RAK7204 AT Command Manual

You can configure your RAK7204 WisNode Sense Home by sending AT Commands via a Serial port tool running on your PC. The following list shows the AT Commands that you can use:

The AT commands can be classified in the following groups:

• **Read Command**: Reads the current configuration or status of the board. The command name and the list of parameters are separated by = character. The <m> parameter is separated with its associated value <n> by the : character.

at+get_config=<m>:<n>

• Write Command: Writes/Modifies the current configuration of the board. The command name and the list of parameters are separated by = character. The <m> parameter is separated with its associated value <n> by the : character.

at+set_config=<m>:<n>

• **Operational Commands**: There are also commands that are neither read nor write commands. The purpose is to execute an action, for example:

at+send=lora:<m>:<n> // Sends data through the LoRa transceiver.

• Special Command: The RAK7204 UART port has two operational modes: Configuration Mode and Data Transmission Mode. When switching from data transmission mode to configuration mode the command to be entered is +++ and does not contain terminators such as \r and \r and \r n.

After executing the command, a response is sent back to the external MCU. The usual reply has the following format:

OK [information]\r\n



Only the read commands have information in the replied message, while Write commands do not have an informative description.

The firmware developed running in the external MCU will expect at a minimum string of Ok\r\n after sending a successful command to the board. On the other hand, when the command is not successfully executed by the board, you will receive a response in the following format:

ERROR: [ErrCode]\r\n

Error Code Table

1 The last command received is an unsupported AT command. 2 Invalid parameter in the AT command. 3 There is an error when reading or writing the flash memory. 4 There is an error when reading or writing through IIC bus. 5 There is an error when sending data through the UART port. 80 The LoRa transceiver is busy, could not process a new command. 81 LoRa service is unknown. Unknown MAC command received by node. Execute commands that are not supported in the current state, such as sending at join command in P2P mode. 82 The LoRa parameters are invalid. 83 The LoRa parameters are invalid. 84 The LoRa data rate (DR) is invalid. 85 The device has not joined into a LoRa network. 86 The device has not joined into a LoRa network. 87 The length of the packet exceeded that maximum allowed by the LoRa protocol. 88 Service is closed by the server. Due to the limitation of duty cycle, the server will send "SRV_MAC_DUTY_CYCLE_REQ" MAC command to close the service. 89 This is an unsupported region code. 90 Duty cycle is restricted. Due to duty cycle, data cannot be sent at this time until the time limit is removed. 91 No available LoRa channel could be found. 92 No available LoRa channel could be found. 93 Status is error. Generally, the internal state of the protocol stack is wrong. 94 Time out reached while sending the packet through the LoRa RX1 window. 95 Time out reached while waiting for a packet in the LoRa RX1 window. 96 Time out reached while waiting for a packet in the LoRa RX2 window. 97 There is an error while receiving a packet during the LoRa RX1 window.	Error Code	Description
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92 No available LoRa channel could be found. 93 Status is error. Generally, the internal state of the protocol stack is wrong. 94 Time out reached while sending the packet through the LoRa transceiver. 95 Time out reached while waiting for a packet in the LoRa RX1 window. 96 Time out reached while waiting for a packet in the LoRa RX2 window.	90	
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Time out reached while waiting for a packet in the LoRa RX1 window. Time out reached while waiting for a packet in the LoRa RX2 window.	93	Status is error. Generally, the internal state of the protocol stack is wrong.
96 Time out reached while waiting for a packet in the LoRa RX2 window.	94	Time out reached while sending the packet through the LoRa transceiver.
	95	Time out reached while waiting for a packet in the LoRa RX1 window.
97 There is an error while receiving a packet during the LoRa RX1 window.	96	Time out reached while waiting for a packet in the LoRa RX2 window.
	97	There is an error while receiving a packet during the LoRa RX1 window.

Error Code	Description
98	There is an error while receiving a packet during the LoRa RX2 window.
99	Failed to join into a LoRa network.
100	Duplicated downlink message is detected. A message with an invalid downlink count is received.
101	Payload size is not valid for the current data rate (DR).
102	Many downlink packets are lost.
103	Address fail. The address of the received packet does not match the address of the current node.
104	Invalid MIC is detected in the LoRa message.

General AT Command

1. at+version

This command is used to get the current firmware version number.

Operation	Command	Response
Read	at+version	OK <version number=""></version>

Parameter: NONE

Example:

at+version\r\n
0K V3.0.0.14.H.p_rst

2. at+help

This command is used to obtain all AT commands supported by the current firmware.

Operation	Command	Response
Read	at+help	OK <all at="" commands=""></all>

Parameter: NONE

Example:

```
at+help\r\n
========AT Commands List==========
Device AT commands:
 at+version
 at+help
 at+set_config=device:restart
 at+set_config=device:sleep:X
 at+get_config=device:status
 at+set_config=device:uart:X:Y
 at+set_config=device:uart_mode:X:Y
 at+send=uart:X:YYY
 at+set_config=device:gpio:X:Y
 at+get_config=device:gpio:X
 at+get_config=device:adc:X
LoRaWAN AT commands:
 at+set_config=lora:default_parameters
 at+join
 at+send=lora:X:YYY
 at+set_config=lora:region:XXX
 at+get_config=lora:channel
 at+set_config=lora:dev_eui:XXXX
 at+set_config=lora:app_eui:XXXX
 at+set_config=lora:app_key:XXXX
 at+set_config=lora:dev_addr:XXXX
 at+set_config=lora:apps_key:XXXX
 at+set_config=lora:nwks_key:XXXX
 at+set_config=lora:multicastenable:X
 at+set_config=lora:multicast_dev_addr:XXXX
 at+set_config=lora:multicast_apps_key:XXXX
 at+set_config=lora:multicast_nwks_key:XXXX
 at+set_config=lora:join_mode:X
 at+set_config=lora:work_mode:X
 at+set_config=lora:ch_mask:X:Y
 at+set_config=lora:class:X
 at+set_config=lora:confirm:X
 at+set_config=lora:dr:X
 at+set_config=lora:tx_power:X
 at+set_config=lora:adr:X
 at+set_config=lora:send_interval:X:Y
 at+get_config=lora:status
 at+set_config=lora:dutycycle_enable:X
 at+set_config=lora:send_repeat_cnt:X
LoRaP2P AT commands:
 at+set_config=lorap2p:XXX:Y:Z:A:B:C
 at+set_config=lorap2p:transfer_mode:X
 at+send=lorap2p:XXX
   -----List End-----
```

3. at+set_config=device:restart

This command is used to restart the device.

Operation	Command	Response
Read	at+set_config=device:restart	

Parameter: NONE

Example:

4. at+set_config=device:sleep: <status>

This command is used to change the current state of the device between the sleep and the wake-up mode.

Operation	Command	Response
Write	at+set_config=device:sleep: <status></status>	OK <status></status>

Parameter:

Status 0: wake up 1: sleep

Example:

```
at+set_config=device:sleep:1\r\n
OK Sleep
at+set_config=device:sleep:0\r\n
Go to Sleep
OK
```

5. at+get_config=device:status

This command is used to obtain the current status of the device.

Operation	Command	Response
Read	at+get_config=device:status	OK <information></information>

Parameter: None

Example:

Interface Type AT Command

1. at+set_config=device:uart: <index>:<baud_rate>

This command is used to configure the baud rate for a UART port.



There will be no reply after executing this configuration if a different baud rate is set. To make your UART serial communication work again, configure the UART baud rate setting of the Serial Port Tool based on the new baud rate.

Operation	Command	Response
Write	<pre>at+set_config=device:uart:<index>:<baud_rate></baud_rate></index></pre>	ОК

index	UART Number: 1 or 3. Two UART ports are currently supported starting FW V3.0.0.14.H - UART1 and UART3
baud_rate	UART Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Example:

```
at+set_config=device:uart:1:115200\r\n
OK.
```

2. at+set_config=device:uart_mode: <index>:<mode>

This command is used to set the UART operation between the AT configuration mode and the data transmission mode.

Operation	Command	Response
Write	at+set_config=device:uart_mode: <index>:<mode></mode></index>	OK

Parameter:

index	UART Number: 1 or 3. Two UART ports are currently supported starting FW V3.0.0.14.H - UART1 and UART3
mode	UART Mode : Only 1 can be selected, which means the UART is set to data transmission mode

Example:

```
at+set_config=device:uart_mode:1:1\r\n
Uart transparent mode configure success
OK
```

3. at+send=uart: <index>:<data>

This command is used to send data over a UART port.

Operation	Command	Response
Write	at+send=uart: <index>:<data></data></index>	ОК

index UART Port Number. Currently, the RAK7204 only supports UART1.

mode The data you want to send. The maximum length of data is **250 characters**, equivalent to 255 — the length of at+... — the length of $r \cdot r$.

Example:

at+send=uart:1:12345\r\n OK12345

4. at+set_config=device:gpio: <pin_num>:<status>

This command is used to set the voltage level state (high or low) of a pin on a board.

Operation	Command	Response
Read	<pre>at+get_config=device:gpio:<pin_num></pin_num></pre>	OK <status></status>

Parameter:

pin_num	Pin index of the board
status	0: Low voltage level 1: High voltage level

Example:

 $\label{lem:config} \begin{tabular}{ll} at+set_config=device:gpio:2:0\r\n \\ OK \end{tabular}$

5. at+get_config=device:gpio: <pin_num>

This command is used to obtain the voltage level status of a pin on a board.

Operation	Command	Response
Write	at+set_config=device:gpio: <pin_num>:<status></status></pin_num>	ОК

pin_num Pin index of the board

status (Return Value) 0: Low voltage level

1: High voltage level

Example:

at+get_config=device:gpio:2\r\n
OK 1

6. at+get_config=device:adc: <pin_num>

This command is used to obtain the voltage level of an ADC pin of the board.

Operation	Command	Response
Read	at+get_config=device:adc: <pin_num></pin_num>	OK <voltage></voltage>

Parameter:

pin_num ADC pin index of the board

Voltage (Return Value) Voltage, Unit: **mV**

Example:

at+get_config=device:adc:2\r\n
OK 681mV

LoRaWAN Type AT Command

1. at+join

This command is used to join a LoRaWAN network.

Operation	Command	Response
	at+join	OK Join Success

Parameter: NONE

Example:

```
at+join\r\n
OTAA:
DevEui:00662CA006D4F7E5
AppEui:70B3D57ED003CBC5
AppKey:72E181E4428C4F305827284D2FD54618
OTAA Join Start...
[LoRa]:Join Success
OK
```

2. at+send=lora: <port>:<data>

This command is used to send data via LoRaWAN.

Operation	Command	Re	esponse
	at+send=lora: <port>:<data></data></port>	0	K

Parameter:

port Sending port of LoRa. The value range is 1-223.

data

The sending data format is in hexadecimal format. The possible values are between **00-FF**. The board will internally cast every two characters into a byte before sending it to the LoRa transceiver. The maximum length varies depending on the band frequency and DR (LoRaWAN standard). Refer to Appendix III.

Example:

When sending data as unconfirmed uplink:

```
at+send=lora:1:5A00\r\n
OK
```

When sending data as confirmed uplink:

```
at+send=lora:1:5A00\r\n
OK
at+recv=0,-48,7,0
```

```
NOTE:
```

When sending a confirmed message, you will receive an ACK response, i.e. at+recv=... . The 0, -105, -12,0 stands for:

- 0 : For the LoRa port;
- -105 : For the RSSI;
- -12 : For the SNR;
- 0 : For the length of the data (no valid data in ACK).

3. at+set_config=lora:region: <region>

This command is used to set the appropriate working frequency band.

Operation	Command	Response
Write	<pre>at+set_config=lora:region:<region></region></pre>	ОК

Parameter:

region EU433, CN470, IN865, EU868, US915, AU915, KR920, AS923. The default is EU868.

Example:

at+set_config=lora:region:EU868\r\n OK

NOTE:

In the AS923 frequency band, the supported frequency plan is "as2" and dwell is set to 1.

4. at+get_config=lora:channel

This command is used to read all the LoRa channel information for the device's current region.

Operation	Command	Response
Read	at+get_config=lora:channel	OK <channel information=""></channel>

Parameter: NONE

Example: EU868 region

```
at+get_config=lora:channel\r\n
OK * 0,on,868100000,0,5; * 1,on,868300000,0,5; * 2,on,868500000,0,5; 3,off,0,0,0; 4,off,0,0,0;
```

NOTE:

With *0, on, 868100000, 0, 5 as an example, the following is the channel parameter analysis:

- * at the beginning if the channel is open;
- 0 is the channel ID;
- on indicates the current status of the channel;
- 868100000 is the actual frequency of the channel, unit is Hz;
- 0,5 indicates the DR of the channel, DR0~DR5.

5. at+set_config=lora:ch_mask: <channel_number>:<status>

This command is used to switch a channel (turn on or off) in the current region.

Operation	Command	Response
Write	<pre>at+set_config=lora:ch_mask:<channel_number>:<status></status></channel_number></pre>	OK

Parameter:

channel_number	Channel number
status	0: off 1: on

Example:

at+set_config=lora:ch_mask:0:0\r\n OK

6. at+set_config=lora:dev_eui: <dev_eui>

This command is used to set the Device EUI parameter for the LoRaWAN OTAA mode.

Operation	Command	Response
Write	at+set_config=lora:dev_eui: <dev_eui></dev_eui>	ОК

Parameter:

dev_eui Device EUI

Example:

 $at+set_config=lora:dev_eui:3530353064377716\r\\$ OK

7. at+set_config=lora:app_eui: <app_eui>

This command is used to set the Application EUI parameter for the LoRaWAN OTAA mode.

Operation	Command	Response
Write	at+set_config=lora:app_eui: <app_eui></app_eui>	OK

Parameter:

app_eui Application EUI

Example:

at+set_config=lora:app_eui:0000000000000001\r\n
0K

8. at+set_config=lora:app_key: <app_key>

This command is used to set the Application Key parameter for the LoRaWAN OTAA mode.

Operation	Command	Response
Write	<pre>at+set_config=lora:app_key:<app_key></app_key></pre>	ОК
Parameter:		

Application Key

Example:

app_key

 $at+set_config=lora: app_key: 841986913ACD00BBC2BE2479D70F3228 \label{eq:config} \\ OK$

9. at+set_config=lora:dev_addr: <dev_addr>

This command is used to set the Device Address parameter for the LoRaWAN ABP mode.

Operation	Command	Response
Write	at+set_config=lora:dev_addr: <dev_addr></dev_addr>	ОК

dev_addr Device Address

Example:

at+set_config=lora:dev_addr:260125D7\r\n
OK

10. at+set_config=lora:apps_key: <apps_key>

This command is used to set the Application Session Key parameter for the LoRaWAN ABP mode.

Operation	Command	Response
Write	<pre>at+set_config=lora:apps_key:<apps_key></apps_key></pre>	ОК

Parameter:

apps_key Application Session Key

Example:

 $at+set_config=lora:apps_key:841986913ACD00BBC2BE2479D70F3228\r\nOK$

11. at+set_config=lora:nwks_key: <nwks_key>

This command is used to set the Network Session Key parameter for the LoRaWAN ABP mode.

Operation	Command	Response
Read	at+set_config=lora:nwks_key: <nwks_key></nwks_key>	ОК

Parameter:

nwks_key Network Session Key

Example:

 $at+set_config=lora:nwks_key:69AF20AEA26C01B243945A28C9172B42\\ r\\ n$ OK

12. at+set_config=lora:join_mode: <mode>

This command is used to switch the LoRaWAN access mode between the OTAA and the ABP mode.

The default is OTAA.

Operation	Command	Response
Write	<pre>at+set_config=lora:join_mode:<mode></mode></pre>	ОК
Parameter:		
	Activation mode	
mode	0: OTAA 1: ABP	

Example:

at+set_config=lora:join_mode:0\r\n
OK

13. at+set_config=lora:class: <class>

This command is used to set the LoRaWAN class to Class A, Class B, or Class C.

Operation	Command	Response
Write	at+set_config=lora:class: <class></class>	ОК

Parameter:

0: Class A
1: Class B (Not supported at this time)
2: Class C
The default is Class A.

Example:

 $\begin{tabular}{ll} at+set_config=lora:class:0\r\\ OK \end{tabular}$

14. at+set_config=lora:confirm: <type>

This command is used to set the type messages to be sent: Confirmed/Unconfirmed.

Operation	Command	Response
Write	<pre>at+set_config=lora:confirm:<type></type></pre>	ОК
Parameter:		
type	O: unconfirm type 1: confirm type The default is unconfirm type.	

Example:

at+set_config=lora:confirm:0\r\n
0K

15. at+set_config=lora:dr: <dr>

This command is used to set the data rate (DR) of LoRa.

Operation	Command	Response
Write	at+set_config=lora:dr: <dr></dr>	ОК

Parameter:

dr The data rate of LoRa is related to the current region. In most of the LoRa areas, it is common to use 0 to 5. Detailed reference can be made to LoRaWAN 1.0.2 specification.

Example:

```
at+set_config=lora:dr:5\r\n
OK
```

16. at+set_config=lora:tx_power: <tx_power>

This command is used to set the RF transmission power level of the LoRa transceiver. The unit is in dBm.

Operation	Command	Response
Write	at+set_config=lora:tx_power: <tx_power></tx_power>	OK

LoRa transmit power level varies depending on frequency band and DR. Refer to the tx_power

LoRaWAN 1.0.2 specification or Appendix II for details.

The default is 0.

Example:

at+set_config=lora:tx_power:0\r\n
OK

17. at+set_config=lora:adr: <status>

This command is used to turn on/off the ADR feature of the LoRa communication.

Operation	Command	Response
Write	<pre>at+set_config=lora:adr:<status></status></pre>	ОК
Parameter:		
status	0: Turn off 1: Turn on	

The default is on.

Example:

 $\begin{tabular}{ll} at+set_config=lora:adr:1\r\n\\ OK \end{tabular}$

$18. \ \, \textbf{at+get_config=lora:status}$

This command is used to get all the information related to the current LoRa status, except the channel information.

Operation	Command	Response
Read	at+get_config=lora:status	OK <lora detail="" status=""></lora>

Parameter: NONE

Example:

```
at+get_config=lora:status\r\n
OK Work Mode: LoRaWAN
Region: EU868
Send_interval: 200s
Auto send status: true
Send_interval work at sleep
MulticastEnable: false
DutycycleEnable: false
Send_repeat_cnt: 0
Join_mode: OTAA
DevEui: 00662CA006D4F7E5
AppEui: 70B3D57ED003CBC5
AppKey: 72E181E4428C4F305827284D2FD54618
Class: A
Joined Network:true
IsConfirm: confirm
AdrEnable: true
EnableRepeaterSupport: false
RX2_CHANNEL_FREQUENCY: 869525000, RX2_CHANNEL_DR:3
RX_WINDOW_DURATION: 3000ms
RECEIVE_DELAY_1: 1000ms
RECEIVE_DELAY_2: 2000ms
JOIN_ACCEPT_DELAY_1: 5000ms
JOIN_ACCEPT_DELAY_2: 6000ms
Current Datarate: 5
Primeval Datarate: 5
ChannelsTxPower: 0
UpLinkCounter: 2
DownLinkCounter: 0
```

19. at+set_config=lora:send_interval: <status>:<interval>

This command is used to set the time interval for sending data.

Operation	Command	Response
Write	<pre>at+set_config=lora:send_interval:<status>:<interval></interval></status></pre>	ОК
Parameter:		
status	Enable/disable the mechanism for sending data in intervals. 0: the device will not send data automatically. 1: the device will send data every 'interval' seconds.	
interval	Time in seconds. This parameter is only valid if 'status' is set to 1.	

Example:

at+set_config=lora:send_interval:1:120\r\n OK

20. at+set_config=lora:work_mode: <mode>

This command is used to set the Working Mode:

Operation	Command	Response
Write	at+set_config=lora:work_mode: <mode></mode>	ОК

Parameter:

mode 0: LoRaWAN®
1: LoRaP2P
2: Test Mode.

Example:

```
at+set_config=lora:work_mode:0\r\n
LoRa (R) is a registered trademark or service mark of Semtech Corporation or its affiliates. LoRa
______
           \_| \_\_| |_/\_| \_/ \/ \/ \|_|_| \_
                       __|_|\_
RAK7204 Version:3.0.0.14.H.p_rst
**********
______
periodic rst is enabled. (interval:86400)
UART1 work mode: RUI_UART_NORMAL, 115200, N81
UART3 work mode: RUI_UART_USER, 115200, N81
BME680 init success.
autosend_interval: 200s
Current work_mode:LoRaWAN, join_mode:OTAA, MulticastEnable: false, Class: A
Initialization OK
```

21. at+set_config=lora:dutycycle_enable: <status>

This command is used to enable or disable the Duty Cycle feature.

Operation	Command	Response
Write	<pre>at+set_config=lora:dutycycle_enable:<status></status></pre>	ОК

0: disable

status 1: enable

The default is disable.

Example:

at+set_config=lora:dutycycle_enable:1\r\n
OK

22. at+set_config=lora:multicastenable: <IsEnable>

This commands is used to enable multicasting.

Operation	Command	Response
Write	<pre>at+set_config=lora:multicastenable:<isenable></isenable></pre>	ОК

Parameter:

0: disable

IsEnable 1: enable

The default is disable.

Example:

at+set_config=lora:multicastenable:1\r\n
OK

23. at+set_config=lora:multicast_dev_addr: <multicast_dev_addr>

This command is used to set the Device Address for the multicast feature.

Operation	Command	Response
Write	at+set_config=lora:multicast_dev_addr: <multicast_dev_addr></multicast_dev_addr>	ОК

Parameter:

multicast_dev_addr

Multicast Device Address

Example:

at+set_config=lora:multicast_dev_addr:260111fd\r\n
OK

24. at+set_config=lora:multicast_apps_key: <multicast_apps_key>

This command is used to set the Application Session Key for the multicast feature.

Operation	Command	Response
Write	at+set_config=lora:multicast_apps_key: <multicast_apps_key></multicast_apps_key>	ОК

Parameter:

multicast_app_addr

Multicast Application Session Key

Example:

 $at+set_config=lora: multicast_apps_key: F13DDFA2619B10411F02F042E1C0F356 \\ \ r\ n\ OK$

25. at+set_config=lora:multicast_nwks_key: <multicast_nwks_key>

This command is used to set the Network Session Key for the multicast feature.

Operation	Command	Response
Write	at+set_config=lora:multicast_nwks_key: <multicast_nwks_key></multicast_nwks_key>	ОК

Parameter:

multicast_nwks_key

Multicast Network Session Key

Example:

26. set_config=lora:default_parameters

This command is used to restore the factory setting.

Operation	Command	Response
Write	at+set_config=lora:default_parameters	ОК

Parameter: NONE

Example:

at+set_config=lora:default_parameters\r\n

27. set_config=lora:periodic_rst_interval: <time>

This command is used to set a periodic restart.

Operation	Command	Response
Write	<pre>at+set_config=lora:periodic_rst_interval:<time></time></pre>	ОК

Parameter:

time Time in seconds.

Example:

at+set_config=lora:periodic_rst_interval:864000\r\n interval_time=864000

LoraP2P AT Command

1. at+set_config=lorap2p: <frequency>:<spreadfact>:<bandwidth>:<codingrate>:<preamlen>:<power>

This command is used to set the relevant parameters of LoRAP2p mode and is only valid when the LoRa mode was switched to LoRaP2P before.

Operation	Command	Response
Write	<pre>at+set_config=lorap2p:<frequency>:<spreadfact>:<bandwidth>: <codingrate>:<preamlen>:<power></power></preamlen></codingrate></bandwidth></spreadfact></frequency></pre>	ОК

Parameter:

frequency	Frequency, the unit is Hz The default is 869525000Hz.
spreadfact	Spreading factor The default is 12.
bandwidth	0: 125KHz 1: 250KHz 2: 500KHz The default is 0.
codeingrate	1: 4/5 2: 4/6 3: 4/7 4: 4/8 The default is 1.
preamble	Preamble Length. 5~65535 The default is 8.
power	TX power. The unit is in dBm. 5~20 The default is 20.

Example:

at+set_config=lorap2p:869525000:12:0:1:8:20\r\n OK

2. at+set_config=lorap2p:transfer_mode: <mode>

This command is used to switch the state of the LoRa transceiver between sending and receiving state, and it's only valid when the LoRa mode was set to LoRaP2P before.

Operation	Command	Response
Write	<pre>at+set_config=lorap2p: transfer_mode:<mode></mode></pre>	ОК
Parameter :		
mode	1: receiver mode 2: sender mode	
	The default is sender mode.	

Example :

at+set_config=lorap2p:transfer_mode:1\r\n
OK

3. at+send=lorap2p: <data>

This command is used to send data through LoRaP2P, and only valid when the LoRa work mode was set to LoRaP2P before.

Operation	Command	Response
Send	at+send=lorap2p: <data></data>	ОК
Parameter :		
mode	1: receiver mode 2: sender mode	
	The default is sender mode.	

Example:

at+send=lorap2p:1234\r\n
0K

In LoRa P2P mode, the receiving node receives the data and outputs the data in the following format:

at+recv=<RSSI>,<SNR>,< Data Length >:< Data >

Appendix I: Data Rate by Region

EU433/EU868/AS923

Data Rate	Configuration	Indicative Physical Bit Rate [bit/s]
0	LoRa: SF12 / 125 kHz	250
1	LoRa: SF11 / 125 kHz	440
2	LoRa: SF10 / 125 kHz	980
3	LoRa: SF9 / 125 kHz	1760
4	LoRa: SF8 / 125 kHz	3125
5	LoRa: SF7 / 125 kHz	5470
6	LoRa: SF7 / 250 kHz	11000
7	FSK: 50 kbps	50000
8 ~ 15	RFU	

CN470/KR920

Data Rate	Configuration	Indicative Physical Bit Rate [bit/s]
0	LoRa: SF12 / 125 kHz	250
1	LoRa: SF11 / 125 kHz	440
2	LoRa: SF10 / 125 kHz	980
3	LoRa: SF9 / 125 kHz	1760
4	LoRa: SF8 / 125 kHz	3125
5	LoRa: SF7 / 125 kHz	5470
6 ~ 15	RFU	

US915

Data Rate	Configuration	Indicative Physical Bit Rate [bit/s]
0	LoRa: SF10 / 125 kHz	980
1	LoRa: SF9 / 125 kHz	1760
2	LoRa: SF8 / 125 kHz	3125
3	LoRa: SF7 / 125 kHz	5470
4	LoRa: SF8 / 500 kHz	12500
5 ~ 7	RFU	
8	LoRa: SF12 / 500 kHz	980
9	LoRa: SF11 / 500 kHz	1760
10	LoRa: SF10 / 500 kHz	3900
11	LoRa: SF9 / 500 kHz	7000
12	LoRa: SF8 / 500 kHz	12500
13	LoRa: SF7 / 500 kHz	21900
14 ~ 15	RFU	

AU915

Data Rate	Configuration	Indicative Physical Bit Rate [bit/s]
0	LoRa: SF12 / 125 kHz	250
1	LoRa: SF11 / 125 kHz	440
2	LoRa: SF10 / 125 kHz	980
3	LoRa: SF9 / 125 kHz	1760
4	LoRa: SF8 / 125 kHz	3125
5	LoRa: SF7 / 125 kHz	5470
6	LoRa: SF8 / 500 kHz	12500
7	RFU	RFU
8	LoRa: SF12 / 500 kHz	980
9	LoRa: SF11 / 500 kHz	1760
10	LoRa: SF10 / 500 kHz	3900
11	LoRa: SF9 / 500 kHz	7000
12	LoRa: SF8 / 500 kHz	12500

IN865

Data Rate	Configuration	Indicative Physical Bit Rate [bit/s]
0	LoRa: SF12 / 125 kHz	250
1	LoRa: SF11 / 125 kHz	440
2	LoRa: SF10 / 125 kHz	980
3	LoRa: SF9 / 125 kHz	1760
4	LoRa: SF8 / 125 kHz	3125
5	LoRa: SF7 / 125 kHz	5470
6	RFU	RFU
7	FSK: 50 kbps	50000
8 ~ 15	RFU	RFU

Appendix II: TX Power by Region

EU868

By default, MaxEIRP is considered to be +16 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6	MaxEIRP - 12 dB
7	MaxEIRP - 14 dB
8 ~ 15	RFU

TXPower	Configuration (conducted power)
0	30 dBm - 2*TXpower
1	28 dBm
2	26 dBm
3 ~ 9	
10	10 dBm
11 ~ 15	RFU

AU915

By default, MaxEIRP is considered to be +30 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1 ~ 10	MaxEIRP - 2*TXPower
11 ~ 10	RFU

KR920

By default, MaxEIRP is considered to be $+14~\mathrm{dBm}$.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6	MaxEIRP - 12 dB
7	MaxEIRP - 14 dB
8 ~ 15	RFU

AS923

By default, Max EIRP shall be 16 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6	MaxEIRP - 12 dB
7	MaxEIRP - 14 dB
8 ~ 15	RFU

IN865

By default, MaxEIRP is considered to be 30 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6	MaxEIRP - 12 dB
7	MaxEIRP - 14 dB
8	MaxEIRP - 16 dB
9	MaxEIRP - 18 dB
10	MaxEIRP - 20 dB
11 ~ 15	RFU

CN470

By default, MaxEIRP is considered to be +19.15 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6	MaxEIRP - 12 dB
7	MaxEIRP - 14 dB
8 ~ 15	RFU

EU433

By default, MAxEIRP is considered to be +12.15 dBm.

TXPower	Configuration (EIRP)
0	MaxEIRP
1	MaxEIRP - 2 dB
2	MaxEIRP - 4 dB
3	MaxEIRP - 6 dB
4	MaxEIRP - 8 dB
5	MaxEIRP - 10 dB
6 ~ 15	RFU

Appendix III: Maximum Transmission Load by Region



M in the following list is the length with MAC header, N is the length without MAC header, and the maximum sending data length is N.

EU868

Data Rate	М	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6	250	242
7	250	242
8 ~ 15	Not Defined	Not Defined

US915

Data Rate	М	N
0	19	11
1	61	53
2	133	125
3	250	242
4	250	242
5 ~ 7	Not Defined	Not Defined
8	61	53
9	137	129
10	250	242
11	250	242
11 12	250 250	
		242

AU915

Data Rate	M	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6	250	242
7	– .	Net Defined
7	Not Defined	Not Defined
8	Not Defined 61	53
8	61	53
9	61 137	53 129
9	61 137 250	53 129 242
8 9 10 11	61 137 250 250	53 129 242 242

KR920

Data Rate	М	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6 ~ 15	Not Defined	Not Defined

AS923

Data Rate	Uplink MAC Pa	yload Size (M)	Downlink MAC I	Payload Size (M)
	UplinkDwellTime = 0	UplinkDwellTime = 1	DownlinkDwellTime = 0	DownlinkDwellTime = 1
0	59	N/A	59	N/A
1	59	N/A	59	N/A
2	59	19	59	19
3	123	61	123	61
4	250	133	250	133
5	250	250	250	250
6	250	250	250	250
7	250	250	250	250
8	RI	=U	RI	=U

IN865

Data Rate	М	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6	250	242
7	250	242
8 ~ 15	Not Defined	Not Defined

CN470

Data Rate	М	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6 ~ 15	Not Defined	Not Defined

EU433

Data Rate	M	N
0	59	51
1	59	51
2	59	51
3	123	115
4	250	242
5	250	242
6	250	242
7	250	242
8 ~ 15	Not Defined	Not Defined

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