

### 2.3.2.4 MOD=4 (3 x DS18B20)

This mode has total 11 bytes. As shown below:

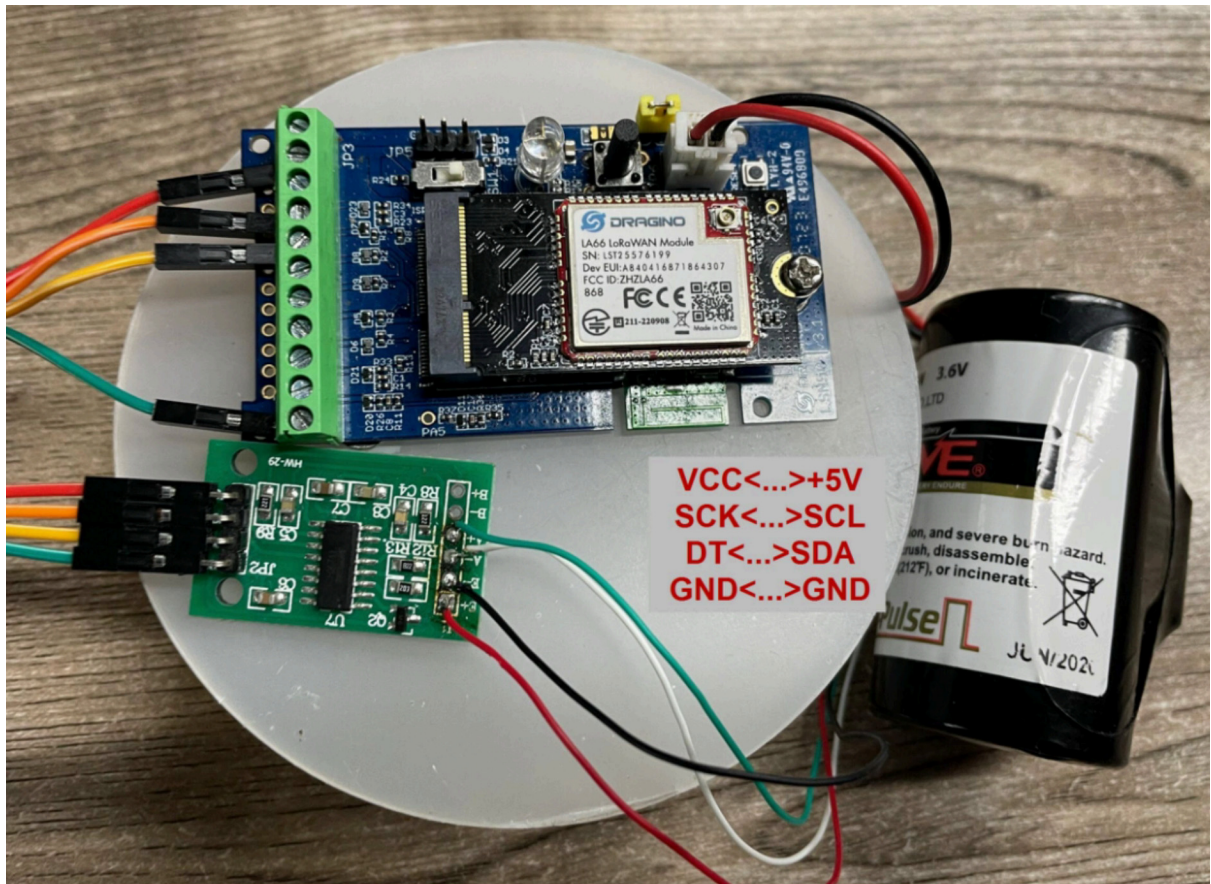
Size(bytes)	2	2	2	1	2	2
Value	BAT	Temperature1(DS18B20) (PC13)	ADC(PA4)	Digital in(PB15) & Digital Interrupt(PA8)	Temperature2(DS18B20) (PB9)	Temperature3(DS18B20) (PB8)

The image shows a Wireshark packet capture of a JSON payload. The payload is: `"FALSE", TempC1: 28.2, Weight: 283, Work_mode: "Weight" }`. The raw payload bytes are: `0D 93 91 1A 10 96 91 18 91 17`. Red arrows point from labels to specific bytes in the raw payload:

- Temperature1 (DS18B20)**: Points to the 2nd byte (0D).
- Digital Input and Digital Interrupt**: Points to the 3rd byte (93).
- Temperature2 (DS18B20)**: Points to the 4th byte (91).
- Battery Info**: Points to the 5th byte (1A).
- ADC**: Points to the 6th byte (10).
- Temperature3 (DS18B20)**: Points to the 7th byte (96).



### 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

The image shows a network traffic analysis tool interface with several packet capture entries. The top entry is highlighted and annotated with red arrows pointing to specific bytes in its payload. The annotations are as follows:

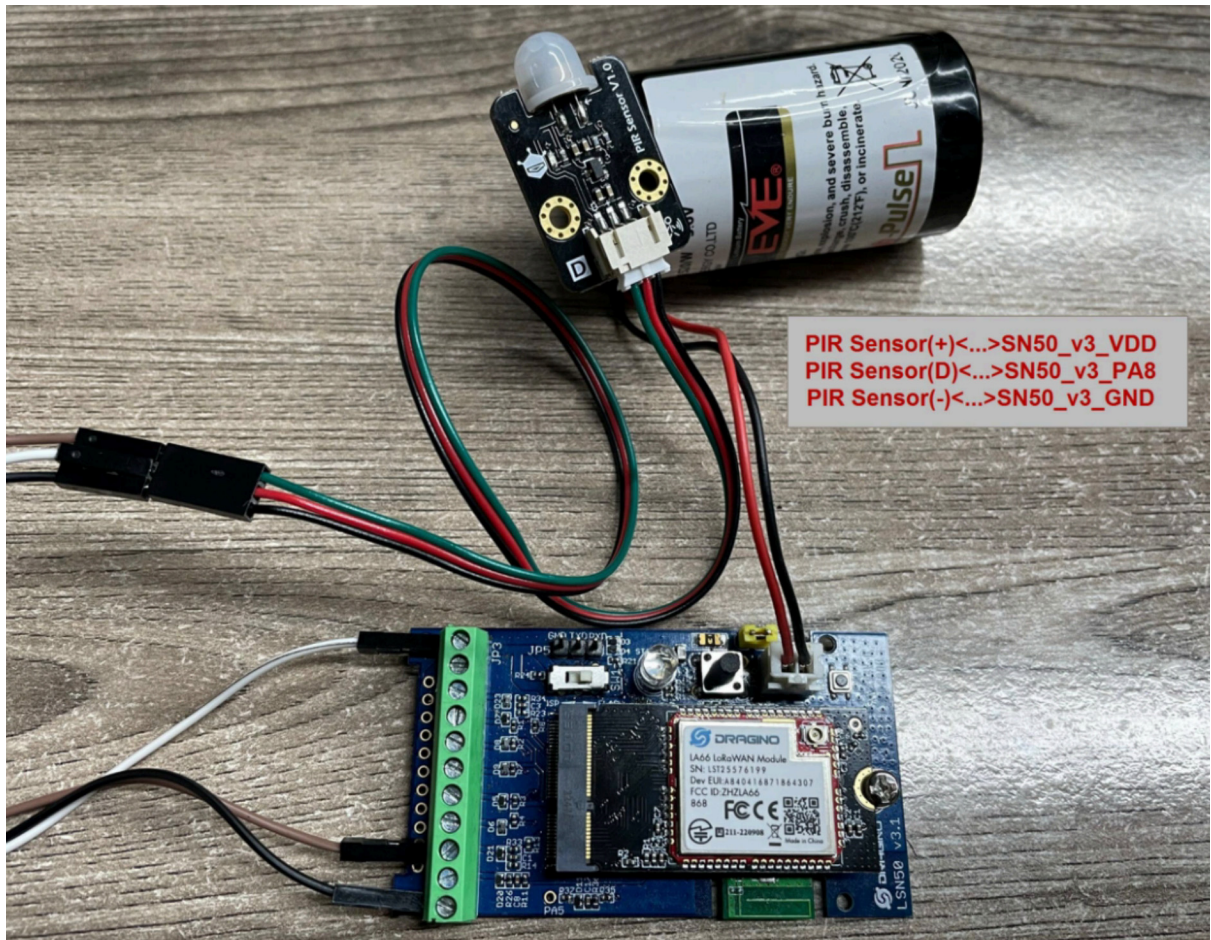
- Temperature (DS18B20):** Points to the byte `0C` in the payload `0C E9 38 08 08 F8 08 38 F0 FF FF`.
- Digital Input and Digital Interrupt:** Points to the bytes `08` and `08` in the payload.
- Battery Info:** Points to the byte `08` in the payload.
- ADC:** Points to the byte `08` in the payload.
- Weight:** Points to the bytes `F0 FF FF` in the payload.

The packet details include: DevAddr: 26 08 29 38, MAC payload: 3F 60 37 92 56 F2 BF 8B 34 BA 1A, FPort: 2, SNR: 0.2, RSSI: -108, Bandwidth: 125000. The payload is shown in hexadecimal: `0C E9 38 08 08 F8 08 38 F0 FF FF`.

### 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)

The screenshot shows the lsn50 interface with a data message at 17:34:00. The MAC payload is 0E 33 7F FF 00 47 1C 01. The data preview shows a sequence of bytes: 0E337FFF00471C01CC0001. Red arrows point from these bytes to labels: 0E337FFF to Digital Interrupt (PB15), 00 to Battery Info, 47 to Temperature (DS18B20), 01 to ADC1 (PA4), CC to ADC2 (PA5), and 0001 to 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 screenshot shows the lsn50 interface with a data message at 17:34:43. The MAC payload is 0E 31 7F FF 7F FF 20 7F. The data preview shows a sequence of bytes: 0E317FFF7FFF0000000000000000. Red arrows point from these bytes to labels: 0E317FFF to Digital Interrupt (PB15), 7FFF to Count1 (PA8), 00000000 to Count2 (PA4), 00 to Battery Info, 00000000 to Temperature1 (PC13), 00000000 to Temperature2 (PB9), and 00000000 to Temperature3 (PB8).

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

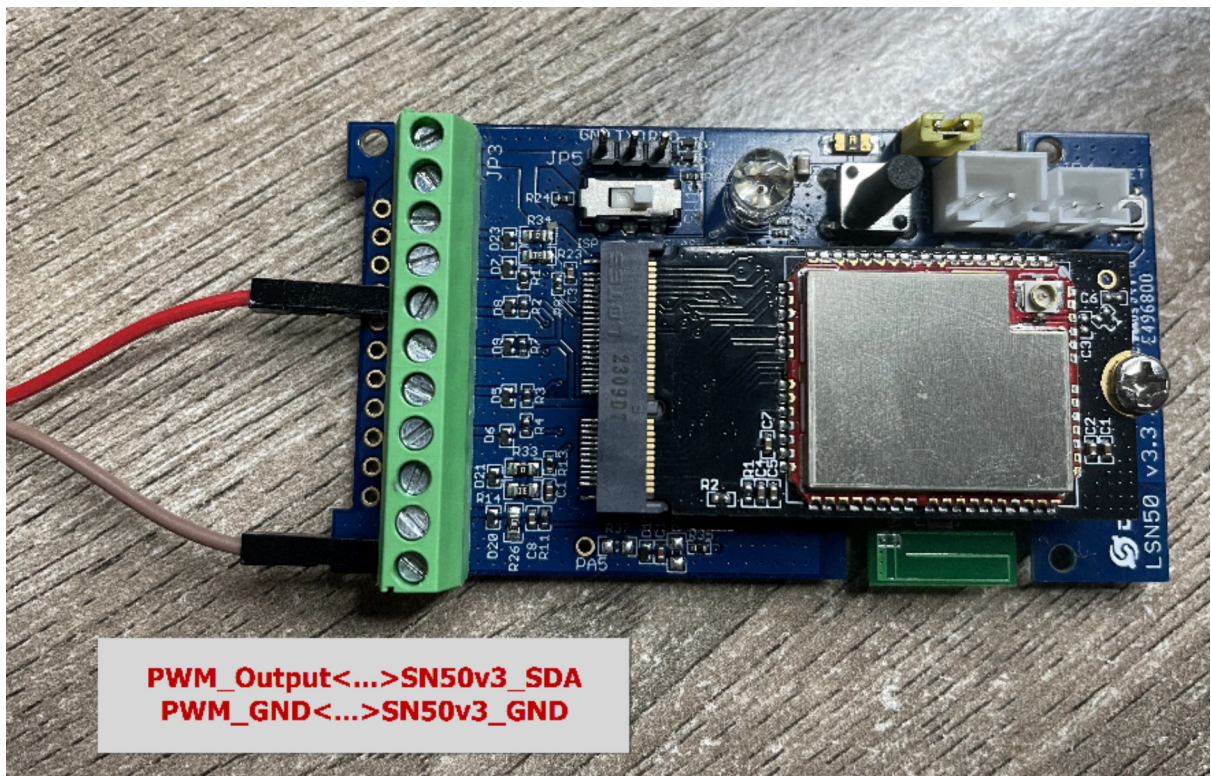
When AA is 2, set the count of PA4 pin to BB Corresponding downlink: 09 02 bb bb bb bb

**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



sn50v3-lb  
ID: sn50v3-lb

↑ 5 ↓ 1 • Last activity 45 seconds ago

Overview **Live data** Messaging Location Payload formatters General settings

Time Type Data preview Verbose stream Export as JSON Pause Clear

↑ 16:33:36 Forward uplink data message { ADC1\_V: 0, BatV: 3.678, Door\_status: "OPEN", Dutycycle: 50, EXTI\_Trigger: "FALSE", Frequency: 20000, TempC1: "NULL", Work\_mode: "PWM", pwm\_mode: "us" }

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

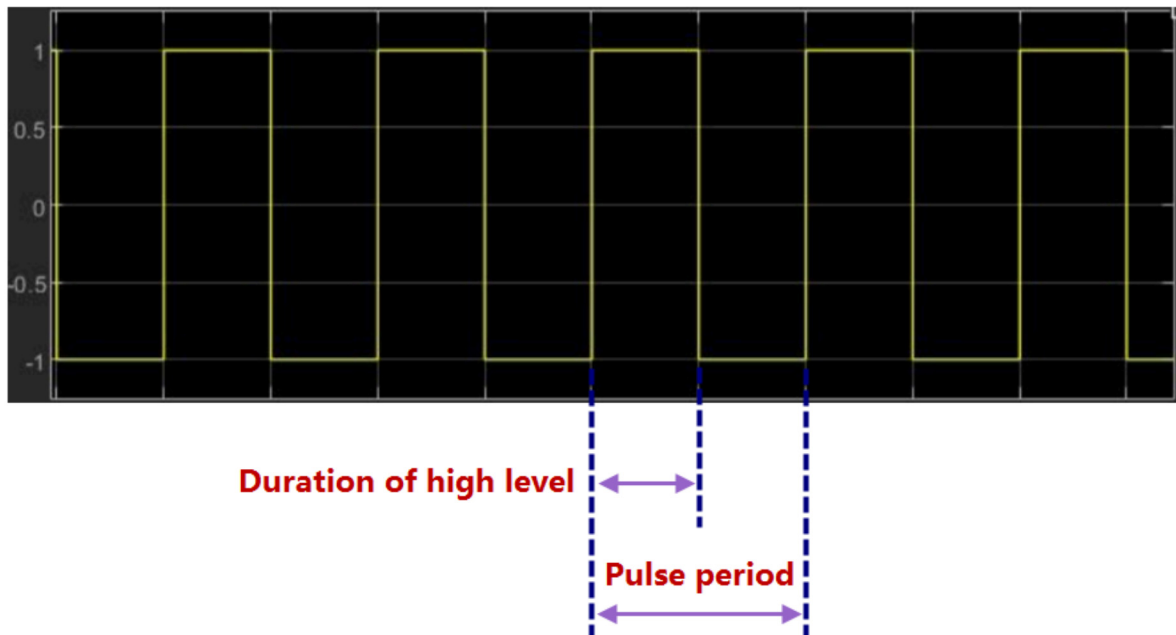
Frequency:

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

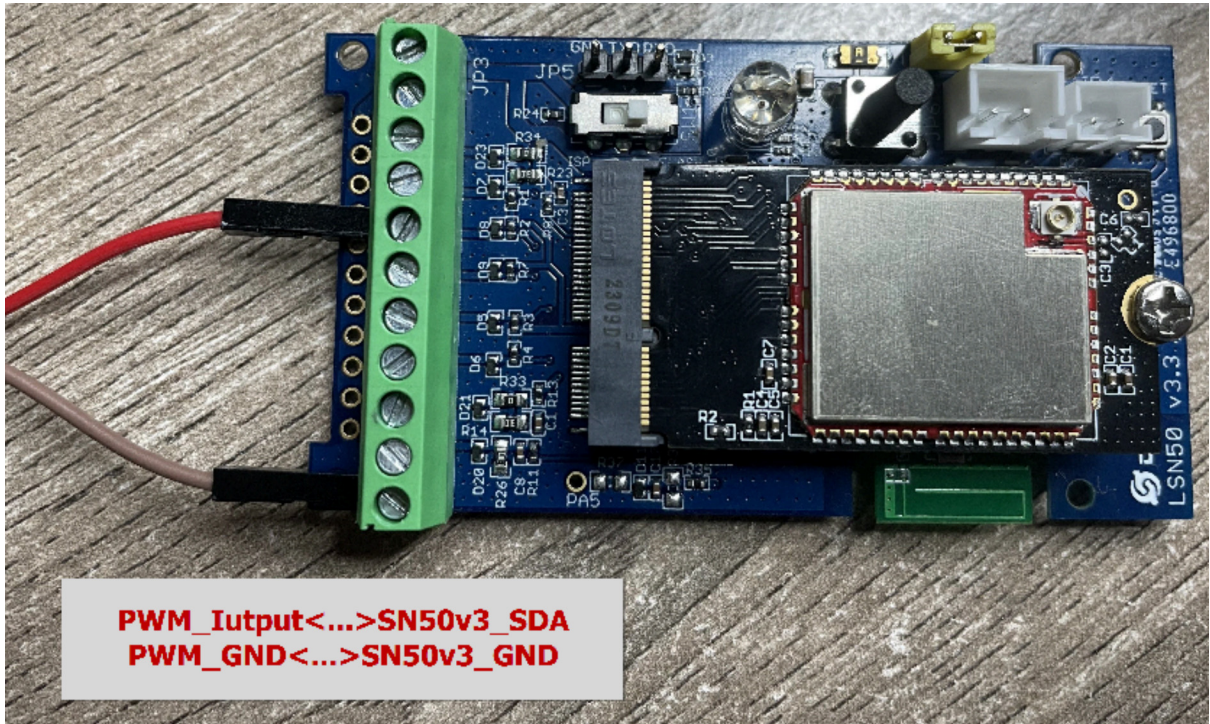
If **AT+PWMSET=1**, Frequency= 1000/Pulse period (HZ) ;

**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**

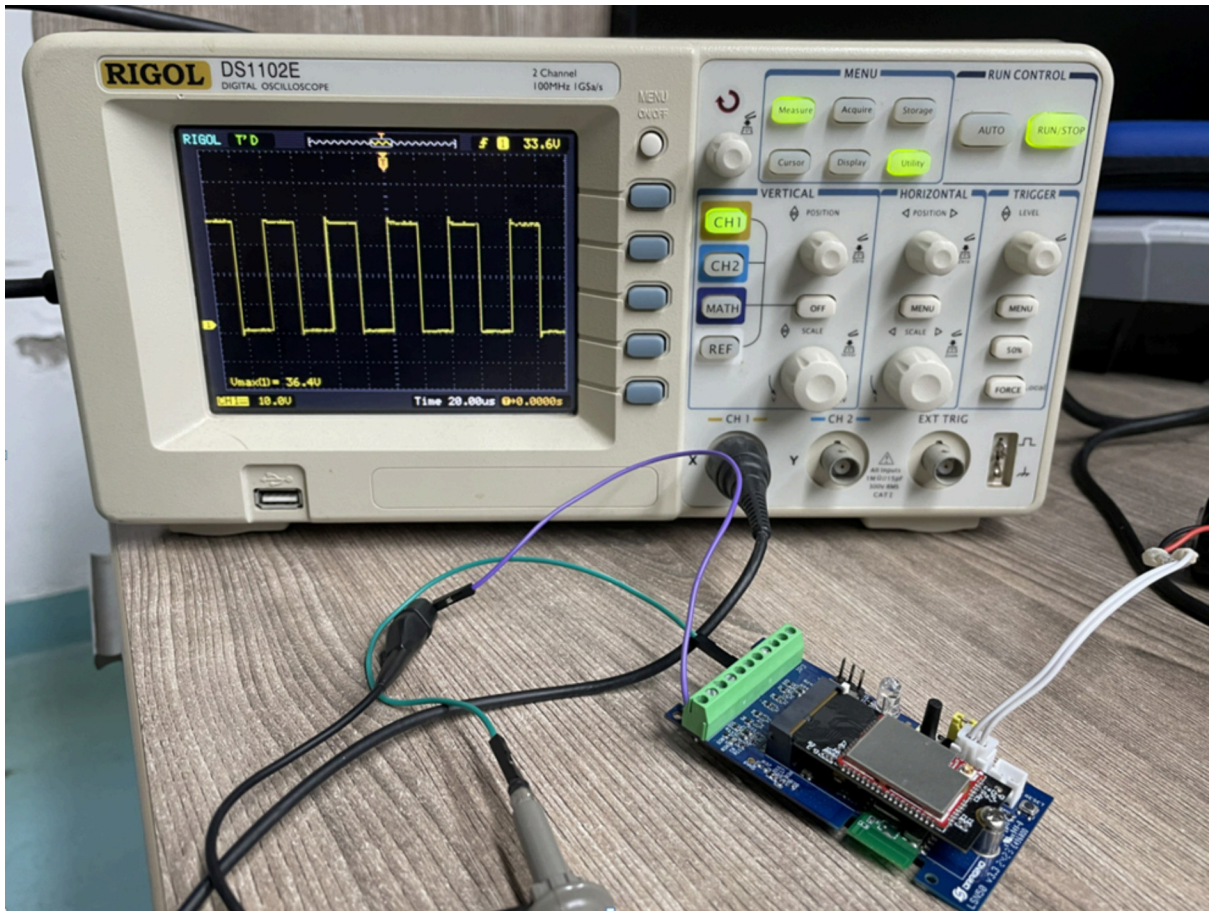
xx xx xx is the output frequency, the unit is HZ.

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.