Smart Button

Featuring LoRaWAN®

IOT-S500BT

User Guide

Contents

1. Product Introduction

1.1 Overview

IOT-S500BT is a LoRaWAN® based smart button for wireless controls, triggers and alarms. IOT-S500BT supports multiple press actions, all of which can be defined by the user to control devices or trigger scenes. Besides, Linovision also provides a red button version that is primarily used for emergency situation. Compact and battery-powered, IOT-S500BT is easy to install and carry everywhere. IOT-S500BT can be widely used in smart homes, smart offices, hotels, schools, etc.

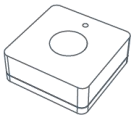
Sensor data are transmitted in real-time using the standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distances while consuming very little power. The user can get alarm through Linovision IoT Cloud or through the user's own Application Server.

1.2 Features

- Up to 15 km communication range
- Easy configuration via NFC
- Standard LoRaWAN® support
- Milesight IoT Cloud compliant
- Support multiple press actions to control devices, trigger a scene or send emergency alarms
- Compact design, easy to install or carry
- Built-in LED indicator and buzzer for press actions, network status, and low battery indication

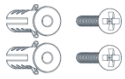
2. Hardware Introduction

2.1 Packing List



1 ×

WS101 Sensor



2 ×

Wall Mounting Kits

1 ×

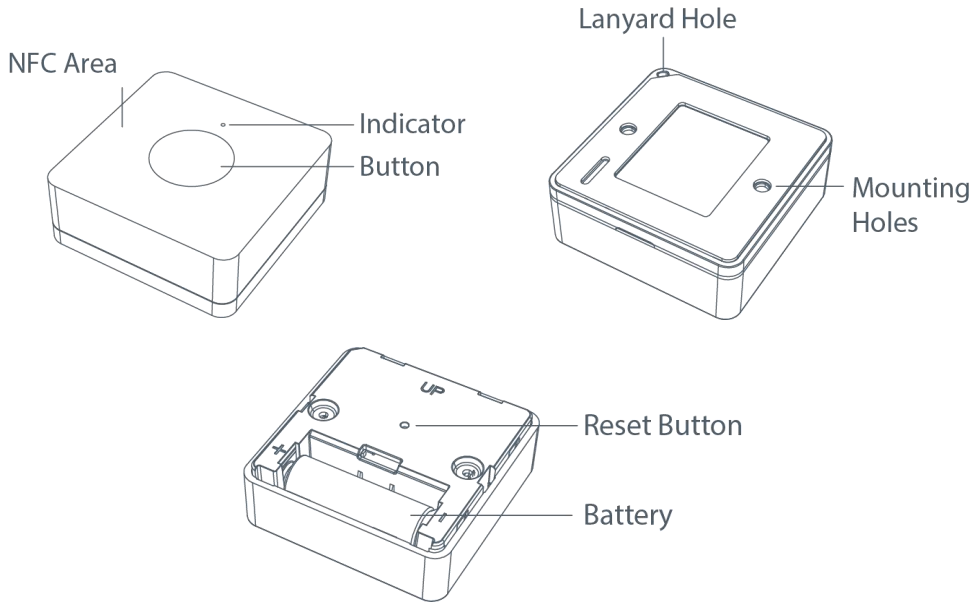
3M Tape

1 ×

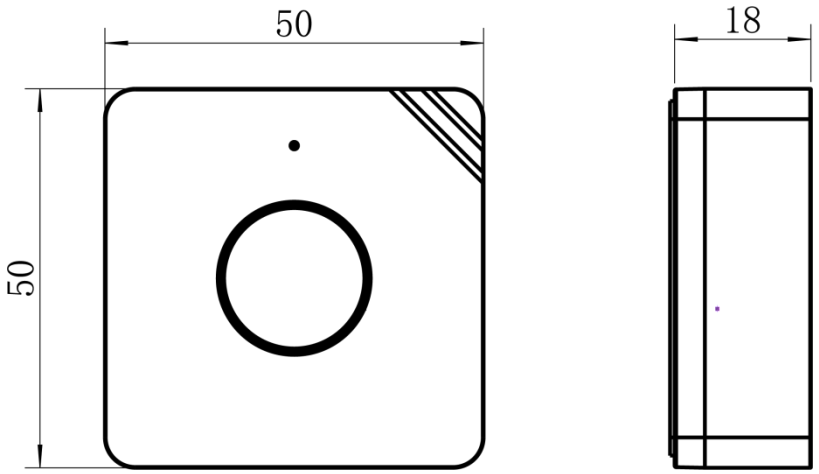
Quick Guide

If any of the above items is missing or damaged, please contact your sales representative.

2.2 Hardware Overview



2.3 Dimensions (mm)



2.4 LED Patterns

IOT-S500BT equips with a LED indicator to indicate the network status and reset button features. Besides, when button is pressed, the indicator will light up at the same time. Red indicator means network is unregistered, while green indicator means device has registered on network.

Function	Action	LED Indicator
Network Status	Send join network requests	Red, blinks once
	Joined the network successfully	Green, blinks twice
Reboot	Press and hold the reset button for more than 3s	Slowly blinks
Reset to Factory Default	Press and hold the reset button for more than 10s	Quickly blinks

3. Operation Guide

3.1 Button Mode

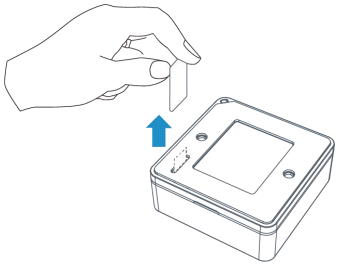
IOT-S500BT provides 3 kinds of pressing actions allowing users to define different alarms. Please refer to chapter 5.1 for detailed message of every action.

Mode	Action
Mode 1	Short press the button (≤3 seconds).
Mode 2	Long press the button (>3 seconds).
Mode 3	Double press the button (press interval is within 3 seconds).

3.2 NFC Configuration

IOT-S500BT can be configured via NFC-enabled smartphone.

1. Pull out the battery insulating sheet to power on the device. The indicator will light up in green for 3 seconds when device turns on.



2. Download and install “ToolBox” App from Google Play or App Store.
3. Enable NFC on the smartphone and open ToolBox.
4. Attach the smartphone with NFC area to the device to read device information.

5. Basic information and settings of devices will be shown on ToolBox if it’s recognized successfully. You can read and configure the device by tapping the Read/Write button on the App. In order to protect the security of devices, password validation is required when first configuration. The default password is **123456**.

Note:

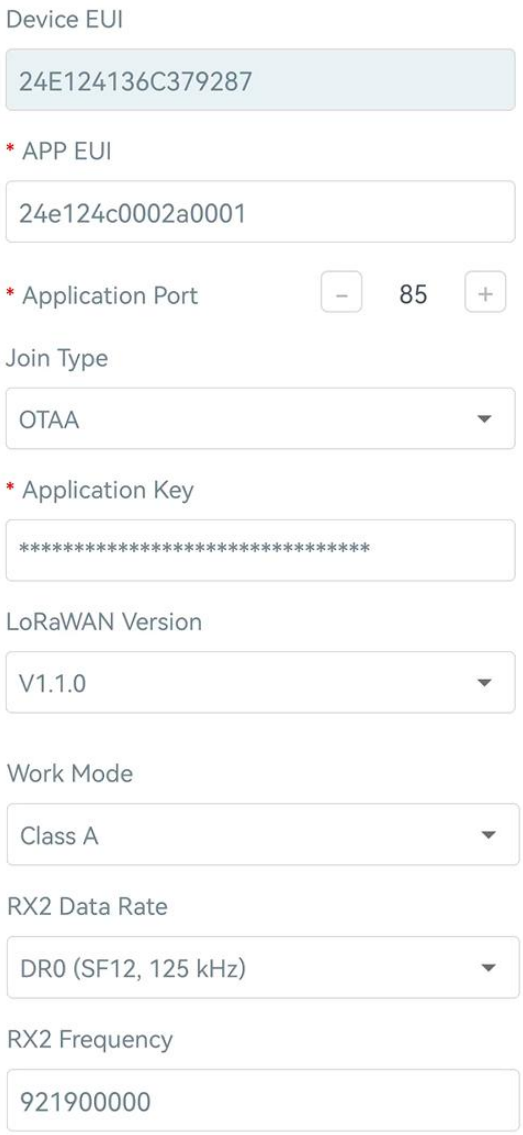
1) Ensure the location of smartphone NFC area and it's recommended to take off phone case.
2) If the smartphone fails to read/write configurations via NFC, move the phone away and backto try again.
3) IOT-S500BT can also be configured by ToolBox software via dedicated NFC reader provided by Linovision IoT, you can also configure it via TTL interface inside the device.

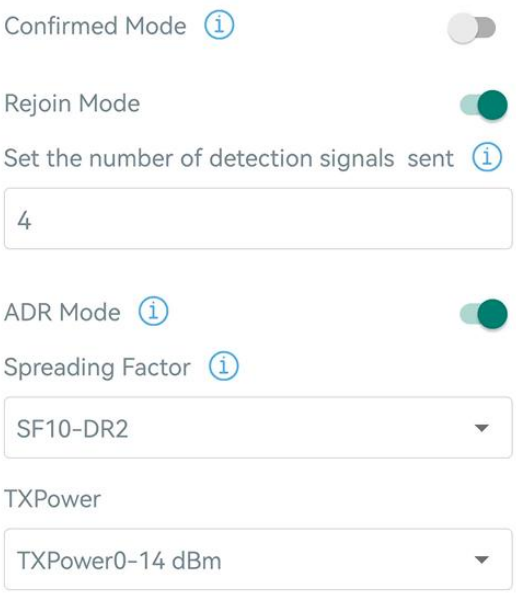
3.3 LoRaWAN Settings

LoRaWAN settings are used for configuring the transmission parameters in LoRaWAN® network.

Basic LoRaWAN Settings:

Go to **Device > Setting > LoRaWAN Settings** of ToolBox App to configure join type, App EUI, App Key and other information. You can also keep all settings by default.





Parameters	Description
Device EUI	Unique ID of the device which can also be found on the label.
App EUI	Default App EUI is 24E124C0002A0001.
Application Port	The port used for sending and receiving data, default port is 85.
Join Type	OTAA and ABP modes are available.
Application Key	Appkey for OTAA mode, default is 5572404C696E6B4C6F52613230313823.
Device Address	DevAddr for ABP mode, default is the 5th to 12th digits of SN.
Network Session Key	Nwkskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Application Session Key	Appskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
LoRaWAN Version	V1.0.2, V1.0.3, V1.1 are available.
Work Mode	It's fixed as Class A.
RX2 Data Rate	RX2 data rate to receive downlinks or send Milesight D2D commands.
RX2 Frequency	RX2 frequency to receive downlinks or send Milesight D2D commands. Unit: Hz
Spread Factor	If ADR is disabled, the device will send data via this spread factor.
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend data once.
Rejoin Mode	Reporting interval ≤ 30 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every 30 mins to validate connectivity; If there is no response, the device will re-join the network.

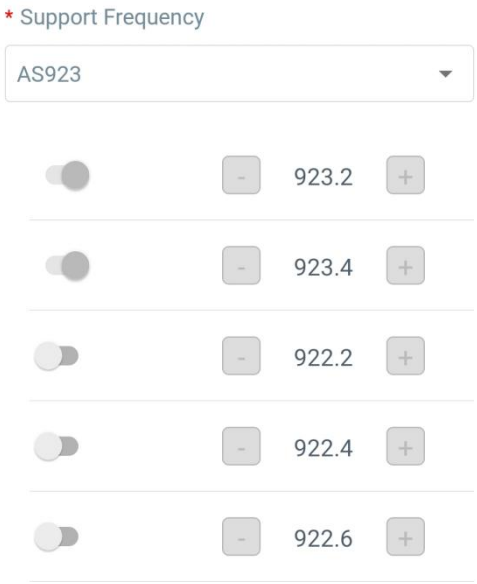
	Reporting interval > 30 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval to validate connectivity; If there is no response, the device will re-join the network.
Set the number of packets sent	When rejoin mode is enabled, set the number of LinkCheckReq packets sent.
ADR Mode	Allow network server to adjust datarate of the device.
Tx Power	Transmit power of device.

Note:

1) Please contact sales representative for device EUI list if there are many units.
2) Please contact sales representative if you need random App keys before purchase.
3) Select OTAA mode if you use Milesight IoT Cloud to manage devices.
4) Only OTAA mode supports rejoin mode.

LoRaWAN Frequency Settings:

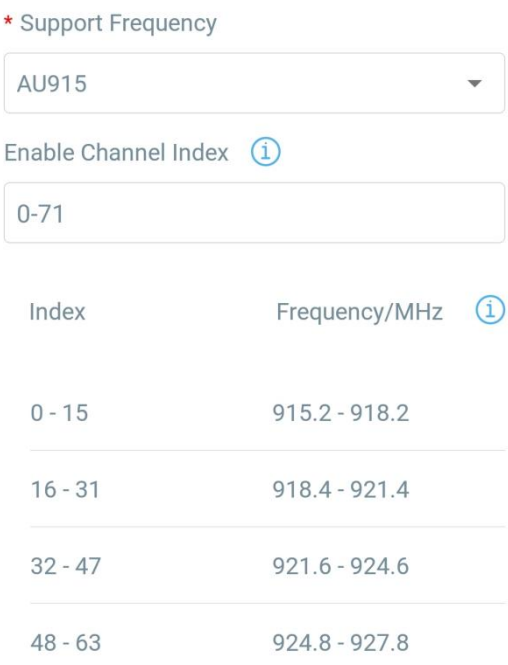
Go to **Setting > LoRaWAN Settings** of ToolBox App to select supported frequency and select channels to send uplinks. Make sure the channels match the LoRaWAN® gateway.



If device frequency is one of CN470/AU915/US915, you can enter the index of the channel that you want to enable in the input box, making them separated by commas.

Examples:

1, 40: Enabling Channel 1 and Channel 40
1-40: Enabling Channel 1 to Channel 40
1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60
All: Enabling all channels
Null: Indicates that all channels are disabled



Note:

For -868M model, default frequency is EU868;

For -915M model, default frequency is AU915.

3.4 General Settings

Go to **Device > Setting > General Settings** of ToolBox App to change the reporting interval, etc.

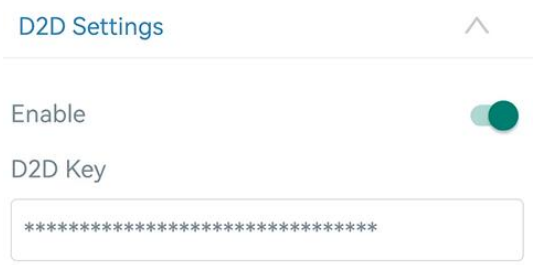
Parameters	Description
Reporting Interval	Reporting interval of battery level to network server. Default: 1080min, Range: 1-1080 mins
LED Indicator	Enable or disable the light indicating in chapter 2.4. Note: The indicator of reset button is not allowed to disable.
Buzzer	The buzzer will be triggering together with indicator if the device is registered to network.
Double Press	Enable or disable double press mode.

	Note: If double press is disabled, double press settings under Milesight D2D will also be hidden.
Change Password	Change the password for ToolBox App to write this device.

3.5 Milesight D2D Settings

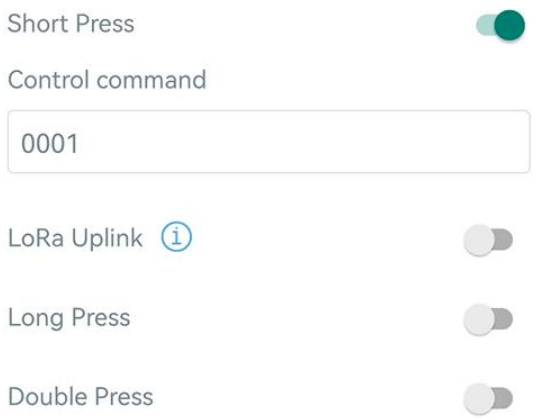
Milesight D2D protocol is developed by Milesight and used for setting up transmission among Milesight devices without gateway. When the Milesight D2D setting is enabled, WS101 can work as a Milesight D2D controller to send control commands to trigger Milesight D2D agent devices.

1. Configure RX2 datarate and RX2 frequency in LoRaWAN® settings, it is suggested to change the default value if there are many LoRaWAN® devices around.
2. Enable Milesight D2D feature.
3. Define a unique Milesight D2D key which is the same as Milesight D2D agent devices, then select the frequency and spreading factor. (Default Milesight D2D Key: 5572404C696E6B4C6F52613230313823)



4. Enable one of IOT-S500BT button mode and configure a 2-byte hexadecimal command (This command is pre-defined in Milesight D2D agent device). When you press as this button mode, IOT-S500BTwill send the control command to corresponding Milesight D2D agent devices.

Note: When LoRa Uplink feature is enabled, a LoRaWAN® uplink packet that contains the info of button status will be sent to gateway after the Milesight D2D control command packet.



3.6 Maintenance

3.6.1 Upgrade

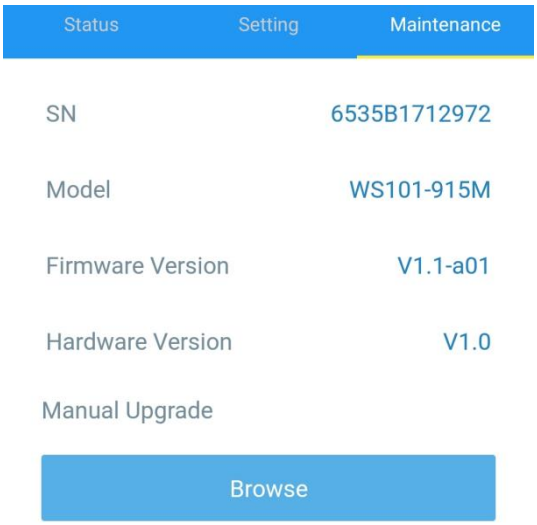
1. Download firmware from Linovision website to your smartphone.

2. Open ToolBox App and click **Browse** to import firmware and upgrade the device.

Note:

1) Operation on ToolBox is not supported during upgrade.

2) Only Android version ToolBox supports the upgrade feature.

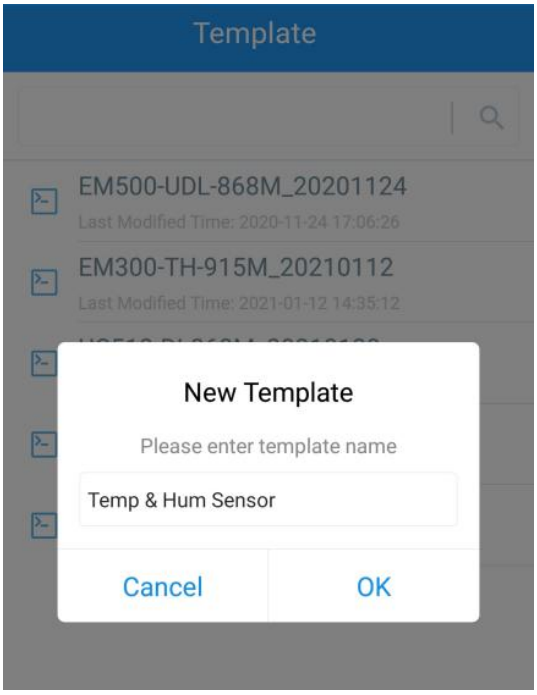


3.6.2 Backup

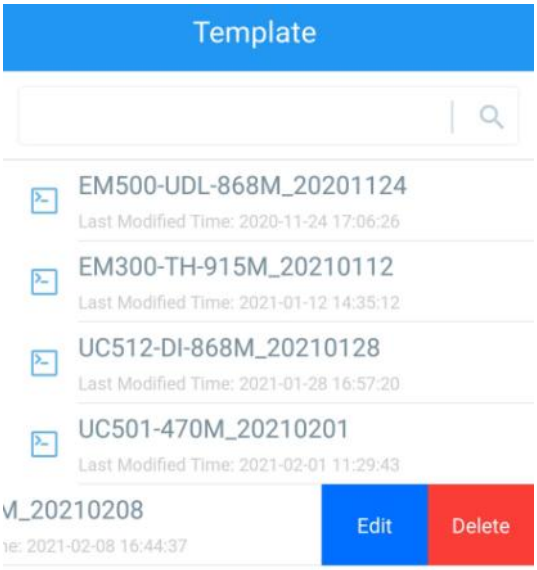
IOT-S500BT supports configuration backup for easy and quick device configuration in bulk. Backup is allowed only for devices with the same model and LoRaWAN® frequency band.

1. Go to **Template** page on the App and save current settings as a template. You can also edit the template file.

2. Select one template file that saved in the smartphone and click **Write**, then attach it to another device to write configuration.



Note: Slide the template item to the left to edit or delete the template. Click the template to edit the configurations.



3.6.3 Reset to Factory Default

Please select one of the following methods to reset device:

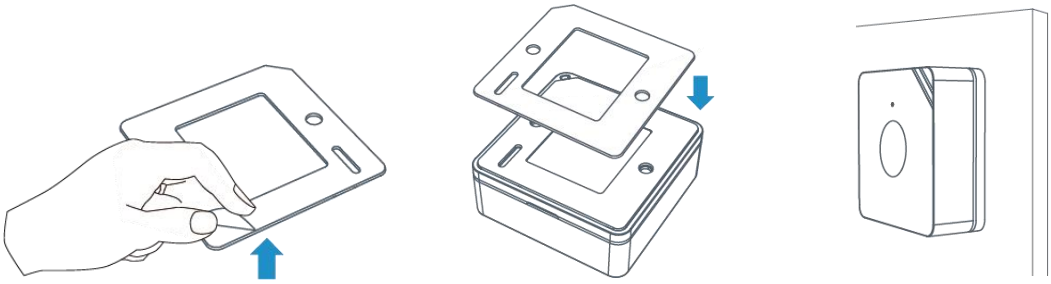
Via Hardware: Hold on the reset button for more than 10s. After reset complete, the indicator will blink in green twice and device will reboot.

Via ToolBox App: Go to **Device > Maintenance** to tap **Reset**, then attach smartphone with NFC area to device to complete reset.

4. Installation

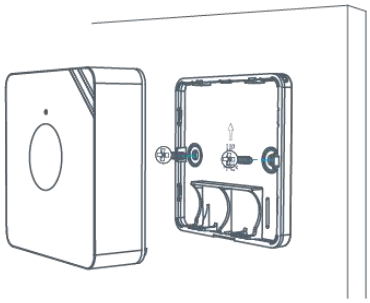
3M Tapes Fix:

Paste 3M tape to the back of the button, then tear the other side and place it on a flat surface.



Screw Fix:

Remove the back cover of the button, screw the wall plugs into the wall and fix the cover with screws on it, then install back the device.



Lanyard:

Pass the lanyard through the aperture near the edge of the button, then you can hang the button onto keychains and the like.

5. Device Payload

All data are based on the following format(HEX), the Data field should follow little-endian:

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel 3	...
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	1 Byte	...

5.1 Basic Information

IOT-S500BT reports basic information of button whenever joining the network.

Channel	Type	Description
ff	01(Protocol Version)	01=> V1
	08 (Device SN)	12 digits
	09 (Hardware Version)	01 40 => V1.4
	0a (Software Version)	01 14 => V1.14
	0b (Power On)	Device is on
	0f (Device Type)	00: Class A, 01: Class B, 02: Class C

Example:

ff0bff ff0101 ff086538b2232131 ff090100 ff0a0102 ff0f00					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0b (Power On)	ff (Reserved)	ff	01 (Protocol Version)	01 (V1)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	08(Device SN)	6538b2232131	ff	09 (Hardware version)	0100 (V1.0)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0a (Software version)	0102 (V1.2)	ff	0f (Device Type)	00 (Class A)

5.2 Button Message

IOT-S500BT reports battery level according to reporting interval (1080 mins by default) and button message when button is pressed. Besides, when battery level is lower than 10%, it will upload battery packet once.

Channel	Type	Description
01	75(Battery Level)	UINT8, Unit: %
ff	2e(Button Message)	01: Mode 1(short press) 02: Mode 2 (long press) 03: Mode 3 (double press)

Examples:

01 75 64		
Channel	**Type**	**Value**
01	75 (Battery)	64 => 100%

ff 2e 01		
Channel	**Type**	**Value**
ff	2e(Button Message)	01 => short press

5.3 Downlink Commands

IOT-S500BT supports downlink commands to configure the device.

The application port is 85 by default.

Channel	Type	Description
ff	03 (Set Reporting Interval)	2 Bytes, unit: s
	10 (Reboot)	ff (Reserved)
	2f (Set LED Indicator)	00: Disable 01: Enable
	74 (Set Double Press Mode)	00: Disable 01: Enable
	3e (Set Buzzer)	00: Disable 01: Enable

Examples:

1. Set reporting interval as 20 minutes.

ff03b004		
Channel	**Type**	**Value**
ff	03 (Set Reporting Interval)	b0 04 => 04 b0 = 1200s = 20 minutes

2. Reboot the device.

ff10ff		
Channel	**Type**	**Value**
ff	10 (Reboot)	ff (Reserved)

3. Disable double press mode.

ff7400		
Channel	**Type**	**Value**
ff	74 (Set Double Press)	00 => Disable

-END-