

**1. How could I start my first-time LoRa test? What should I set my LoRa parameters?**

- 1) Please put your gateway (dongle) at least 1.5 meter from the ground under open sky. The higher the gateway (dongle) is; the longer the transmission distance will be.
- 2) Rather than directly installing LoRa dongle to PC, It's better to connect the dongle to PC by extended USB cable. It could reduce the computer's noise.
- 3) Please make sure the antenna is perpendicular to the ground. It is difficult to transmit RF signal by putting the antenna parallel with the ground.
- 4) You could set RF parameters to have the best LoRa coverage as below:

RF frequency should be set according to your area. The recommended RF frequency for the different area is as following.

Europe:	865.XXX~868.000 MHz
Japan:	920.8XX~927.800 MHz
America & Taiwan:	915.XXX~928.000 MHz

RF power is 7(Max);

RF TRx rate is 0.81K; Wakeup time is 1 sec.

The recommended UART parameters as below:

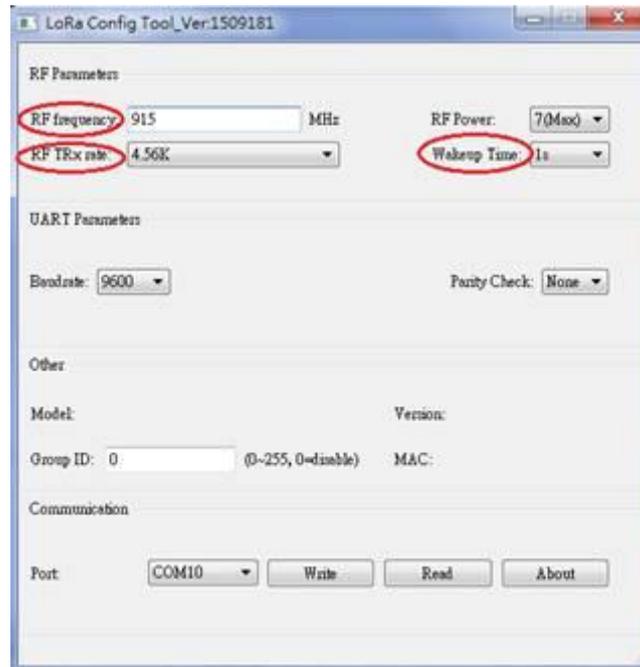
Baud rate: 9600; Parity Check: None

- 5) If you only test one tracker, please set the tracker mode as "Active Mode" in MOST. It will report to your gateway automatically according to the interval setting.

If you test more than one tracker, please set the tracker mode to be "Passive Mode" on MOST. Setting tracker to be "Active Mode" might result in data collision and report lost. You can use cyclically ping LoRa trackers in operation setting area in MOST. Please refer to M O S T Evaluation Testing Tool\_20151014.doc to have the proper setting for your test.

**2. How could we improve the difficulty of LoRa module to receive data in power-saving mode?**

- 1) It is difficult to wake up LoRa module to receive data if the transmitter is in normal mode. Please make sure your transmitter is in wakeup mode to wake up the receiver.
- 2) Please make sure RF frequency, RF TRx Rate and Wakeup time are matched in both transmitter and receiver as the picture below. If these parameters are not matched, it would cause the data missing or not receiving any data.



3) Baudrate and parity check should be matched with PC UART's setting.

**3. What LoRa parameters would affect the transmission distance? How should I adjust them?**

- 1) RF power would affect the transmission distance. Enhance the RF power level would lengthen the transmission distance.
- 2) RF TRx rate would affect the data transmission speed over the air. Enhancing the RF TRx rate would accelerate the transmission speed, but the transmission distance will be shortened.
- 3) Transmission distance will be affected by the surrounding environments. You could try to set different RF frequency to tune which RF frequency is proper for LoRa transmission.

**4. There must be 2 seconds of interval between writing two setting commands to LoRa module or reading setting from LoRa module by the setting command**

If user writes two commands within 2 seconds, the LoRa module could not deal with the second command because it would reboot after getting and writing the first command. Please wait at least for 2 seconds and then write the next command /read the setting again after writing command or reading the setting.

**5. What is the power consumption in each operating mode?**

Mode	Standby Current
Normal Mode	12mA
Wake-up Mode	12mA
Power-saving Mode	2.68 mA@ Wakeup Time 50ms
	0.21 mA@ Wakeup Time 1s
	0.08 mA@ Wakeup Time 4s

**6. How could I increase the tracker's battery life?**

- 1) Wakeup time is the frequency that the tracker be awaked to receive the data. The longer the wakeup time is, the lower the power consumption is.
- 2) Enhance RF TRx rate would decrease the power consumption.
- 3) You could also change the interval time of your report in MOST. The longer the interval is, the less the power consumption is.

**7. I have already finished all the setting according to your manual. Why could I not receive LoRa signal properly?**

When the LoRa data received rate is not good, please try to change RF frequency band. If there is some RF frequency used by the other application in your testing environments, please NOT set the same RF frequency with the occupied frequency to prevent from data collision.

It is better to set the frequency as three decimal points.

Note: Frequency should be avoided in Taiwan:

922MHz & 924 MHz -ETC

**8. How could I reduce the data loss rate? How should I avoid receive garbled data?**

LoRa has transmission loss issue. You could check the following matters.

- 1) Please make sure your LoRa coverage is good in your test area.
- 2) Sometimes, though the RF frequency is different from the others', it is still possibly to receive the others' data and cause data collision. Please try to keep the gateway (dongle) far away from the others' LoRa devices, RFID, GSM and WCDMA station.
- 3) RSSI is a very important factor in data transmission. When the RSSI is below 35, the data loss rate will be increased a lot. The report message might turn

to garbled. You can enhance the RF power or reduce the RF TRx rate to improve RSSI.

**9. How could I know NL-T212 is ON or OFF?**

You could check if NL-T212 is ON by pressing the SOS button. When NL-T212 is on, pressing the SOS button would make it flash red light once. If NL-T212 is off, pressing the SOS button would have no response.



**10. I couldn't turn on my NL-T212 tracker. What should I do?**

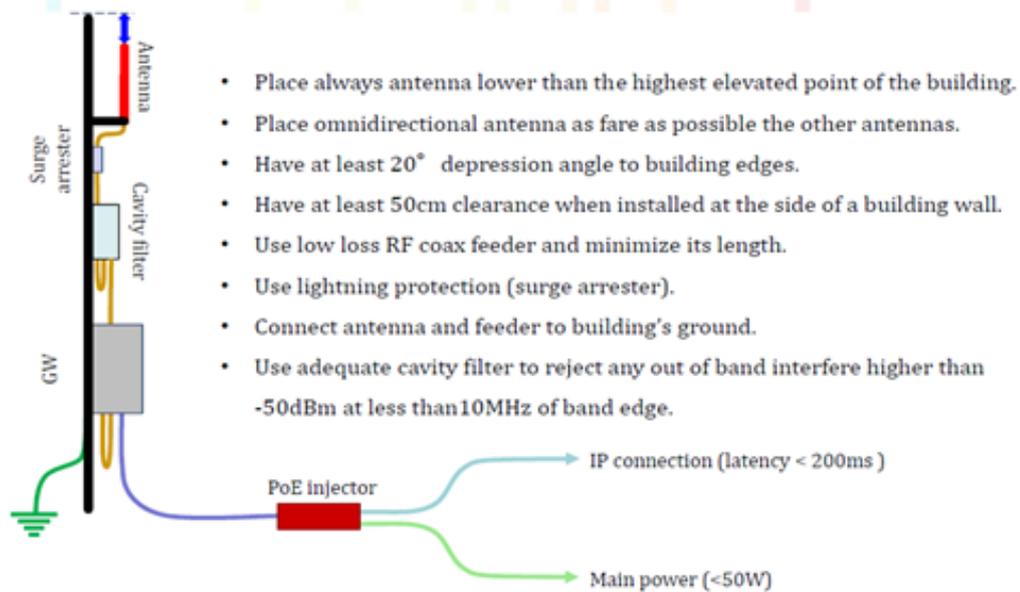
You could reset the device by pin reset button once to turn on the device when you meet this problem.

**11. What should I do to have good GPS fix for outdoor test?**

- 1) You should have 1<sup>st</sup> GPS fix under the open sky before you start to move.
- 2) When you install LoRa tracker on the vehicle, please make sure the device will not be shaken when vehicle is moving.

**12. How to install your antenna on the top of roof?**

## Antenna Installation 1/2



## Antenna Installation 2/2



**13. I try to wake up my MCU using BZ Pin as wake up interrupt. However, it was not successful. How to do?**

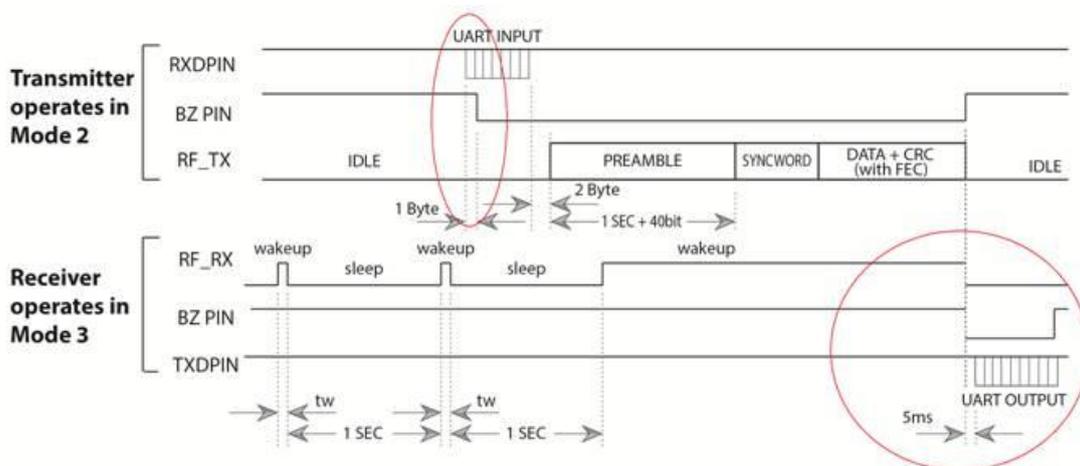
Basically, BZ pin is to wake MCU. BZ pin would go low in two conditions as below:

- 1) Wake-up mode (Mode 2) : P1 = 0, P2 = 1

When RXD pin of the module is receiving the first byte of data, BZ pin will be set low, and start to evaluate P2's level. After RXD pin has received the last byte of data, waiting for 2~3 Bytes time, if there is no data entry, BZ pin is set high and switch to transmit state.

- 2) Power-saving mode (Mode 3) : P1 = 1, P2 = 0

After the error detection correction identifies the data is correct, BZ pin will be set low. UART opens and output data after 5ms [It would be 1ms in Mode 1 and Mode2]. After UART finishes transmitting data, UART closes and set BZ pin high again. If the mode setting keeps the same, it will re-enter into the sleeping state and wait for the next wake-up period. You could take reference as below(wake-up period (for example 1 second)).



**14. There are 3 nodes (LoRa module + MCU) in the same group by setting group ID=1. RF frequency, RF TRx Rate and Wakeup time are matched as well. Is it possible that node A just transmits the data to node B, and node C would not receive data in its MCU?**

Yes, it's possible. LoRa's transmission is by broadcast. When node A transmit the data in wake-up mode, node B & C in power-saving mode would be awaked. UART of node B & C would open and transmit the data to its MCU.

However, if you set the different group ID (for example, group ID=2) for node C, node C would be awaked to check whether the group ID matches its setting. If it's

not matched, UART would not open and MCU would not receive any data. Then the LoRa module goes to power-saving mode again.

The range of our group ID is from 0 to 255. If the Lora module needs to have more group IDs to use, it needs to customize the FW.