

LSM1x0A LoRa CLI Command interface manual

Rev 1.0

SJI

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Contents

| | |
|--|----------|
| 1. AT COMMAND COMPLETE SET | 3 |
| 2. LORA RF TEST DESCRIPTION | 4 |
| 2.1 CONFIGURE RF TEST..... | 4 |
| 2.2 RF TEST – OTAA | 6 |
| 3. LORA COMMAND | 8 |

History

| Date | Contents | Version | |
|------------|----------|---------|--|
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1. AT command complete set

A typical serial terminal emulator can also be used to control the EVK instead of the proposed test SW. In that case the following parameters should be used:

- Speed : 9600 bauds
- Data bits: 8
- Stop bits: 1
- Parity: None

The following table gather all AT command available:

2. LoRa RF Test Description

2.1 Configure RF test

General Setting

*** Conf RF Test Setting**(Required to set every device reset)

The screenshot shows the SEONG JI LoRa Manual configuration interface. The 'Conf RF Test' section is highlighted with a red box. It contains the following fields and values:

- TCONF: 868300000
- Freq(Hz): 15
- PW(dBm): 4:125
- Bandwidth(KHz): 7
- SF: 5
- CodingRate: LNA
- Modulation: 1
- PayloadLen: 16

The 'Set' button for the Conf RF Test is also highlighted.

- As in the picture above, enter parameters without spaces and Set

AT+TCONF=<Frequency>:<Power>:<LoRa Bandwidth>:<Lora SF>:<CodingRate>:<Lna>:<PA Boost>:<Modulation>:<PayloadLen>:<FskDeviation>:<LowDrOpt>:<BTproduct>:<CR>

Ex) AT+TCONF=868300000:10:4:5:4/5:0:0:1:16:0:0:0

Tx Test

After selecting Tx in the Packet part, set the number of times to repeat Value and Send.

Ex) AT+TTX=10

The screenshot shows the SEONG JI LoRa Manual software interface. On the left, the 'UART Log' window displays the command 'AT+TTX=10' and a series of status messages including 'TTxStart', '7946491:Tx LoRa Test', and 'TTxEnd'. The main 'LoRa Manual' window has various configuration tabs. The 'Packet' tab is selected, showing 'Tx' as the packet type and '10' as the value. The 'Send' button is highlighted with a red box. Other tabs like 'RF Test', 'Modulation', and 'RF Test Stop' are also visible.

Rx Test

After selecting Rx in the Packet part, set the number of times to repeat Value and Send.

- ➔ if received success display "OnRxDone"
- ➔ if received fail display "OnRxTimeout"

Ex) AT+TRX=5

The screenshot shows the SEONG JI LoRa Manual software interface. On the left, the 'UART Log' window displays the command 'AT+TRX=5' and a series of status messages including 'TrxStart', '7s257:RssValue=-111 dBm, SnnValue=3dB', and 'TrxEnd'. The main 'LoRa Manual' window has various configuration tabs. The 'Packet' tab is selected, showing 'Rx' as the packet type and '5' as the value. The 'Send' button is highlighted with a red box. Other tabs like 'RF Test', 'Modulation', and 'RF Test Stop' are also visible.

2.2 RF test – OTAA

1) Select region band ID

Ex) EU- AT+BAND=5, Korea- AT+BAND=6

The screenshot shows the SEONG JI LoRa Manual software interface. The 'Port Set' section at the top left has 'DUTCOM: 7' and 'Connect' and 'Close' buttons. The 'UART Log' section on the left displays the command 'AT+BAND=6' and its output, which includes OTAA mode settings and device addresses. The 'LoRa Manual' section on the right contains various configuration fields. The 'Region Band ID' field is highlighted with a red box and set to '6KR920'. Other fields include 'Set Network ID', 'Set ETSI DutyCycle', 'Join Network Mode' (set to 1: OTAA), 'Set Device Class', 'Set Freq / Datarate', 'LoRa Device Setting', 'Key Write', 'AT SEND', 'RF Test', 'Conf RF Test', 'Packet', and 'Verify'.

2) Join the basesyaron

Ex) AT+JOIN=1

The screenshot shows the SEONG JI LoRa Manual software interface. The 'Port Set' section at the top left has 'DUTCOM: 7' and 'Connect' and 'Close' buttons. The 'UART Log' section on the left displays the command 'AT+JOIN=1' and its output, which includes OTAA mode settings and device addresses. The 'LoRa Manual' section on the right contains various configuration fields. The 'Join Network Mode' field is highlighted with a red box and set to '1: OTAA'. Other fields include 'Region Band ID', 'Set Network ID', 'Set ETSI DutyCycle', 'Set Device Class', 'Set Freq / Datarate', 'LoRa Device Setting', 'Key Write', 'AT SEND', 'RF Test', 'Conf RF Test', 'Packet', and 'Verify'.

3) Send data

Ex) AT+SEND=48:0:1245

Port Set

DUTCOM:

UART Log

AT+SEND=48:0:1245

445s866:TX on freq 922100000 Hz at DR 0

OK

447s171:MAC txDone

448s057:RX_1 on freq 922100000 Hz at DR 0

448s402:IRQ_RX_TX_TIMEOUT

448s402:MAC rxTimeOut

449s057:RX_2 on freq 921900000 Hz at DR 0

449s402:IRQ_RX_TX_TIMEOUT

449s402:MAC rxTimeOut

LoRa Manual

Region Band ID

Set Network ID
ID:

Set ETS1 DutyCycle
☐ ENABLE

Join Network Mode
☐ 0: ABP ☒ 1: OTAA

Set Device Class
A

Verbose Level
Value

Set Freq / Datarate
 Hz
Rx Datarate
Tx Datarate

LoRa Device Setting
Adaptive Datarate
0:OFF
Tx Datarate
Set Delay
RX1DL ms
Tx Power

Key Write
ID: App Eui Value:

AT SEND
Port 0 : Unconfirmed Payload

RF Test
RF Tx Hopping
Fstart(MHz) Fstop Fdelta Packed Num

Conf RF Test
Freq(Hz) PW(dBm) Bandwidth(KHz) SF CodingRate
☐ LNA ☐ Boost Modulation PayloadLen
fskDev LowDrOpt 2:Auto BT Product 0:No Gaussian

Packet
Tx Value

Verify

RSSI Test



3. LoRa Command

| Command | Name | Description |
|------------------------------|----------------------------------|---|
| AT? | Help on all <CMD> | Help on All Commands. Ex) AT? (CR) |
| ATZ | Reset | Trig a MCU reset. Ex) ATZ (CR) |
| AT+BAT=? | Battery level | Get the battery level (in mV). Ex) AT+BAT=? (CR) |
| AT+VL=level AT+VL=? | Verbose level | Set or Get the verbose level. <level>: [0: off ~ 3: High] Ex) AT+VL=3 (CR) |
| AT+MODE=mode AT+MODE=? | Mode Change | LoRa & Sigfox Mode Change. After a MCU reset. <mode>: [0: SigFox, 1: LoRa] Ex) AT+MODE=1 (CR) |
| AT\$SSWVER=? | Software version | Get the Software version. Ex) AT\$SSWVER=? (CR) |
| AT+VER=? | Firmware and library versions | Get the version of firmware and libraries. Ex) AT+VER=? (CR) |
| AT+LTIME=? | Local time in UTC format | Get the local time in UTC format. Ex) AT+LTIME=? (CR) |
| AT+LINKC? | Link Check | Piggyback a Link Check Request to the next uplink. Ex) AT+LINKC? (CR) |
| AT+APPEUI=eui AT+APPEUI=? | Application EUI | Set or Get the Application EUI. Ex) AT+APPEUI=00:00:00:00:00:00:00:07 (CR) |
| AT+NWKKEY=key AT+NWKKEY=? | Network Key | Set or Get the Network Key. Ex) AT+NWKKEY=00:11:22:33:44:55:66:77:88:99:AA:BB:CC:DD:EE:FF (CR) |

| Command | Name | Description |
|--------------------------------|-------------------------|--|
| AT+APPKEY=key AT+APPKEY=? | Application Key | Set or Get the Application Key. Ex) AT+APPKEY=00:11:22:33:44:55:66:77:88:99:AA:BB:CC:DD:EE:FF (CR) |
| AT+NWKSKEY=key AT+NWKSKEY=? | Network Session Key | Set or Get the Network Session Key. Ex) AT+NWKSKEY=00:11:22:33:44:55:66:77:88:99:AA:BB:CC:DD:EE:FF (CR) |
| AT+APPSKEY=key AT+APPSKEY=? | Application Session Key | Set or Get the Application Session Key. Ex) AT+APPSKEY=00:11:22:33:44:55:66:77:88:99:AA:BB:CC:DD:EE:FF (CR) |
| AT+DADDR=address AT+DADDR=? | Device address | Set or Get the Device address. Ex) AT+DADDR=00:11:22:33 (CR) |
| AT+DEUI=? | Device EUI | Get the Device EUI. Ex) AT+DEUI=? (CR) |
| AT+NWKID=id AT+NWKID=? | Network ID | Set or Get the Network ID. <id>: [0 ~ 127]. Ex) AT+NWKID=100 (CR) |
| AT+JOIN=mode AT+JOIN=? | Join network with Mode | Join network with Mode. <mode> [0: ABP, 1: OTAA] Ex) AT+JOIN=1 (CR) |
| AT+SEND=port:ack:data | Send binary data | Send binary data with the application <Port> [1 ~ 199] <Ack> [0: unconfirmed, 1: confirmed] Ex) AT+SEND=1:1:123456789012345678901234567890123456789012345678901234567890123456 (CR) |
| AT+ADR=mode AT+ADR=? | Adaptive DataRate | Set or Get the Adaptive DataRate setting. <mode>: [0: Off, 1: On] Ex) AT+ADR=0 (CR) |

| Command | Name | Description |
|---------------------------|--------------------------|---|
| AT+DR=datarate AT+DR=? | Tx DataRate | <p>Set or Get the Tx DataRate. Activation when ADR off Only <datarate>: [0 ~ 7]</p> <p>[EU868]</p> <p>0: LoRa - SF12 / 125 kHz, bit rate - 250 bit/s 1: LoRa - SF11 / 125 kHz, bit rate - 440 bit/s 2: LoRa - SF10 / 125 kHz, bit rate - 980 bit/s 3: LoRa - SF9 / 125 kHz, bit rate - 1760 bit/s 4: LoRa - SF8 / 125 kHz, bit rate - 3125 bit/s 5: LoRa - SF7 / 125 kHz, bit rate - 5470 bit/s 6: LoRa - SF7 / 250 kHz, bit rate - 11000 bit/s 7: FSK - 50 kbps, bit rate - 5000 bit/s</p> <p>Ex) AT+DR=0 (CR)</p> |
| AT+TXP=power AT+TXP=? | Transmit Power | <p>Set or Get the Transmit Power. (valid range according to region) <power>: [0 ~ 15]</p> <p>AS923: [0~7] AU915: [0~14] CN779: [0~5] EU868: [0~7] KR920: [0~7] IN865: [0~10] US915: [0~14] RU864: [0~7]</p> <p>Ex) AT+TXP=0 (CR) (in KR920 0: MAX ERP)</p> |
| AT+BAND=band AT+BAND=? | Active Region Band ID | <p>Set or Get the Active Region Band ID. [0 ~ 9] <band>: [0: AS923, 1: AU915, 2: CN470, 3: CN779, 4: EU433, 5: EU868, 6: KR920, 7: IN865, 8: US915, 9: RU864]</p> <p>Ex) AT+BAND=0 (CR)</p> |

| Command | Name | Description |
|---------------------------------|--|--|
| AT+CLASS=class AT+CLASS=? | Device Class | Set or Get the Device Class. <Class>: [A, C] Class B to be update Ex) AT+CLASS=? (CR) |
| AT+DCS=mode AT+DCS=? | ETSI DutyCycle | Set or Get the ETSI DutyCycle. <mode>: [0: disable, 1: enable] - Only for testing Ex) AT+DCS=0 (CR) (for KR920, AS923, AU915,..) |
| AT+RX2FQ=freq AT+RX2FQ=? | Rx2 window Freq | Set or Get the Rx2 window. <freq>: Frequency (in Hz) Ex) AT+RX2FQ=869525000 (CR) |
| AT+RX2DR=datarate AT+RX2DR=? | Rx2 window DataRate | Set or Get the Rx2 window DataRate. <datarate>: [0 ~ 7] Ex) AT+RX2DR=0 (CR) |
| AT+RX1DL=delay AT+RX1DL=? | Delay between end of Tx and Rx Window 1 | Set or Get the delay between the end of the Tx and the Rx Window 1. <delay>: delay (in ms) Ex) AT+RX1DL=1000 (CR) |
| AT+RX2DL=delay AT+RX2DL=? | Delay between end of Tx and Rx Window 2 | Set or Get the delay between the end of the Tx and the Rx Window 2 in ms. <delay>: delay (in ms) Ex) AT+RX2DL=2000 (CR) |
| AT+JN1DL=delay AT+JN1DL=? | Join Accept Delay between end of Tx and Join Rx Window 1 | Set or Get the Join Accept Delay between the end of the Tx and the Join Rx Window 1 in ms. <delay>: delay (in ms) Ex) AT+JN1DL=5000 (CR) |
| AT+JN2DL=delay AT+JN2DL=? | Join Accept Delay between end of Tx and Join Rx Window 2 | Set or Get the Join Accept Delay between the end of the Tx and the Join Rx Window 2 in ms. <delay>: delay (in ms) Ex) AT+JN2DL=6000 (CR) |

| Command | Name | Description |
|--|-----------------|---|
| AT+TTH=fstart:fstop:fdelta:packetnb | Test Tx Hopping | <p>Starts RF Tx hopping test from Fstart to Fstop in Hz or MHz, Fdelta in Hz. Class B test.</p> <p><fstart>: frequency (in Hz or MHz)</p> <p><fstop>: frequency (in Hz or MHz)</p> <p><fdelta>: frequency (in Hz)</p> <p>Ex) AT+TTH=867:869:500000:10 (CR)</p> |
| AT+TCONF=frequency:power:bandwidth:sf:codingrate:lna:paboost:modulation:payloadlen:fskdeviation:lowdropt:btproduct | Configure RF | <p>Configure RF test.</p> <p><Frequency>: [ex: 868300000]Hz</p> <p><Power>: [-9 ~ 22]dBm Max 15dBm at Low Power</p> <p><Bandwidth>: Lora [4: 125, 5: 250, 6: 500]kHz, or FSK: [4800Hz : 467000]Hz</p> <p><SF>: [7 ~ 12] or <FSK>: [600 ~ 300000]</p> <p><CodingRate>: [4/5, 4/6, 4/7, 4/8]</p> <p><Lna>: [0: Off, 1: On]</p> <p><PA Boost>: [0: Off, 1: On]</p> <p><Modulation>: [0: FSK, 1: LoRa, 2: BPSK]</p> <p><PayloadLen>: [1 ~ 256]</p> <p><FskDev>: FSK Only [600 ~ 20000]</p> <p><LowDrOpt>: Lora Only [0: off, 1: On, 2: Auto]</p> <p><BTproduct>: [0: no Gaussian Filter Applied, 1: BT=0,3, 2: BT=0,5, 3: BT=0,7, 4: BT=1]</p> <p>Ex) AT+TCONF=922300000:14:4:12:4/5:1:0:1:16:0:2:3 (CR)</p> |
| AT+TTONE | RF Tx Tone test | <p>Starts RF Tx Tone test (CW Test Mode)</p> <p>Ex)AT+TTONE (CR)</p> |
| AT+TRSSI | RF Rx RSSI test | <p>Starts RF Rx RSSI test.</p> <p>Ex) AT+TRSSI (CR)</p> |
| AT+TTX=packetnb | Test RF Tx | <p>Starts RF Tx test: Nb of packets sent.</p> <p>Ex) AT+TTX=16 (CR)</p> |
| AT+TRX=packetnb | Test RF Rx | <p>Starts RF Rx test: Nb of packets expected.</p> <p>Stop by input 'X'</p> <p>Ex) AT+TRX=16 (CR)</p> |

| Command | Name | Description |
|---------|----------------------------|--|
| AT+MTX | Test RF Modulation wave | Starts RF Tx test: Modulation Continuous Wave Ex) AT+MTX (CR) |
| AT+MRX | Test RF Continuous Rx | Starts RF Rx test: Continuous receive Stop by input 'X' Ex) AT+MRX (CR) |
| AT+TOFF | Stop RF test | Stops on-going RF test. Ex) AT+TOFF (CR) |