

LSM1x0A Sigfox CLI Command Interface Manual

Rev 1.0

SEONG JI

MAY. 31. 2022

Contents

1. AT COMMAND COMPLETE SET	3
2. SIGFOX RF TEST DESCRIPTION.....	4
2.1 RF STANDARD TEST.....	4
2.2 BACKEND TEST	5
3. SIGFOX COMMAND	7

History

Date	Contents	Version	
2022-05-31	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. Sigfox RF Test Description

2.1 RF standard test

1) Input AT Command command to LSM110A used as RX

EX) AT+RL=905200000

Test Result

- ➔ if received success display "TEST PASSED"
- ➔ if received fail display "Wait For End of Rx"

The screenshot shows the SigFox Manual software interface. The 'Rx Test' section is highlighted with a red box. It contains a 'Listening Mode' checkbox and a 'Frequency (Hz)' input field. The 'Tx Test' section is also visible, with 'CW Test Mode' selected. The 'Encryption Set' section shows 'Key' set to '0: Private Key' and 'Payload' set to '0: OFF'. The 'Radio Output Power' section shows 'Value' set to '0 dB'. The 'RSSI Calibration' section shows 'RSSI' set to '0 dB'. The 'Configure the enabled channels for FCC' section shows 'Value' set to '0' and 'Timer Enable' checked. The 'Sigfox Test Mode' section shows 'RC' set to '1: SFX RC1' and 'Mode' set to '00: TX_BPSK'. The 'Button' section includes 'Reset', 'FW Version', 'Get ID', 'Get PAC', 'Factory Init.', 'Get Battery Level', and 'Send OOB Message'.

2) Input AT Command command to LSM110A used as TX

EX) AT+CW=902200000

- ➔ Transmit frequency to Continuous wave

The screenshot shows the SigFox Manual software interface. The 'Tx Test' section is highlighted with a red box. It contains 'CW Test Mode' selected, 'Frequency (Hz)' input field, and 'Bitrate' input field. The 'Encryption Set' section shows 'Key' set to '0: Private Key' and 'Payload' set to '0: OFF'. The 'Radio Output Power' section shows 'Value' set to '0 dB'. The 'RSSI Calibration' section shows 'RSSI' set to '0 dB'. The 'Configure the enabled channels for FCC' section shows 'Value' set to '0' and 'Timer Enable' checked. The 'Sigfox Test Mode' section shows 'RC' set to '1: SFX RC1' and 'Mode' set to '00: TX_BPSK'. The 'Button' section includes 'Reset', 'FW Version', 'Get ID', 'Get PAC', 'Factory Init.', 'Get Battery Level', and 'Send OOB Message'.

2.2 Backend test

1) Select regional config zone

EX) AT\$RC=2

The screenshot shows the SEONG JI SigFox Manual software interface. The 'UART Log' window on the left displays the command 'AT\$RC=1' and the response 'OK'. The 'SigFox Manual' section on the right contains various configuration options. The 'Regional Config Zone' section is highlighted with a red box, showing 'RC' set to '1:SFX RC1'. Other sections include 'Port Set' (DUTCOM: 7), 'Encryption Set' (Key: 0: Private Key, Payload: 0: OFF), 'Radio Output Power' (Value: dB), 'Tx Test' (Frequency, Bitrate, Send, Stop), 'Rx Test' (Frequency, Set, Stop), 'Configure the enabled channels for FCC' (Value, Timer Enable, Set), 'Sigfox Test Mode' (RC: 1:SFX RC1, Mode: 00:TX_BPSK, Start), and a 'Button' section with options like Reset, FW Version, Get ID, Get PAC, Factory Init., Get Battery Level, and Send OOB Message.

2) Key setting

EX) AT\$410=0

The screenshot shows the SEONG JI SigFox Manual software interface. The 'UART Log' window on the left displays the command 'AT\$RC=1' and the response 'OK', followed by 'AT\$410=0' and the response 'OK'. The 'SigFox Manual' section on the right contains various configuration options. The 'Encryption Set' section is highlighted with a red box, showing 'Key' set to '0: Private Key' and 'Payload' set to '0: OFF'. Other sections include 'Port Set' (DUTCOM: 7), 'Radio Output Power' (Value: dB), 'Regional Config Zone' (RC: 1:SFX RC1), 'RSSI Calibration' (RSSI: dB), 'Tx Test' (Frequency, Bitrate, Send, Stop), 'Rx Test' (Frequency, Set, Stop), 'Configure the enabled channels for FCC' (Value, Timer Enable, Set), 'Sigfox Test Mode' (RC: 1:SFX RC1, Mode: 00:TX_BPSK, Start), and a 'Button' section with options like Reset, FW Version, Get ID, Get PAC, Factory Init., Get Battery Level, and Send OOB Message.

2) Send dataa

EX) AT\$SF=112233,1,1

LSM_SigFox_CMD v01

Port Set
DUTCOM: 11 Connect Close

UART Log

```
240s180:RF_API_stop
240s182:CS timer_stop
240s182:RF_API_init in TX
240s182:RF at Freq 923289500
240s186:TX START:nB=22
240s231:Wait For End of Tx
242s206:OnTxDone
242s206:End Of Tx
242s206:TX END
242s206:RF_API_stop
242s208:Delay= 1 ms
242s209:Delay Up
+RX=-11,08 @ 1,OK
```

AT Command
 AT SEND

CLEAR SAVE LOG

SigFox Manual

Index	Bit / Payload	Resp	TxFlag	
1: FRAME	112233	1		Send

Encryption Set
Key: 0: Private Key Set Get
Payload: 0: OFF Set Get

Radio Output Power
Value: dB Set Get

Regional Config Zone
RC: 5:SFX RCS Set Get

Tx Test
Frequency (Hz) Bitrate
CW Test Mode Send
PRBS9 Send
BPSK Mode Send

Listening For Local Loop
Frequency Hz Set

RSSI Calibration
 dB Set Get

Echo Mode
☐ 1. On ☐ 2. Off

Configure the enabled channels for FCC
Value ☐ Timer Enable Set

Sigfox Test Mode
RC: 1:SFX RC1 Mode: 00:TX_BPSK Start

Button
Reset SFX Mode FW Version Get ID Get PAC Factory Init. Get Battery Level Send OOB Message

3. Sigfox 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)
ATE=mode	Echo mode	Not used except to set echo mode. <mode>: [0: echo ON, 1: echo OFF] Ex) ATE=1 (CR) ATE=? (CR) Get echo mode
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, 1: Low, 2: Meddle, 3: High] Ex) AT+VL=3 (CR) AT+VL=? (CR) Get level
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+MODE=? (CR) Get mode
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\$RFS	Factory settings	Restores the factory setting. Ex) AT\$RFS (CR)
AT\$ID	Device ID	Get the 32-bit device ID. Ex) AT\$ID (CR)

AT\$PAC	Device PAC	<p>Get the 8-byte device PAC.</p> <p>Ex) AT\$PAC (CR)</p>
AT\$SB=bit_value{,opt_responsewaited}{,opt_txflag}	Bit status	<p>Send a bit to the Sigfox network.</p> <p><bit_value>: [0 or 1]</p> <p><opt_responsewaited> 0: no response waited (default)</p> <p><opt_responsewaited> 1: response waited</p> <p><opt_txflag> 0: one Tx frame sent</p> <p><opt_txflag> 1: three Tx frame sent (default)</p> <p>Ex) AT\$SB=0,1,1 (CR)</p> <p>AT\$SB=1 (CR) sends bit 1 with no response waited.</p> <p>AT\$SB=0,1 (CR) sends bit 0 with a response waited.</p> <p>AT\$SB=0,1,1 (CR) sends bit 0 with a response waited and with three Tx frames sent.</p>
AT\$SF=payload{,opt_responsewaited}{,opt_txflag}	ASCII payload in bytes	<p>Send a frame to the Sigfox network.</p> <p><payload>: [12 bytes maximum in ASCII format (24 ASCII characters max)]</p> <p><opt_responsewaited>: [0: no response waited (default)]</p> <p><opt_responsewaited>: [1: response waited]</p> <p><opt_txflag>: [0: one Tx frame sent]</p> <p><opt_txflag>: [1: three Tx frames sent (default)]</p> <p>Ex) AT\$SF=313245,1,1 (CR)</p> <p>AT\$SF=313245 (CR) sends 0x31 0x32 0x45 payload with no response waited.</p> <p>AT\$SF=313245,1 (CR) sends 0x31 0x32 0x45 payload with a response waited.</p> <p>AT\$SF=313245,1,1 (CR) sends 0x31 0x32 0x45 payload with a response waited and with three Tx frames sent.</p>

AT\$SH=payload_length, payload{,opt_responsewait ed}{,opt_txflag}	Hexadecimal payload in bytes	<p>Send a Hex frame to the Sigfox network.</p> <p><payload_length>: [length in bytes]</p> <p><payload>: [12 bytes maximum in hexadecimal format]</p> <p><opt_responsewait>: [0: no response waited (default)]</p> <p><opt_responsewait>: [1: response waited]</p> <p><opt_txflag>: [0: one Tx frame sent]</p> <p><opt_txflag>: [1: three Tx frames sent (default)]</p> <p>Ex) AT\$SH=1,A,1 (CR)</p> <p>AT\$SH=1,A (CR) sends 0x41 payload with no response waited.</p> <p>AT\$SH=1,A,1 (CR) sends 0x41 payload with a response waited.</p>
AT\$CW=freq	Continuous wave(CW)	<p>Start or stop a continuous unmodulated carrier for test. Run CW Test mode.</p> <p><freq>: frequency (in Hz)</p> <p>Ex) AT\$CW=902200000 (CR)</p> <p>AT\$CW=0 (CR) Stop a CW</p>
AT\$PN=freq,bitrate	PRBS9 BPBSK test mode	<p>Run PRBS9 BPBSK Test mode. Send a continuous modulated carrier for test.</p> <p><freq>: frequency (in Hz)</p> <p><bitrate>: 100 or 600</p> <p>Ex) AT\$PN=902200000,100 (CR)</p> <p>AT\$PN=0 (CR) Stop a BPBSK</p>

AT\$TM=rc,mode	Sigfox test mode	<p>Start a Sigfox test mode.</p> <p><rc></p> <p>SFX_RC1 = 1 SFX_RC2 = 2 SFX_RC3C = 3C SFX_RC4 = 4 SFX_RC5 = 5 SFX_RC6 = 6 SFX_RC7 = 7</p> <p><mode></p> <p>SFX_TEST_MODE_TX_BPSK = 0 SFX_TEST_MODE_TX_PROTOCOL = 1 SFX_TEST_MODE_RX_PROTOCOL = 2 SFX_TEST_MODE_RX_GFSK = 3 SFX_TEST_MODE_RX_SENDSI = 4 SFX_TEST_MODE_TX_SYNTH = 5 SFX_TEST_MODE_TX_FREQ_DISTRIBUTION = 6 SFX_TEST_MODE_TX_BIT = 11 SFX_TEST_MODE_PUBLIC_KEY = 12 SFX_TEST_MODE_NVM = 13</p> <p>Ex) AT\$TM=2,0 (CR)</p>
AT\$RSSICAL=value AT\$RSSICAL=?	RSSI value in dB	<p>Set or Get the RSSI calibration value in dB.</p> <p><value>: calibration value (in dB)</p> <p>Ex) AT\$RSSICAL=0 (CR) AT\$RSSICAL=? (CR)</p>
AT\$RL=freq	Listening for a data packet	<p>Starts listening for a local loop.</p> <p><freq>: frequency (in Hz)</p> <p>Stop by input 'X'</p> <p>Ex) AT\$RL=905200000 (CR)</p>
AT\$SL=freq,datarate,count	Send local loop	<p>Send TX packet up to count number for local test.</p> <p><freq>: frequency (in Hz) <datarate>: data rate (in bps) <count>: send packets counter</p> <p>Ex) AT\$SL=905200000,600,10 (CR)</p>

AT\$RP2P	P2P RX	Starts listening for the P2P. Stop by input 'X' Ex) AT\$RP2P (CR)
AT\$SP2P=payload	P2P TX	Send TX packet for the P2P. <payload>: [12 bytes maximum in ASCII format (24 ASCII characters max)] Ex) AT\$SP2P=112233445566778899AABBCC (CR)
ATS300	Out-of-band message	Send one keep-alive out-of-band message. Ex) ATS300 (CR)
ATS302=power ATS302=?	Radio output power	Set or Get the radio output power. <power> : power (in dBm) Ex) ATS302=22 (CR) ATS302=? (CR) Get power
ATS400=<8_digit_word0> <8_digit_word1><8_digit_word2>,timer_enable	Enabled channels for FCC	Configure the enabled channels for FCC. Ex) ATS400=000000004000000000000000,0 (CR)
ATS410=key ATS410=?	Encryption key	Set or Get the configuration of the device encryption key. <key>: [0: Use Private key, 1: Use Public key] Ex) ATS410=1 (CR) ATS410=? (CR) Get the encryption key
ATS411=mode ATS411=?	Payload encryption	Set or Get the device payload encryption mode. <mode>: [0:Payload Encryption OFF, 1:Payload Encryption ON] Ex) ATS411=1 (CR) ATS411=? (CR) Get payload encryption