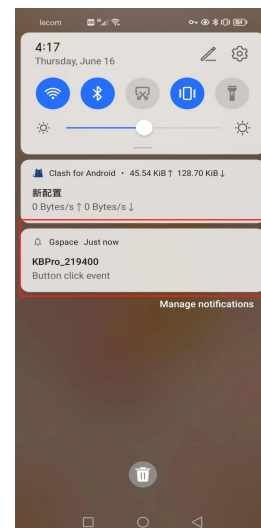
← Trigger Action		SAVE
Advertisement	<input checked="" type="checkbox"/>	
Device Alarm	<input type="checkbox"/>	
Record	<input type="checkbox"/>	
Report to app	<input type="checkbox"/>	

Notes:
 1. Check 'Advertisement' if you want the beacon start advertisement when trigger event happened.
 2. Check 'Report to app' if you want the beacon to send a notification to app when trigger event happened

If set "Report to app", there will be a message notification displayed on the cell phone when the trigger event happens.

← Trigger Action		SAVE
Advertisement	<input checked="" type="checkbox"/>	
Device Alarm	<input type="checkbox"/>	
Record	<input type="checkbox"/>	
Report to app	<input checked="" type="checkbox"/>	

Notes:
 1. Check 'Advertisement' if you want the beacon start advertisement when trigger event happened.
 2. Check 'Report to app' if you want the beacon to send a notification to app when trigger event happened



Trigger Adv Slot: Which SLOT the Beacon device would broadcast when the trigger event happens. For example, SLOT0 is set to be iBeacon, if 'Trigger Adv Slot' is set to be SLOT0, then when the Beacon button is single clicked, the Beacon will broadcast iBeacon.

← Trigger0		UPLOAD
Trigger Type	Button single click	>
Trigger Action	Advertisement	>
Trigger Adv Slot	Slot0	>
Advertisement Change	Disable	>
Trigger Adv Time	30	>



← Trigger Adv Slot		SAVE
Slot0	<input checked="" type="radio"/>	
Slot1	<input type="radio"/>	
Slot2	<input type="radio"/>	
Slot3	<input type="radio"/>	
Slot4	<input type="radio"/>	

- **Advertisement change:** When this feature is ON, the UUID will change when trigger event happens

← Advertisement Change SAVE

NO ☒

YES ☐

Note: When this feature is ON, the UUID will change when trigger event happened

- **Trigger Adv Time:** The Advertisement duration when trigger event happens

← Trigger Adv Time SAVE

30

Note: Advertisement duration when trigger event happened, the range is 2~7200 and the unit is second

- **Trigger only advertisement:** When this feature is set to be 'YES', this slot will be broadcasted only when the trigger happens.

For example. If you set 'Trigger Adv Slot' of 'Button single click' to be SLOT0, and SLOT0 is iBeacon, then iBeacon will be broadcasted only when the button single click happens

← Beacon Detail UPLOAD

Beacon Type iBeacon >

Adv Interval 1000.0 >

Tx Power 0 >

Adv Mode Legacy >

Connectable ON >

Trigger only advertisement NO >

UUID 7777772E-6B6B-6D63-6E2E-636F6D000001 >

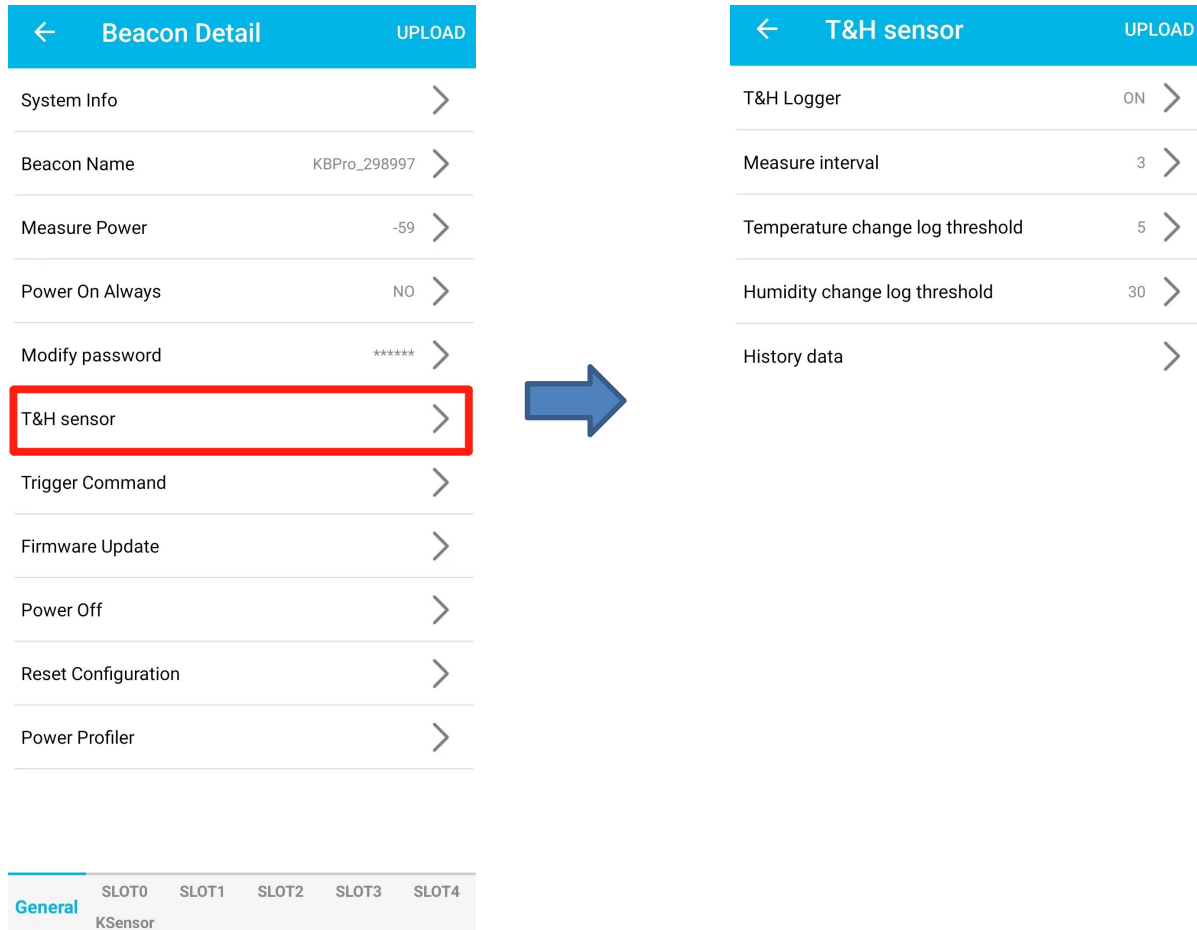
MajorID 2 >

MinorID 5235 >

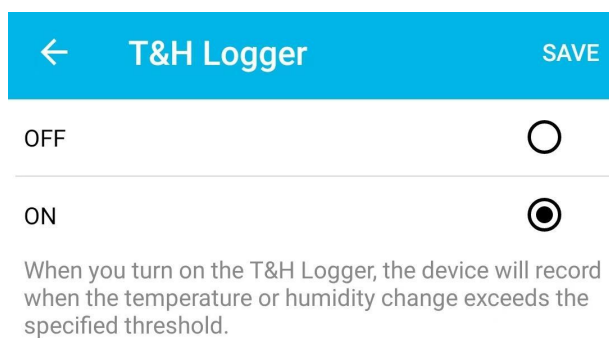
3.5 How to configure Sensor

For some KBeacon models with sensor, parameters can be configured.

- Temperature & Humidity Sensor (K23/K6P/K6PS/K6PB/K6PT)



T&H Logger: When this feature is on, the device will record when temperature/humidity change exceeds the threshold you set.



Measure interval: Time interval for measuring temperature and humidity.

←
Measure interval
SAVE

3

Notes, the valid measurement interval range is 1 ~ 200, and the unit is second

Temperature / Humidity change log threshold: If you set a value (take 5 as an example, it means 0.5 Celsius), the device will save the record if the difference between the current temperature / humidity and the last saved temperature / humidity greater or equal than 0.5 Celsius.

←
Temperature change lo...
SAVE

5

Notes, the valid range is from 0 ~ 200, and the unit is 0.1 Celsius.

The device will save the record if the difference between the current temperature and the last saved temperature greater or equal then this threshold.

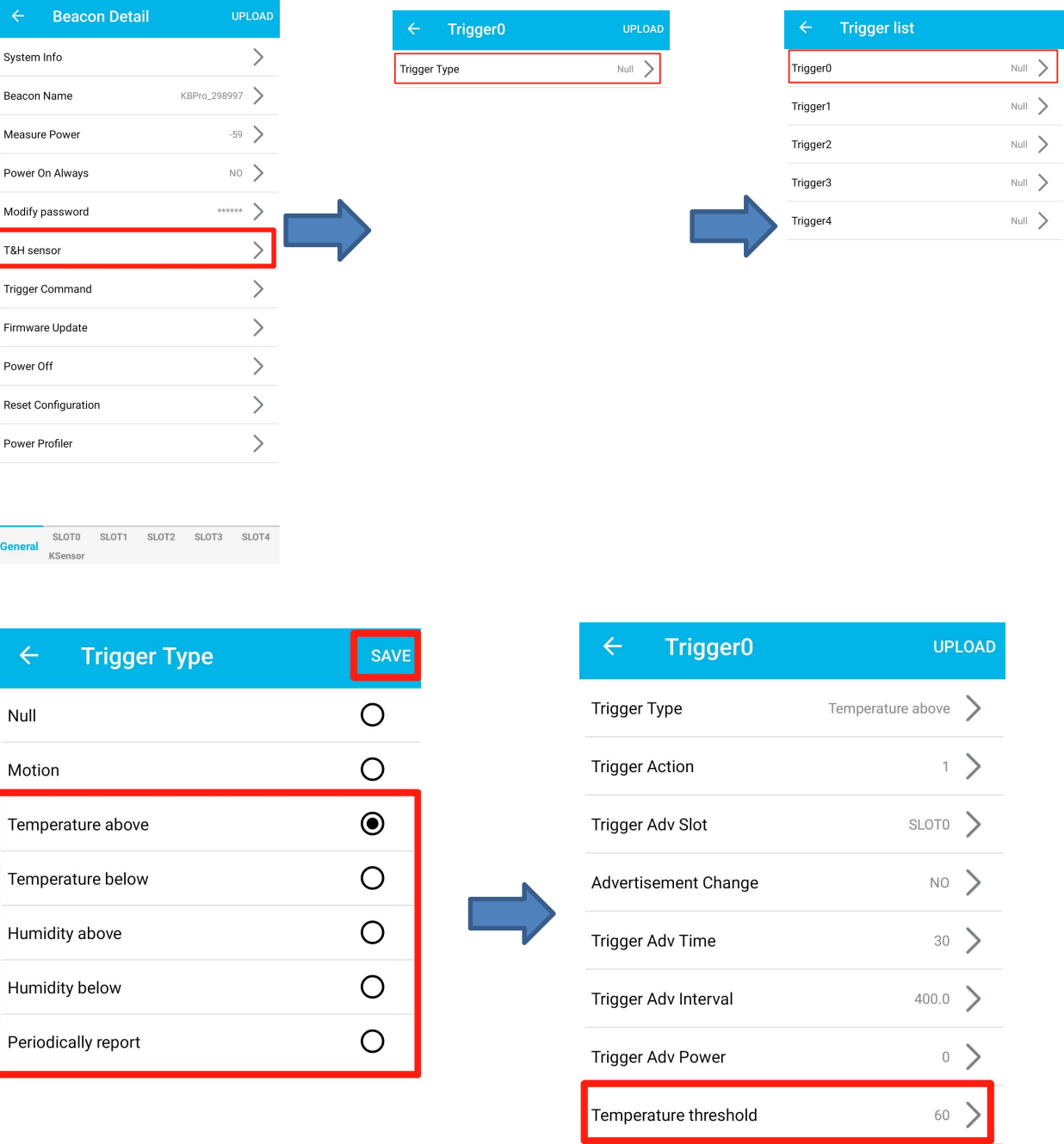
History data: The data can be loaded or cleared.

←	T&H history	EXPORT	⋮
2022-06-16 18:09:19	Temperature: 29.86°C Humidity: 70.31%		
2022-06-16 18:07:16	Temperature: 30.05°C Humidity: 67.04%		
2022-06-16 18:04:19	Temperature: 30.2°C Humidity: 70.14%		
2022-06-16 17:55:31	Temperature: 29.79°C Humidity: 71.45%		
2022-06-16 17:54:19	Temperature: 29.5°C Humidity: 74.47%		
2022-06-16 17:53:22	Temperature: 29.05°C Humidity: 74.84%		
2022-06-16 17:51:31	Temperature: 29.19°C Humidity: 71.2%		
2022-06-16 17:49:31	Temperature: 29.66°C Humidity: 69.17%		



←	T&H histo	Load All	Clear
2022-06-16 17:53:22	Humidity: 74.84%		
2022-06-16 17:51:31	Temperature: 29.19°C Humidity: 71.2%		
2022-06-16 17:49:31	Temperature: 29.66°C Humidity: 69.17%		
2022-06-16 17:38:39	Temperature: 29.89°C Humidity: 72.2%		
2022-06-16 17:24:45	Temperature: 29.65°C Humidity: 69.19%		
2022-06-16 17:21:39	Temperature: 29.77°C Humidity: 72.11%		
2022-06-16 17:16:39	Temperature: 29.63°C Humidity: 69.15%		
2022-06-16 17:01:15	Temperature: 29.31°C Humidity: 72.18%		

Trigger Command: The feature and setting is same as 3.4 except “Temperature threshold” in “Temperature/Humidity above/below”. If you set a value (take 60 as an example, it means 6 Celsius), when the temperature is above 6 Celsius the trigger event happens.



←

Temperature threshold

SAVE

60

Notes, the valid range is from -50 ~ 1000, and the unit is 1 Celsius.



←

Trigger0

UPLOAD

Trigger Type	Temperature above	>
Trigger Action	1	>
Trigger Adv Slot	SLOT0	>
Advertisement Change	NO	>
Trigger Adv Time	30	>
Trigger Adv Interval	400.0	>
Trigger Adv Power	0	>
Temperature threshold	60	>

Click “Save” and return, then click “Upload”.

● Cutoff Sensor (S1)

←

Beacon Detail

UPLOAD

System Info	>
Beacon Name	KBPro_299037 >
Measure Power	-59 >
Power On Always	NO >
Modify password	***** >
Cutoff sensor	>
Trigger Command	>
Firmware Update	>
Power Off	>
Reset Configuration	>
Power Profiler	>



←

Cutoff sensor

UPLOAD

Disable Period0	00:00 ~ 00:00	>
Disable Period1	00:00 ~ 00:00	>
Disable Period2	00:00 ~ 00:00	>
History data	>	

General

SLOT0

SLOT1

SLOT2

SLOT3

SLOT4

KSensor

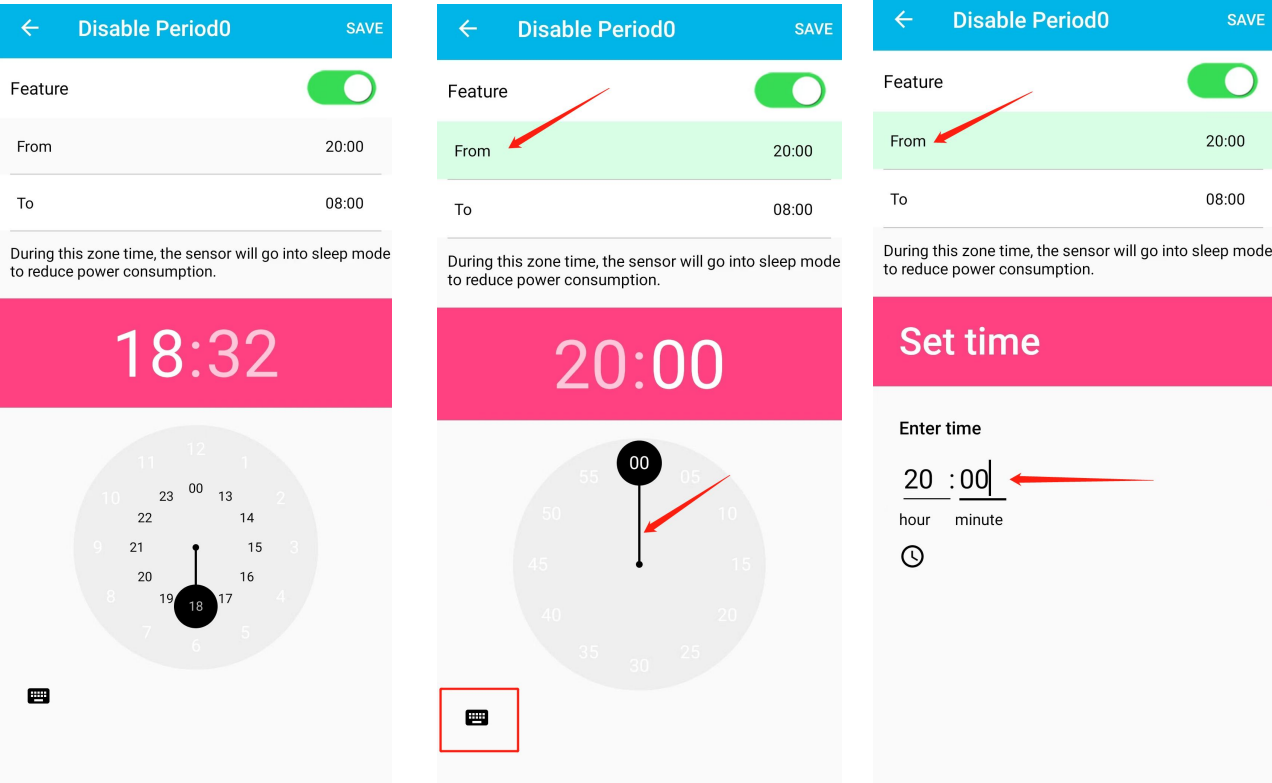
Cutoff 0 means S1 is installing well and closed;

Cutoff 1 means S1 is installing well and opened;

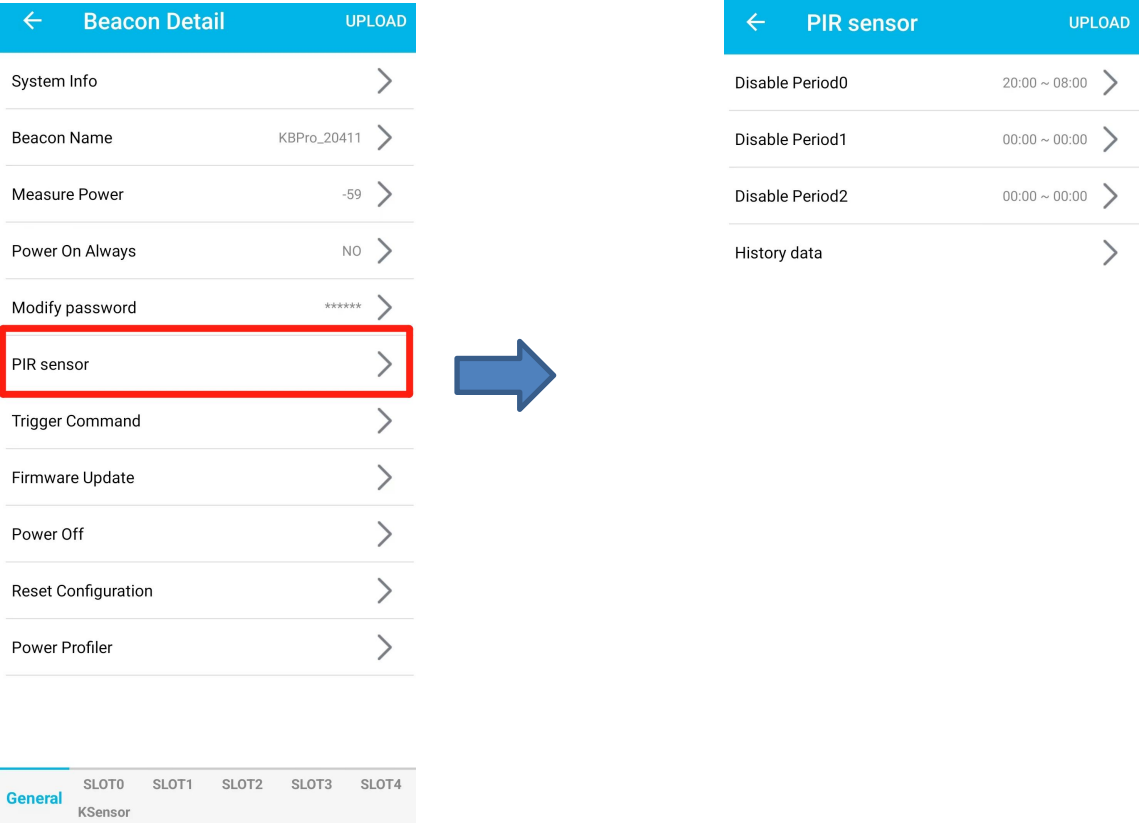
Cutoff 2 means S1 is not installing well and closed, the black button (at the bottom of the device) didn't press down;

Cutoff 3 means S1 is installing well and opened, the black button didn't press down.

Disable Period: When this feature is on, you can set the time period of sleep mode by turning the hour hand and minute hand, or input the time through the keyboard.



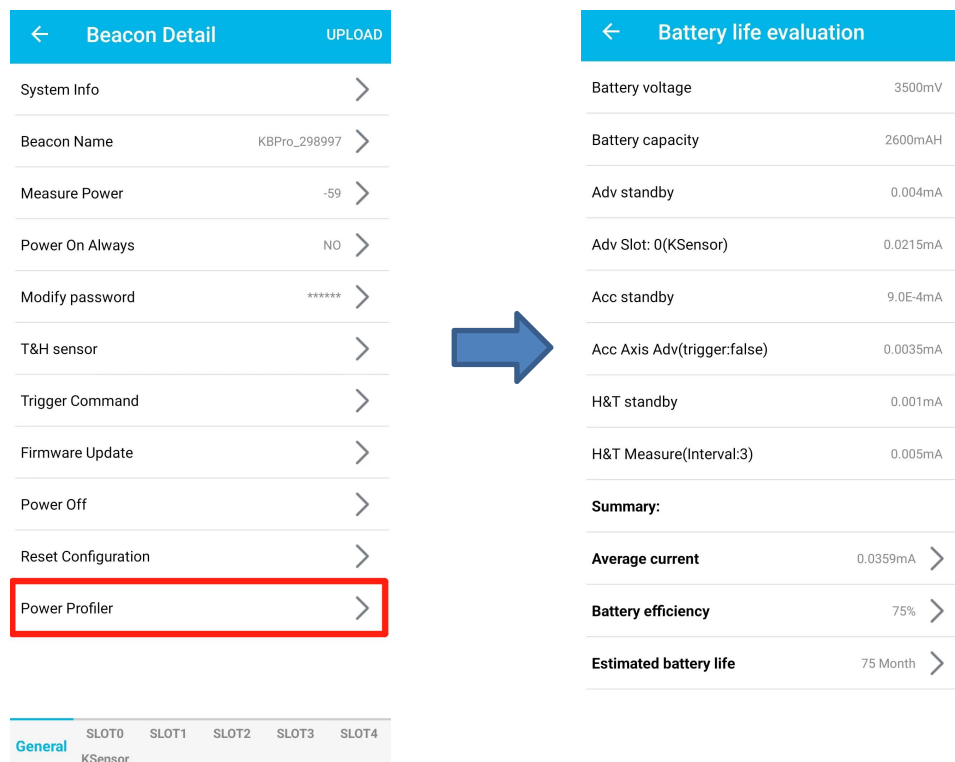
● PIR Sensor (S2)



The configuration is same as “Cutoff Sensor”.

3.6 How to evaluate battery life

KBeaconPro supports evaluating the battery life of beacon according to the configured parameters.



Average current: The average current of the device is based on the current configuration parameters, and is calculated after the device is powered on for 30 seconds for current stabilizes. The average current does not include power consumption by trigger broadcasting. Also, it does not include the power consumption when the device was connected.

Battery efficiency: Usually the battery capacity is based on the ideal 1mA discharge model at room temperature. In actual use, the capacity of the battery is related to temperature, current and self-discharge. We recommend 75%.

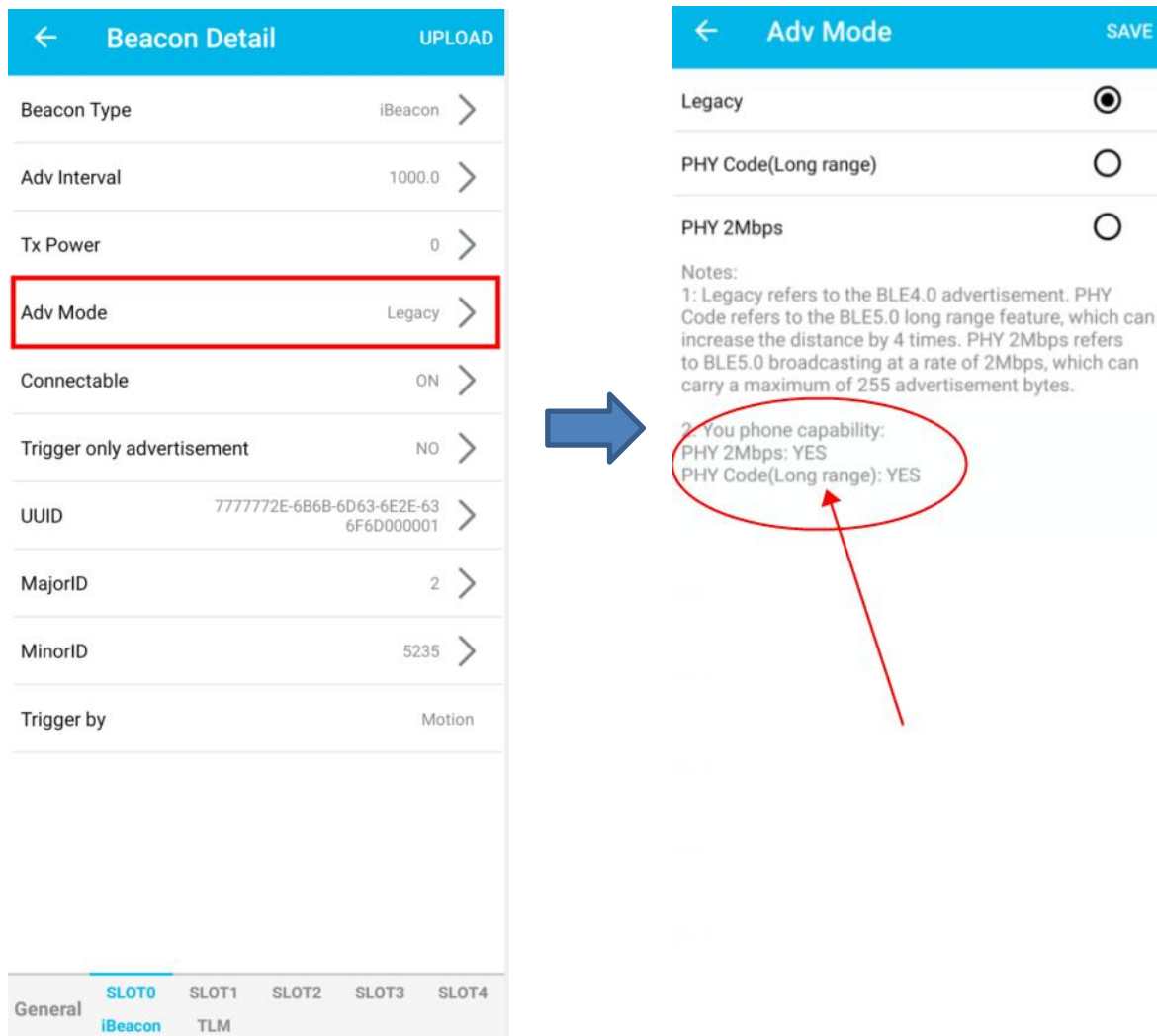
Estimated battery life: Estimated battery life = Battery capacity * Battery efficiency/ Average current/24(hours)/30(days)

3.7 How to configure Adv Mode

For some KBeacon models that support BLE5.0 long range feature, 'Adv Mode' can be configured.

- **Legacy:** BLE 4.0 advertisement
- **PHY Code:** BLE 5.0 long range feature
- **PHY 2Mbps:** BLE5.0 broadcasting at a rate of 2Mbps

KBeaconPro App can detect which Adv Mode your phone support (Only supported on Android phones).



Reminder:

Please make sure that your phone supports BLE 5.0 PHY Code(Long range) feature, otherwise you will not be able to scan the PHY code advertisement if the Beacon was set to PHY Code(Long range) Mode.

If you set the Beacon to PHY code advertisement, and your phone doesn't support PHY Code broadcast, you can force the device to enter the Legacy mode for 30 seconds by single click the button of the device.

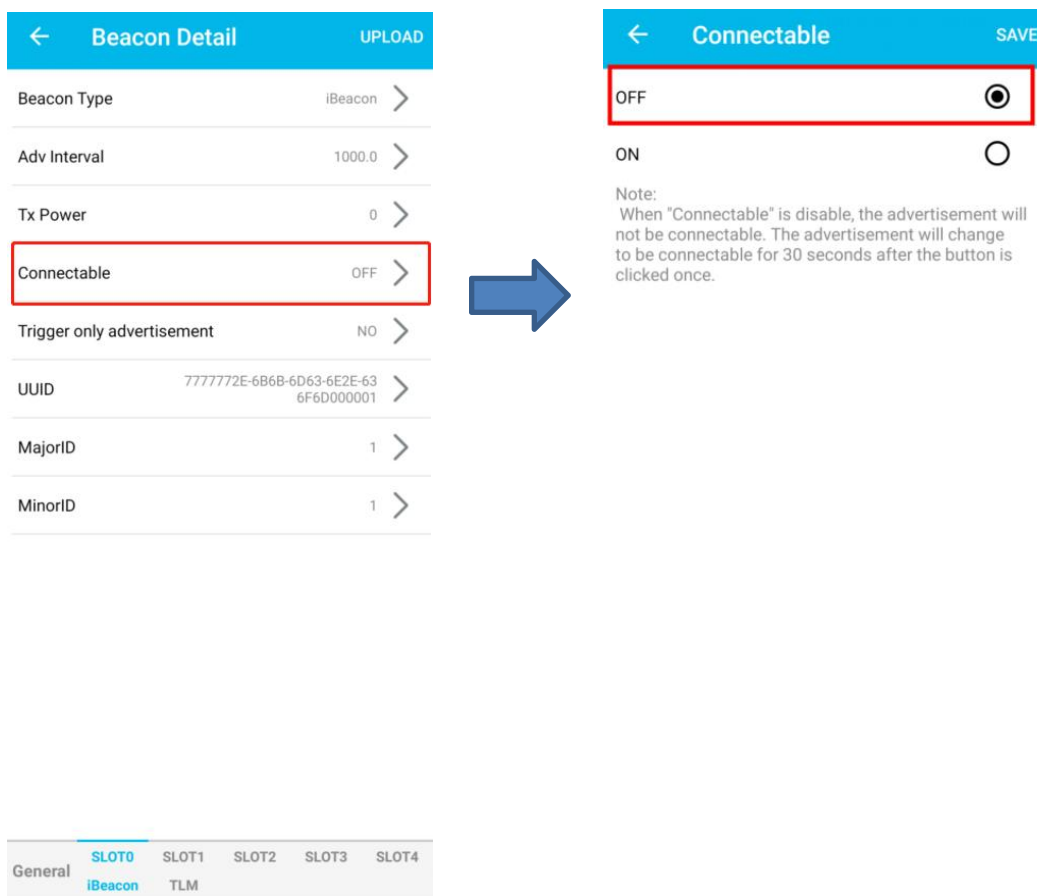
4. Other settings

4.1 Unconnectable mode

Each SLOT has two different advertising status, connectable mode and unconnectable mode. Only when the advertising status is connectable, the KBeacon is configurable. But the unconnectable mode saves about 10% -20% power consumption than connectable mode.

After the KBeacon is deployed, we recommend setting the KBeacon to be unconnectable mode. This can lower battery power consumption and the Beacon also have better security performance.

How to set unconnectable mode: Tap: Connectable—> OFF—> Save—>Return —>UPLOAD.



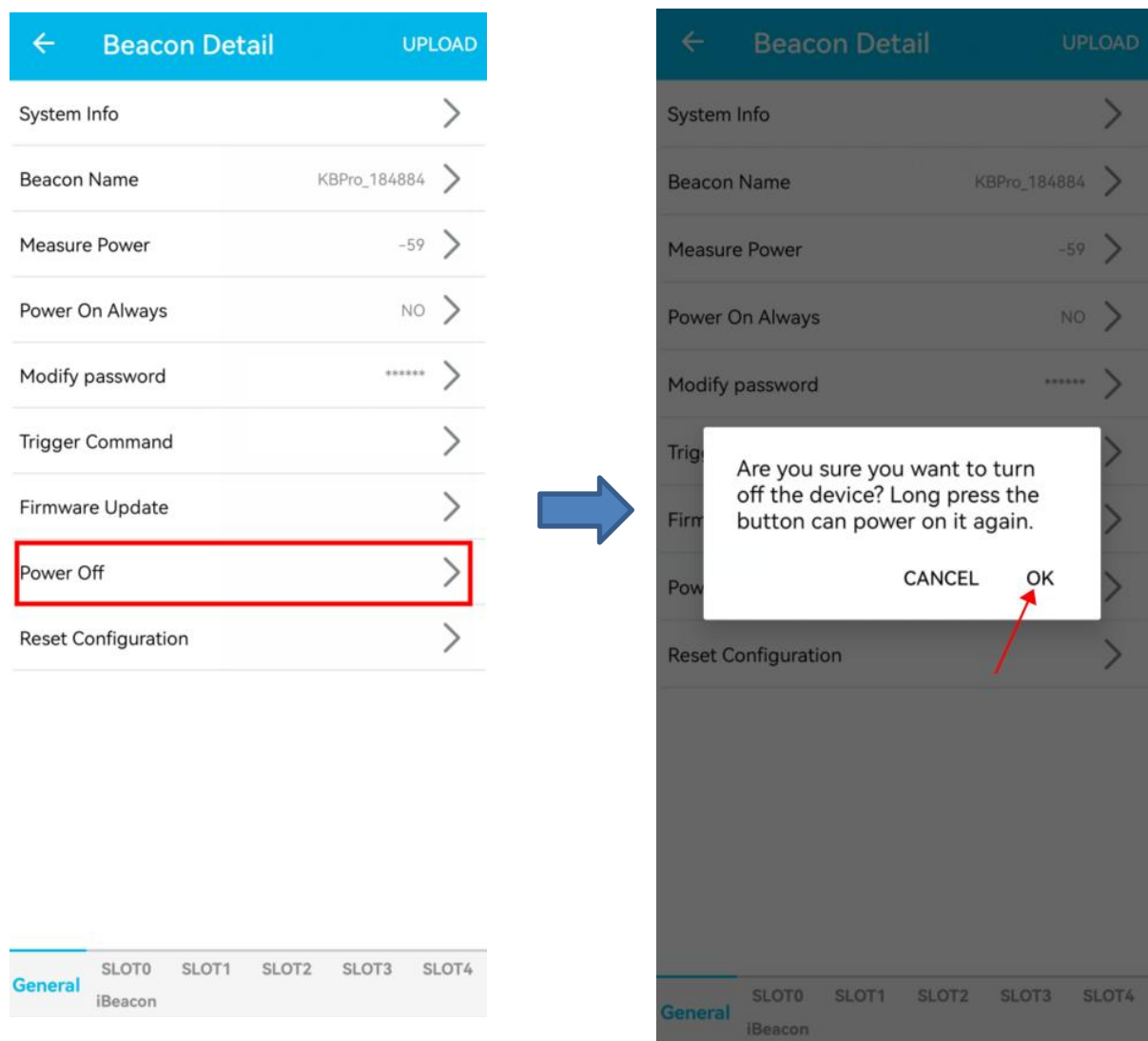
Question: How can I configure KBeacon again if it was set to be unconnectable mode?

- For KBeacon with button: click the button, the Beacon will enter a connectable mode for 30 seconds, users can connect the device within these 30s. Or re-install battery.
- For KBeacon without button: Re-install battery
- **Reminder: For the KBeacon device that doesn't have button and whose battery can not be re-installed, once the device was set to unconnectable mode, it can not be configured any more!**

4.2 Power Off

For KBeacon device WITH BUTTON, you can use the App to turn off the device.

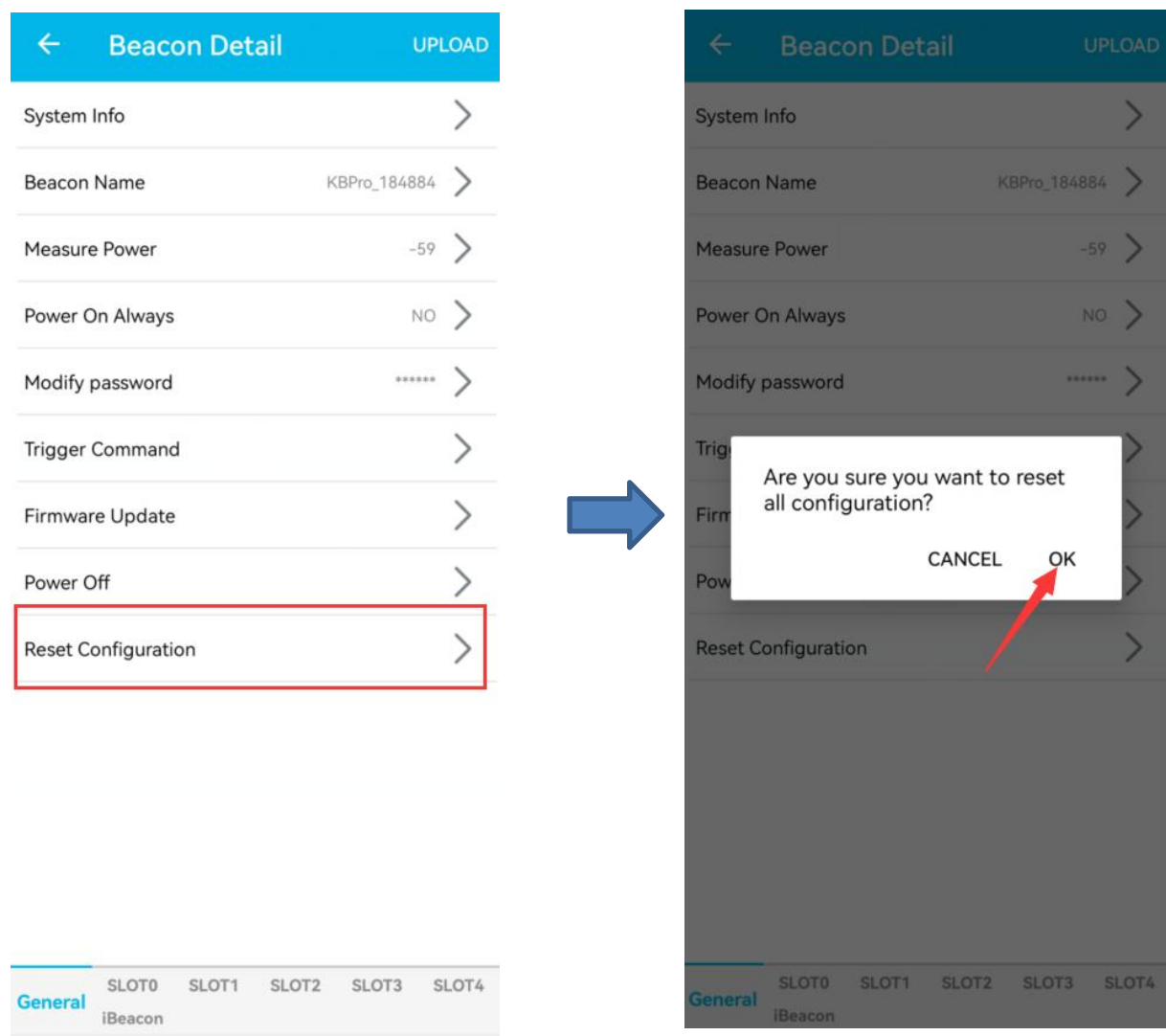
Tap: Power Off—> OK



4.3 Reset configuration

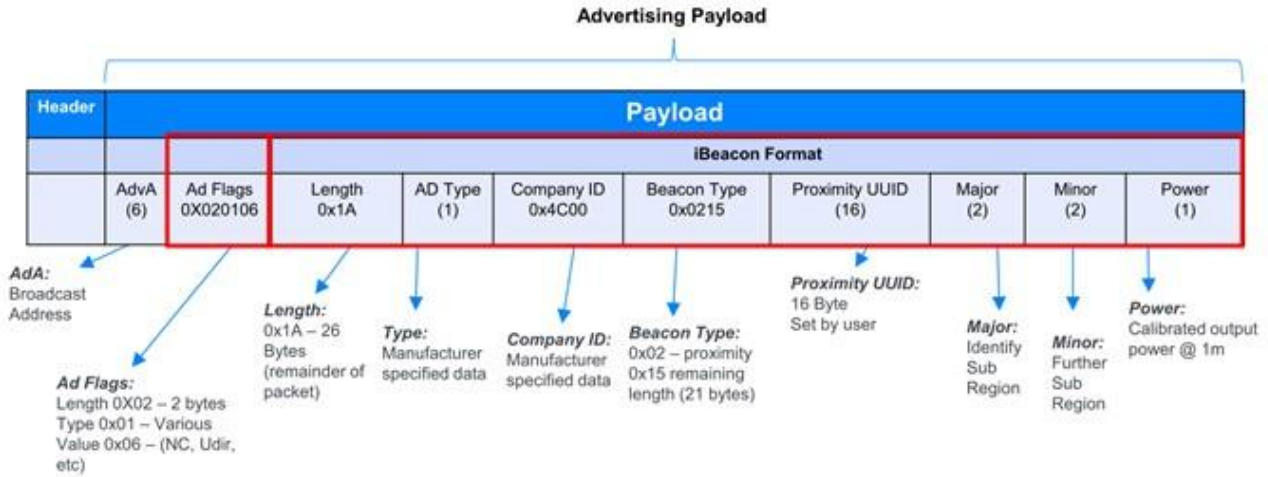
You can reset the KBeacons setting to factory default configuration on the App.

Tap: Reset configuration—> OK



5. KBeacon payload

● iBeacon payload struct



How to calculate distance from iBeacon signal:

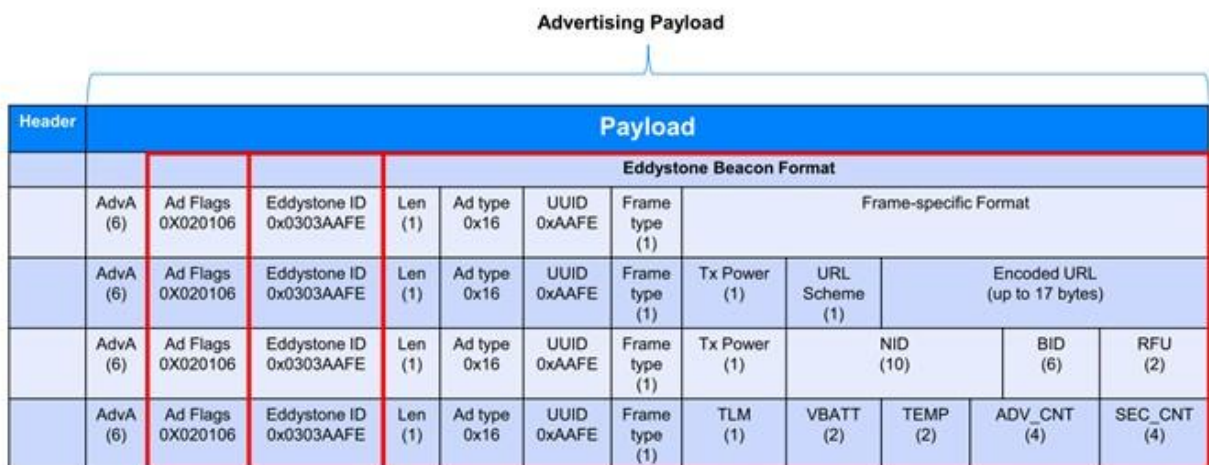
Formula:

$$\text{distance} = 10^{((\text{abs(RSSI)} - \text{abs(Calibrated Power)}) / (10 * n))}$$

And:

- ◆ RSSI: received rssi on phone
- ◆ Calibrated Power: Calibrated power at 1 meters
- ◆ n: environment factor, typical value is 2.0

● Eddystone payload struct



URL – Physical Web

UID – Broadcasts Unique beacon ID

TLM – Broadcasts telemetry (health and status)

● KSensor payload struct

1. The advertising data packet of KSensor is defined by KKM. Please refer to the following table for details.

Offset	Length	Type	value
0	1byte	AdvA	0x6
1	3byte	AdvFlags	0x020106
4	4byte	ID	0x0303AAFE
8	1byte	Length	
9	1byte	Adv type	0x16
10	2byte	UUID	0xAAFE
12	1byte	Frame Type	0x21
13	1byte	Version tag	0x1
14	1byte	Sensor mask	0bit: voltage; 1bit:temp 2bit: humidty 3bit: acc 4bit: cutoff 5bit: PIR indication 6~7bit: reserved
15	2byte	Voltage	big-endian battery voltage, unit is mV
17	2byte	Temperature	Exist if temp bit set 1. Temperature, Fixed Point 8.8 format
19	2byte	Humidity	Exist if humidty bit set 1. Temperature, Fixed Point 8.8 format
21	2byte	Acc axis X pos	Exist if acc bit was set 1. big-endian axis X, unit is mg
23	2byte	Acc axis Y pos	Exist if acc bit was set 1. big-endian axis Y, unit is mg
25	2byte	Acc axis Z pos	Exist if acc bit was set 1. big-endian axis Z, unit is mg
27	1byte	cutoff flag	Exist if cutoff bit was set 1. bit0: 1 device was cutoff bit1: 1 device was plug, 0 normal
28	1byte	PIR flag	Exist if PIR indication bit was set 1. 1: The human body is detected

Remark:

- The uint of battery is mV. For example, if the VBATT is 3270, it means the battery voltage is 3270mV;
- Temperature. 2 bytes Fixed Point 8.8. The format is same as temperature in Eddystone TLM.

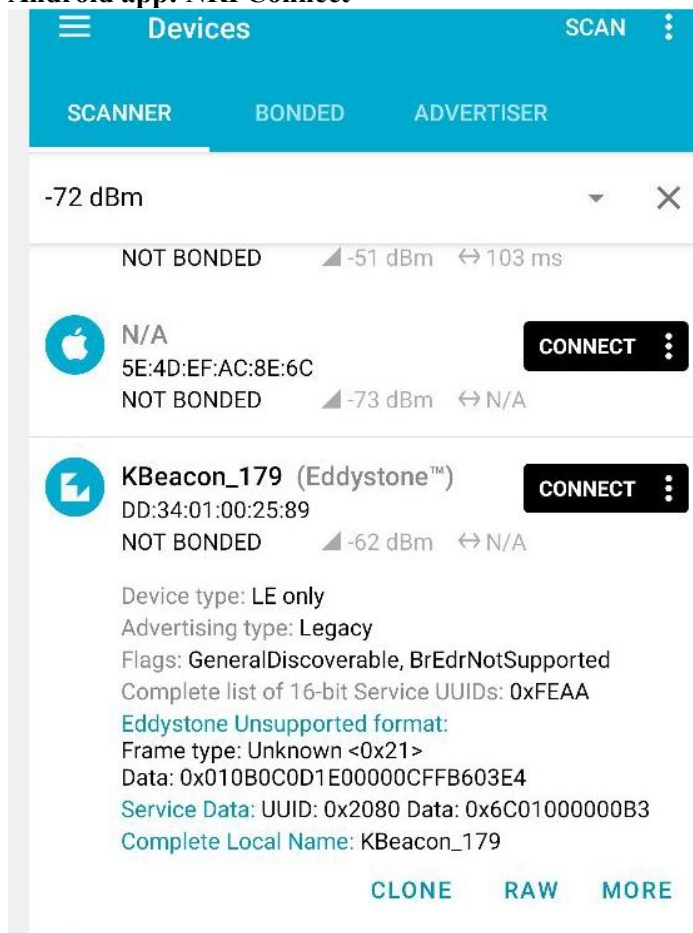
- Humidity. 2 bytes Fixed Point 8.8. The format is same as temperature in Eddystone TLM.

The Fixed Point 8.8 format:

<http://people.ece.cornell.edu/land/courses/ece4760/>

Example for KSensor Data.

Android app: NRFConnect



2. System advertisement Data Format

The advertising data packet of System is defined by KKM. Please refer to the following table for details.

Offset	Length	Type	value
0	1byte	AdvA	0x6
1	3byte	AdvFlags	0x020106
4	4byte	ID	0x0303AAFE
8	1byte	Length	
9	1byte	Adv type	0x16
10	2byte	UUID	0xAAFE
12	1byte	Frame Type	0x22
13	1byte	Model ID	Device model ID

14	1byte	Battery	Battery Precent
15	6byte	Mac address	big-endian
21	2byte	Software version	big-endian format. For example if the value is 0x0632, then version is V6.49

Model ID define:

- K1: 10
- K11: 11
- K12: 12
- B1: 13
- U1: 14
- F1: 15
- K18: 18
- K15a: 16
- K15:19
- S1: 17

- K21: 21
- B2: 22
- K21u:25
- S2:26
- K23: 23
- K23p: 24

- K3: 30
- W3: 38
- S3: 36

- K4: 40
- K41:41
- K4u: 45
- K4p: 47
- W4: 48
- K4pt: 49
- S4: 46

- K5: 50
- K51: 51

- W52: 52
- K5p: 57
- K5pt: 58

- K6: 60
- K61: 61
- K6p: 67
- K6pb: 68
- K6ps: 69

- K7: 70
- K71: 71
- K7u: 75
- W7: 78

- K8: 80
- K8u: 85
- W8:86
- W8u:87

- K9: 90
- K91: 91
- K9P: 97
- K9Pb: 98

- P1:101
- B1u:102
- P2: 102