

KCM0A5S Series

AT Commands Manual

Short-Range Products

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About the Document

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1 Introduction

This document outlines general, Wi-SUN-related and data transmission-related AT commands supported by Quectel KCM0A5S series module.

1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

1.2. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

AT commands implemented by the module can be separated into three categories syntactically: “**Basic**” and “**Extended**”, as listed below:

- **Basic Command**

These AT commands have the format of **AT<x><n>**, or **AT&<x><n>**, where **<x>** is the command, and **<n>** is/are the argument(s) for that command. An example of this is **ATE<n>**, which tells the DCE (Data Circuit-terminating Equipment) whether received characters should be echoed back to the DTE (Data Terminal Equipment) according to the value of **<n>**. **<n>** is optional and a default will be used if it is omitted.

- **Extended Command**

Extended commands can be executed in several modes, as shown in the following table.

Table 1: Types of AT Commands

Command Type	Syntax	Description
Test Command	AT+<cmd>=?	Test the existence of the corresponding command and return information about the type, value, or range of its parameter.
Read Command	AT+<cmd>?	Check the current parameter value of the corresponding command.
Write Command	AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]	Set user-definable parameter value.
Execution Command	AT+<cmd>	Return a specific information parameter or perform a specific action.

Multiple commands can be placed on a single line using a semi-colon (;) between commands. In such cases, only the first command should have **AT** prefix. Commands can be in upper or lower case.

Spaces should be ignored when you enter AT commands, except in the following cases:

- Within quoted strings, where spaces are preserved;
- Within an unquoted string or numeric parameter;
- Within an IP address;
- Within the AT command name up to and including a =, ? or =?.

On input, at least a carriage return is required. A newline character is ignored so it is permissible to use carriage return/line feed pairs on the input.

If no command is entered after the **AT** token, **OK** will be returned. If an invalid command is entered, **ERROR** will be returned.

Optional parameters, unless explicitly stated, need to be provided up to the last parameter being entered.

1.3. AT Command Responses

When the AT command processor has finished processing a line, it will output **OK**, **ERROR** or **+CME ERROR: <err>** to indicate that it is ready to accept a new command. Solicited information responses are sent before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

```
<CR><LF>+CMD1: <parameters><CR><LF>  
<CR><LF>OK<CR><LF>
```

Or

```
<CR><LF><parameters><CR><LF>  
<CR><LF>OK<CR><LF>
```

1.4. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about the use of the AT commands introduced herein. The examples, however, should not be taken as Quectel's recommendations or suggestions about how to design a program flow or what status to set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there is a correlation among these examples, or that they should be executed in a given sequence. The URLs, domain names, IP addresses, usernames/accounts, and passwords (if any) in the AT command examples are provided for illustrative and explanatory purposes only, and they should be modified to reflect your actual usage and specific needs.

2 AT Command Description

2.1. Description of General AT Commands

2.1.1. AT+Qrst Reboot Module

The command reboots the module.

AT+Qrst Reboot Module	
Execution Command AT+Qrst	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.1.2. ATi Display MT Identification Information

The command displays the MT identification information.

ATi Display MT Identification Information	
Execution Command ATi	Response Quectel <objectID> Revision: <revision> OK
Maximum Response Time	300 ms
Characteristics	-

Parameter

<objectID>	String type without double quotation marks. Identifier of device type.
<revision>	String type without double quotation marks. Identification text of MT firmware version.

2.1.3. AT+QVERSION Get Firmware Version

The command gets firmware version of the module.

AT+QVERSION Get Firmware Version	
Execution Command AT+QVERSION	Response +QVERSION: <version> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<version>	String type without double quotation marks. Firmware version number.
------------------------	--

2.1.4. AT+QECHO Enable/Disable Echo Function

The command enables or disables echo function.

AT+QECHO Enable/Disable Echo Function	
Write Command AT+QECHO=<enable>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<enable>	Integer type. Enable/disable echo function. <u>0</u> Disable 1 Enable
-----------------------	---

2.1.5. AT+QSETBAUD Set Baud Rate

The command sets serial port baud rate and writes it to flash.

AT+QSETBAUD Set Baud Rate	
Write Command AT+QSETBAUD=<baud_rate>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<baud_rate>	Integer type. Serial port baud rate. Supported baud rate values: 2400, 4800, 9600,19200, 38400, 57600, 115200. Default value: 115200. Unit: bps.
--------------------------	--

2.1.6. AT+QTXPOWER Set TX Power

The command sets TX power and writes it to flash.

AT+QTXPOWER Set TX Power	
Read Command AT+QTXPOWER?	Response +QTXPOWER: <TX_power> OK If there is any error: ERROR
Write Command AT+QTXPOWER=<TX_power>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<TX_power> Integer type. TX power. Range: -30–30. Default value: 10. Unit: dBm.

2.2. Description of Wi-SUN-Related AT Commands

The commands in this chapter are applicable to scenarios where the module is configured as a BR or a node.

2.2.1. AT+QWSNETNAME Configure Network Name

The command configures the name of the target network the module will join. It must be configured before the network join.

AT+QWSNETNAME Configure Network Name	
Read Command AT+QWSNETNAME?	Response +QWSNETNAME: <name> OK If there is any error: ERROR
Write Command AT+QWSNETNAME=<name>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<name> String type. Name of the target network the module will join. Default value: "wisun". Maximum length: 32 bytes.

2.2.2. AT+QWSNETSETS Configure Network Connection Parameter Set

The command configures the parameter set for network connection.

AT+QWSNETSETS Configure Network Connection Parameter Set	
Read Command AT+QWSNETSETS?	Response +QWSNETSETS: <set> OK If there is any error: ERROR
Write command AT+QWSNETSETS=<set>	Response +QWSNETSETS: <set> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<set>	Integer type. A set of parameters used to configure various behaviors of the node when joining and operating in a Wi-SUN network.
<u>1</u>	Suitable for networks with fewer than 100 nodes.
2	Suitable for networks with 100–800 nodes.
3	Suitable for networks with 801–1500 nodes.
4	Suitable for testing scenarios, applicable to networks with fewer than 10 nodes.

2.2.3. AT+QWSPHY Configure RF Parameters

This command configures the RF parameters of the module.

AT+QWSPHY Configure RF Parameters	
Read Command AT+QWSPHY?	Response +QWSPHY: <domain>,<chan_id>,<phy_id> OK If there is any error:

	ERROR
Write Command AT+QWSPHY=<domain>,<chan_id>,<phy_id>	Response +QWSPHY: <domain>,<chan_id>,<phy_id> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<domain>	Integer type. Region. Different regions apply different RF standards. 1 North America 2 Japan 3 Europe 5 India 7 Brazil 8 Australia and New Zealand 13 Singapore
<chan_id>	Integer type. Channel plan ID. It selects a channel plan that specifies the channel distribution and parameters for a certain regulatory region. Available channel plan IDs vary by region and operating mode. Default value: 1.
<phy_id>	Integer type. Physical layer configuration identifier, which uniquely identifies a specific physical layer modulation method and data rate. Default value: 2.

Table 2: RF Configurations and Theoretical Maximum Rates by Region

Region	RF Configuration (<domain>-<chan_id>-<phy_id>)	Theoretical Maximum Rate (kbps)
North America	1-1-2	50
	1-1-3	100
	1-3-8	300
	1-2-68	400
	1-4-51	800
	1-5-34	1200
Japan	2-21-2	50

	2-22-4	100
	2-21-84	200
	2-22-68	400
	2-24-51	800
Brazil	7-1-2	50
	7-1-3	100
	7-3-8	300
	7-2-68	400
	7-4-51	800
	7-5-34	1200
Australia and New Zealand	8-48-2	50
	8-48-3	100
	8-49-6	200
	8-49-8	300
Europe (863–870 MHz)	3-32-1	50
	3-33-3	100
	3-33-84	200
Europe (863–876 MHz)	3-36-1	50
	3-37-3	100
	3-37-84	200
Europe (870–876 MHz)	3-34-1	50
	3-35-3	100
	3-35-84	200
India	5-39-1	50
	5-40-3	100
	5-40-84	200
Singapore	13-41-1	50
	13-42-3	100
	13-42-84	200

2.2.4. AT+QWSCMAC Set MAC Address

This command sets module MAC address.

AT+QWSCMAC Set MAC Address	
Read Command AT+QWSCMAC?	Response +QWSCMAC: <MAC> OK If there is any error: ERROR
Write Command AT+QWSCMAC=<MAC>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<MAC>	Hexadecimal string type. MAC address. Maximum length: 16 bytes.
--------------------	---

2.2.5. AT+QWSROOTCA Write External Root Certificate

This command writes the external root certificate.

AT+QWSROOTCA Write External Root Certificate	
Read Command AT+QWSROOTCA?	Response +QWSROOTCA: <index>,<len> OK If there is any error: ERROR
Write Command AT+QWSROOTCA=<index>,<len>	Response > Or ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately.

The configurations are saved to flash automatically.

Parameter

<index>	Integer type. Certificate index. Range: 0–9.
<len>	Integer type. Certificate length. Range: 1–1023. Unit: byte.

NOTE

> response indicates that you must manually type the certificate content.

2.2.6. AT+QWSDEVCERT Write External Device Certificate

The command writes the external device certificate.

AT+QWSDEVCERT Write External Device Certificate

Write Command AT+QWSDEVCERT=<len>	Response > Or ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately. The configuration is saved to flash automatically.

Parameter

<len>	Integer type. Certificate length. Range: 1–1023. Unit: byte.
-------	--

NOTE

> response indicates that you must manually type the certificate content.

2.2.7. AT+QWSDEVKEY Write Private Key of External Device

The command writes the private key of the external device.

AT+QWSDEVKEY Write Private Key of External Device	
Write Command AT+QWSDEVKEY=<len>	Response > Or ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately. The configuration is saved to flash automatically.

Parameter

<len>	Integer type. Private key length. Range: 1–1023. Unit: byte.
--------------------	--

NOTE

> response indicates that you must manually type the private key content.

2.2.8. AT+QWSKEYCHAIN Select Certificate

This command selects whether to use the built-in or external certificate.

AT+QWSKEYCHAIN Select Certificate	
Read Command AT+QWSKEYCHAIN?	Response +QWSKEYCHAIN: <chain> OK If there is any error: ERROR
Write Command AT+QWSKEYCHAIN=<chain>	Response OK Or ERROR
Maximum Response Time	1000 ms
Characteristics	-

Parameter

<chain>	Integer type. Certificate type.
0	Built-in certificate
1	External certificate

2.2.9. AT+QWSCLRCERT Clear External Certificate

The command clears the stored external certificate.

AT+QWSCLRCERT Clear External Certificate	
Execution Command AT+QWSCLRCERT	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.2.10. AT+QWSCLRCACHE Clear Authentication Cache

This command clears the authentication cache.

AT+QWSCLRCACHE Clear Authentication Cache	
Execution Command AT+QWSCLRCACHE	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

NOTE

1. This command is mainly used for testing, and its frequent execution in normal production environments is not recommended.
2. After clearing the cache, the module cannot use the previously stored credentials when re-joining the same PAN and must perform the complete authentication process again.
3. Since Wi-SUN uses AES-CCM* for replay protection, clearing the cache may prevent the module from re-joining the same PAN before the session expires.

2.2.11. AT+QWSUNICAST Configure Unicast Dwell Interval

This command configures the unicast dwell interval.

AT+QWSUNICAST Configure Unicast Dwell Interval	
Read Command AT+QWSUNICAST?	Response +QWSUNICAST: <time> OK If there is any error: ERROR
Write Command AT+QWSUNICAST=<time>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<time> Integer type. Unicast dwell interval. Range: 15–255. Default value: 255. Unit: ms.

NOTE

1. Unicast dwell interval is the duration for which a node continuously listens or transmits data on a specific channel during unicast communication in a Wi-SUN network.
2. Dwell time setting affects how long a node stays on each channel during channel hopping (frequency hopping). A longer dwell time means the node listens on that channel for a longer period, which can help improve communication reliability but may also increase overall communication latency. A reasonable adjustment of the unicast dwell time (recommended range: 15–255 ms) can reduce network latency and optimize network throughput.

2.2.12. AT+QWSNETINFO Query Network Information

This command queries network information.

AT+QWSNETINFO Query Network Information	
Read Command AT+QWSNETINFO?	Response +QWSNETINFO: <pan_id>,<hop_count> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<pan_id>	Hexadecimal string type. Network identifier.
<hop_count>	Integer type. Number of hops from the current module to the border router.

2.2.13. AT+QWSPING Ping Test

This command performs a ping test.

AT+QWSPING Ping Test	
Write Command AT+QWSPING=<IPv6_addr>	Response +QWSPING: <IPv6_addr>,<rtt> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<IPv6_addr>	String type. IPv6 address of ping target.
<rtt>	Integer type. Round-trip time of ping packet. Unit: ms.

2.2.14. AT+QWSAVE Save Network Configurations

This command saves network configurations to flash, including network name, network connection parameter set, RF parameters, certificate selection, unicast dwell time, broadcast dwell time, and leaf mode.

AT+QWSAVE Save Network Configurations	
Execution Command AT+QWSAVE	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.2.15. AT+QWSRESET Restore Default Network Configurations

The command restores default network configurations.

AT+QWSRESET Restore Default Network Configurations	
Execution Command AT+QWSRESET	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.2.16. AT+QWSNBS Query Neighbor Information

This command queries neighbor information of the node or the BR.

AT+QWSNBS Query Neighbor Information	
Read Command AT+QWSNBS?	Response +QWSNBS: <count>,<neighbors_info> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<count>	Integer type. Number of neighbors.
<neighbors_info>	String type. Contains information about neighbor nodes, including their addresses, TX/RX counters, and signal quality.

2.3. Description of Data Transmission-related AT Commands

Except for **AT+QSENDBR**, all other commands in this chapter are applicable to scenarios where the module is configured as a BR or a node.

2.3.1. AT+QIPSET Set Peer Port and Local Port

The command sets the peer port and local port for data transmission.

AT+QIPSET Set Peer Port and Local Port	
Read Command AT+QIPSET?	Response +QIPSET: <remote_port>,<local_port> OK If there is any error: ERROR
Write Command AT+QIPSET=<remote_port>,<local_port>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<remote_port>	Integer type. Peer port. Range: 1–65535.
<local_port>	Integer type. Local port. Range: 1–65535.

2.3.2. AT+QIOPEN Open UDP Data Transmission Channel

The command opens the UDP data transmission channel.

AT+QIOPEN Open UDP Data Transmission Channel	
Execution Command AT+QIOPEN	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.3.3. AT+QIPCLOSE Close UDP Data Transmission Channel

The command closes the UDP data transmission channel.

AT+QIPCLOSE Close UDP Data Transmission Channel	
Execution Command AT+QIPCLOSE	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.3.4. AT+QIPMODE Set Data Transmission Mode

The command sets the data transmission mode, including normal transmission mode or transparent transmission mode.

AT+QIPMODE Set Data Transmission Mode	
Read Command AT+QIPMODE?	Response +QIPMODE: <mode> OK If there is any error: ERROR
Write Command AT+QIPMODE=<mode>	Response +QIPMODE: <mode> OK

	If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<mode>	Integer type. Data transmission mode.
0	Normal transmission mode
1	Transparent transmission mode

2.3.5. AT+QIPADDR Query IP Address by Type

The command queries the IP address of the specified type.

AT+QIPADDR Query IP Address by Type	
Write Command AT+QIPADDR=<type>	Response +QIPADDR: <type>,<IPv6_addr> OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<type>	Integer type. IP address type. When AT+QIPADDR is executed on the BR side, the value of <type> can only be 1 or 2.
1	Local link address
2	Global unicast address
3	BR address
4	Parent node address
<IPv6_addr>	String type. IP address corresponding to <type> .

2.3.6. AT+QSENDBR Send Data to BR

This command enables the module to send data to the BR as a node.

AT+QSENDBR Send Data to BR	
Write Command AT+QSENDBR=<len>,<data>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	This command can only be executed on the node side.

Parameter

<len>	Integer type. Length of data to be sent. Range: 1–512. Unit: byte.
<data>	String type without double quotation marks. Data to be sent.

2.3.7. AT+QSENDNODE Send Data to Node

This command enables the module to send data to other nodes when it is configured as a node or a BR.

AT+QSENDNODE Send Data to Node	
Write Command AT+QSENDNODE=<MAC>,<len>,<data>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<MAC>	String type without double quotation marks. MAC address of the receiver.
<len>	Integer type. Length of data to be sent. Range: 1–512. Unit: byte.
<data>	String type without double quotation marks. Data to be sent.

2.3.8. ATO Enter Transparent Transmission Mode

This command enables the module to enter the transparent transmission mode.

ATO Enter Transparent Transmission Mode	
Execution Command ATO	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	All messages are broadcast to all nodes when the BR side enters transparent transmission mode.

2.3.9. +++ Exit Transparent Transmission Mode

The command enables the module to exit the transparent transmission mode.

+++ Exit Transparent Transmission Mode	
Execution Command +++	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command does not require <LF>.

2.4. Description of Node-Side-Related AT Commands

The commands in this chapter are only applicable to scenarios where the module is configured as a node.

2.4.1. AT+QWSJOIN Join the Network

This command enables the module to join the network as a node.

AT+QWSJOIN Join the Network	
Read Command AT+QWSJOIN?	Response +QWSJOIN: <join_state> OK

	If there is any error: ERROR
Execution Command AT+QWSJOIN	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<join_state>	Integer type. Connection status.
0	Not connected
1	Searching for PAN
2	Authenticating
3	Requesting PAN parameters
4	Configuring route
5	Connected

2.4.2. AT+QWSQUIT Exit the Network

This command enables the module to exit the network as a node.

AT+QWSQUIT Exit the Network	
Execution Command AT+QWSQUIT	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.4.3. AT+QWSAUTOJOIN Join Network Upon Power-on Automatically

This command enables the module to automatically join the network upon power-on.

AT+QWSAUTOJOIN Join Network Upon Power-on Automatically	
Read Command AT+QWSAUTOJOIN?	Response +QWSAUTOJOIN: <enable> OK

	If there is any error: ERROR
Write Command AT+QWSAUTOJOIN=<enable>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<enable>	Integer type. Enable or disable automatic network join after power-on.
<u>0</u>	Disable
1	Enable

2.4.4. AT+QWSLEAFMODE Configure Leaf Mode

The command configures the leaf mode.

AT+QWSLEAFMODE Configure Leaf Mode	
Read Command AT+QWSLEAFMODE?	Response +QWSLEAFMODE: <mode> OK If there is any error: ERROR
Write Command AT+QWSLEAFMODE=<mode>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<mode>	Integer type. Enable or disable the leaf mode.
<u>0</u>	Disable
1	Enable

NOTE

After enabling leaf mode, the node will not connect to any child nodes, or forward routing information, or broadcast messages. This mode is suitable for scenarios where the node only functions as a terminal node without participating in route forwarding.

2.5. Description of BR-Side-Related AT Commands

The commands in this chapter are only applicable to scenarios where the module is configured as a BR.

2.5.1. AT+QWSTART Enable Network

This command enables the module to enable the network as a BR.

AT+QWSTART Enable Network	
Read Command AT+QWSTART?	Response +QWSTART: <state> OK If there is any error: ERROR
Execution Command AT+QWSTART	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<state>	Integer type. Network status.
<u>0</u>	Disabled
1	Enabled

2.5.2. AT+QWSTOP Disable Network

This command enables the module to disable the network as a BR.

AT+QWSTOP Disable Network	
Execution Command AT+QWSTOP	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

2.5.3. AT+QWSAUTOSTART Enable Network Upon Power-on Automatically

This command enables the module to automatically enable the network upon power-on.

AT+QWSAUTOSTART Enable Network Upon Power-on Automatically	
Read Command AT+QWSAUTOSTART?	Response +QWSAUTOSTART: <enable> OK If there is any error: ERROR
Write Command AT+QWSAUTOSTART=<enable>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<enable>	Integer type. Enable or disable the network automatically after power-on.
<u>0</u>	Disabled
1	Enabled

2.5.4. AT+QWSBROADCAST Set Broadcast Parameters

This command sets broadcast parameters.

AT+QWSBROADCAST Set Broadcast Parameters	
Read Command AT+QWSBROADCAST?	Response +QWSBROADCAST: <interval>,<dwel> OK If there is any error: ERROR
Write Command AT+QWSBROADCAST= <interval>,<dwel>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	-

Parameter

<interval>	Integer type. Broadcast interval. Range: 100–3600000. Default value: 1020. Unit: ms.
<dwel>	Integer type. Broadcast dwell interval. Range: 100–255. Default value: 255. Unit: ms.

NOTE

1. Broadcast interval, which must exceed the broadcast dwell interval, is the time between the start of two consecutive broadcast transmissions within the broadcast schedule of an advertising node. Broadcast interval determines the frequency of broadcast transmission. It is recommended to set this value to 4 times the larger of the unicast dwell interval and the broadcast dwell interval. If the application prioritizes unicast messages, it is recommended to increase this interval to reduce the bandwidth occupied by the broadcast transmission.
2. Broadcast dwell interval is the time during which a node can transmit broadcast messages, as defined in the broadcast channel hopping schedule. A longer broadcast dwell interval results in less time available for unicast communication. For applications dominated by unicast, it is recommended to decrease this value to optimize unicast throughput and reduce latency.

2.5.5. AT+QWSROUTER Query Routing Information

This command queries routing information.

AT+QWSROUTER Query Routing Information	
Read Command AT+QWSROUTER?	Response +QWSROUTER: <node_count> Node <index>: <node_ipv6> ... OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately.

Parameter

<node_count>	Integer type. Number of nodes in the routing table.
<index>	Integer type. Node index, starting from 0.
<node_ipv6>	String type. IPv6 address of the corresponding node.

3 URC Descriptions

3.1. +QSTAT URC Indicating Wi-SUN Network Connection Status Change

+QSTAT URC Indicating Wi-SUN Network Connection Status Change

+QSTAT: <event>

This URC indicates Wi-SUN network connection status changes.

Parameter

<event>	String type. Event reported when the Wi-SUN network connection status changes.	
	"CONNECTED"	Connected
	"DISCONNECTED"	Disconnected
	"SELECT"	Network discovery
	"AUTHENTICATE"	Security authentication
	"PANCONFIG"	PAN configuration acquisition
	"ROUTING"	Routing configuration

3.2. +QRECV URC Indicating Data Reception

+QRECV URC Indicating Data Reception

+QRECV: <MAC>,<len>,<data>

This URC indicates that the node receives data.

Parameter

<MAC>	String type. MAC address of the sender.
<len>	Integer type. Length of received data. Range: 1–512. Unit: byte.
<data>	String type without double quotation marks. Received data.

4 Examples

This chapter introduces the main practical AT command examples for network configuration, and for data transmission in normal transmission mode and in transparent transmission mode.

4.1. Network Configuration

```
//Node-side configuration
RDY                                     //Power-on prompt.

AT+QWSNETNAME="wisun"                 //Configure the name of the network to be joined.
+QWSNETNAME: "wisun"

OK
AT+QWSNETSETS=1                       //Configure network connection parameter set.
+QWSNETSETS: 1

OK
AT+QWSPHY=1,1,2                      //Configure RF parameters.
+QWSPHY: 1,1,2

OK
AT+QWSJOIN                            //Join the network as a node.
OK

+QSTAT: "CONNECTED"                 //URC indicating successful network connection.
AT+QWSJOIN?                         //Query current connection status.
+QWSJOIN: 5

OK
AT+QWSNETINFO?                      //Query network information.
+QWSNETINFO: "0x36a1",1

OK
AT+QIPSET=1234,1234                 //Set communication port.
+QIPSET: 1234,1234
```

```
OK
AT+QIPOPEN //Open the communication port.
OK
```

```
//BR-side configuration
RDY //Power-on prompt

AT+QWSNETNAME="wisun" //Configure the name of the network to be joined.
+QWSNETNAME: "wisun"

OK
AT+QWSNETSETS=1 //Configure network connection parameter set.
+QWSNETSETS: 1

OK
AT+QWSTART //Enable network.
OK

AT+QIPSET=1234,1234 //Set communication port.

+QIPSET: 1234,1234
OK
AT+QIPOPEN //Open the communication port.
OK
```

4.2. Data Transmission in Normal Transmission Mode

```
AT+QIPMODE=0 //Set the data transmission mode to normal transmission mode.
+QIPMODE: 0

OK
AT+QSENDBR=10,1234567890 //Send 10 bytes of data to the BR.
OK

+QRECV: "8c1f6458b000a432",11,hello node //BR responds with "hello node"
AT+QSENDNODE=8c1f6458b000a987,10,1234567890 //Send 10 bytes of data to the specified node.
OK
```

4.3. Data Transmission in Transparent Transmission Mode

```
AT+QIPMODE=1           //Set the data transmission mode to transparent transmission mode.
+QIPMODE: 1

OK
ATO                     //Enter transparent transmission mode.
OK
hello br                //Node sends data to the BR.
hello node              //BR responds with data.
```

5 Appendix References

Table 3: Related Documents

Document Names
[1] Quectel_KCM0A5S_Hardware_Design
[2] Quectel_KCM0A5S_TE-B_User_Guide

Table 4: Terms and Abbreviations

Abbreviation	Description
AES	Advanced Encryption Standard
BR	Border Router
CCM	Counter with CBC-MAC
DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
ID	Identifier
IP	Internet Protocol
IPv6	Internet Protocol version 6
MAC	Medium Access Control
MT	Mobile Terminal
PAN	Personal Area Network
PHY	Physical Layer
TX	Transmit

UDP	User Datagram Protocol
URC	Unsolicited Result Code
URL	Uniform Resource Locator
Wi-SUN	Wireless Smart Utility Network
