

Lora Radio Modem AT Command

Lora Transparent Transmission Protocol

RC-RICK-XXX is a radio modem with UART interface usable with AT commands for long distance communication with LoRa modulation (LoRa Transparent Transmission Protocol).

Working into European bandwidth : 868MHz

The hardware is based on the module RC-WLE5-XXX designed by RadioControlli (STM32WLE5Jx based).

For more information and details, please refer to :

- RC-WLE5-XXX datasheet (www.radiocontrolli.com)
- STM32WLE5J8 datasheet (www.st.com)

Module Information :

RC-RICK-868 —————> 868MHz standard Version (UFL Connector)

RC-RICK-868-HA —————> Helical Antenna Version



The module is designed to be easily integrated into your hardware application, we provide 2 versions:

1) Standard version with UFL connector

You can use the UFL connector where you can directly connect the antenna.

2) Version with helical antenna (full version)

Applications:

- Smart meters
- Wireless security systems
- Home and Building automation
- 6LoWPAN systems
- Automatic Measure Reading
- Low-Power Wireless Systems
- Wireless Sensor Networks
- Remote Control
- Street Lights System
- Parking Sensors
- Environmental Sensors
- Smart Grid and Automatic Meter Reading

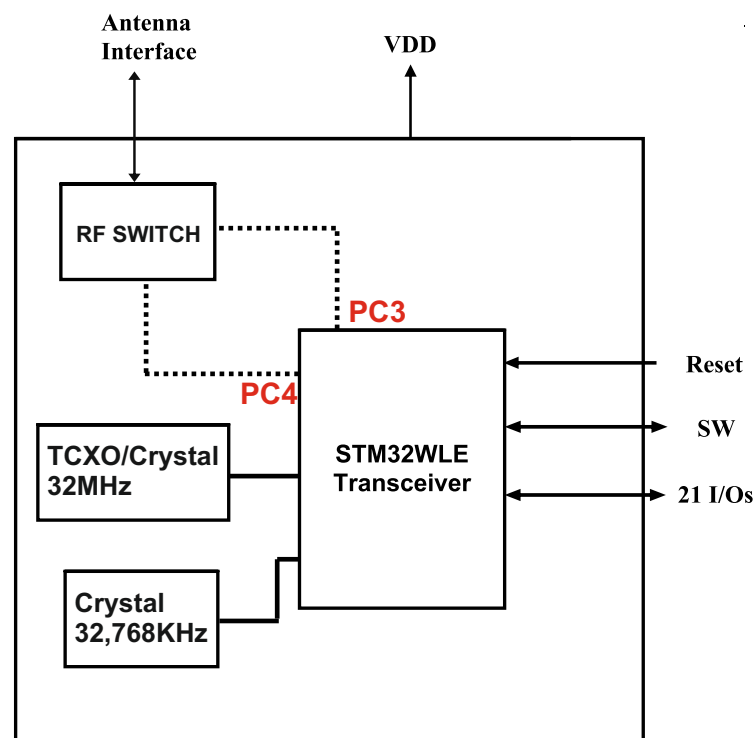
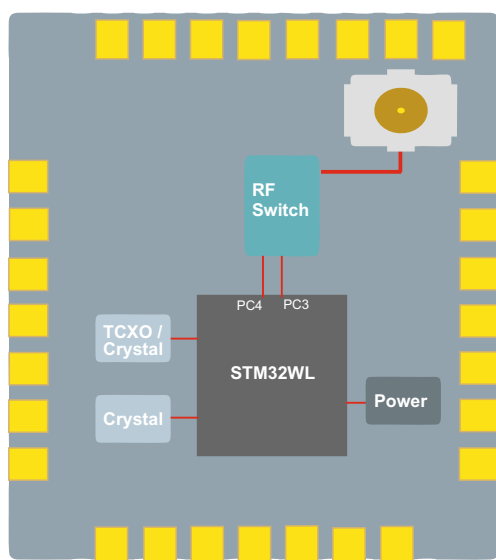
TECHNICAL CHARACTERISTICS

Characteristics	MIN	TYP	MAX	UNIT
V _{CC} Supply Voltage	2.5	3.3	3.7	Vdc
I _s Supply Current (Sleep mode)		2.0		uA
I _{s1} Supply Current (Receive mode)		5.0		mA
I _{s2} Supply Current (Transmit mode)		120.0		mA
F Frequency Band		868		Mhz
T RF TX Power (433MHz version)			+10.0	dBm
T1 RF TX Power (868MHz version)	+15.0		+22.0	dBm
S RX Sensitivity		-140		dBm
TE Operating Temperature Range	-20		+70	°C

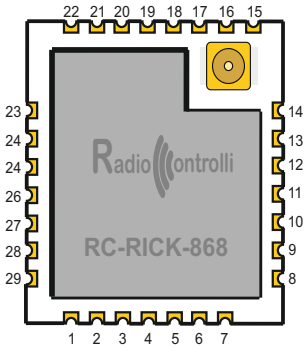
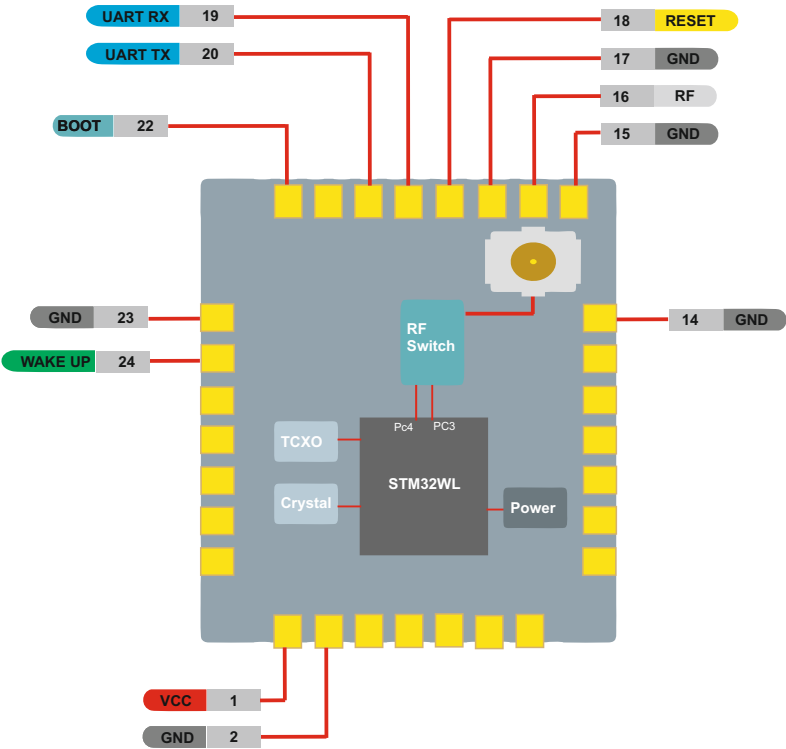
BLOCK DIAGRAM

The module is based on STM32WL5Jx device which integrates :

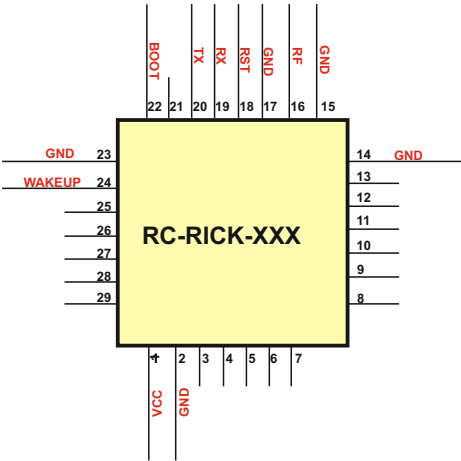
- ARM Cortex M4 processor
- Sx126x LoRa transceiver on the same chip.



PINOUT



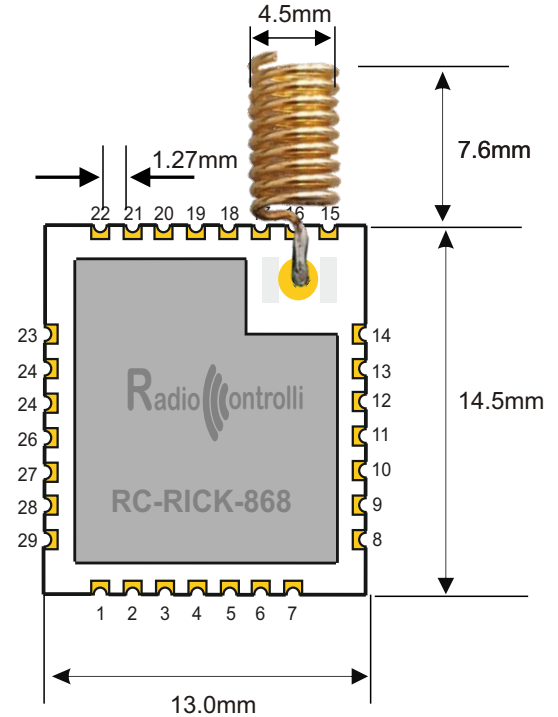
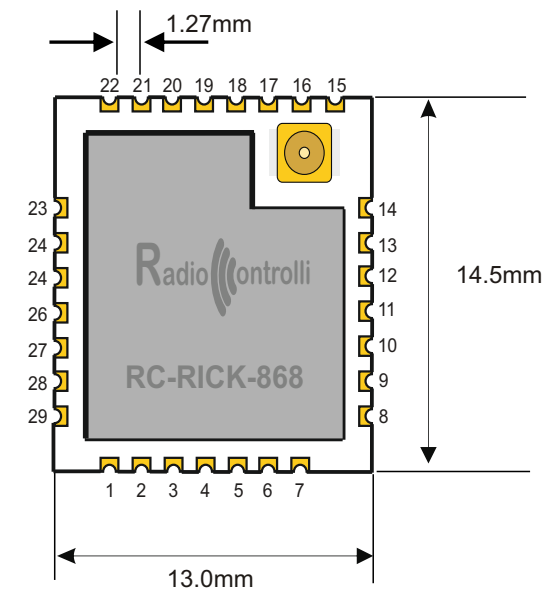
Standard Version



Pin Descriptions

Pin Number	Name	Description
01	VCC	Supply Voltage
2,14,15,17,22,23	GND	Ground
16	RF	Antenna
18	RST	Reset Trigger Input (Active pull down).
19	RX	UART RX Input
20	TX	UART TX Input
22	BOOT	Using this pin it's possible to updated the FW version. In normal operation this pin must be GND. Make this pin at 1 (3Volt) when is necessary to proced with the firmware update.
24	WakeUp Low-active	When the module is in sleep mode, it's possible to pull down (50ms) this pin to wake up the module.

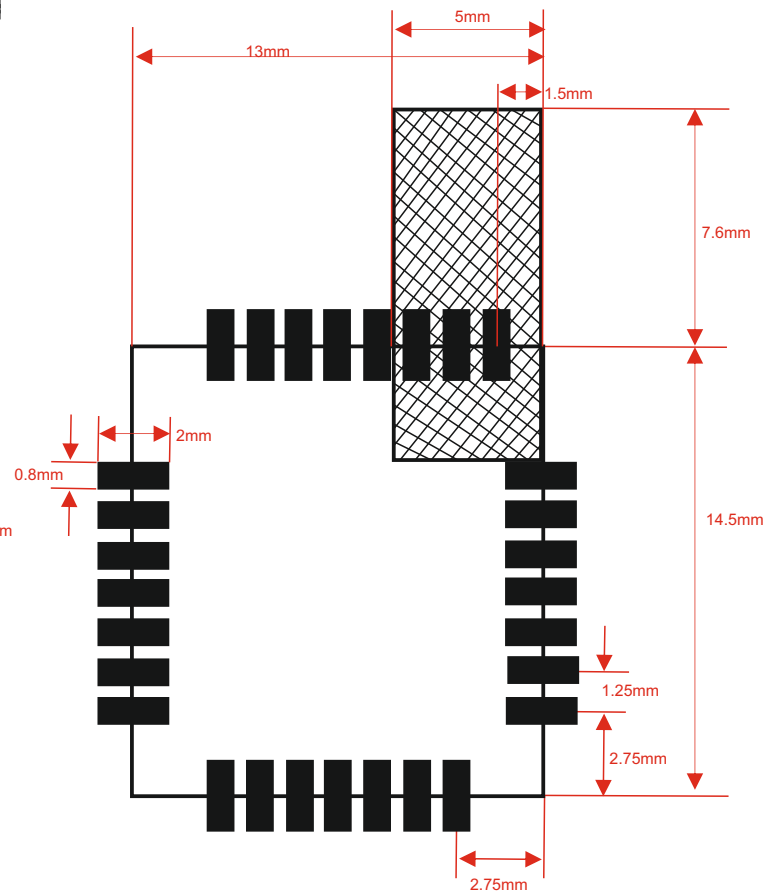
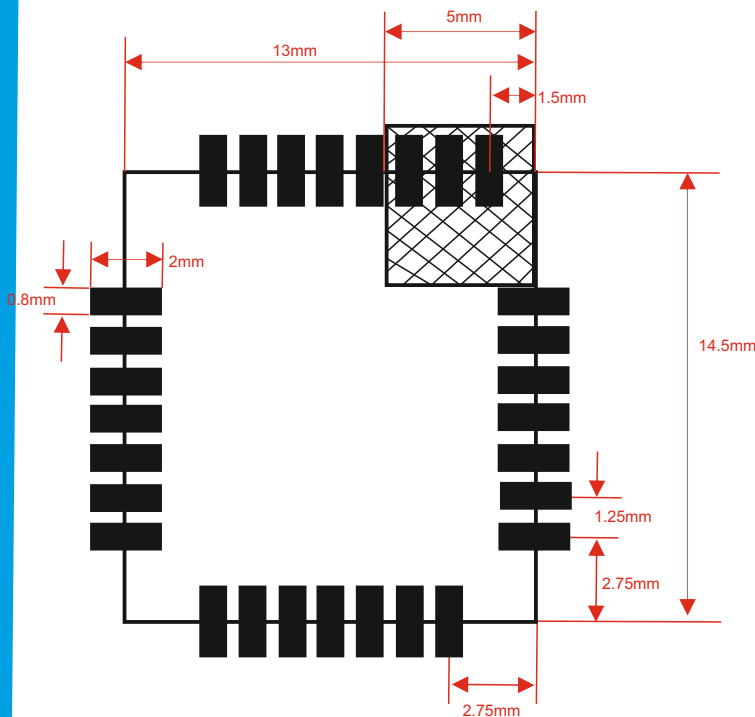
MECHANICAL DIMENSIONS:



Tolerance $\pm 0.5\text{mm}$



RECOMMENDED PCB LAYOUT:



Note :
Make sure in the shadow area shall without any wiring or ground.

1- AT Command instruction

The AT commands are used to drive the LoRa module and to send data.
AT commands are sent through the UART peripheral.

Serial Port parameters:

- Baud rate: 9600
- Data: 8 bit
- Parity: none
- Stop: 1 bit
- Flow control: none

AT command is based on ASCII code.

Request message: AT+<CMD>[OP][parameter-1,parameter-2,...,parameter-n]<CR><LF>

token	Description
AT+	prefix
CMD	command name
OP code	operational character, use OP code : [OP1]"=" : setting [OP2]"?" : inquiry current command instruction [OP3]"'" : execution [OP4]"=?" : inquiry current command content
Parameter-1, parameter-n	Parameters setting
<CR><LF>	

Response format : <CR><LF>[+CMD:] [parameter-1,parameter-n]<CR><LF>
Or <CR><LF><STATUS><CR><LF>

token	Description
+CMD:	command
Parameter-1 ... parameter-n	Back to current character
STATUS	execution status "OK" : exe success "ERROR": exe failure

1- AT Command (Basic Command)

Description	Read Firmware version
Syntax	+VER=?<CR><LF>
Format	AT+VER=? <CR><LF>
Response	<CR><LF>+VER:[parameter-1]<CR><LF>
ResultCode	<CR><LF>OK<CR><LF>

```
12:32]>>>AT+VER=?
[12:32]<<<
+VER:v1.4.2_X0.1
OK
```

Description	Open and Close LOG (factory use)
Syntax	+LOG=[parameter-1] <CR><LF>
Format Command	AT+LOG=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+LOG=? <CR><LF>
Response Query	<CR><LF>+LOG:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 0 close

parameter-1 = 1 open

```
[14:03]>>>AT+LOG=1
[14:03]<<<
OK
```

```
[14:12]>>>AT+LOG=?
[14:12]<<<
+LOG:1
OK
```

Description	Sleeping Mode
Syntax	+Sleep=[parameter-1] <CR><LF>
Format Command	AT+Sleep<CR><LF>
Response Command	<CR><LF>
Format Query	AT+Sleep? <CR><LF>
Response Query	<CR><LF>+Sleep<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

```
[10:34]>>>AT+Sleep
[10:34]<<<
OK
```

```
[10:35]>>>AT+Sleep?
[10:35]<<<
AT+Sleep entry low power mode
```

AT+SLEEP means that both BB (BaseBand) and RF enter the lowest power consumption state. After this command the module will no longer respond to any AT command, it will be necessary to use the wake-up pin to return to the previous conditions.

1-AT Command (Basic Command)

Description	Open and Close automatic saving command
Syntax	+AutoSave=[parameter-1] <CR><LF>
Format Command	AT+AutoSave=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+AutoSave=? <CR><LF>
Response Query	<CR><LF>+AutoSave:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 0=close 1=open

```
[10:55]>>>AT+AutoSave=1
[10:55]<<<
OK
```

```
[10:55]>>>AT+AutoSave=?
[10:55]<<<
+AutoSave:1
OK
```

Note :

With AutoSave=1 the value of the parameters below are saved in flash memory ,
ready to be used when the device is turned on again.

With AutoSave=0 the value of the parameters below are not saved in flash memory.

Command AutoSave : AT-Freq, AT+BW , AT+RX, AT+ACKRSSI
AT+PreambleLen, AT+LPRX , AT+LOG , AT+CadParams
AT+AESKEY, AT+ENAES , AT+TXPW , AT+Baud

Description	Set & and get UART baudrate (default 9600bps)
Syntax	+Baud=[parameter-1] <CR><LF>
Format Command	AT+Baud=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+Baud? <CR><LF>
Response Query	<CR><LF>+Baud:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 0=115200 1=57600 2=38400 3=19200 4=9600 5=4800 6=2400value

```
[10:48]>>>AT+Baud=4
[10:48]<<<
OK
```

```
[10:45]>>>AT+Baud=?
[10:45]<<<
+Baud:4
OK
```


1-AT Command (Basic Command)

Description	<i>Receiving data setting RSSI SNR</i>
Syntax	+ACKRSSI=[parameter-1] <CR><LF>
Format Command	AT+ACKRSSI=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+ACKRSSI=? <CR><LF>
Response Query	<CR><LF>+ACKRSSI:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 1 mean enable RSSI and SNR 0 mean disable RSSI and SNR

```
[10:04]>>>AT+ACKRSSI=1
[10:04]<<<
OK
```

```
[10:05]>>>AT+ACKRSSI=?
[10:05]<<<
+ACKRSSI:1
OK
```

```
[15:51]<<<Hello world
RSSI=-20 dBm,SNR=10
OK
16126s508:OnRxDone
+EVT:RxDone
```

examples of the packet received
with ACKRSSI=1

Description	<i>Read current RSSI</i>
Syntax	+ED=?<CR><LF>
Format	AT+ED=? <CR><LF>
Response	<CR><LF>+ED:[parameter-1]<CR><LF>
ResultCode	<CR><LF>OK<CR><LF>

```
[16:29]>>>AT+ED=?
[16:29]<<<
+ED=-108
OK
```


1-AT Command (Basic Command)

Description	Set / Get AutoRx mechanism
Syntax	+AutoRx=[parameter-1] <CR><LF>
Format Command	AT+AutoRx=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+AutoRx=? <CR><LF>
Response Query	<CR><LF>+AutoRx:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 1 mean enable 0 mean disable

```
[13:43]>>>AT+AutoRx=1
[13:43]<<<
OK
```

```
[13:42]>>>AT+AutoRx=?
[13:42]<<<
+AutoRx:1
OK
```

Note :

When AutoRx is turned on, the system will be in the RX connection state when idle, waiting to receive the data.

Description	Enable or Disable EVT report mechanism
Syntax	+EVTRPT=[parameter-1] <CR><LF>
Format Command	AT+EVTRPT=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+EVTRPT=? <CR><LF>
Response Query	<CR><LF>+EVTRPT:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 1 mean enable EVT report 0 mean disable EVT report

```
[13:50]>>>AT+EVTRPT=1
[13:50]<<<
OK
```

```
[13:50]>>>AT+EVTRPT=?
[13:50]<<<
+EVTRPT:1
OK
```

Note :

When AutoRx is turned on, the system will be in the RX connection state when idle, waiting to receive the data.

1-AT Command (Radiofrequency Command)

Description	Set LoRa Frequency
Syntax	+Freq=[parameter-1] <CR><LF>
Format Command	AT+Freq=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+Freq=? <CR><LF>
Response Query	<CR><LF>+Freq:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 868000000-900000000

```
[15:03]>>>AT+Freq=868100000
[15:03]<<<
OK
```

```
[15:04]>>>AT+Freq=?
[15:04]<<<
+Freq:868100000
OK
```

Description	Set LoRa Bandwidth
Syntax	+BW=[parameter-1] <CR><LF>
Format Command	AT+BW=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+BW=? <CR><LF>
Response Query	<CR><LF>+BW:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 0 : 125KHz 1 : 250KHz 2 : 500KHz 3 : 62KHz 4 : 41KHz 5 : 31KHz
 6 : 20KHz 7 : 15KHz 8 : 10KHz 9 : 7KHz

```
[15:03]>>>AT+BW=3
[15:03]<<<
OK
```

```
[15:18]>>>AT+BW=?
[15:18]<<<
+BW:3
OK
```

Description	Set / Get SYNC WORD
Syntax	+SYNCWORD=[parameter-1] <CR><LF>
Format Command	AT+SYNCWORD=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+SYNCWORD=? <CR><LF>
Response Query	<CR><LF>+SYNCWORD:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = It is a 16 byte ascii value, so it must be composed of 4 ascii characters and each ascii character cannot be "0"
 AT+SYNCWORD = 1234 OK
 AT+SYNCWORD = 1204 is not OK

```
[14:00]>>>AT+SYNCWORD=1424
[14:00]<<<
OK
```

```
[14:00]>>>AT+SYNCWORD=?
[14:00]<<<
+SYNCWORD:1424
OK
```

1-AT Command (Radiofrequency Command)

Description	Set LoRa Spreading Factor
Syntax	+SF=[parameter-1] <CR><LF>
Format Command	AT+SF=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+SF? <CR><LF>
Response Query	<CR><LF>+SF:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = value between 6-12

```
[15:03]>>>AT+SF=9
[15:03]<<<
OK
```

```
[15:24]>>>AT+SF=?
[15:24]<<<
+SF:9
OK
```

Description	Set LoRa Coding Rate
Syntax	+CR=[parameter-1] <CR><LF>
Format Command	AT+CR=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+CR? <CR><LF>
Response Query	<CR><LF>+CR:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = value between 1-4

```
[15:03]>>>AT+CR=4
[15:03]<<<
OK
```

```
[15:27]>>>AT+CR=?
[15:27]<<<
+CR:4
OK
```

1-AT Command (Radiofrequency Command)

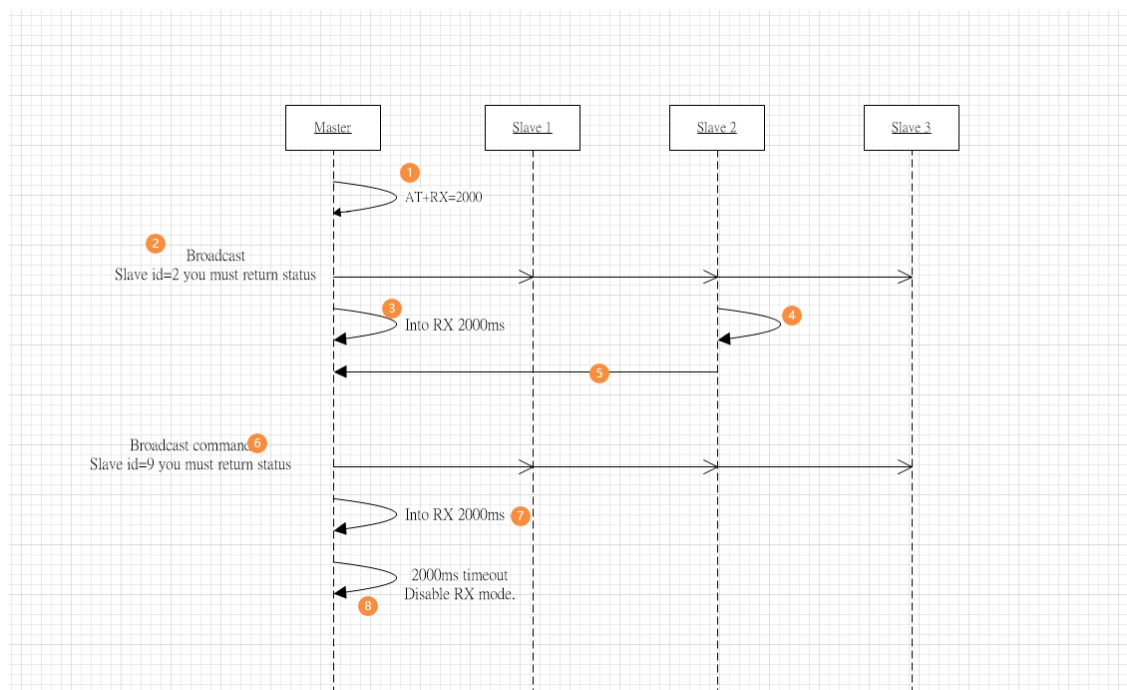
Description	<i>RX Mode Time-out</i>
Syntax	+RX=[parameter-1] <CR><LF>
Format Command	AT+RX=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+RX? <CR><LF>
Response Query	<CR><LF>+RX:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = RX time-out value units is ms, 0 means no time-out value

```
[15:03]>>>AT+RX=0
[15:03]<<<
OK
```

```
[09:32]>>>AT+RX=?  
[09:32]<<<  
+RX:0  
  
OK
```

There are some use cases, where you need to poll your application, after the master sends the request command, the master will immediately enter the receiving state for a defined period, waiting for the slave to return the data. In this case will be possible to use the command `AT+RX= [ parameter-1 ]`



The above figure is a polling sequence diagram.

At mark No. 6,

We want slave id:9 to return the status (but there is no slave id:9 in this network)

At this time, after the master waits for 2000ms in the RX state, it will close the RX state.

1-AT Command (Radiofrequency Command)

Description	<i>Change RF to be wait mode</i>
Syntax	+Standby<CR><LF>
Format Command	AT+Standby<CR><LF>
Response Command	<CR><LF>
Format Query	AT+Standby? <CR><LF>
Response Query	<CR><LF>+AT+Standby switch RF to standby mode<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

```
[15:03]>>>AT+Standby
[15:03]<<<
OK
```

```
[09:42]>>>AT+Standby?
[09:42]<<<
AT+Standby switch RF to standby mode
```

AT+Standby means to switch the state of RF layer to idle state.

When the RF layer is in the TX or RX state, if I want to interrupt the current TX or RX state of the RF layer, I can use AT+Standby to make the RF enter the standby mode.

AT+Standby means that AT+Standby enters the lowest power consumption state, but BaseBand can still receive AT commands.

1-AT Command (Radiofrequency Command)

Description	Set and get TX power
Syntax	+TXPW=[parameter-1] <CR><LF>
Format Command	AT+TXPW=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+TXPW=? <CR><LF>
Response Query	<CR><LF>+TXPW:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = value between 0-22

```
[10:13]>>>AT+TXPW=22
[10:13]<<<
OK
```

```
[10:14]>>>AT+TXPW=?
[10:14]<<<
+TXPW:22
OK
```

Description	Transfer the text and specify a lenght
Syntax	+Send[parameter-1],[parameter-2] <CR><LF>
Format Command	AT+Send=[parameter-1],[parameter-2] <CR><LF>
Response Command	<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = data len

parameter-2 = data

```
[10:13]>>>AT+Send=10,XXXXXXXXXX
[10:13]<<<OK
OK
```

1-AT Command (LowPower RX Mode Command)

Description	Set & and get lenght
Syntax	+PreambleLen=[parameter-1] <CR><LF>
Format Command	AT+PreambleLen=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+PreambleLen? <CR><LF>
Response Query	<CR><LF>+PreambleLen:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = value from 1 to 65535

```
[11:52]>>>AT+PreambleLen=8
[11:52]<<<
OK
```

```
[11:52]>>>AT+PreambleLen=?
[11:52]<<<
+PreambleLen:8
OK
```

Note : TX & RX Preamble Lem must be the same.

Description	Low power mode
Syntax	+LPRX=[parameter-1] <CR><LF>
Format Command	AT+LPRX=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+LPRX? <CR><LF>
Response Query	<CR><LF>+LPRX:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = value from 100 to 4000 ms

```
[11:58]>>>AT+LPRX=1000
[11:58]<<<
OK
```

```
[11:58]>>>AT+LPRX=?
[11:58]<<<
+LPRX:1000
OK
```

Note : TX & RX Preamble Lem must be the same.

1-AT Command (LowPower RX Mode Command)

Description	Set wake up character by AIR
Syntax	+CadParams[parameter-1],[parameter-2],[parameter-3]<CR><LF>
Format Command	AT+CadParams=[parameter-1],[parameter-2][parameter-3] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+CadParams=? <CR><LF>
Response Query	<CR><LF>+LPRX:[parameter-1],[parameter-2][parameter-3]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 0 = CAD_01_SYMBOL
 1= CAD_02_SYMBOL
 2= CAD_04_SYMBOL
 3= CAD_08_SYMBOL
 4= CAD_16_SYMBOL
 DEFAULT = 2

```
[16:26]>>>AT+CadParams=?
[16:26]<<<
+CadParams:2,28,10
OK
```

parameter-2 check CAD peak (data:0-255)
 DEFAULT=28

parameter-3 check CAD Min. (data:0-255)
 DEFAULT=10

AT Command (RF Testing Command for laboratoring use)

Description	Set transmission continually
Syntax	+DutyTest[parameter-1],[parameter-2],[parameter-3]<CR><LF>
Format Command	AT+SutyTest=[parameter-1],[parameter-2][parameter-3] <CR><LF>
Response Command	<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = packages quantity (0 to illimitate)

parameter-2 delay second x package

parameter-3 transmission

Example: AT+DutyTest=0,200,AAAAAAAAAAAA
 Transmission unlimited, AAAAAAAAAAAA per 200ms

1-AT Command (Encryption transmission Command)

Description	<i>Set transmission key using AES256 for encryption</i>
Syntax	+AESKEY[parameter-1]<CR><LF>
Format Command	AT+AESKEY=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+AESKEY=? <CR><LF>
Response Query	<CR><LF>+AESKEY:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter-1 = 64pc character key in hexadecimal.

Ex:

AT+AESKEY=212121212222222232323232424242425252525262626262727272728282828

212121212222222232323232424242425252525262626262727272728282828 is the key, range is :0-9, A-F,a-f.

```
[[16:40]>>>AT+AESKEY=?
[16:40]<<<
+AESKEY:4141414142424242434343444444444545454546464647474748484848
OK
OK
```

Description	<i>Open & Close encryption transmission</i>
Syntax	+ENAES[parameter-1]<CR><LF>
Format Command	AT+ENAES=[parameter-1] <CR><LF>
Response Command	<CR><LF>
Format Query	AT+ENAES=? <CR><LF>
Response Query	<CR><LF>+ENAES:[parameter-1]<CR><LF>
Result Code	<CR><LF>OK<CR><LF>

parameter -1 = 0:close 1: open

When open, TX& RX terminal must set with same key code and must transmission or receiving code by this command.

```
[16:46]>>>AT+ENAES=?
[16:46]<<<
+ENAES:0
OK
```

2-Quick Start Guide

To proceed with this test, use a RC-RICK-XXX-EV evaluation board which is composed as follows:

- RC-RICK-XXX module
- 433/868MHz Antenna
- CP2102 USB/serial interface

More information about this evaluation board can be found on the last page of this document.

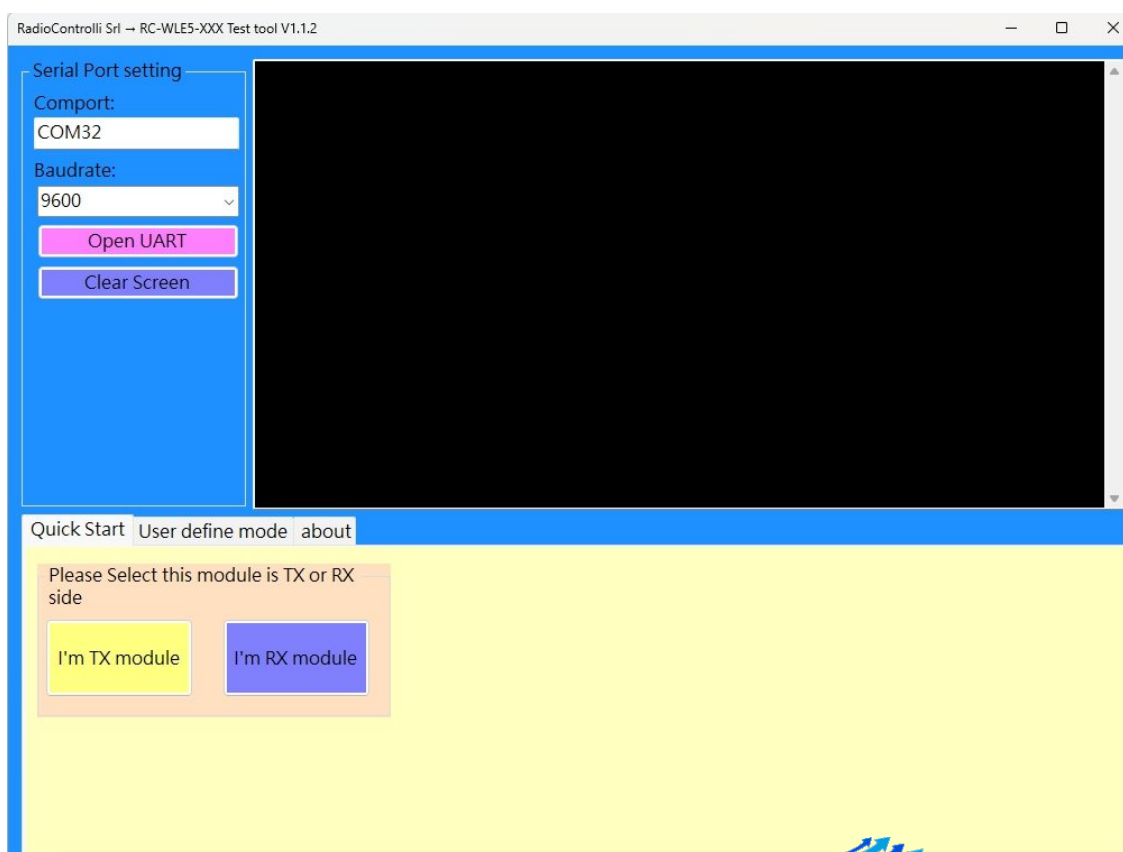
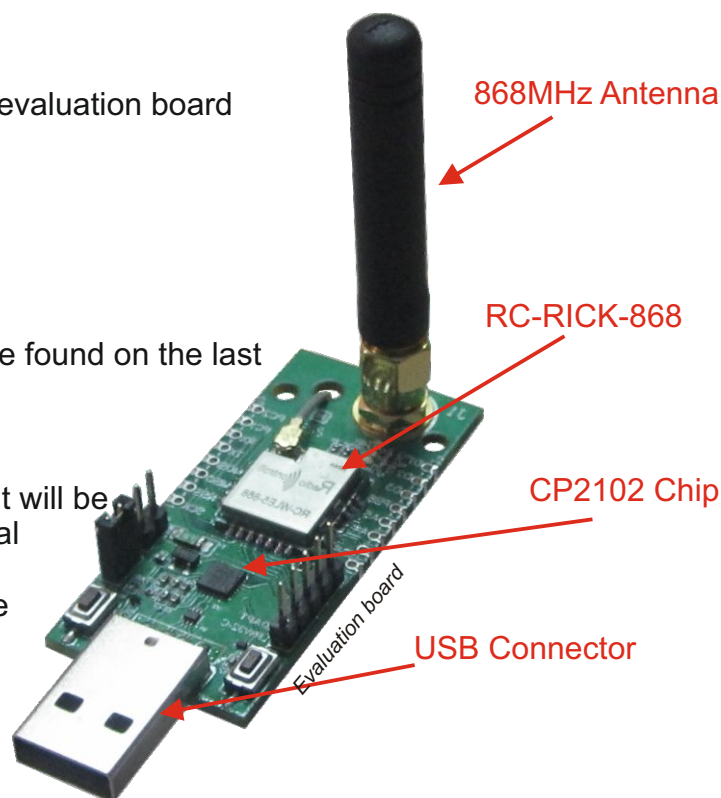
For user to start quickly to use the LORA module, it will be necessary to use a standard windows serial terminal (for example Putty, Real Term ect) or you can use a RadioControlli application downloadable from the following link :

[DOWNLOAD AT COMMAND](#)

Connect the LORA module through UART dongle to a Personal Computer.

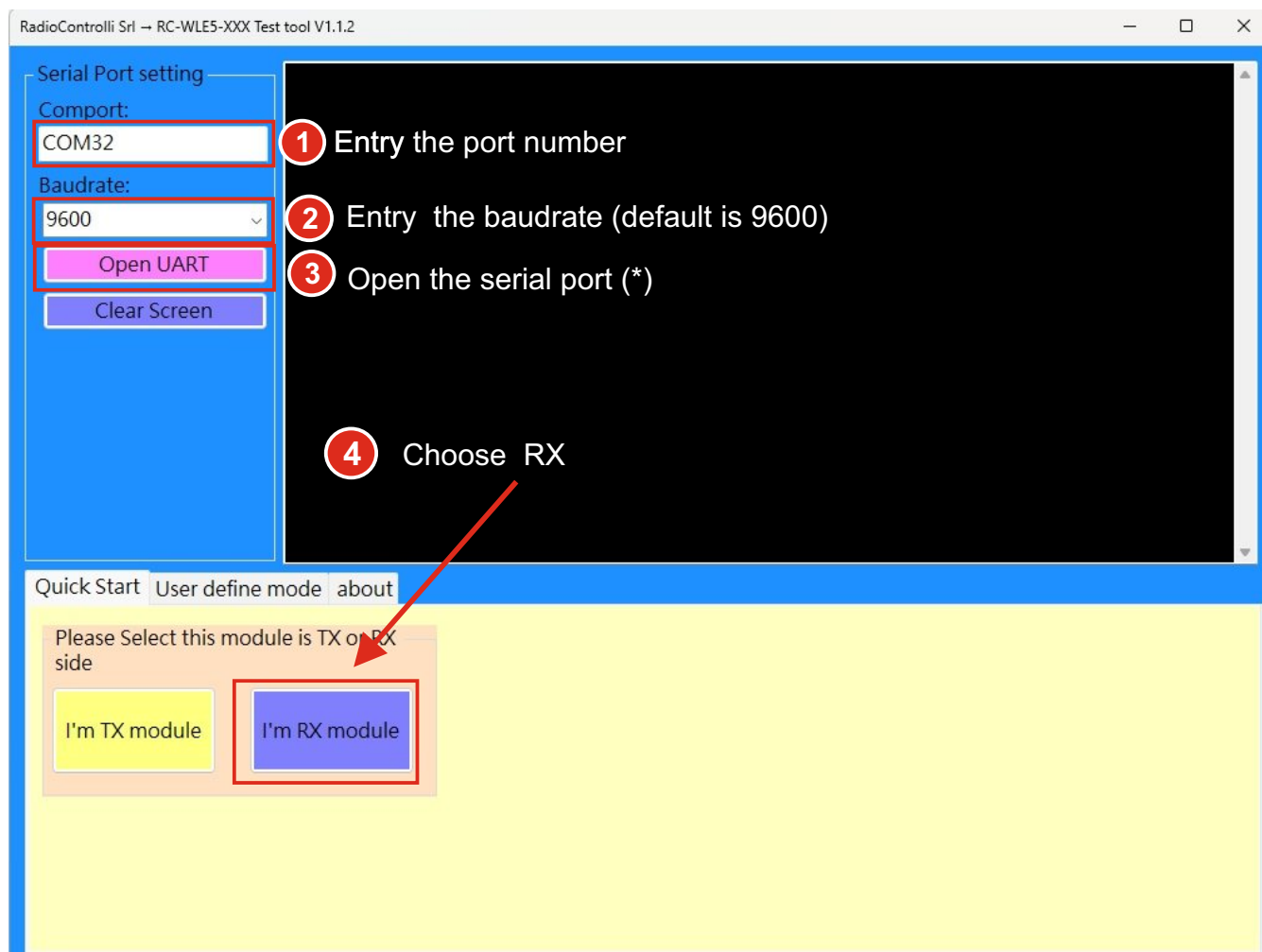
The test will be done using two modules : one as RX, the other as TX.

Launch the application RC-WLE5-XXX.exe.



2- Quick Start : Receiving Station-1

- 1) Input the Comport and set the baudrate (9600 by default).
- 2) Click «Open UART»
- 3) Choose TX or RX Module to go on the corresponding setting function.
- 4) Choose RX



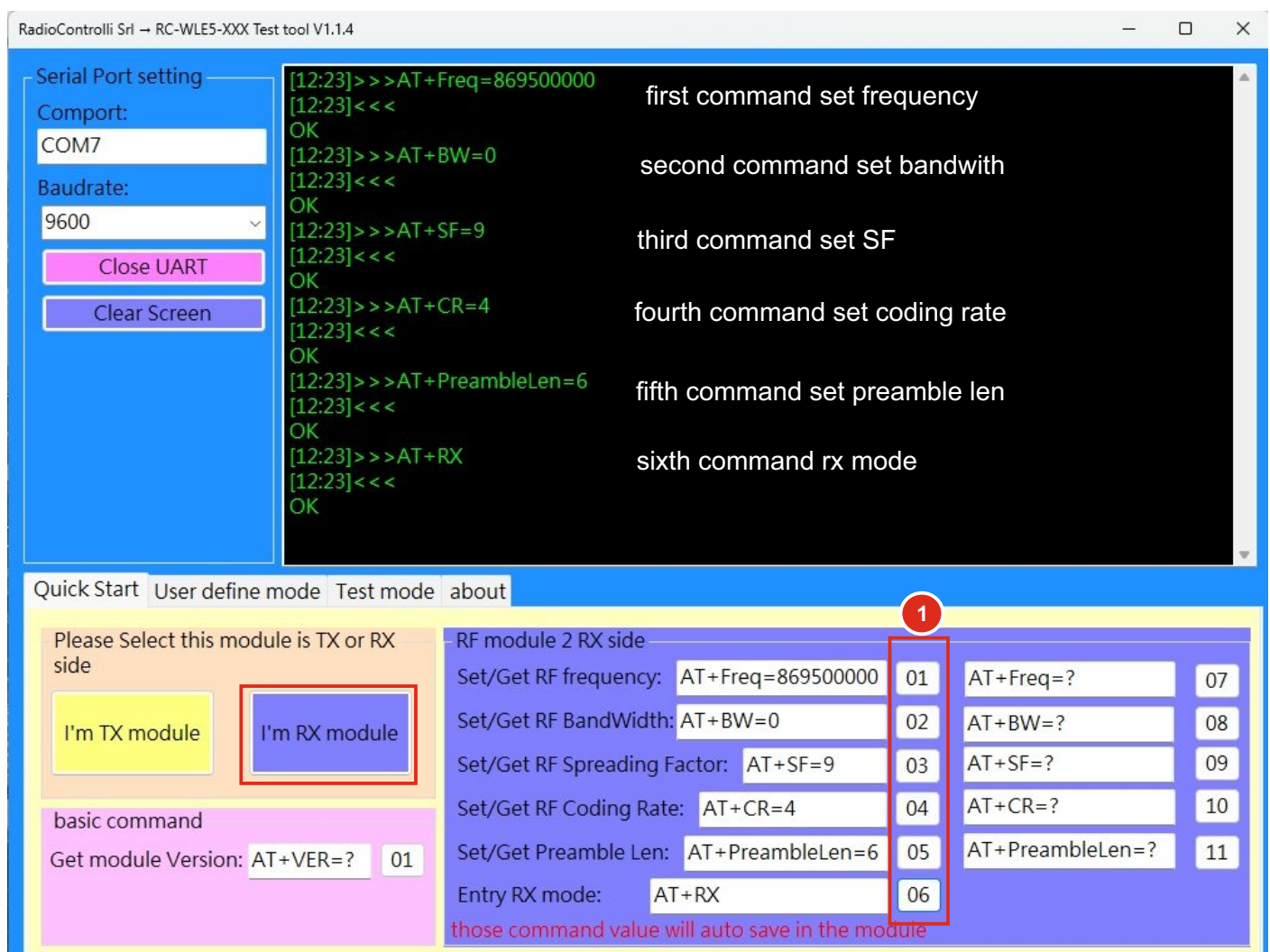
(*) The USB Dongle RadioControlli has inside the Silicon Labs CP2102 chip as serial/usb interface, to open the serial port will be necessary to use the Silicon Labs driver.

2- Quick Start : Receiving Station-2

The following figure shows the setting page of Rx mode, and send all the 01-06 instruction in sequence once, that is to complete the module setting of RX.

- AT+Freq=869500000 set frequency to 869.5MHz
- AT+BW=0 set Lora bandwidth to 125MHz
- AT+SF=9 set Lora spreading factor to 9
- AT+CR=4 set Lora coding rate to 4
- AT+PreambleLen=6 set PreambleLen to 6
- AT+RX

When the last instruction AT+RX will be executed, the module will always be in the receiving mode.



The screenshot shows the 'RadioControlli Srl → RC-WLE5-XXX Test tool V1.1.4' window. The 'Quick Start' tab is active, showing a 'Please Select this module is TX or RX side' section with 'I'm RX module' selected. Below this, the 'basic command' section shows 'Get module Version: AT+VER=? 01'. The 'RF module 2 RX side' section contains a list of commands with numbered buttons (01-06) highlighted by a red box and a red circle with the number 1. The commands are: AT+Freq=869500000 (01), AT+BW=0 (02), AT+SF=9 (03), AT+CR=4 (04), AT+PreambleLen=6 (05), and AT+RX (06). A note at the bottom states 'those command value will auto save in the module'.

Serial Port setting
Comport: COM7
Baudrate: 9600
Close UART
Clear Screen

```
[12:23]>>>AT+Freq=869500000
[12:23]<<<
OK
[12:23]>>>AT+BW=0
[12:23]<<<
OK
[12:23]>>>AT+SF=9
[12:23]<<<
OK
[12:23]>>>AT+CR=4
[12:23]<<<
OK
[12:23]>>>AT+PreambleLen=6
[12:23]<<<
OK
[12:23]>>>AT+RX
[12:23]<<<
OK
```

first command set frequency
second command set bandwidth
third command set SF
fourth command set coding rate
fifth command set preamble len
sixth command rx mode

Quick Start User define mode Test mode about

Please Select this module is TX or RX side
I'm TX module I'm RX module

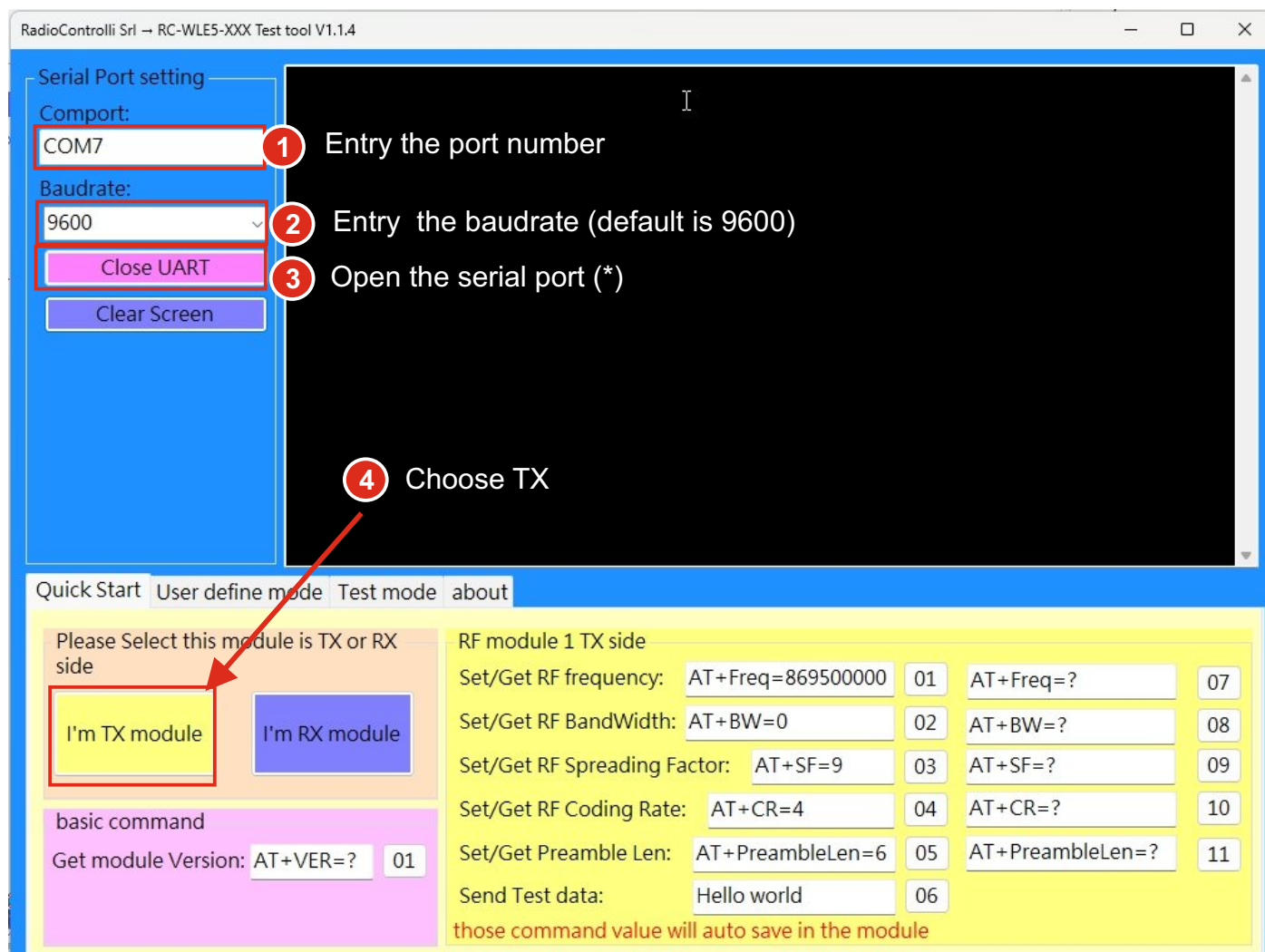
basic command
Get module Version: AT+VER=? 01

RF module 2 RX side
Set/Get RF frequency: AT+Freq=869500000 01 AT+Freq=? 07
Set/Get RF BandWidth: AT+BW=0 02 AT+BW=? 08
Set/Get RF Spreading Factor: AT+SF=9 03 AT+SF=? 09
Set/Get RF Coding Rate: AT+CR=4 04 AT+CR=? 10
Set/Get Preamble Len: AT+PreambleLen=6 05 AT+PreambleLen=? 11
Entry RX mode: AT+RX 06

those command value will auto save in the module

2- Quick Start : Transmission Station-1

- 1) Input the Comport and set the baudrate (9600 by default).
- 2) Click «Open UART»
- 3) Choose TX or RX Module to go on the corresponding setting function.
- 4) Choose TX



RadioControlli Srl → RC-WLES-XXX Test tool V1.1.4

Serial Port setting

Comport: COM7

Baudrate: 9600

Close UART

Clear Screen

Quick Start | User define mode | Test mode | about

Please Select this module is TX or RX side

I'm TX module | I'm RX module

basic command

Get module Version: AT+VER=? 01

RF module 1 TX side

Set/Get RF frequency:	AT+Freq=869500000	01	AT+Freq=?	07
Set/Get RF BandWidth:	AT+BW=0	02	AT+BW=?	08
Set/Get RF Spreading Factor:	AT+SF=9	03	AT+SF=?	09
Set/Get RF Coding Rate:	AT+CR=4	04	AT+CR=?	10
Set/Get Preamble Len:	AT+PreambleLen=6	05	AT+PreambleLen=?	11
Send Test data:	Hello world	06		

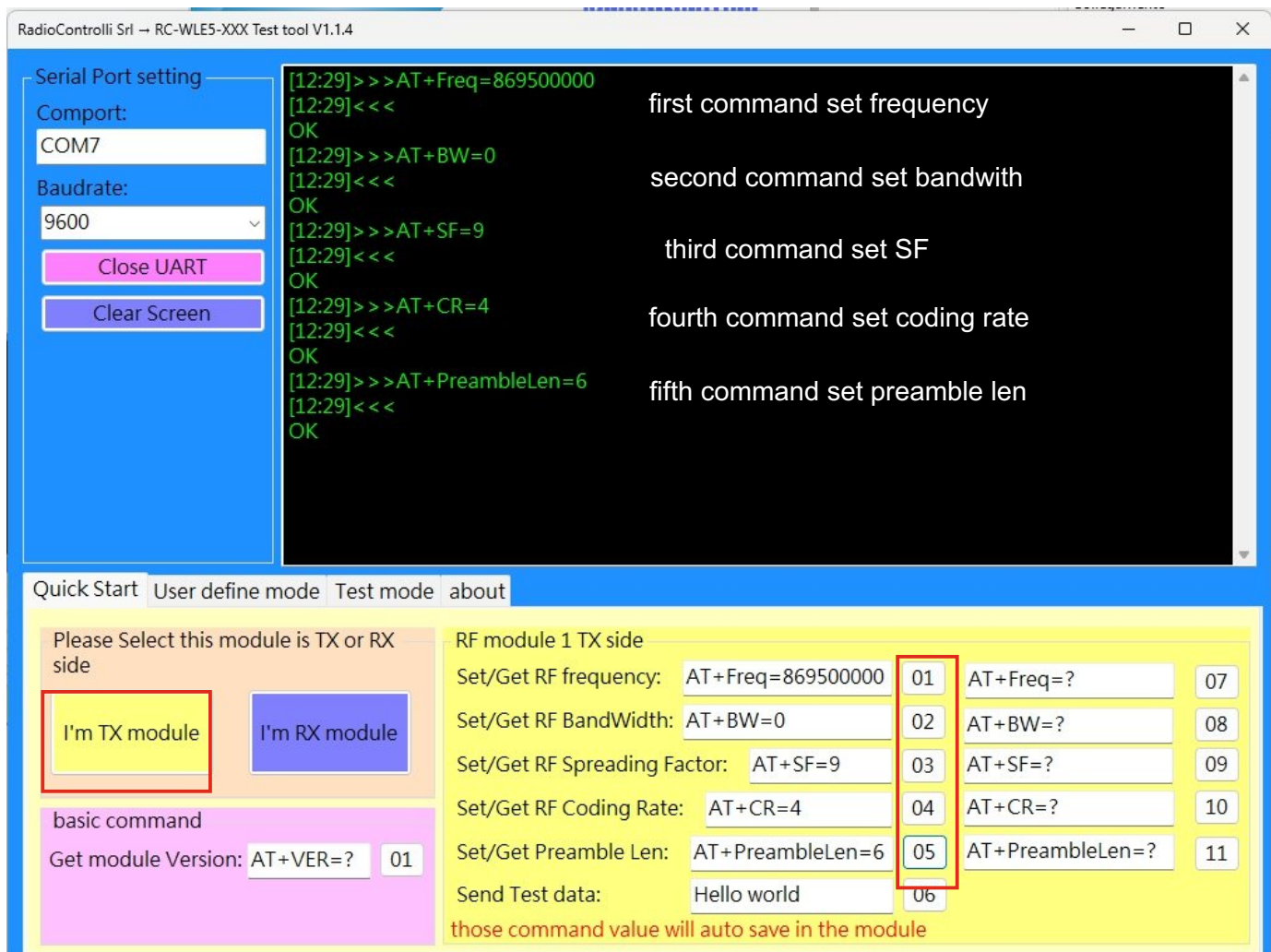
those command value will auto save in the module

(*) The USB Dongle RadioControlli has inside the Silicon Labs CP2102 chip as serial/usb interface, to open the serial port will be necessary to use the Silicon Labs driver.

2- Quick Start : Transmission Station-2

The following figure shows the setting page of Tx mode, and send all the 01-05 instruction in sequence once, that is to complete the module setting of TX .

- AT+Freq=869500000 set frequency to 869.5MHz
- AT+BW=0 set Lora bandwidth to 125MHz
- AT+SF=9 set Lora spreading factor to 9
- AT+CR=4 set Lora coding rate to 4
- AT+PreambleLen=6 set PreambleLen to 6



RadioControlli Srl → RC-WLE5-XXX Test tool V1.1.4

Serial Port setting
Comport: COM7
Baudrate: 9600
Close UART
Clear Screen

```
[12:29]>>>AT+Freq=869500000
[12:29]<<<
OK
[12:29]>>>AT+BW=0
[12:29]<<<
OK
[12:29]>>>AT+SF=9
[12:29]<<<
OK
[12:29]>>>AT+CR=4
[12:29]<<<
OK
[12:29]>>>AT+PreambleLen=6
[12:29]<<<
OK
```

first command set frequency
second command set bandwidth
third command set SF
fourth command set coding rate
fifth command set preamble len

Quick Start User define mode Test mode about

Please Select this module is TX or RX side
I'm TX module I'm RX module

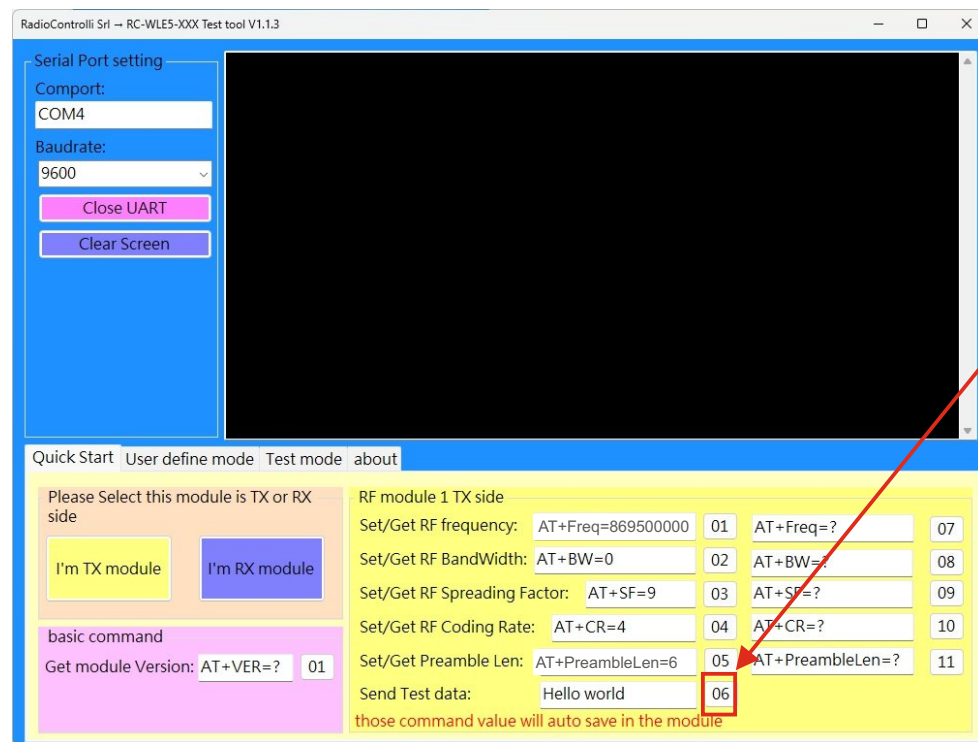
basic command
Get module Version: AT+VER=? 01

RF module 1 TX side
Set/Get RF frequency: AT+Freq=869500000 01 AT+Freq=? 07
Set/Get RF BandWidth: AT+BW=0 02 AT+BW=? 08
Set/Get RF Spreading Factor: AT+SF=9 03 AT+SF=? 09
Set/Get RF Coding Rate: AT+CR=4 04 AT+CR=? 10
Set/Get Preamble Len: AT+PreambleLen=6 05 AT+PreambleLen=? 11
Send Test data: Hello world 06

those command value will auto save in the module

2- Quick Start : First message sent

After all this sets, we are ready to send the first message :



RadioControlli S.r.l. → RC-WLE5-XXX Test tool V1.1.3

Serial Port setting
Comport: COM4
Baudrate: 9600
Close UART
Clear Screen

Quick Start User define mode Test mode about

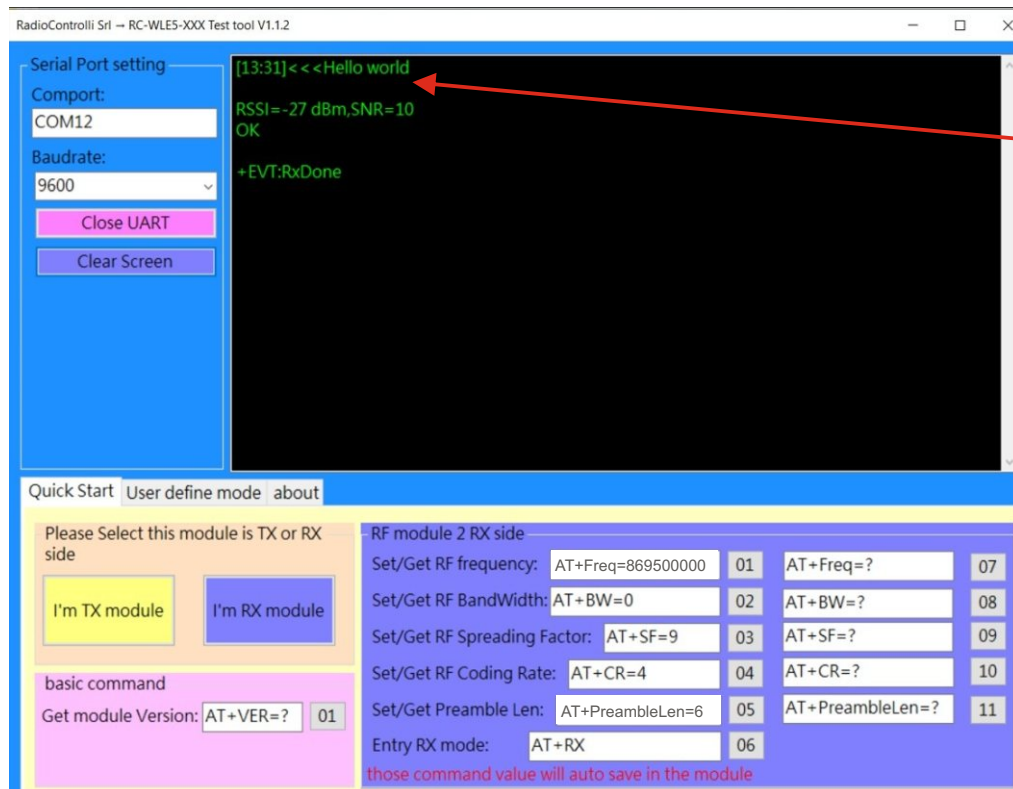
Please Select this module is TX or RX side
I'm TX module I'm RX module

basic command
Get module Version: AT+VER=? 01

RF module 1 TX side
Set/Get RF frequency: AT+Freq=869500000 01 AT+Freq=? 07
Set/Get RF BandWidth: AT+BW=0 02 AT+BW=? 08
Set/Get RF Spreading Factor: AT+SF=9 03 AT+SF=? 09
Set/Get RF Coding Rate: AT+CR=4 04 AT+CR=? 10
Set/Get Preamble Len: AT+PreambleLen=6 05 AT+PreambleLen=? 11
Send Test data: Hello world 06
those command value will auto save in the module

Transmission Station :

Push this button



RadioControlli S.r.l. → RC-WLE5-XXX Test tool V1.1.2

Serial Port setting
Comport: COM12
Baudrate: 9600
Close UART
Clear Screen

Quick Start User define mode about

Please Select this module is TX or RX side
I'm TX module I'm RX module

basic command
Get module Version: AT+VER=? 01

RF module 2 RX side
Set/Get RF frequency: AT+Freq=869500000 01 AT+Freq=? 07
Set/Get RF BandWidth: AT+BW=0 02 AT+BW=? 08
Set/Get RF Spreading Factor: AT+SF=9 03 AT+SF=? 09
Set/Get RF Coding Rate: AT+CR=4 04 AT+CR=? 10
Set/Get Preamble Len: AT+PreambleLen=6 05 AT+PreambleLen=? 11
Entry RX mode: AT+RX 06
those command value will auto save in the module

[13:31]<<Hello world
RSSI=-27 dBm,SNR=10
OK
+EVT:RxDone

Receiving Station :

Message received

You can send other messages from the transmission station, changing the «Test data» and pushing the button

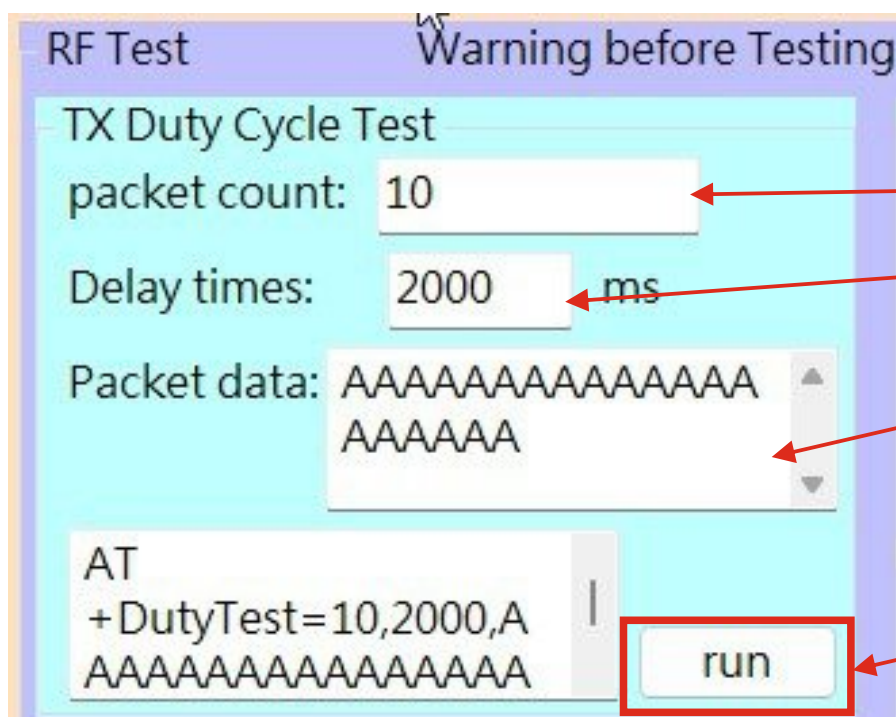
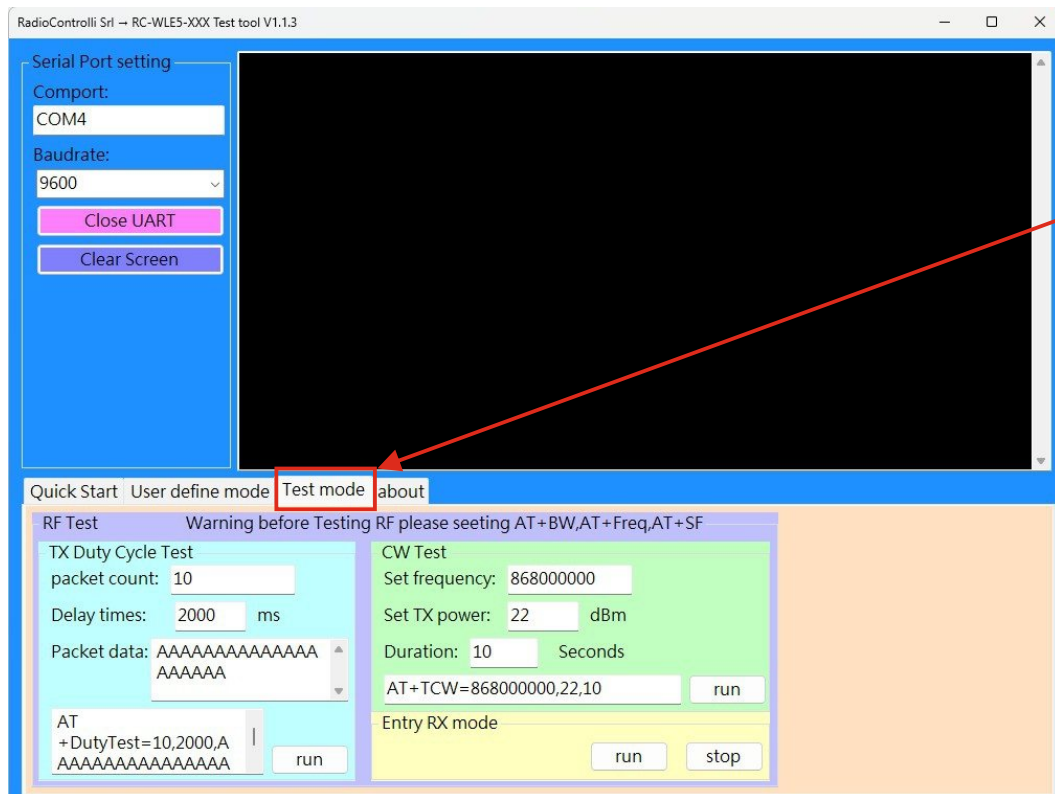
Send Test data: HELLO WORLD!!!! 06

2- Quick Start : Packets data sent continuously -1

This software also contains a "test mode" where it is possible to send a certain number of

Transmission Station :

Push this button



Transmission Station :

Entry number of the packets

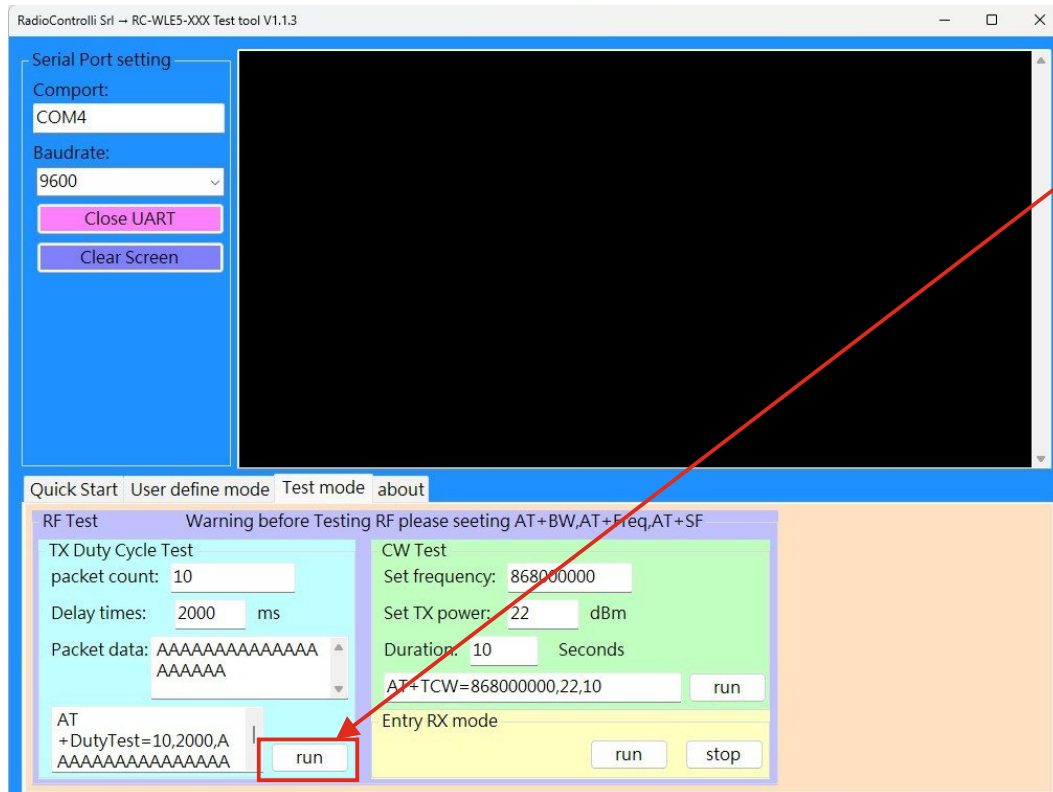
Entry delay times between the packets

Entry data packet

Push this button to RUN the command

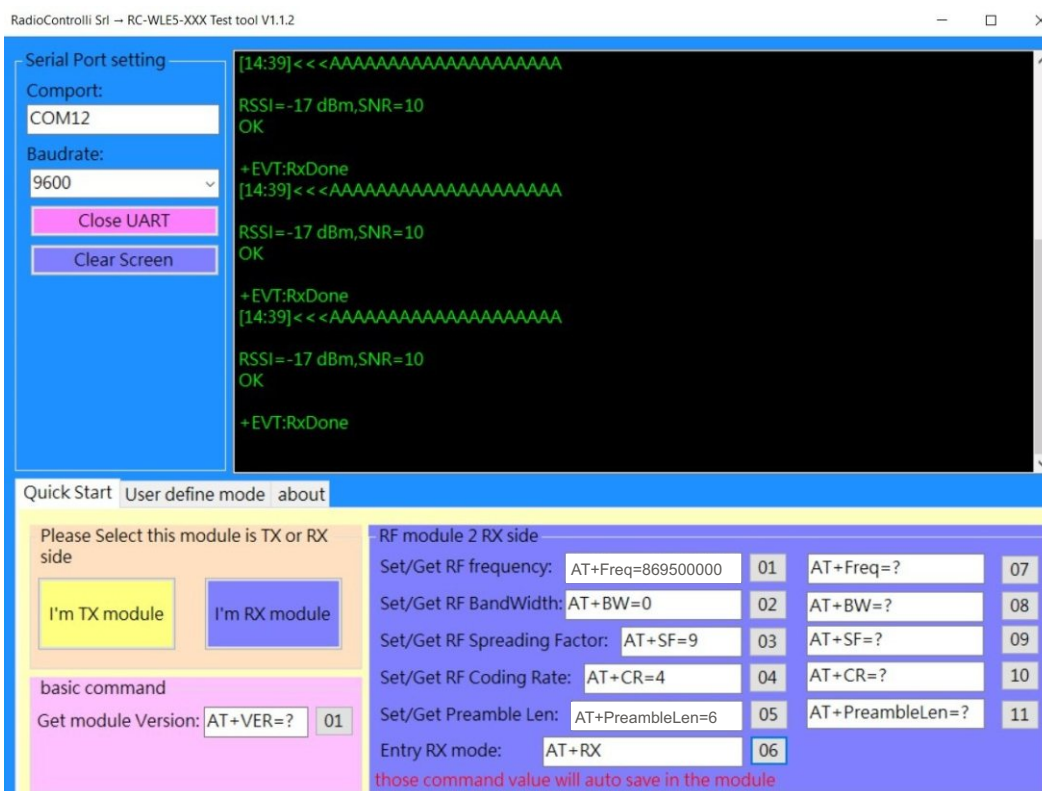
2- Quick Start : Packets data sent continuously -2

When the indicated button is pressed, the command will be executed and therefore the following will be transmitted:



Transmission Station :

Receiving Station : Packets received

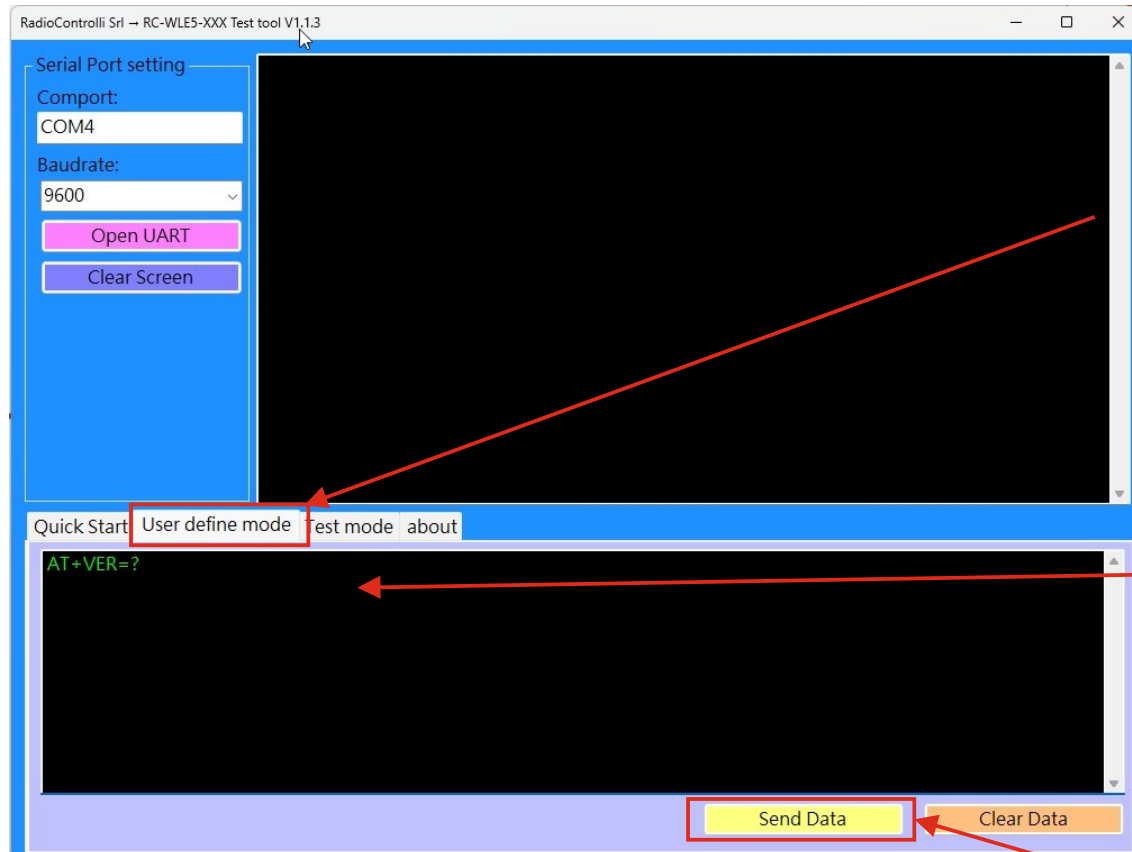


Receiving Station :

Packets received

2- Quick Start : AT command send locally

This software also contains a "User define mode" where it is possible to send AT command locally.

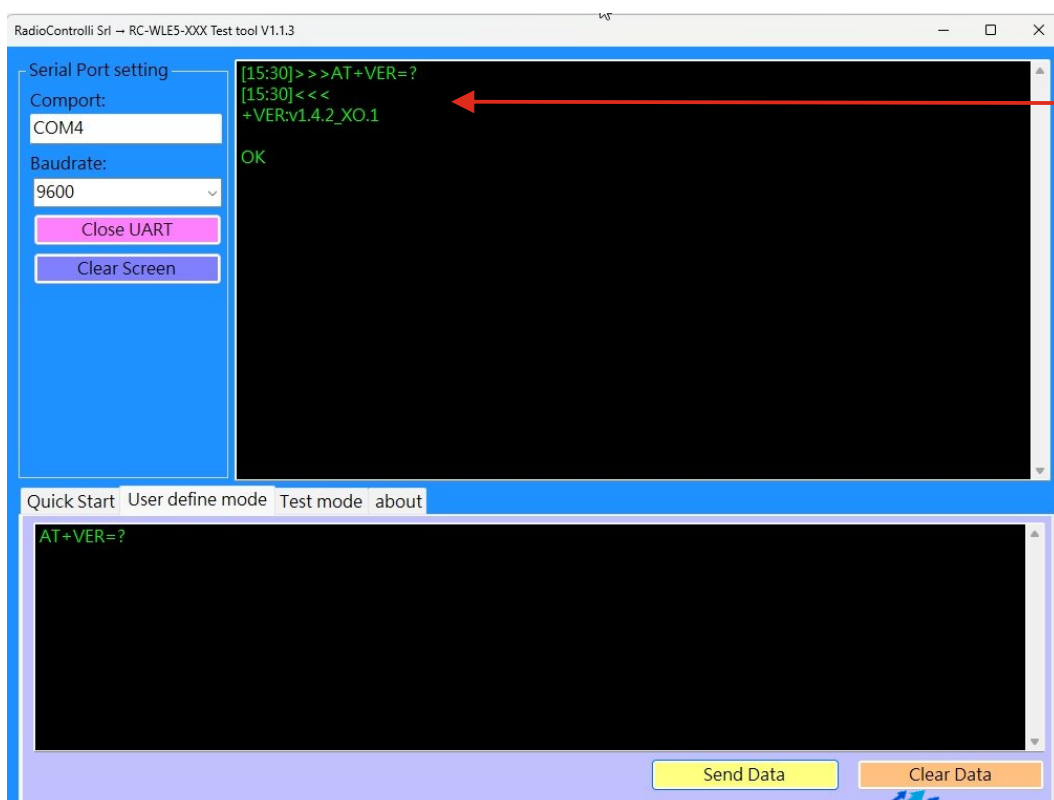


Transmission or Receiver station

Push this button

It's possible to write the AT command in this AREA, in this case we are sending AT+VER=?

Push this button to Send Data



Answer received from the module.

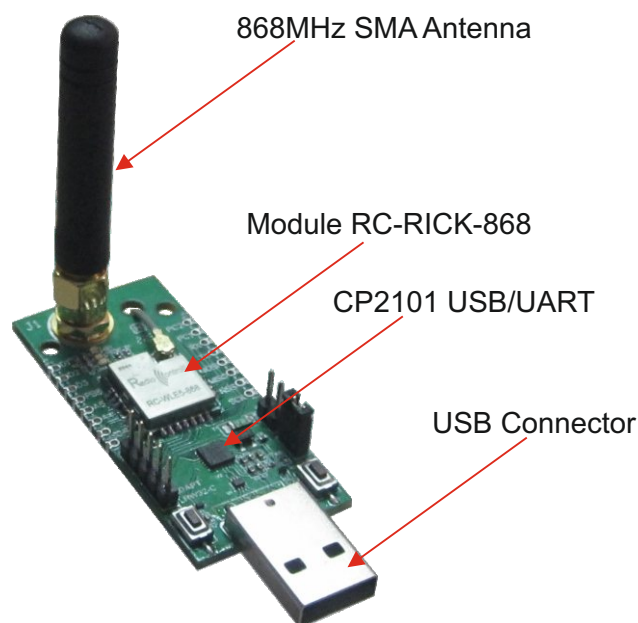
3- Evaluation Kit (RC-RICK-XXX-EV) composed by :

N.2 LORA Dongle equipped with :

- Dongle USB Interface
(based on the CP2102 Silicon Lab USB/Serial)
- RC-RICK-868 module
(Hardware = RC-WLE5-XXX with pre-installed internal software).
- Cable UFL-SMA
- RC-ANT-868-SMA



DONGLE N.1



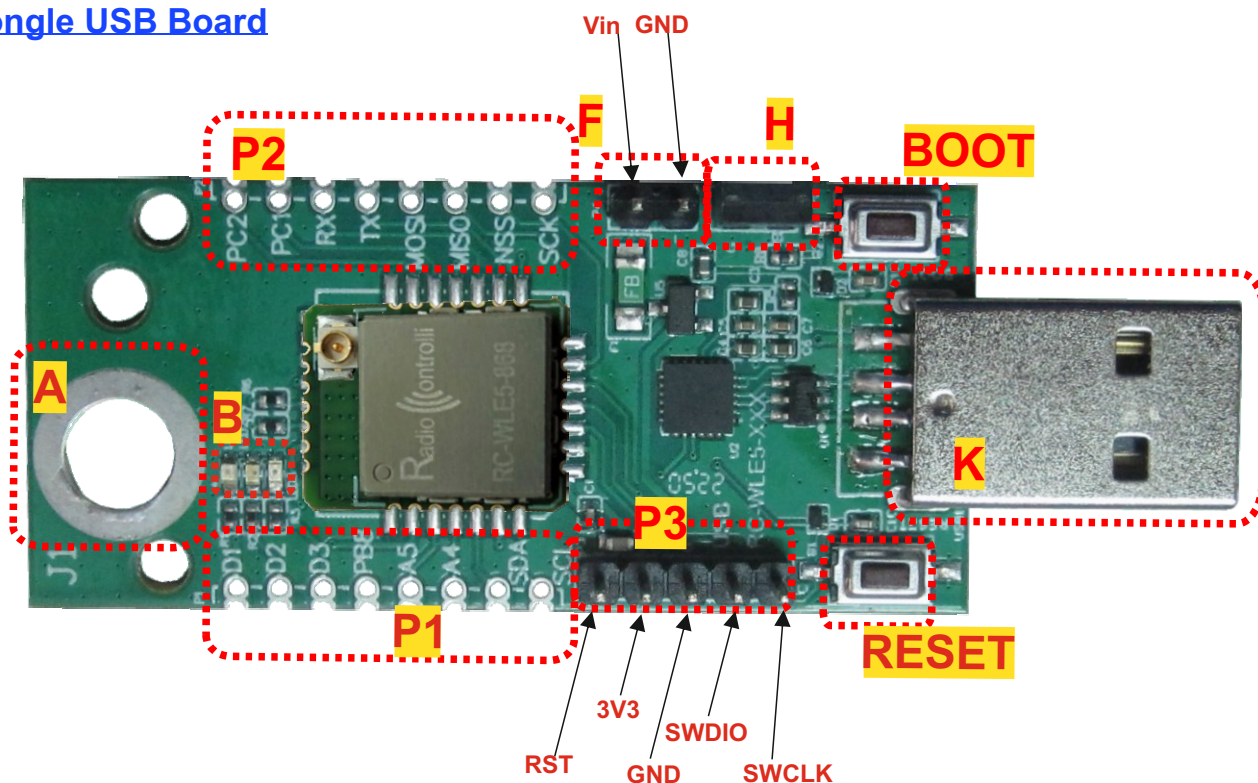
DONGLE N.2

Using this Evaluation kit it is possible to test immediately the LORA radiomodem point to point based on the module RC-RICK-868.

DONGLE N.1 will be STATION A and DONGLE N.2 will be STATION B

3- Evaluation Kit (RC-RICK-XXX-EV)

Dongle USB Board



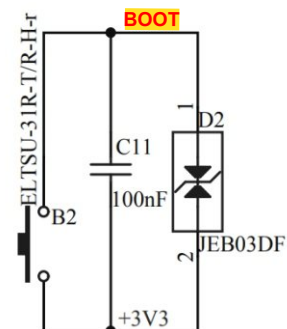
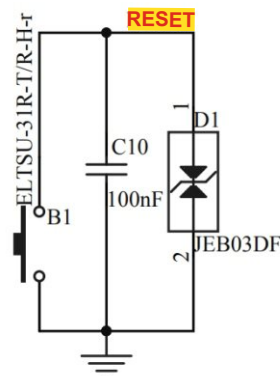
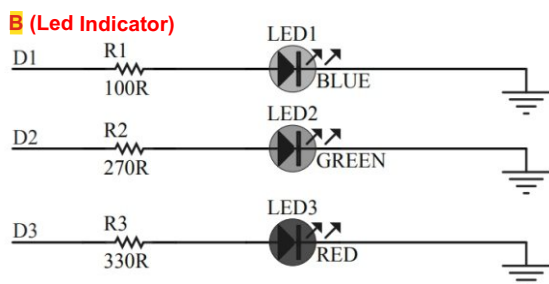
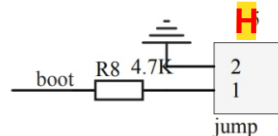
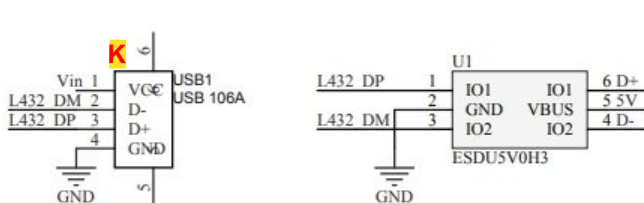
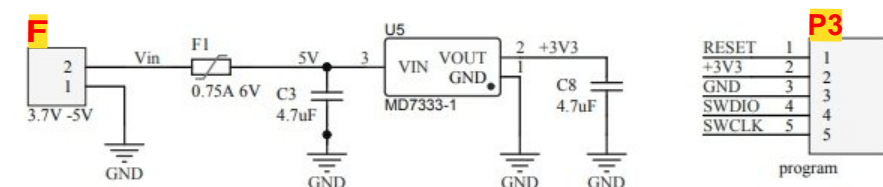
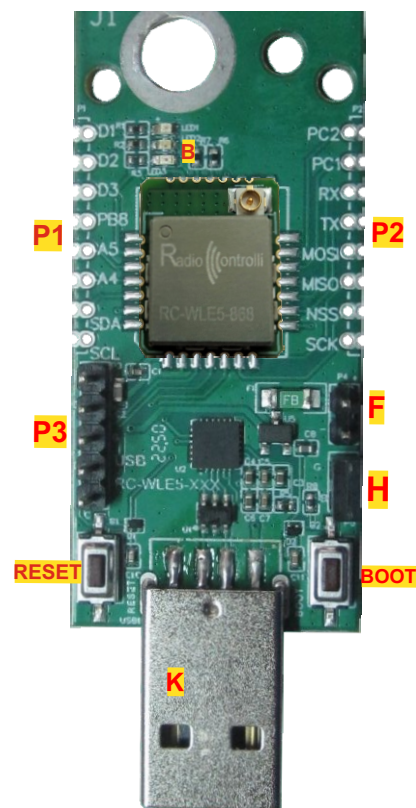
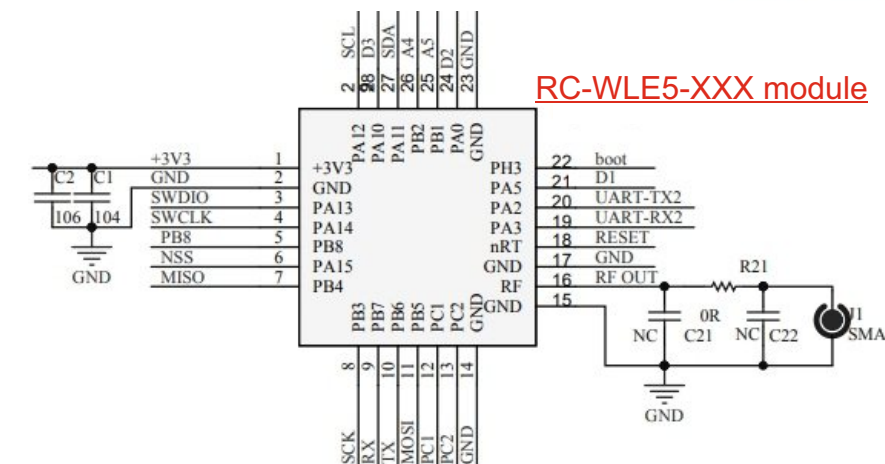
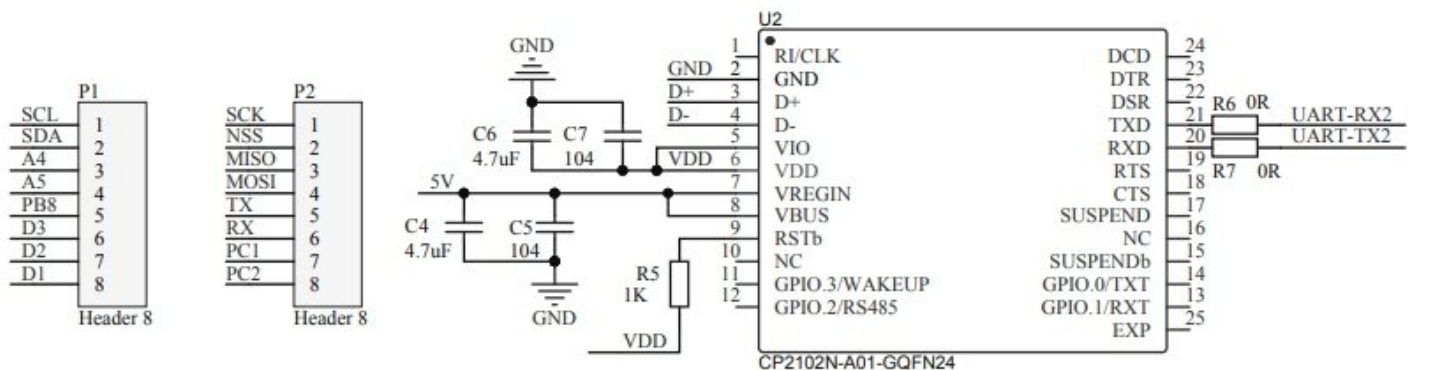
- A** When the customer will need the SMA connector, he can put it on, and inserted the cable (see picture below).
- B** Led Indicator, LED1 (Blue) , LED2(Green), LED3 (Red)
- P1** Connector D1,D2,D3,PB8,A5,A4,SDA,SCI
- P2** Connector PC2,PC1,RX,TX,MOSI,MISO,NRS,SCK
- P3** Programming Connector, connect to ST-LINK to program the module
- F** Connector used to power on the board, VIN = 3.7-5.0Vdc
- H** Jumper used to pull down PH3 (boot), for default the jumper must be done.
- RESET** Push-button- Push the button to reset the module.
- BOOT** Push-button- Push the button and you can program th module with a serial port. Jumper H must be removed.

Evaluation Board with module onboard and Antenna



3- Evaluation Kit (RC-RICK-XXX-EV)

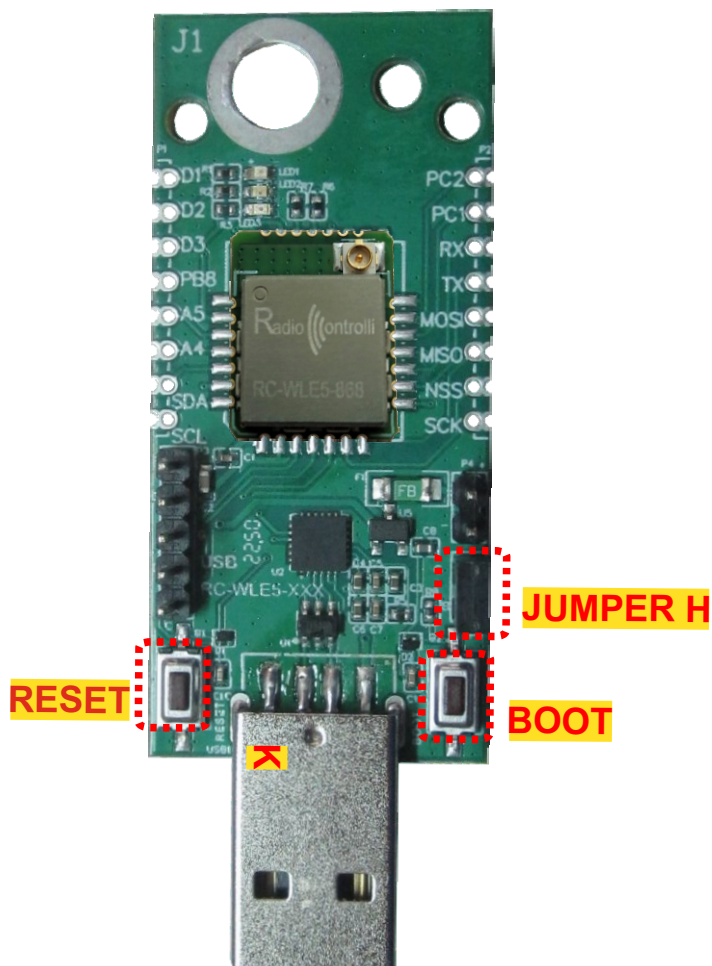
Evaluation Board Schematics



4- Firmware Update (Dongle USB)

It's possible to proceed with the firmware update using the following procedure :

- Download the software «RICK Update firmware» on the following link : =====> [DOWNLOAD](#)
- Download the last firmware version on the following link : =====> [FW DOWNLOAD](#)
- Connect the USB Dongle to a PC
- Remove the **JUMPER H** (mean that the pin 22 BOOT is in high 3,3V condition)
- Push first the **BOOT Button** and after the **RESET Button** (means giving a GND pulse to pin 18 RST).
- Launch the RICK Update Firmware appear the following screen :



- Insert the correct COM PORT
- Select the firmware to load onto the board .
- Push FW download

-Will appear the following screen :



-Push OK button and wait for about 2 minutes



-Update FW done.