

## Dragino LoRa® AT Command Sets (For LGT92)

---

Version	Describe	Author	Time
V1.4	Initiate, refer to firmware v1.4	Dragino	2019-May-13
V1.5	Refer to firmware version v1.5	Dragino	2019-Nov-26
V1.5.3	Refer to firmware version v1.5.3	Dragino	2020-01-18

1	Introduction .....	4
1.1	How to connect device and send AT command? .....	4
2	General Command .....	6
2.1	AT: Attention .....	6
2.2	AT?: Short Help .....	6
2.3	ATZ: MCU Reset .....	6
2.4	AT+FDR: Factory Data Reset .....	6
2.5	AT+VER: Image Version and Frequency Band.....	7
2.6	AT+HWVER: Get the LGT92 of hardware version and gps of version.....	7
2.7	AT+CFG: Print all configurations .....	7
2.8	AT+TDC: Application Data Transmission Interval.....	8
3	Keys, IDs and EUIs management.....	8
3.1	AT+APPEUI: Application EUI .....	8
3.2	AT+APPKEY: Application Key .....	9
3.3	AT+APPSKEY: Application Session Key .....	9
3.4	AT+DADDR: Device Address.....	9
3.5	AT+DEUI: Device EUI.....	10
3.6	AT+NWKID: Network ID(You can enter this command change only after successful network connection) .....	10
3.7	AT+NWKSKEY: Network Session Key.....	11
4	Joining and sending data on LoRa® network .....	11
4.1	AT+CFM: Confirm Mode .....	11
4.2	AT+CFS: Confirm Status .....	11
4.3	AT+JOIN: Join LoRa® Network .....	12
4.4	AT+NJM: LoRa® Network Join Mode .....	12
4.5	AT+NJS: LoRa® Network Join Status .....	13
4.6	AT+RECV: Print Last Received Data in Raw Format .....	13
4.7	AT+RECVB: Print Last Received Data in Binary Format.....	13
4.8	AT+SEND: Send Text Data .....	13
4.9	AT+SENB: Send Hexadecimal Data .....	14
5	LoRa® network management.....	14
5.1	AT+ADR: Adaptive Rate .....	14
5.2	AT+CLASS: LoRa® Class(Currently only support class A, class C) .....	15
5.3	AT+DCS: Duty Cycle Setting .....	15
5.4	AT+DR: Data Rate (Can Only be Modified after ADR=0).....	16
5.5	AT+FCD: Frame Counter Downlink .....	16
5.6	AT+FCU: Frame Counter Uplink .....	16
5.7	AT+JN1DL: Join Accept Delay1.....	17
5.8	AT+JN2DL: Join Accept Delay2.....	17
5.9	AT+PNM: Public Network Mode.....	18

---

5.10	AT+RX1DL: Receive Delay1 .....	18
5.11	AT+RX2DL: Receive Delay2 .....	19
5.12	AT+RX2DR: Rx2 Window Data Rate .....	19
5.13	AT+RX2FQ: Rx2 Window Frequency .....	20
5.14	AT+TXP: Transmit Power .....	20
5.15	AT+RSSI: RSSI of the Last Received Packet.....	20
5.16	AT+SNR: SNR of the Last Received Packet .....	21
5.17	AT+PORT: Application Port .....	21
5.18	AT+CHS: Single Channel Mode .....	21
5.19	AT+CHE: Eight Channel Mode.....	22
5.20	AT+SGM: Include/exclude motion sensor value in payload .....	24
5.21	AT+ACE: Get or set the Alarm Packet transmission interval.....	24
5.22	AT+KAT: Get or set the keep alive time data transmission interval.....	25
5.23	AT+LON: Disable/Enable LED flashing .....	25
5.24	AT+MLON: Set LED status for movement detection (use for debug purpose) 25	
5.25	AT+MD: Set movement detection mode.....	26
6	GPS management.....	28
6.1	AT+PDOP: Get or set the PDOP value.....	28
6.2	AT+FTIME: Set max GPS positioning time. ....	28
6.3	AT+NMEA886: Get or set the navigation mode of GPS.....	29
6.4	AT+NMEA353: Get or set the search mode of GPS .....	30

# 1 Introduction

This article describes the AT Commands Set used in Dragino LoRa® products, it cover below products:

- LGT92
- [Serial Port Tool](#)

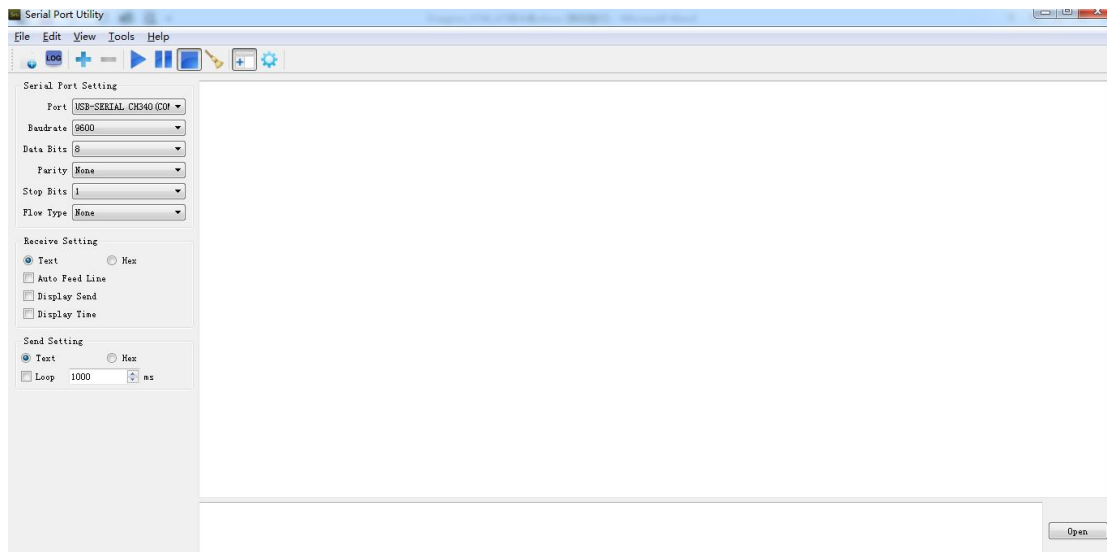
## 1.1 How to connect device and send AT command?

### Software Setting:

An USB-TTL can be used with standard windows software such as Serial Port Utility. The chosen software should be configured with the following parameters:

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

Figure 1 show the standard configuration for Serial Port Utility to use USB-TTL.



All the AT commands have a standard format as “AT+XXX”, with XXX denoting the command.

There are four available command behaviors:

- **AT+XXX?** provides a short help of the given command, for example **AT?**
- **AT+XXX** is used to run a command, such as **AT+JOIN**
- **AT+XXX=?** is used to get the value of a given command, for example **AT+TDC=?**
- **AT+XXX=<value>** is used to provide a value to a command, for example **AT+SENDB=12:12a0ff**

The output of the commands is provided on the UART. The output format is as below:

<value><CR><LF>

<CR><LF><Status>

**Note:** <CR> stands for “carriage return” and <LF> stands for “line feed”

The <value><CR><LF> output is returned whenever the “help AT+XXX?” or the “get AT+XXX=” commands are run.

When no value is returned, the <value><CR><LF> output is not returned at all.

Every command (except for ATZ used for MCU reset) returns a status string, which is preceded and followed by <CR><LF> in a “<CR><LF><Status>” format. The possible status are:

- OK: command run correctly without error.
- AT\_ERROR: generic error
- AT\_PARAM\_ERROR: a parameter of the command is wrong
- AT\_BUSY\_ERROR: the LoRa® network is busy, so the command could not completed
- AT\_TEST\_PARAM\_OVERFLOW: the parameter is too long
- AT\_NO\_NETWORK\_JOINED: the LoRa® network has not been joined yet
- AT\_RX\_ERROR: error detection during the reception of the command

More details on each command description and examples are described in the next part of this section. Note that each command preceded by # is the one provided by the host to the module. Then the return of the module is printed.

## 2 General Command

### 2.1 AT: Attention

AT: Attention	
Test Command: <b>AT</b>	Response:  <b>OK</b>

### 2.2 AT?: Short Help

AT?: Short Help	
Test Command: <b>AT?</b>	Response: <b>AT+&lt;CMD&gt;?:help on &lt;CMD&gt;</b> <b>AT+&lt;CMD&gt;:run &lt;CMD&gt;</b> <b>AT+&lt;CMD&gt;=&lt;value&gt;:set the value</b> <b>AT+&lt;CMD&gt;=? :get the value</b> <b>&lt;followed by the help of all commands&gt;</b>  <b>OK</b>

### 2.3 ATZ: MCU Reset

ATZ: MCU Reset	
Test Command: <b>ATZ?</b>	Response: <b>ATZ: Trig a reset of the MCU</b>  <b>OK</b>
Test Command: <b>ATZ</b>	Response: <b>LSN50 Device/LoRa ST Module</b> <b>Image Version: XX</b> <b>Frequency Band: XX</b> <b>DevEui= XX XX XX XX XX XX XX XX</b>  <b>&lt;followed by the Tx and Rx information&gt;</b>

### 2.4 AT+FDR: Factory Data Reset

AT+FDR: Factory Data Reset	
Test Command:	Response:

<b>AT+FDR</b>	<b>LSN50 Device/LoRa ST Module</b> <b>Image Version: XX</b> <b>Frequency Band: XX</b> <b>DevEui= XX XX XX XX XX XX XX XX</b> <b>Please set the parameters or reset Device to apply change</b>
Test Command: <b>AT+FDR?</b>	Response: <b>AT+FDR: Reset Parameters to Factory Default, Keys Reserve</b>  <b>OK</b>

## 2.5 AT+VER: Image Version and Frequency Band

<b>AT+VER: Image Version and Frequency Band</b>	
Test Command: <b>AT+VER=?</b>	Response: <b>1.3 EU868</b>  <b>OK</b>
Test Command: <b>AT+VER?</b>	Response: <b>AT+VER: Get current image version and Frequency Band</b>  <b>OK</b>

## 2.6 AT+HWVER: Get the LGT92 of hardware version and gps of version.

<b>AT+HWVER: Get the LGT92 of hardware version and gps of version.</b>	
Test Command: <b>AT+HWVER=?</b>	Response: <b>L70-RL</b>  <b>OK</b>
Test Command: <b>AT+HWVER?</b> <b>L70-RL.</b>	Response: <b>Get the LGT92 of hardware version and gps of version.</b>  <b>OK</b>

## 2.7 AT+CFG: Print all configurations

<b>AT+CFG: Print all configurations</b>	
Test Command: <b>AT+CFG</b>	Response: <b>AT+DEUI = XX XX XX XX XX XX XX XX</b> <b>AT+DADDR=XXXXXXXX</b>

	<p>.....</p> <p><b>AT+RX2WTO=X</b></p> <p><b>AT+CHS=868100000</b></p> <p><b>OK</b></p>
--	--

## 2.8 AT+TDC: Application Data Transmission Interval

<b>AT+TDC: Application Data Transmission Interval&lt; The default TDC is 30000 ms&gt;</b>	
Test Command: <b>AT+TDC?</b>	Response: <b>AT+TDC: Get or set the application data transmission interval in ms</b>  <b>OK</b>
<b>AT+TDC=?</b>	Response: <b>30000</b>  <b>OK</b>
<b>AT+TDC=60000</b>	Response:  <b>OK</b>

## 3 Keys, IDs and EUIs management

### 3.1 AT+APPEUI: Application EUI

<b>AT+APPEUI: Application EUI &lt;8 hex separated by &gt;</b>	
Test Command: <b>AT+APPEUI?</b>	Response: <b>AT+APPEUI: Get or Set the Application EUI</b>  <b>OK</b>
Test Command: <b>AT+APPEUI=?</b>	Response: <b>00 b3 d5 7e f0 00 4d 34</b>  <b>OK</b>



Test Command: <b>AT+APPEUI=01 30 48 23 54 76 53</b> <b>CD</b>	Response:  <b>OK</b>
---	----------------------------

### 3.2 AT+APPKEY: Application Key

<b>AT+APPKEY: Application Key &lt;16 hex separated by &gt;</b>	
Test Command: <b>AT+APPKEY?</b>	Response: <b>AT+APPKEY: Get or Set the Application Key</b>  <b>OK</b>
Test Command: <b>AT+APPKEY=?</b>	Response: <b>00 35 55 55 22 23 55 53 43 24 23 42 34 35 35 35</b>  <b>OK</b>
Test Command: <b>AT+APPKEY=00 35 55 55 22</b> <b>23 55 53 43 24 23 42 34 35</b> <b>35 35</b>	Response:  <b>OK</b>

### 3.3 AT+APPSKEY: Application Session Key

<b>AT+APPSKEY: Application Session Key &lt;16 hex separated by &gt;</b>	
Test Command: <b>AT+APPSKEY?</b>	Response: <b>AT+APPSKEY: Get or Set the Application Session Key</b>  <b>OK</b>
Test Command: <b>AT+APPSKEY=?</b>	Response: <b>00 7d dc 73 33 d3 eb 9e 14 38 d5 a4 3e 62 5b e2</b>  <b>OK</b>
Test Command: <b>AT+APPSKEY=00 7d dc 73 33</b> <b>d3 eb 9e 14 38 d5 a4 3e 62</b> <b>5b e2</b>	Response:(While Error in format, return <b>AT_PARAM_ERROR)</b>  <b>OK</b>

### 3.4 AT+DADDR: Device Address

<b>AT+DADDR: Device Address &lt;4 hex digit separate by &gt;</b>
--

Test Command: <b>AT+DADDR?</b>	Response: <b>AT+DADDR: Get or Set the Device Address</b>  <b>OK</b>
Test Command: <b>AT+DADDR=?</b>	Response: <b>(While Error in format, return AT_PARAM_ERROR)</b> <b>A8 40 41 FF</b>  <b>OK</b>
Test Command: <b>AT+DADDR=A8 40 41 FF</b>	Response:  <b>OK</b>

### 3.5 AT+DEUI: Device EUI

<b>AT+DEUI: Device EUI&lt;8 hex separated by:&gt;</b>	
Test Command: <b>AT+DEUI?</b>	Response: <b>AT+DEUI: Get or Set the Device EUI</b>  <b>OK</b>
Test Command: <b>AT+DEUI=?</b>	Response: <b>00 44 34 22 33 45 55 55</b>  <b>OK</b>
Test Command: <b>AT+DEUI=A8 40 41 FF FF 12 34 56</b>	Response: <b>(System will write new value to Device EUI,While Error in format, return AT_PARAM_ERROR)</b>  <b>OK</b>

### 3.6 AT+NWKID: Network ID(You can enter this command change only after successful network connection)

<b>AT+NWKID: Network ID&lt;4 hex separated by:&gt;</b>	
Test Command: <b>AT+NWKID?</b>	Response: <b>AT+NWKID: Get or Set the Network ID</b>  <b>OK</b>
Test Command: <b>AT+NWKID=?</b>	Response: <b>a8 40 41 ff</b>

	<b>OK</b>
Test Command: <b>AT+NWKID=A8 40 41 FF</b>	Response:  <b>OK</b>

### 3.7 AT+NWKSKEY: Network Session Key

<b>AT+NWKSKEY: Network Session Key&lt;16 hex separated by:&gt;</b>	
Test Command: <b>AT+NWKSKEY?</b>	Response: <b>AT+NWKSKEY: Get or Set the Network Session Key</b>  <b>OK</b>
Test Command: <b>AT+NWKSKEY=?</b>	Response: <b>00 4f 19 25 52 ce 97 09 d7 fa 84 71 db 51 02 92</b>  <b>OK</b>
Test Command: <b>AT+NWKSKEY=A8 40 41 FF FF 12 34 56 00 01 02 04 05 06 06 07</b>	Response:  <b>OK</b>

## 4 Joining and sending date on LoRa® network

### 4.1 AT+CFM: Confirm Mode

<b>AT+CFM: Confirm Mode</b>	
Test Command: <b>AT+CFM?</b>	Response: <b>AT+CFM: Get or Set the confirmation mode (0-1)</b>  <b>OK</b>
Test Command: <b>AT+CFM=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+CFM=1</b>	Response:  <b>OK</b>
Test Command: <b>AT+CFM=2</b>	While Error in format, return <b>AT_PARAM_ERROR</b>

### 4.2 AT+CFS: Confirm Status

<b>AT+ CFS: Confirm Status</b>	
Test Command: <b>AT+CFS?</b>	Response: <b>AT+CFS: Get confirmation status of the last AT+SEND (0-1)</b>  <b>OK</b>
Test Command: <b>AT+CFS=?</b>	Response: <b>0</b>  <b>OK</b>

### 4.3 AT+JOIN: Join LoRa® Network

<b>AT+ JOIN: Join LoRa® Network</b>	
Test Command: <b>AT+JOIN</b>	Response:  <b>OK</b>
Test Command: <b>AT+ JOIN?</b>	Response: <b>AT+JOIN: Join network</b>  <b>OK</b>
	While Error in format, return <b>AT_BUSY_ERROR</b>

### 4.4 AT+NJM: LoRa® Network Join Mode

<b>AT+ NJM: LoRa® Network Join Mode</b>	
Test Command: <b>AT+NJM=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+NJM?</b>	Response: <b>AT+NJM: Get or Set the Network Join Mode. (0: ABP, 1: OTAA)</b>  <b>OK</b>
Test Command: <b>AT+NJM=0</b>	Response:

	<b>OK</b>
Test Command: <b>AT+NJM=2</b>	While Error in format, return <b>AT_PARAM_ERROR</b>

#### 4.5 AT+NJS: LoRa® Network Join Status

<b>AT+ NJS: LoRa® Network Join Status</b>	
Test Command: <b>AT+NJS=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+NJS?</b>	Response: <b>AT+NJS: Get the join status</b>  <b>OK</b>

#### 4.6 AT+RECV: Print Last Received Data in Raw Format

<b>AT+ RECV: Print Last Received Data in Raw Format&lt;port:data&gt;</b>	
Test Command: <b>AT+RECV=?</b>	Response: <b>0:</b>  <b>OK</b>
Test Command: <b>AT+RECV?</b>	Response: <b>AT+RECV: print last received data in raw format</b>  <b>OK</b>

#### 4.7 AT+RECVB: Print Last Received Data in Binary Format

<b>AT+ RECVB: Print Last Received Data in Binary Format&lt;port:data&gt;</b>	
Test Command: <b>AT+RECVB=?</b>	Response: <b>2: 0010</b>  <b>OK</b>
Test Command: <b>AT+RECVB?</b>	Response: <b>AT+RECVB: print last received data in binary format (with hexadecimal values)</b>  <b>OK</b>

#### 4.8 AT+SEND: Send Text Data

<b>AT+ SEND: Send Text Data&lt;port:data&gt;</b>	
Test Command: <b>AT+SEND?</b>	Response: <b>AT+SEND: Send text data along with the application port</b>  <b>OK</b>
Test Command: <b>AT+SEND=12:hello world</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_BUSY_ERROR/AT_BUSY_ERROR/AT_NO_NETWORK_JOINED</b>

#### 4.9 AT+SENB: Send Hexadecimal Data

<b>AT+SENB: Send Hexadecimal Data&lt;port:data&gt;</b>	
Test Command: <b>AT+SENB?</b>	Response: <b>AT+SENB: Send hexadecimal data along with the application port</b>  <b>OK</b>
Test Command: <b>AT+SENB=12:abcdef0123456789</b>	Response:  <b>OK</b>
Test Command: <b>AT+SENB=abcdef0123456789</b>	While Error in format, return <b>AT_PARAM_ERROR</b> <b>AT_BUSY_ERROR/AT_NO_NETWORK_JOINED</b>

## 5 LoRa® network management

### 5.1 AT+ADR: Adaptive Rate

<b>AT+ ADR: Adaptive Rate</b>	
Test Command: <b>AT+ADR=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+ADR?</b>	Response: <b>AT+ADR: Get or Set the Adaptive Data Rate setting. (0: off, 1: on)</b>

	<b>OK</b>
Test Command: <b>AT+ADR=0</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR</b>

## 5.2 AT+CLASS: LoRa® Class(Currently only support class A, class C)

<b>AT+ CLASS: LoRa® Class</b>	
Test Command: <b>AT+CLASS=?</b>	Response: <b>A</b>  <b>OK</b>
Test Command: <b>AT+CLASS?</b>	Response: <b>AT+CLASS: Get or Set the Device Class</b>  <b>OK</b>
Test Command: <b>AT+CLASS=C</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR</b>

## 5.3 AT+DCS: Duty Cycle Setting

<b>AT+ DCS: Duty Cycle Setting</b>	
Test Command: <b>AT+DCS?</b>	Response: <b>AT+DCS: Get or Set the ETSI Duty Cycle setting - 0=disable, 1=enable - Only for testing</b>  <b>OK</b>
Test Command: <b>AT+DCS=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+DCS=1</b>	Response:  <b>OK</b>
	While Error in format, return

	<b>AT_PARAM_ERROR</b>
--	-----------------------

#### 5.4 AT+DR: Data Rate (Can Only be Modified after ADR=0)

<b>AT+DR: Data Rate</b>	
Test Command: <b>AT+DR=?</b>	Response: <b>5</b>  <b>OK</b>
Test Command: <b>AT+DR?</b>	Response: <b>Get or Set the Data Rate. (0-7 corresponding to DR_X)</b>  <b>OK</b>
Test Command: <b>AT+DR=2</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR</b>

#### 5.5 AT+FCD: Frame Counter Downlink

<b>AT+ FCD: Frame Counter Downlink</b>	
Test Command: <b>AT+FCD=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+FCD?</b>	Response: <b>AT+FCD: Get or Set the Frame Counter Downlink</b>  <b>OK</b>
Test Command: <b>AT+FCD=10</b>	Response:( <b>System will write new value to FCD</b> )  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR</b>

#### 5.6 AT+FCU: Frame Counter Uplink

<b>AT+ FCU: Frame Counter Uplink</b>	
Test Command: <b>AT+FCU=?</b>	Response: <b>0</b>



	<b>OK</b>
Test Command: <b>AT+FCU?</b>	Response: <b>AT+FCU: Get or Set the Frame Counter Uplink</b>  <b>OK</b>
Test Command: <b>AT+FCU=10</b>	Response:  <b>OK</b>
Test Command: <b>AT+ FCU=10.1</b>	Response: While Error in format, return <b>AT_PARAM_ERROR</b>

### 5.7 AT+JN1DL: Join Accept Delay1

<b>AT+ JN1DL: Join Accept Delay1</b>	
Test Command: <b>AT+JN1DL=?</b>	Response: <b>5000</b>  <b>OK</b>
Test Command: <b>AT+JN1DL?</b>	Response: <b>AT+JN1DL: Get or Set the Join Accept Delay between the end of the Tx and the Join Rx Window 1 in ms</b>  <b>OK</b>
Test Command: <b>AT+JN1DL=10000</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR/AT_BUSY_ERROR</b>

### 5.8 AT+JN2DL: Join Accept Delay2

<b>AT+ JN2DL: Join Accept Delay2</b>	
Test Command: <b>AT+JN2DL=?</b>	Response: <b>6000</b>  <b>OK</b>
Test Command:	Response:

<b>AT+JN2DL?</b>	<b>AT+JN2DL: Get or Set the Join Accept Delay between the end of the Tx and the Join Rx Window 2 in ms</b>
	<b>OK</b>
Test Command: <b>AT+JN2DL=20000</b>	Response: <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR/AT_BUSY_ERROR</b>

### 5.9 AT+PNM: Public Network Mode

<b>AT+ PNM: Public Network Mode</b>	
Test Command: <b>AT+PNM=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+PNM?</b>	Response: <b>AT+PNM: Get or Set the public network mode. (0: off, 1: on)</b>  <b>OK</b>
Test Command: <b>AT+PNM=1</b>	Response:( <b>System will write new value to PNM</b> )  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR/AT_BUSY_ERROR</b>

### 5.10 AT+RX1DL: Receive Delay1

<b>AT+ RX1DL: Receive Delay1</b>	
Test Command: <b>AT+RX1DL=?</b>	Response: <b>1000</b>  <b>OK</b>
Test Command: <b>AT+RX1DL?</b>	Response: <b>AT+RX1DL: Get or Set the delay between the end of the Tx and the Rx Window 1 in ms</b>  <b>OK</b>
Test Command:	Response:

<b>AT+RX1DL=1500</b>	<b>OK</b>
	While Error in format, return <b>AT_BUSY_ERROR/AT_PARAM_ERROR</b>

### 5.11 AT+RX2DL: Receive Delay2

<b>AT+ RX2DL: Receive Delay2</b>	
Test Command: <b>AT+RX2DL=?</b>	Response: <b>2000</b>  <b>OK</b>
Test Command: <b>AT+RX2DL?</b>	Response: <b>AT+RX2DL: Get or Set the delay between the end of the Tx and the Rx Window 2 in ms</b>  <b>OK</b>
Test Command: <b>AT+RX2DL=2500</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_BUSY_ERROR/AT_PARAM_ERROR</b>

### 5.12 AT+RX2DR: Rx2 Window Data Rate

<b>AT+ RX2DR: Rx2 Window Data Rate</b>	
Test Command: <b>AT+RX2DR=?</b>	Response:  <b>OK</b>
Test Command: <b>AT+RX2DR?</b>	Response: <b>AT+RX2DR: Get or Set the Rx2 window data rate (0-7 corresponding to DR_X)</b>  <b>OK</b>
Test Command: <b>AT+RX2DR=6</b>	Response:  <b>OK</b>
	Response: While Error in format, return <b>AT_PARAM_ERROR</b>

### 5.13 AT+RX2FQ: Rx2 Window Frequency

AT+ RX2FQ: Rx2 Window Frequency	
Test Command: <b>AT+RX2FQ=?</b>	Response: <b>434665000</b>  <b>OK</b>
Test Command: <b>AT+RX2FQ?</b>	Response: <b>AT+RX2FQ: Get or Set the Rx2 window frequency</b>  <b>OK</b>
Test Command: <b>AT+RX2FQ=434665000</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_BUSY_ERROR / AT_BUSY_ERROR</b>

### 5.14 AT+TXP: Transmit Power

AT+ TXP: Transmit Power	
Test Command: <b>AT+TXP=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+TXP?</b>	Response: <b>AT+TXP: Get or Set the Transmit Power (0-5, MAX:0, MIN:5, according to LoRaWAN Spec)</b>  <b>OK</b>
Test Command: <b>AT+ TXP=1</b>	Response:  <b>OK</b>
	While Error in format, return <b>AT_PARAM_ERROR</b>

### 5.15 AT+RSSI: RSSI of the Last Received Packet

AT+ RSSI: RSSI of the Last Received Packet	
Test Command: <b>AT+RSSI=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command:	Response:

<b>AT+RSSI?</b>	<b>AT+RSSI: Get the RSSI of the last received packet</b>
	<b>OK</b>

### 5.16 AT+SNR: SNR of the Last Received Packet

<b>AT+ SNR: SNR of the Last Received Packet</b>	
Test Command: <b>AT+SNR=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+SNR?</b>	Response: <b>AT+SNR: Get the SNR of the last received packet</b>  <b>OK</b>

### 5.17 AT+PORT: Application Port

<b>AT+PORT: Application Port</b>	
Test Command: <b>AT+PORT=21</b>	Response:  <b>OK</b>
Test Command: <b>AT+PORT?</b>	Response: <b>AT+PORT: Get or set the application port</b>  <b>OK</b>
Test Command: <b>AT+PORT=?</b>	Response: <b>21</b>  <b>OK</b>

### 5.18 AT+CHS: Single Channel Mode

<b>AT+ CHS: Single Channel Mode</b>	
Test Command: <b>AT+CHS=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+CHS?</b>	Response: <b>AT+CHS: Get or Set Frequency (Unit: Hz) for Single Channel Mode</b>

	<b>OK</b>
Test Command: <b>AT+CHS =868100000</b>	Response:  <b>OK</b>

### 5.19 AT+CHE: Eight Channel Mode

<b>AT+CHE: Eight Channel Mode</b>	
Test Command: <b>AT+CHE=?</b>	Response: 1 902.3 902.5 902.7 902.9 903.1 903.3 903.5 903.7  <b>OK</b>
Test Command: <b>AT+CHE?</b>	Response: <b>AT+CHE: Get or Set eight channels mode,Only for US915,AU915,CN470</b>  <b>OK</b>
Test Command: <b>AT+CHE=1</b>	Response:  <b>OK</b>

CHE	CN470 Uplink Channels(125KHz,4/5,Unit:MHz,CHS=0)								
0	ENABLE Channel 80-95								
1	486.3	486.5	486.7	486.9	487.1	487.3	487.5	487.7	Channel 80-87
2	487.9	488.1	488.3	488.5	488.7	488.9	489.1	489.3	Channel 88-95

CHE	US915 Uplink Channels(125KHz,4/5,Unit:MHz,CHS=0)								
0	ENABLE Channel 0-63								
1	902.3	902.5	902.7	902.9	903.1	903.3	903.5	903.7	Channel 0-7
2	903.9	904.1	904.3	904.5	904.7	904.9	905.1	905.3	Channel 8-15
3	905.5	905.7	905.9	906.1	906.3	906.5	906.7	906.9	Channel 16-23
4	907.1	907.3	907.5	907.7	907.9	908.1	908.3	908.5	Channel 24-31
5	908.7	908.9	909.1	909.3	909.5	909.7	909.9	910.1	Channel 32-39
6	910.3	910.5	910.7	910.9	911.1	911.3	911.5	911.7	Channel 40-47
7	911.9	912.1	912.3	912.5	912.7	912.9	913.1	913.3	Channel 48-55
8	913.5	913.7	913.9	914.1	914.3	914.5	914.7	914.9	Channel 56-63

CHE	AU915 Uplink Channels(125KHz,4/5,Unit:MHz, CHS=0)								
0	ENABLE Channel 0-63								
1	915.2	915.4	915.6	915.8	916	916.2	916.4	916.6	Channel 0-7
2	916.8	917	917.2	917.4	917.6	917.8	918	918.2	Channel 8-15
3	918.4	918.6	918.8	919	919.2	919.4	919.6	919.8	Channel 16-23
4	920	920.2	920.4	920.6	920.8	921	921.2	921.4	Channel 24-31
5	921.6	921.8	922	922.2	922.4	922.6	922.8	923	Channel 32-39
6	923.2	923.4	923.6	923.8	924	924.2	924.4	924.6	Channel 40-47
7	924.8	925	925.2	925.4	925.6	925.8	926	926.2	Channel 48-55
8	926.4	926.6	926.8	927	927.2	927.4	927.6	927.8	Channel 56-63

## 5.20 AT+SGM: Include/exclude motion sensor value in payload

AT+SGM: Include/exclude motion sensor value in payload	
Test Command: <b>AT+SGM=?</b>	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+SGM?</b>	Response: Include/exclude motion sensor value in payload 1: exclude 0: include  If motion sensor disable: total payload become 11 bytes If motion sensor enable: total payload become 15 bytes  <b>OK</b>
Test Command: <b>AT+SGM=1</b>	Response:  <b>OK</b>

## 5.21 AT+ACE: Get or set the Alarm Packet transmission interval

AT+ACE: Get or set the Alarm data transmission interval in ms (default:60000 )	
Test Command: <b>AT+ACE=?</b>	Response: <b>60000</b>  <b>OK</b>
Test Command: <b>AT+ACE?</b>	Response: <b>Get or set the Alarm data transmission interval in ms</b>  <b>OK</b>
Test Command: <b>AT+ACE=30000</b>	Response:  <b>OK</b>



## 5.22 AT+KAT: Get or set the keep alive time data transmission interval

AT+KAT: Get or set the keep alive time transmit interval in ms (default: 21600000ms / 6hour )	
Test Command: <b>AT+KAT=?</b>	Response: <b>21600000</b>  <b>OK</b>
Test Command: <b>AT+KAT?</b>	Response: <b>Get or set the keep alive time interval in ms</b>  <b>OK</b>
Test Command: <b>AT+KAT=600000</b>	Response:  <b>OK</b>

## 5.23 AT+LON: Disable/Enable LED flashing

AT+LON: Get or Set the LED status of position, downlink and uplink(default:1)	
Test Command: <b>AT+LON=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+LON?</b>	Response: <b>Get or set the LED flashing of position, downlink and uplink (Disable(0), Enable (1))</b>  <b>OK</b>
Test Command: <b>AT+LON=0</b>	Response:  <b>OK</b>

## 5.24 AT+MLON: Set LED status for movement detection (use for debug purpose)

AT+MLON: Get or set the LED of movement detection (default:0)	
Test Command: <b>AT+MLON=?</b>	Response: <b>0</b>  <b>OK</b>

Test Command: <b>AT+MLON?</b>	Response: <b>Get or set the LED of movement detection (Disable(0), Enable (1))</b>  <b>OK</b>
Test Command: <b>AT+MLON=1</b>	Response:  <b>OK</b>

## 5.25 AT+MD: Set movement detection mode

<b>AT+ MD: Get or set the mode of movement detection (default: 1 )</b>	
Test Command: <b>AT+MD=?</b>	Response: <b>1</b>  <b>OK</b>
Test Command: <b>AT+MD?</b>	Response: <b>Get or set the mode of motion detection (0:Disable,1:Move,2:Collide,3:Customized)</b>  <b>OK</b>
Test Command: <b>AT+MD=0</b>	Response:  <b>OK</b>
Test Command: <b>AT+MD=1</b>	Response:  <b>OK</b>
Test Command: <b>AT+MD=2</b>	Response:  <b>OK</b>
Test Command: <b>AT+MD=3,200,11</b>  <b>(threshold and ODR must &lt; 255, Adjust these two value will have different sensitivity for motion detect)</b>	Response: <b>OK</b>  <b>Threshold: Motion Interrupt sensitivity.</b>  This register holds the threshold value for the Wake on Motion Interrupt for accel x/y/z axes. LSB = 4mg. Range is 0mg to 1020mg  <b>ODR(output data rate): Motion sensor output data rate.</b> ➤ <b>For MD=1, device will use threshold 0x0C/ODR: 0x02, equal to AT+MD=3,12,2</b>

- For MD=2, device will use threshold 0x9F/ODR: 0x07, equal to AT+MD=3,159,7

**Note:**

**ODR value(Hz)**

**0:0.24**

**1:0.49**

**2:0.98**

**3:1.95**

**4:3.91**

**5:7.81**

**6:15.63**

**7:31.25**

**8:62.50**

**9:125**

**10:250**

**11:500**

**12~15: Reserve**

## 6 GPS management

### 6.1 AT+PDOP: Get or set the PDOP value.

AT+PDOP: Get or set the PDOP value (Default:3.0)	
Test Command: <b>AT+PDOP=?</b>	Response: <b>3.00</b>  <b>OK</b>
Test Command: <b>AT+PDOP?</b>	Response: <b>Get or set the PDOP value</b>  PDOP(Position Dilution of Precision) filter, LGT92 will only accept GPS data with a lower PDOP value than pre-configure PDOP value. If device can't get a valid GPS packet within FTIME timeout, it will send use the GPS data with lowest PDOP value to  A GPS packet with lower PDOP has higher accuracy.  <b>OK</b>
Test Command: <b>AT+PDOP=2.5</b>	Response:  <b>OK</b>

### 6.2 AT+FTIME: Set max GPS positioning time.

AT+FTIME: Get or Set positioning failed time to send	
Test Command: <b>AT+FTIME=?</b>	Response: <b>150</b>  <b>OK</b>
Test Command: <b>AT+FTIME?</b>	Response: <b>Get or set the GPS positioning time in s</b>  <b>OK</b>
Test Command: <b>AT+FTIME=120</b>	Response:  <b>OK</b>
<b>Note:</b>	If <b>AT+FTIME=0</b> . The GPS module will be always powered and positioning. This will highly increase the power

	consumption(up to 50mA). When AT+FTIME=0, it will improve fix accuracy and shorten the acquire time for next uplink.
--	--

### 6.3 AT+NMEA886: Get or set the navigation mode of GPS

AT+NMEA886: Get or set the navigation mode of GPS	
Test Command: <b>AT+NMEA886=?</b> For L70-L,L76-L	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+NMEA886?</b>	Response: <b>Get or set the navigation mode of GPS</b>  Set navigation mode.(L70-RL doesn't support option 5, L76-L support all) AT+NMEA886=0    default AT+NMEA886=1    Normal mode: For general purpose AT+NMEA886=2    Fitness mode: For running and walking purpose that the low-speed (<5m/s) movement will have more effect on the position calculation. AT+NMEA886=3    Aviation mode: For high-dynamic purpose that the large-acceleration movement will have more effect on the position calculation. AT+NMEA886=4    Balloon mode: For high-altitude balloon purpose that the vertical movement will have more effect on the position calculation. AT+NMEA886=5    Stationary mode: For stationary applications that zero dynamics is Assumed  <b>OK</b>
Test Command: <b>AT+NMEA886=2</b>	Response:  <b>OK</b>

#### 6.4 AT+NMEA353: Get or set the search mode of GPS

AT+NMEA353: Get or set the search mode of GPS	
Test Command: <b>AT+NMEA353=?</b> For L76-L only	Response: <b>0</b>  <b>OK</b>
Test Command: <b>AT+NMEA353?</b>	Response: <b>Get or set the search mode of GPS (For L76-L only)</b>  NMEA353: 0:GPS module factory default value 1:GPS+GLONASS 2:GPS+BeiDou 3:GPS+Galileo 4:GPS+GLONASS+Galileo  <b>OK</b>
Test Command: <b>AT+NMEA353=2</b>	Response:  <b>OK</b>