

LSM100A LoRa CLI Command interface manual

Rev 1.0

SJI

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History

Date	Contents	Version	
2022-01-28	Create	V1.0	

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:

Field	Value
TCONF	868300000
Freq(Hz)	15
PW(dBm)	4:125
Bandwidth(KHz)	7
SF	5
CodingRate	1
LNA	<input checked="" type="checkbox"/>
Boost	<input checked="" type="checkbox"/>
Modulation	1
PayloadLen	16
fskDev	0
LowDrOpt	2:Auto
BT Product	0:No Gaussian

The 'Set' button is highlighted with a red box.

- 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 displays the command 'AT+TTX=10' and its execution results, including 'TTxStart' and 'TTxEnd'. The main configuration area on the right includes sections for 'LoRa Manual' (Region Band ID, Set Network ID, Set ETSI DutyCycle, Join Network Mode, Set Device Class, Verbose Level), 'Set Freq / Datarate' (Rx Datarate, Tx Datarate, Tx Power), 'LoRa Device Setting' (Adaptive Datarate, Set Delay, RXIDL, Tx Power), 'Key Write' (ID, App Eui, Value), 'AT SEND' (Port, Payload), 'RF Test' (Fstart, Fstop, Fdelta, Packed Num, Test Start), and 'Conf RF Test' (TCONF, Freq(Hz), PW(dBm), Bandwidth(KHz), SF, CodingRate, LNA, Boost, Modulation, PayloadLen, fskDev, LowDrOpt, BT Product). The 'Packet' section at the bottom is highlighted with a red box, showing 'Tx' selected, 'Value' set to 10, and a 'Send' button.

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 displays the command 'AT+TRX=5' and its execution results, including 'TrxStart' and 'TrxEnd'. The main configuration area on the right is identical to the Tx Test screenshot. The 'Packet' section at the bottom is highlighted with a red box, showing 'Rx' selected, 'Value' set to 5, and a 'Send' button.

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 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: 7 Connect Close

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

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Region Band ID
5:EU868 Set Get

EUI / ADDRESS Value
EUI Set Get

Set Freq / Datarate
Hz Set Get
Rx Datarate Set Get
Tx Datarate Set Get

Key Write
ID: App Eui Value: Set Get

AT SEND
Port 48 0 : Unconfirmed Payload 1245 AT SEND

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

Conf RF Test
Freq(Hz) Pw(dBm) Bandwidth(KHz) SF CodingRate
TCONF 15 4:125 7 ☐ LNA ☐ Boost
fskDev LowDrOpt 2:Auto BT Product 0:No Gaussian Set Get

Packet
Tx Value Send

Verify
Reset FW Version Get Local Time Link Check BATTERY Level

Set Network ID
ID: Set Get

Set Device Class
A Set Get

Set ETS1 DutyCycle
☐ ENABLE

Join Network Mode
☐ 0: ABP ☒ 1: OTAA

Set Delay
Adaptive Datarate
0:OFF Set Get
Tx Power Set Get
RX1DL ms Set Get
0 Set Get

Verbose Level
Value Set Get

CLEAR

SAVE LOG

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:coding rate: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)