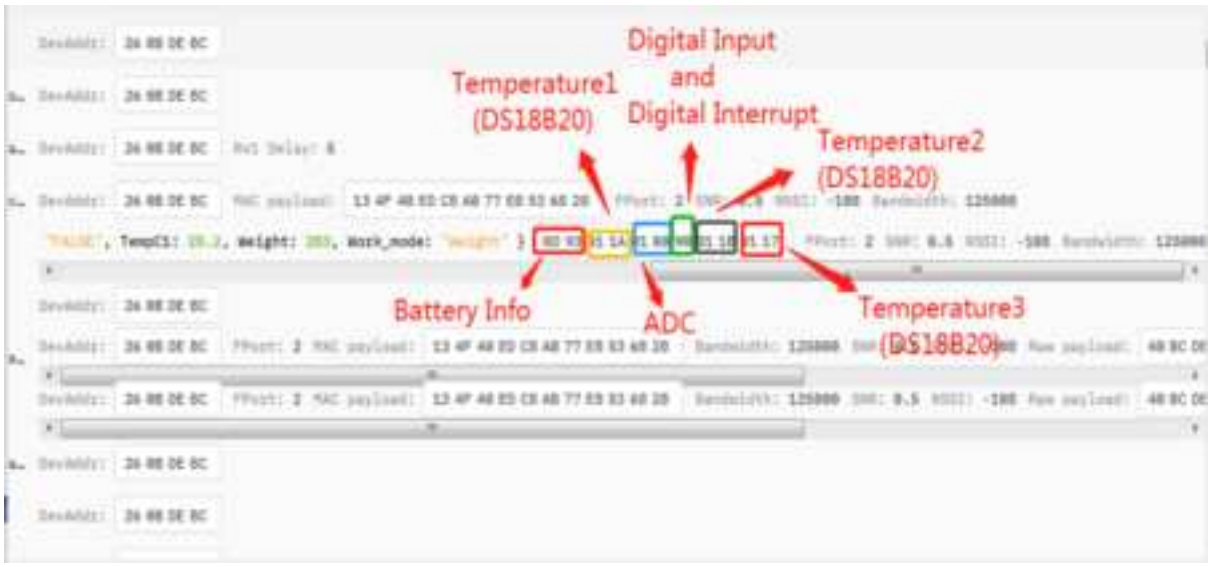
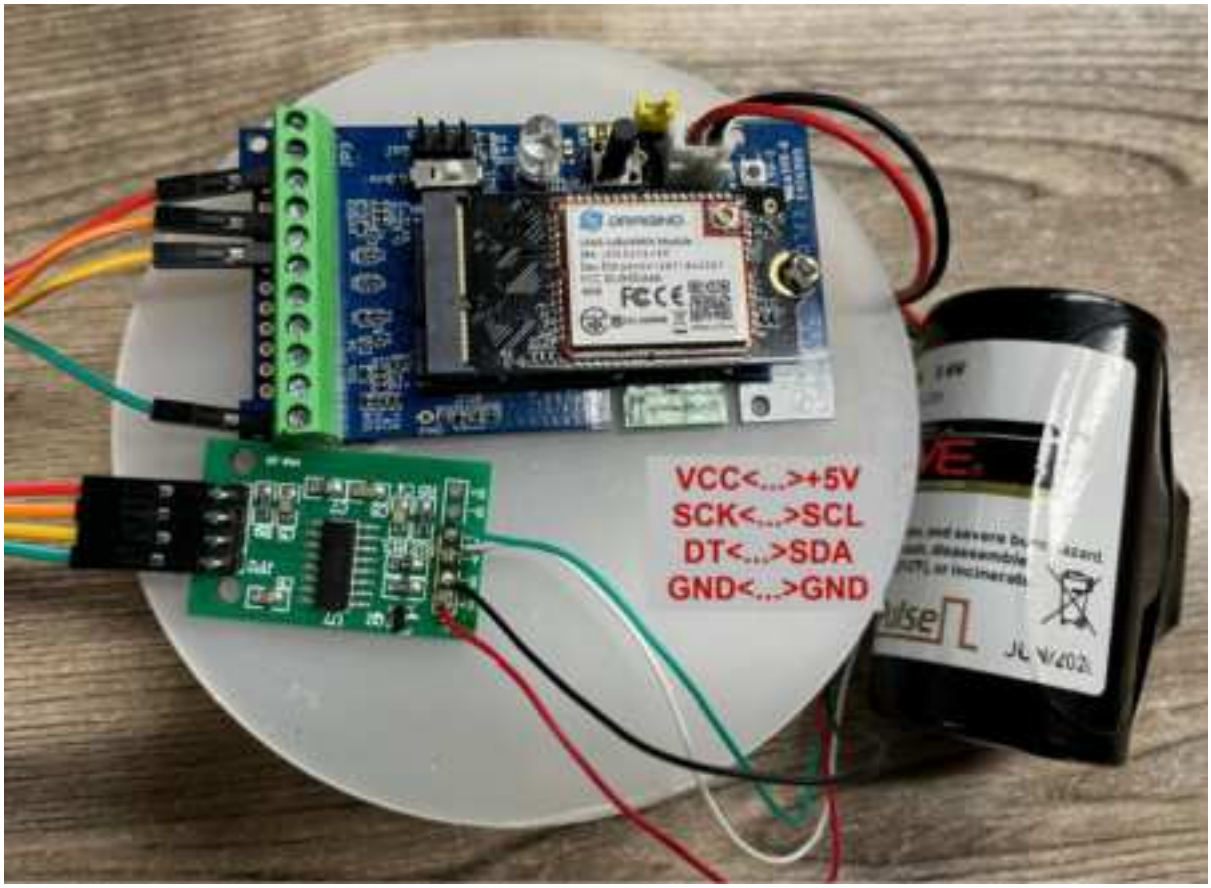
2.3.2.4 MOD=4 (3 x DS18B20)

This mode has total 11 bytes. As shown below:

Size(bytes)	2	2	2	1	2	2
Value	BAT	Temperature1(DS18B20) (PC13)	ADC(PA4)	Digital in(PB15) & Digital Interrupt(PA8)	Temperature2(DS18B20) (PB9)	Temperature3(DS18B20) (PB8)



2.3.2.5 MOD=5(Weight Measurement by HX711)



Each HX711 need to be calibrated before used. User need to do below two steps:

1. Zero calibration. Don't put anything on load cell and run **AT+WEIGRE** to calibrate to Zero gram.
2. Adjust calibration factor (default value 400): Put a known weight thing on load cell and run **AT+WEIGAP** to adjust the Calibration Factor.
3. Weight has 4 bytes, the unit is g.

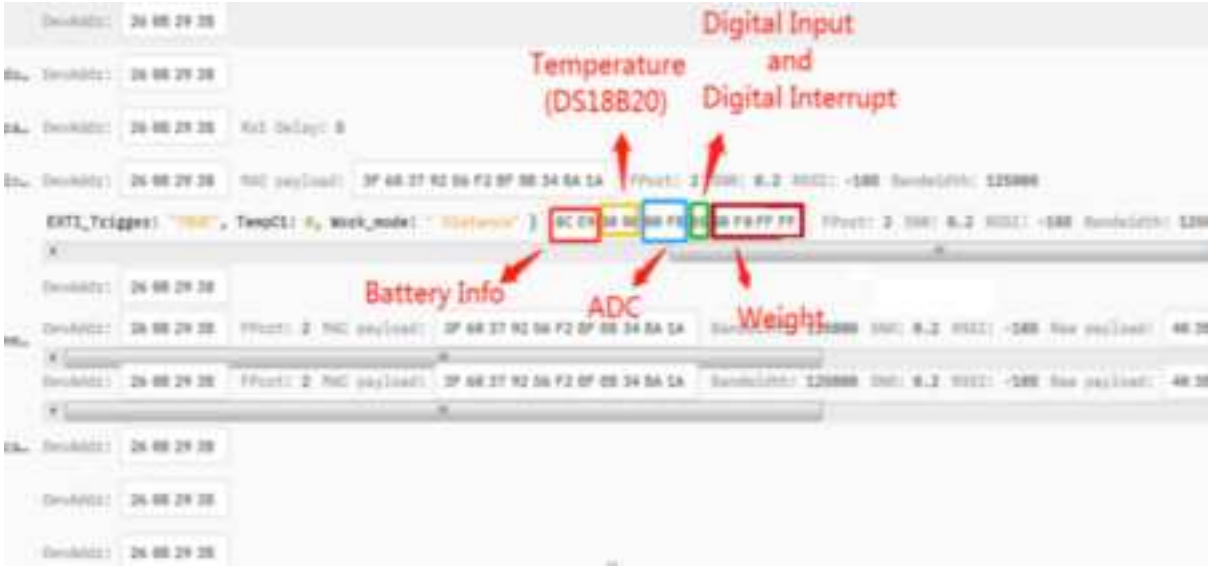
For example:

AT+GETSENSORVALUE =0

Response: Weight is 401 g

Check the response of this command and adjust the value to match the real value for thing.

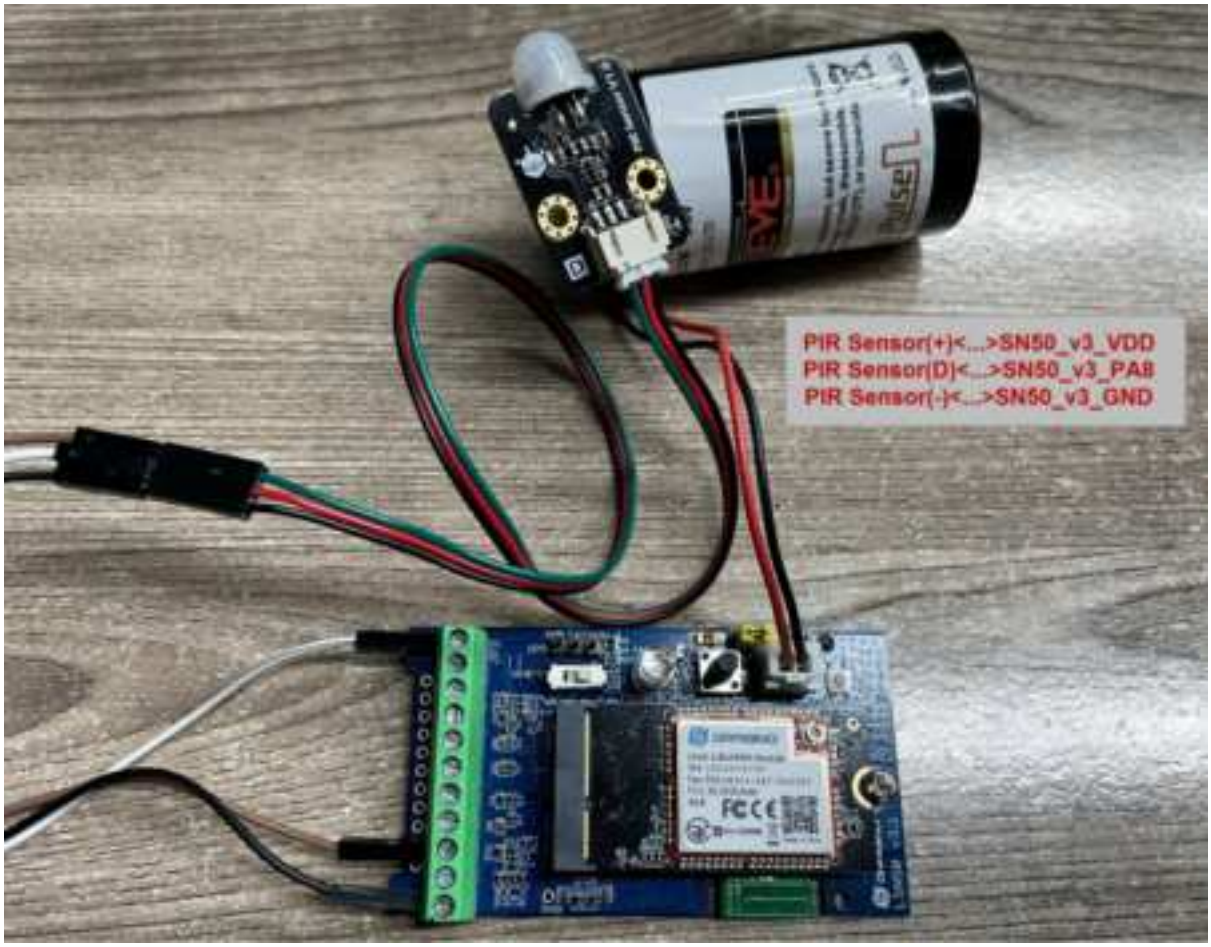
Size(bytes)	2	2	2	1	4
Value	BAT	Temperature(DS18B20)(PC13)	ADC(PA4)	Digital in(PB15) & Digital Interrupt(PA8)	Weight



2.3.2.6 MOD=6 (Counting Mode)

In this mode, the device will work in counting mode. It counts the interrupt on the interrupt pins and sends the count on TDC time.

Connection is as below. The PIR sensor is a count sensor, it will generate interrupt when people come close or go away. User can replace the PIR sensor with other counting sensors.

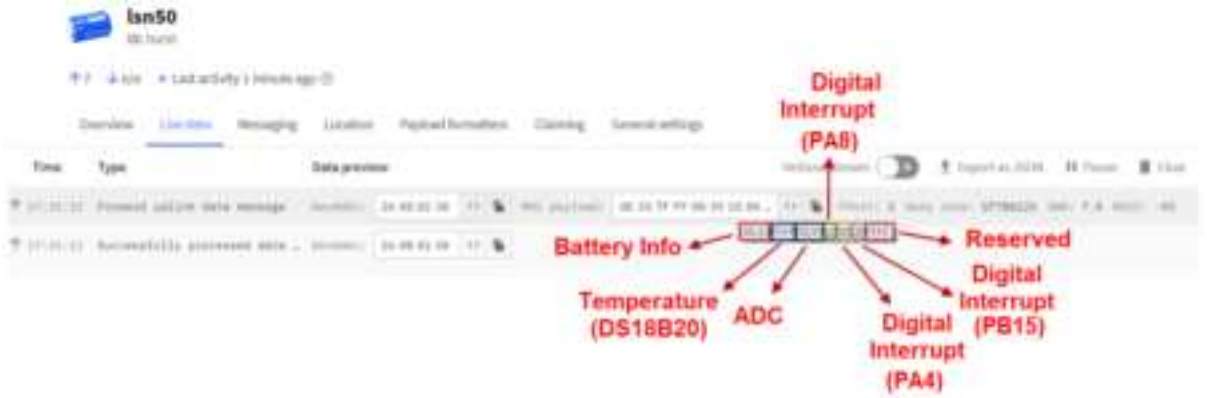


Note: LoRaWAN wireless transmission will infect the PIR sensor. Which cause the counting value increase +1 for every uplink. User can change PIR sensor or put sensor away of the SN50_v3 to avoid this happen.

Size(bytes)	2	2	2	1	4
Value	BAT	Temperature(DS18B20)(PC13)	ADC(PA4)	Digital in(PB15)	Count(PA8)

2.3.2.7 MOD=7 (Three interrupt contact modes)

Size(bytes)	2	2	2	1	1	1	2
Value	BAT	Temperature(DS18B20)(PC13)	ADC(PA5)	Digital Interrupt1(PA8)	Digital Interrupt2(PA4)	Digital Interrupt3(PB15)	Reserved



2.3.2.8 MOD=8 (3ADC+1DS18B20)

Size(bytes)	2	2	2	1	2	2
Value	BAT	Temperature(DS18B20)(PC13)	ADC1(PA4)	Digital Interrupt(PB15)	ADC2(PA5)	ADC3(PA8)

2.3.2.9 MOD=9 (3DS18B20+ two Interrupt count mode)

Size(bytes)	2	2	2	1	2	4	4
Value	BAT	Temperature (DS18B20)(PC13)	Temperature2 (DS18B20)(PB9)	Digital Interrupt (PB15)	Temperature3 (DS18B20)(PB8)	Count1(PA8)	Count2(PA4)

The newly added AT command is issued correspondingly:

AT+INTMOD1 PA8 pin: Corresponding downlink: **06 00 00 xx**

AT+INTMOD2 PA4 pin: Corresponding downlink: **06 00 01 xx**

AT+INTMOD3 PB15 pin: Corresponding downlink: **06 00 02 xx**

AT+SETCNT=aa,bb

When AA is 1, set the count of PA8 pin to BB Corresponding downlink: 09 01 bb bb bb bb

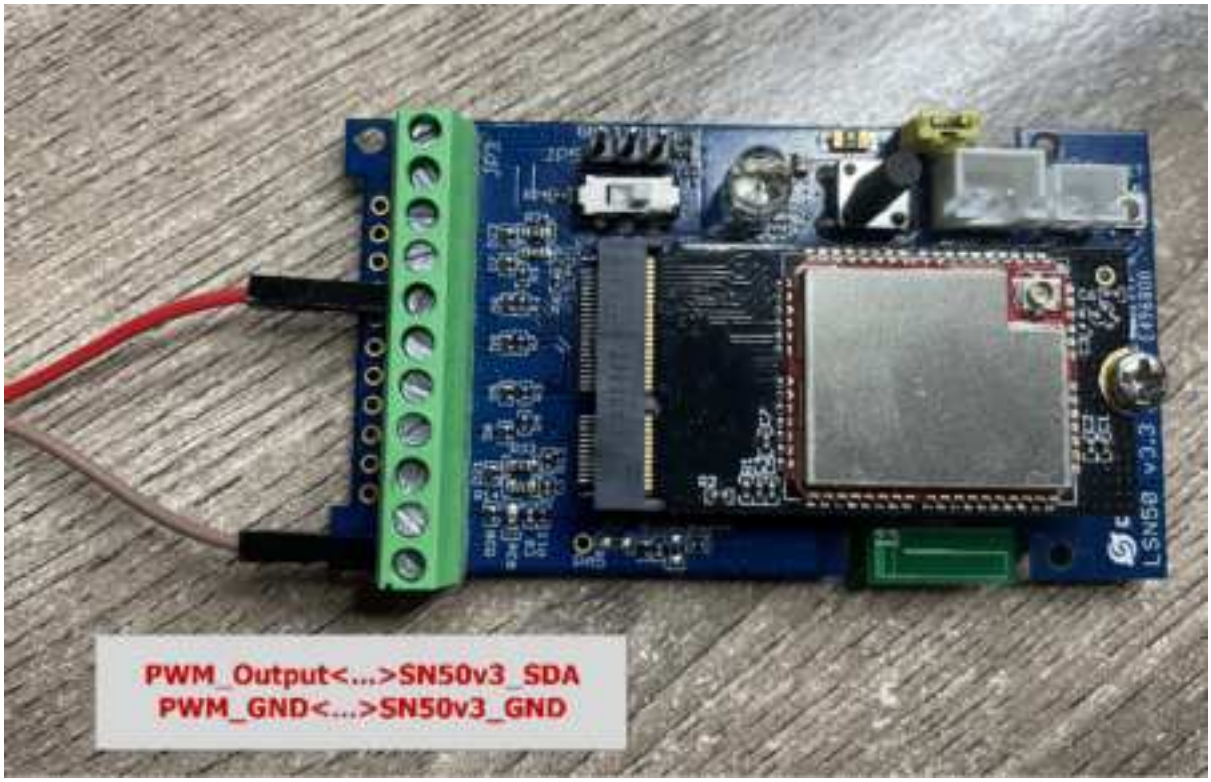
When AA is 2, set the count of PA4 pin to BB Corresponding downlink: 09 02 bb bb bb bb

2.3.2.10 MOD=10 (PWM input capture and output mode, Since firmware v1.2)

In this mode, the uplink can perform PWM input capture, and the downlink can perform PWM output.

It should be noted when using PWM mode.

2.3.2.10.a Uplink, PWM input capture



Size(bytes)	2	2	2	1	2	2
Value	Bat	Temperature(DS18B20)(PC13)	ADC(PA4)	PWM_Setting &Digital Interrupt(PA8)	Pulse period	Duration of high level

When the device detects the following PWM signal ,decoder will converts the pulse period and high-level duration to frequency and duty cycle.

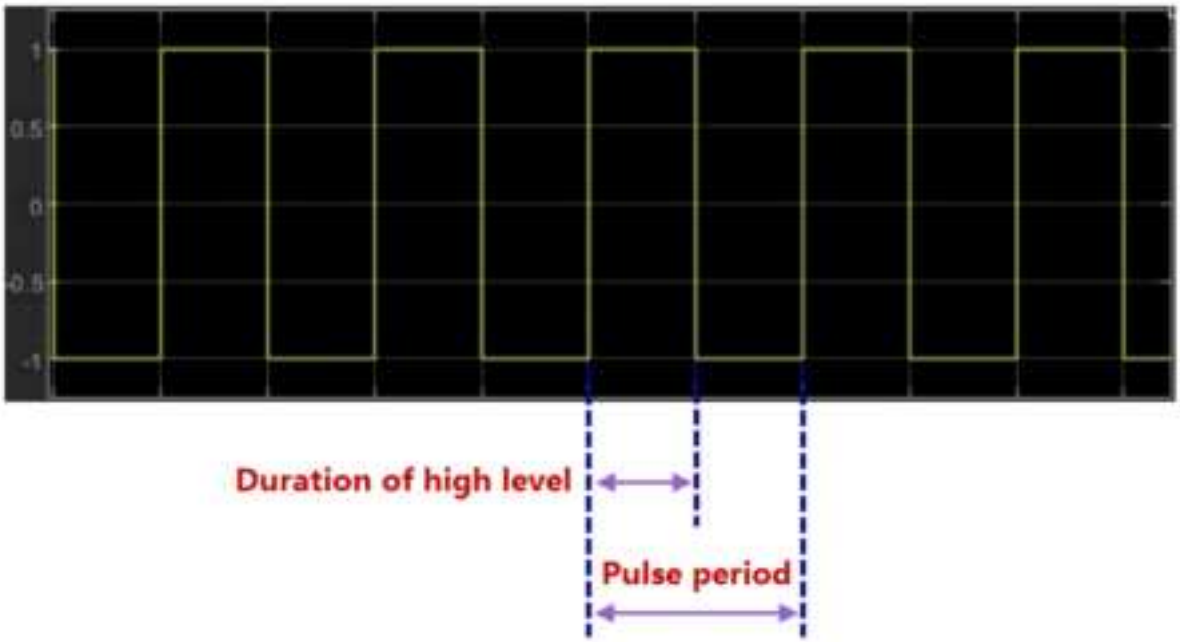
Frequency:

If **AT+PWMSET=0,** Frequency= 1000000/Pulse period (HZ) ;

If **AT+PWMSET=1,** Frequency= 1000/Pulse period (HZ) ;

Duty cycle:

Duty cycle= Duration of high level/ Pulse period*100 (%).



2.3.2.10.b Downlink, PWM output

Downlink: **0B xx xx xx yy zz zz**

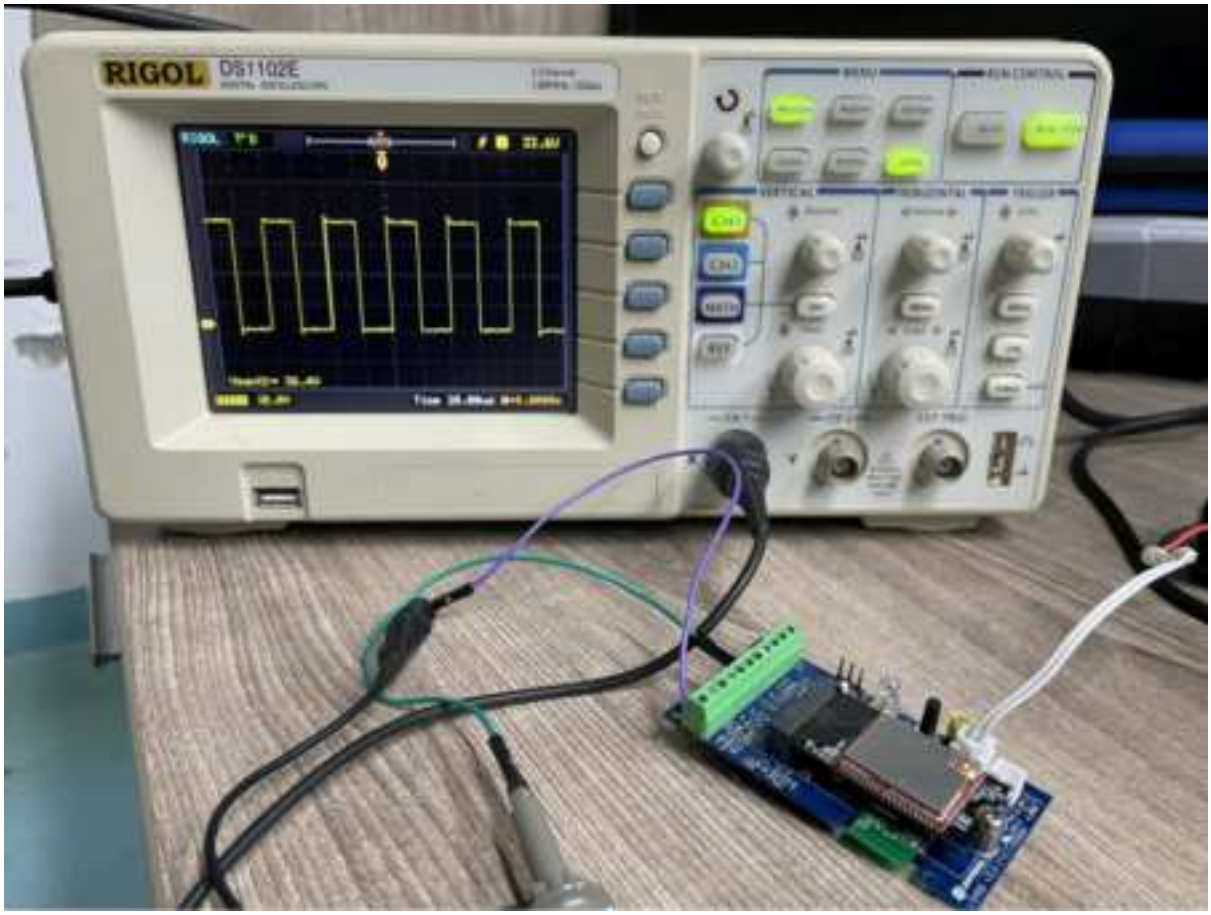
xx xx xx is the output frequency, the unit is HZ.

yy is the duty cycle of the output, the unit is %.

zz zz is the time delay of the output, the unit is ms.

For example, send a downlink command: 0B 00 61 A8 32 13 88, the frequency is 25KHZ, the duty cycle is 50, and the output time is 5 seconds.

The oscilloscope displays as follows:



2.3.3 Decode payload

While using TTN V3 network, you can add the payload format to decode the payload.