SCM1612
Wi-Fi 6 and BLE 5 Low-Power SoC

AT Command Reference

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Version History

Version	Date	Description
0.1	2024-10-08	Initial draft
1.0	2024-12-06	Command Spelling Fix

Table of Contents

1 Introduction

This document provides a comprehensive guide on using AT commands for the SCM1612.

1.1 AT Command Types

AT commands are used to control and interact with the SCM1612. They are categorized into four types:

Type	Command Format	Description
Test Command	AT+WL[Interface]+<CommandName>=?	Queries the Set Command's internal parameters and their permissible range of values. [Interface] can be 0 or 1, representing different interfaces.
Query Command	AT+ WL[Interface]+<CommandName>?	Returns the current value of the specified parameters.
Set Command	AT+ WL[Interface]+<CommandName>=<Value>	Sets the value of user-defined parameters in commands and subsequently executes these commands. Value can be a string or an integer.
Execute Command	AT+ WL[Interface]+<CommandName>	Executes commands that do not require any user-defined parameters.

Notes:

- Not all AT commands support all four types listed above.
- <CommandName> represents the specific AT command, such as CMUX, CFUN, etc.
- String parameters should be enclosed in double quotes. For example: AT+CMUX="Hello".
- Integer parameters should be within the allowed range specified by the corresponding Test command.
- Angle brackets < > indicate mandatory parameters that cannot be omitted.

Examples:

- **Test Command:** AT+WL0+CMUX=?
- **Query Command:** AT+WL1+CFUN?
- **Set Command:** AT+WL0+CMUX="1,1"
- **Execute Command:** AT+WL1+CFUN

2 Basic AT Commands

2.1 OverView

The SCM1612 wireless WiFi modules can be controlled through the serial interface using standard AT commands. This section provides a list of basic AT commands for essential functionalities.

Basic Command	Description
AT	Test AT startup
AT+RST	Restart module
AT+GSLP	Enter sleep mode
ATE	Enable/Disable AT commands echo
AT+UART_CUR	Configure UART settings
AT+SLEEP	Set sleep mode
AT+SLEEPWKCFG	Configure wakeup source and GPIO

2.2 Commands

2.2.1 AT – Test AT startup

TYPE	Execute
Description	This command tests the basic communication and setup of the WiFi module.
Command	AT
Expected Response:	OK
Parameters	None

2.2.2 AT+RST – Restart module

TYPE	Execute
Description	This command restarts the WiFi module.
Command	AT+RST
Expected Response:	OK
Parameters	None

2.2.3 AT+GSLP – Enter deep-sleep mode

TYPE	Set
Description	This command puts the module into deep-sleep mode for a specified duration.
Command	AT+GSLP=<time>
Expected Response:	<time> OK
Parameters	<time>: Sleep duration in milliseconds. A value of 0 indicates indefinite sleep until woken up by an external source. **Note:** The module might wake up earlier than the specified <time> due to other wake-up sources, such as the system timer.

2.2.4 ATE – AT commands echo

TYPE	Set
Description	This command configures the current UART communication settings. Note that these settings are not persistent and do not overwrite the default baud rate stored in the flash memory.
Command	ATE<value>
Expected Response:	OK
Parameters	<value>: 0: Disable echo. 1: Enable echo.

2.2.5 AT+UART_CUR – Current UART configuration

TYPE	Set	
Description	This command configures the current UART communication settings. Note that these settings are not persistent and do not overwrite the default baud rate stored in the flash memory.	
Command	AT+UART_CUR=<baudrate>, <databits>, <stopbits>, <parity>, <flow control>	
Example	AT+UART_CUR=115200, 8, 1, 0, 3	
Expected Response:	OK	
Parameters	**Description**	**Possible Values**
<baudrate>	Baud rate	Up to 115200
<databits>	Data bits	5, 6, 7, or 8
<stopbits>	Stop bits	1 (1 bit), 2 (1.5 bits), 3 (2 bits)

<parity> <flow control>	Parity	0 (None), 1 (Odd), 2 (Even)
	Flow control	0 (Disable), 1 (RTS), 2 (CTS), 3 (Both RTS and CTS)
Notes	• These settings are not saved to flash memory and will be lost upon module restart. • Flow control functionality requires hardware support.	

2.2.6 AT+SLEEP – Sleep mode

Type	Set/Query
Description	This command controls the sleep mode of the module. It is only applicable when the module is operating in station (STA) mode.
Query Command	AT+SLEEP?
Query Response:	+SLEEP : <sleep mode> OK
Set Command:	AT+SLEEP=<sleep mode>
Set Response:	OK
Parameters	<sleep mode> 0: Disable sleep mode. 1: Light-sleep mode. 2: Deep-sleep mode. 3: Hibernation mode.

2.2.7 AT+SLEEPWKCFG – Set wakeup source and awake GPIO

Type	**Set**
Description	This command configures the wake-up source and the GPIO pin responsible for waking up the module from sleep mode.
Command	AT+SLEEPWKCFG=<wakeup source>,<param1>[,<param2>]
Example	AT+SLEEPWKCFG=2,6
Expected Response:	OK
Parameters	<wakeup source> 0: Reserved (not supported). 1: Reserved (not supported). 2: GPIO. <param1>: GPIO pin number (if <wakeup source> is set to 2 for GPIO). <param2> (optional): Wake-up level for the GPIO pin (if <wakeup source> is set to 2 for GPIO).

	0: Low level triggers wake-up. 1: High level triggers wake-up.

3 Wi-Fi Related AT Commands

3.1 Introduction

This section describes the AT commands used to control and configure the Wi-Fi functionality of the SCM1612. The commands are prefixed with AT+WL0 or AT+WL1, where WL0 and WL1 refer to the two available Wi-Fi interfaces on the module. You should replace WL0/1 with the appropriate interface designation in the commands.

3.2 Commands

3.2.1 AT+CWINIT – Initialize or Deinitialize Wi-Fi Driver

Type	Set	
Description	This command initializes or deinitializes the Wi-Fi driver for the specified interface.	
Command	AT+WL0/1+CWINIT=<enable>	
Expected Response:	OK	
Parameters	**Description**	**Possible Values**
<enable>	Enables or disables the Wi-Fi driver	1: Initialize driver. 0: Deinitialize driver.

3.2.2 AT+CWMAC – WiFi MAC address

Type	Set/Query	
Description	This command sets or gets the MAC address of the specified Wi-Fi interface.	
Query Command:	AT+ WL0/1+CWMAC?	
Query Response:	+CWMAC: <MAC address> OK	
Parameters	Please refer to AT command settings.	
Set Command:	AT+ WL0/1+CWMAC=<MAC address>	
Set Response:	OK	
Parameters	**Description**	**Example**
<MAC address>	The MAC address to be set (in the format XX:XX:XX:XX:XX:XX)	64:f9:47:f0:03:38

3.2.3 AT+CWMODE – WiFi mode

Type	Set/Query	
Description	This command sets or gets the operating mode of the specified Wi-Fi interface.	
Test Command	AT+ WL0/1+CWMODE=?	
Test Response	+CWMODE: <mode> OK	
Query Command	AT+ WL0/1+CWMODE?	
Query Response	+CWMODE:<mode> OK	
Set Command	AT+ WL0/1+CWMODE=<mode>	
Set Response	OK	
Parameters	**Description**	**Possible Values**
<mode>	The Wi-Fi operating mode	1: Station mode (STA). 2: Soft Access Point mode (SoftAP).

3.2.4 AT+CWJAP – Connected AP Configuration

Type	Set/Query	
Description	This command sets or gets the configuration for connecting to an Access Point (AP) in Station mode.	
Example(Set)	AT+WL0+CWJAP=XH-Test 00000000 0 0 0	
Query Command	AT+ WL0+CWJAP?	
Query Response	+CWJAP:<ssid>,<bssid>,<channel>,<rssi>,<mode: 11n:0/1 11ax:0/1> OK	
Set Command	AT+ WL0/1+CWJAP=<ssid> <pwd> <alg> <proto> <pmf>	
Set Response	OK or ERROR	
Parameters	**Description**	**Possible Values/Notes**
<ssid>	The SSID of the target AP (string, enclosed in double quotes)	
<pwd>	The password for the AP (string, enclosed in double quotes, max 63 ASCII characters)	

<alg>	The pairwise cipher type	0: OPEN 1: WEP 2: TKIP 3: CCMP 6: SAE 7: CCMP256
<proto>	The encryption protocol	0: OPEN 1: WPA_PSK 2: WPA2_PSK
<pmf>	Protected Management Frames	0: Disable PMF. 1: PMF capable (preferred). 3: PMF required.

Note: PMF (Protected Management Frames) enhances the security of management frames by protecting them against forgery and replay attacks.

3.2.5 AT+CWCAP – Connect to AP

Type	Execute
Description	This command initiates a connection to an AP based on the configuration previously set using AT+CWJAP.
Command	AT+WL0+CWCAP
Expected Response:	OK

3.2.6 AT+CWDHCP – Enable/Disable DHCP

Type	Set/Query
Description	This command enables or disables the DHCP client on the specified Wi-Fi interface. When enabled, the device will automatically obtain an IP address from a DHCP server.
Query Command	AT+ WL0/1+CWDHCP?
Query Response	+CWDHCP:<state> OK
Set Command	AT+ WL0/1+ CWDHCP =<operate>
Set Response	OK
Parameters	<operate>: 0: Disable DHCP 1: Enable DHCP

3.2.7 AT+CWSTR – Start Wi-Fi

Type	Execute

Description	This command starts the Wi-Fi functionality on the specified interface.
Command	**AT+ WL0/1+ CWSTR**
Expected Response	OK

3.2.8 AT+CWSTOP – Stop Wi-Fi

Type	Execute
Description	This command stops the Wi-Fi functionality on the specified interface.
Command	AT+ WL0/1+ CWSTOP
Expected Response	OK

3.2.9 AT+CWQAP – Disconnect from an AP

Type	Execute
Description	This command disconnects the station from the currently connected AP.
Command	AT+ WL0/1+ CWQAP
Expected Response	OK

3.2.10 AT+CWPWR – Query/Set Max Limited Power

Type	Set/Query
Description	This command queries or sets the maximum transmit power limit for the specified Wi-Fi interface.
Query Command	AT+ WL0/1+ CWPWR?
Query Response	+CWPWR: max limited power = <power_value> OK
Set Command	AT+ WL0/1+ CWPWR=<pwr>
Response	OK
Parameters	<pwr>: The maximum transmit power limit

3.2.11 AT+CWPS – Query/Set Power Save Mode

Type	Set/Query
Description	This command queries or sets the power save mode for the specified Wi-Fi interface. Power save modes can help reduce power consumption when the device is idle.
Query Command	AT+ WL0/1+ CWPS?

Query Response	+CWPS:ps type = <WIFI_PS_NONE, WIFI_PS_MIN_MODEM, WIFI_PS_MAX_MODEM> OK
Set Command	AT+WL0/1+ CWPS=<mode>
Set Response	OK
Parameters	< mode >: The power save mode 0: WIFI_PS_NONE(No power saving) 1: WIFI_PS_MIN_MODEM(Minimum power saving) 2: WIFI_PS_MAX_MODEM(Maximum power saving)

3.2.12 AT+CWLAPOPT – Set Configuration for Command AT+CWLAP

This command is to set the configuration for command AT+CWLAP, whether the result of AT+CWLAP will be ordered according to <rssi>, and which parameters will be shown in the result of AT+CWLAP.

Type	Set	
Description	This command configures the behavior of the `AT+CWLAP` command, which is used to scan for available Access Points (APs). It allows you to control how the scan results are sorted and which parameters are displayed.	
Example	AT+CWLAPOPT=1 511	
Command	AT+WL0/1+CWLAPOPT =<sort_enable>, <mask>	
Expected Response	OK or ERROR	
Parameters	**Description**	**Possible Values/Notes**
<sort_enable>	Enables or disables sorting of scan results by RSSI	0: Do not sort by RSSI. 1:Sort by RSSI (descending order, strongest signal first).
<mask>	A bitmask to control which parameters are displayed in the `AT+CWLAP` results | Each bit corresponds to a parameter (see table below). Set the bit to `1` to enable display of that parameter, `0` to disable.	
<mask>	**Bitmask**	
Bit	Parameter	**Description**
0	<encrypt>	Encryption status (e.g., Open, WPA2)
1	<ssid>	SSID of the AP

2	<rssi>	Received Signal Strength Indicator (RSSI)
3	<bssid>	MAC address of the AP
4	<ch>	Channel of the AP
5	<pairwise_cipher>	Pairwise cipher used by the AP
6	<group_cipher>	Group cipher used by the AP
7	<NGB>	Support for 802.11b/g/n (1 if supported, 0 otherwise)
8	<WPS support>	Support for Wi-Fi Protected Setup (WPS)

3.2.13 AT+CWLAPN – Query Number of Available APs

Type	Query
Description	This command queries the number of available Access Points (APs) that were found during the last Wi-Fi scan.
Command	AT+WL0/1+ CWLAPN?
Expected Response	+CWLAPN:ap_num=<number_of_aps> OK

3.2.14 AT+CWSSCN – Stop Wi-Fi Scan

Type	Execute
Description	This command stops an ongoing Wi-Fi scan.
Command	AT+WL0/1+CWSSCN
Expected Response	OK

3.2.15 AT+CWLAP – Show Available APs

Type	Execute/Query
Description	This command initiates a scan for available Access Points (APs) and optionally displays the results.
Example	AT+WL0+CWLAP: Scan all available APs on interface WL0. AT+CWLAP?: Display the results of the last scan on interface WL1. AT+CWLAP=ssid=MyNetwork ch=6: Scan for APs with the SSID "MyNetwork" on channel 6.
Query Command	AT+WL0/1+CWLAP?

(Display Last Scan Results):		
Query Response	+CWLAP:ap[i]=<ssid> <authmode> = b:0/1 g:0/1 n:0/1 ax:0/1 OK	
Execute Command (Start Scan)	AT+WL0/1+CWLAP	
Execute Response	OK	
Execute Command (Filtered Scan)	AT+WL0/1+CWLAP=<ssid=> <bssid=> <ch=> <scantype=> <actmin=> <actmax=> <num=>	
Execute Response	OK	
Parameters	Description	Possible Values/Notes
<ssid>	The SSID of the AP to search for (string, enclosed in double quotes)	
<bssid>	The MAC address of the AP to search for	
<ch>	The channel to scan	
<scantype>	The type of scan to perform	`0`: Active scan. `1`: Passive scan.
<actmin>	The minimum active scan time per channel (milliseconds, range: 0-1500)	Only valid for active scans.
<actmax>	The maximum active scan time per channel (milliseconds, range: 0-1500)	
<num>	The maximum number of APs to display in the results	

3.2.16 AT+ CWLIF– Obtain IP Address of the Station Connected to a SoftAP

Type	Execute
Description	This command retrieves the IP address and MAC address of a station that is currently connected to the SoftAP on the specified interface.
Command	AT+CWLIF
Expected Response	+CWLIF: <ip_address>,<mac_address> OK

3.2.17 AT+ CWDHCPS– Query/Set the IPv4 Addresses Allocated by a SCM SoftAP DHCP Server

Type	Set/Query	
Description	This command queries or configures the IPv4 address range that the DHCP server on the SoftAP will assign to connected clients.	
Query Command	AT+WL0/1+CWDHCPS?	
Query Response	+CWDHCPS: <lease_time>,<start_ip>,<end_ip> OK	
Set Command	AT+WL0/1+CWDHCPS=<enable>,<lease_time>,<start_ip>,<end_ip>	
Set Response	OK	
Parameter	Description	Notes
<enable>	Enables or disables the DHCP server	1: Enable DHCP server and configure the address range. 0: Disable DHCP server and use the default address range.
<lease_time>	The DHCP lease time in minutes	Range: 1-2880
<start_ip>	The starting IPv4 address of the DHCP range	
<end_ip>	The ending IPv4 address of the DHCP range	

3.2.18 AT+ CWSAP– Query/Set the Configuration of a SCM SoftAP

Type	Set/Query	
Description	This command queries or configures the settings of the SoftAP on the specified interface.	
Query Command	AT+WL0/1+CWSAP?	
Query Response	+CWSAP: <ssid>,<pwd>,<channel>,<ecn>,<proto>,<max_conn>,<ssid_hidden> OK	
Set Command	AT+WL0/1+CWSAP=<ssid>,<pwd>,<chl>,<ecn>,<proto>,[<max_conn>][,<ssid_hidden>]	
Set Response	OK	
Parameter	Description	Possible Values/Notes

<ssid>	The SSID of the SoftAP (string, enclosed in double quotes)	
<pwd>	The password for the SoftAP (string, enclosed in double quotes, 8-63 ASCII characters)	
<chl>	The channel for the SoftAP	
<ecn>	The encryption method	0: OPEN 3: CCMP (WEP and TKIP are not supported)
<proto>	The security protocol	0: NONE 2: WPA2 (Only WPA2 is supported)
[<max_conn>]	The maximum number of stations that can connect to the SoftAP	Optional parameter
[<ssid_hidden>]	Controls whether the SSID is broadcast	0: Broadcast SSID (default). 1: Hide SSID.

3.2.19 AT+ CWCOUNTRY– Query/Set the Wi-Fi Country Code

Type	Set/Query	
Description	This command queries or sets the Wi-Fi country code for the specified interface. The country code affects the available channels and regulatory domain for Wi-Fi operation.	
Query Command	AT+WL0/1+CWCOUNTRY?	
Query Response	Country: <country_code>,<total_channel_count> OK	
Set Command	AT+WL0/1+CWCOUNTRY=<country_code>	
Set Response	OK	
Parameter	Description	Notes
<country_code>	The two-letter ISO 3166-1 alpha-2 country code (e.g., "US" for the United States	
<total_channel_count>	The total number of Wi-Fi channels available in the specified country	This value is returned by the query command.

3.3 Examples

This section provides some practical examples of how to use the Wi-Fi related AT commands to perform common tasks.

3.3.1 Connect to an AP and Obtain IP Address via DHCP

This example demonstrates how to connect to an Access Point (AP) and then obtain an IP address automatically using DHCP.

```
AT+WL0+CWINIT=1// Initialize the Wi-Fi driver on interface WL0

OK
AT+WL0+CWMODE=1// Set the Wi-Fi mode to Station (STA)

OK
AT+WL0+CWJAP=HUAWEI-Test 00000000 0 0 0// Connect to the AP
"HUAWEI-Test" (open network)

OK
AT+WL0+CWCAP// Initiate the connection

OK

WIFI CONNECTED // (Unsolicited response indicating connection success)
AT+WL0+CWDHCP=1 // Enable DHCP client

OK

WIFI GOT IP // (Unsolicited response indicating IP address obtained)
```

3.3.2 Scan for Available APs and Display Results

This example shows how to scan for available APs and then display the scan results.

```
AT+WL0+CWINIT=1 // Initialize the Wi-Fi driver

OK
AT+WL0+CWMODE=1 // Set the Wi-Fi mode to Station (STA)

OK

AT+WL0+CWLAP // Start a Wi-Fi scan
```

```
OK

AT+WL0+CWLAP? // Display the scan results
+CWLAP:ap[0] = SC-Ent authmode = 7 b:1 g:1 n:1 ax:0
+CWLAP:ap[1] = SC-IoT authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[2] = SC-Guest authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[3] = NFC authmode = 6 b:1 g:1 n:1 ax:1
+CWLAP:ap[4] = apache_test authmode = 3 b:1 g:1 n:1 ax:1
+CWLAP:ap[5] = CMCC-AP2 authmode = 3 b:1 g:1 n:1 ax:1
+CWLAP:ap[6] = RT-BE88U-MLO authmode = 8 b:1 g:1 n:1 ax:1
+CWLAP:ap[7] = CMCC-CQpy authmode = 3 b:1 g:1 n:1 ax:1
+CWLAP:ap[8] = CMCC-CQpy-3 authmode = 3 b:1 g:1 n:1 ax:1
+CWLAP:ap[9] = SC-Ent authmode = 7 b:1 g:1 n:1 ax:0
+CWLAP:ap[10] = SC-Guest authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[11] = SC-IoT authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[12] = SC-IoT authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[13] = DIRECT-E3MROOM4msUN authmode = 3 b:0 g:1 n:1 ax:1
+CWLAP:ap[14] = SC-Ent authmode = 7 b:1 g:1 n:1 ax:0
+CWLAP:ap[15] = SC-IoT authmode = 6 b:1 g:1 n:1 ax:0
+CWLAP:ap[16] = wULu63h authmode = 3 b:1 g:1 n:1 ax:0
+CWLAP:ap[17] = TP-LINK_3A1D_2G authmode = 0 b:1 g:1 n:1 ax:1
+CWLAP:ap[18] = HUAWEI-Test authmode = 0 b:1 g:1 n:1 ax:1
+CWLAP:ap[19] = Xiaomi_7AB6 authmode = 0 b:1 g:1 n:1 ax:1
+CWLAP:ap[20] = SWaJrIdwhRkTT4e1nu authmode = 0 b:1 g:1 n:1 ax:1
+CWLAP:ap[21] = letter_sap authmode = 0 b:1 g:1 n:1 ax:1
+CWLAP:ap[22] = xiaohu_test authmode = 0 b:1 g:1 n:1 ax:0
+CWLAP:ap[23] = 3333h authmode = 0 b:1 g:1 n:1 ax:0

OK
```

Note: The format of the `+CWLAP` response may vary depending on the configuration set by `AT+CWLAPOPT`.

3.3.3 Start a SoftAP and Configure DHCP Server

This example demonstrates how to configure and start a SoftAP and then set up the DHCP server to assign IP addresses to connected clients.

```
AT+CWINIT=1 // Initialize the Wi-Fi driver
 OK

AT+WL1+CWMODE=2 // Set the Wi-Fi mode to SoftAP on interface WL1

OK
```

AT+WL1+CWDHCPS=1,1,"192.168.66.2","192.168.66.10" // Enable DHCP server and configure the IP address range

OK

AT+WL1+CWSAP="senscomm_test",12345678,6,3,2 // Configure the SoftAP settings (SSID, password, etc.)

OK

AT+WL1+CWDHCPS? // Query the DHCP server configuration (optional)

+CWDHCPS:1,"192.168.66.2","192.168.66.10"

4 TCP/IP AT Commands

4.1 Overview

This section describes the AT commands used to control and configure the TCP/IP networking functionality of the SCM1612 module. These commands allow you to establish TCP and UDP connections, send and receive data, manage network interfaces, and perform network diagnostics.

4.2 Commands

4.2.1 AT+CIFSR - Obtain the local IP address and MAC address.

Type	Execute
Description	This command retrieves the local IP address (IPv4 and IPv6) and MAC address of the station (STA) and SoftAP (AP) interfaces.
Command	AT+CIFSR
Expected Response	+CIFSR:STAIP,"<STA_IPv4_address>" +CIFSR:STAMAC,"<STA_MAC_address>" +CIFSR:STAIP6LL,"<STA_IPv6_link-local_address>" +CIFSR:STAIP6GL,"<STA_IPv6_global_address>" +CIFSR:APIP,"<AP_IPv4_address>" OK

Note: IPv6 support must be enabled in the module's configuration (e.g., by enabling the LWIP_IPV6 kconfig option) for IPv6 addresses to be displayed.

4.2.2 AT+CIPSTA - Query/Set the IP Address of a SCM Station

Type	Set/Query
Description	This command queries or sets the IPv4 address, gateway, and netmask of the station (STA) interface. It can also query the IPv6 link-local and global addresses.
Query Command	AT+CIPSTA?
Query Response	+CIPSTA:ip,"<STA_IPv4_address>" +CIPSTA:gateway,"<gateway_address>" +CIPSTA:netmask,"<netmask>" +CIPSTA:ip6ll,"<STA_IPv6_link-local_address>" +CIPSTA:ip6gl,"<STA_IPv6_global_address>" OK
Set Command	AT+CIPSTA="<IPv4_address>",[,"<gateway_address>", "<netmask>"]
Set Response	OK

Parameter	Description
<IPv4_address>	The IPv4 address to be assigned to the STA interface (string, enclosed in double quotes)
<gateway_address>	The gateway address (optional, string, enclosed in double quotes)
<netmask>	The subnet mask (optional, string, enclosed in double quotes)

Note: IPv6 addresses cannot be set using this command.

4.2.3 AT+CIPSTAMAC - Query/Set the MAC Address of a SCM Station

Type	Set/Query	
Description	This command queries or sets the MAC address of the station (STA) interface.	
Query Command	AT+CIPSTAMAC?	
Query Response	+CIPSTAMAC: "<MAC_address>" OK	
Set Command	AT+CIPSTAMAC=<MAC_address>	
Set Response	OK	
Parameter	Description	Example
<MAC_address>	The MAC address to be assigned to the STA interface (string, enclosed in double quotes)	64:f9:47:f0:03:38

4.2.4 AT+CIPAP - Query/Set the IP Address of a SCM SoftAP

Type	Set/Query
Description	This command queries or sets the IPv4 address, gateway, and netmask of the SoftAP (AP) interface.
Query Command	AT+CIPAP?
Query Response	+CIPAP:ip,"<AP_IPv4_address>" +CIPAP:gateway,"<gateway_address>" +CIPAP:netmask,"<netmask>" OK
Set Command	AT+CIPAP="<IPv4_address>",["<gateway_address>","<netmask>"]
Set Response	OK
Parameter	Description
<IPv4_address>	The IPv4 address to be assigned to the AP interface (string, enclosed in double quotes)
<gateway_address>	The gateway address (optional, string, enclosed in double quotes)

<netmask>	The subnet mask (optional, string, enclosed in double quotes)

4.2.5 AT+CIPAPMAC - Query/Set the MAC Address of a SCM SoftAP

Type	Set/Query	
Description	This command queries or sets the MAC address of the SoftAP (AP) interface.	
Query Command	AT+CIPAPMAC?	
Query Response	+CIPAPMAC: "<MAC_address>" OK	
Set Command	AT+CIPAPMAC=<MAC_address>	
Set Response	OK	
Parameter	Description	Example
<MAC_address>	The MAC address to be assigned to the AP interface (string, enclosed in double quotes)	64:f9:47:f0:03:39

4.2.6 AT+PING - Ping the remote host.

Type	Execute
Description	This command sends ICMP echo requests (ping) to a remote host to test network connectivity.
Command	AT+PING=<host>
Examples	AT+PING="192.168.1.1" AT+PING="www.baidu.com"
Expected Response (Success)	+PING: <time_in_milliseconds> OK
Expected Response (Timeout)	+PING:TIMEOUT ERROR
Parameter	Description
<host>	The IP address (IPv4 or IPv6) or domain name of the remote host (string, enclosed in double quotes)

Note: IPv6 support must be enabled in the module's configuration for pinging IPv6 addresses.

4.2.7 AT+CIPSTART - Establish TCP Connection, UDP Transmission, or SSL Connection.

Type	Execute
Description	This command establishes a TCP, UDP, or SSL connection to a remote host.

TCP/SSL Connection Command	AT+CIPSTART=<link_ID>,<type>,<remote_host>,<remote_port>[,<keep_alive>]	
TCP/SSL Connection Examples:	AT+CIPSTART=1, TCP, 192.168.3.98, 9001 AT+CIPSTART=4, SSL, 192.168.3.98, 9002	
TCP/SSL Connection Expected Response:	Link id: <link_ID>, CONNECT OK	
UDP Connection Command	AT+CIPSTART=<link_ID>,<type>,<remote_host>,<remote_port>,<local_port>	
UDP Connection Example	AT+CIPSTART=3,"UDP","192.168.3.98",8080,1113	
UDP Connection Expected Response	Local port: <local_port> Link id: <link_ID>, CONNECT OK	
Parameter	Description	Possible Values/Notes
<link_ID>	An integer representing the connection ID (0-4)	
<type>	The type of connection	"TCP", "UDP", or "SSL"
<remote_host>	The IP address (IPv4 or IPv6) or domain name of the remote host (string, enclosed in double quotes)	Max length: 64 bytes
<remote_port>	The port number of the remote host	
<keep_alive> (TCP/SSL only)	Enables or disables TCP keep-alive	0: Disable keep-alive (default). 1-7200: Enable keep-alive with the specified interval in seconds.
<local_port> (UDP only)	The local UDP port to use	

Note: IPv6 support must be enabled in the module's configuration for connecting to IPv6 addresses.

4.2.8 AT+CIPSTATUS - Obtain the TCP/UDP/SSL Connection Status and Information

Type	Execute

Description	This command retrieves the status and information about active TCP, UDP, and SSL connections.	
Command	AT+CIPSTATUS	
Expected Response	+CIPSTATUS: <link_ID>,<type>,<remote_host>,<remote_port>,<local_port>,<status> OK	
Parameters	Description	Possible Values
<link_ID>	The connection ID	
<type>	The type of connection	"TCP", "UDP", or "SSL"
<remote_host>	The IP address or domain name of the remote host	
<remote_port>	The remote port number	
<local_port>	The local port number (for UDP connections)	
< server >	The connection server	

4.2.9 AT+CIPSEND – Send Data in the Normal Transmission Mode or Wi-Fi Passthrough Mode

Type	Execute
Description	This command sends data over an established TCP, UDP, or SSL connection. It supports two modes: Normal Transmission Mode and Wi-Fi Passthrough Mode.
Normal Transmission Mode Command	AT+CIPSEND=<link_ID>,<length>
Normal Transmission Mode Expected Response	OK
Wi-Fi Passthrough Mode Command	AT+CIPSEND=<link_ID>
Wi-Fi Passthrough Mode Expected Response	OK
Error Response (if connection is invalid)	Link is not valid ERROR

Parameter	Description	Notes
<link_ID>	The connection ID	
<length> (Normal Mode only)	The length of the data to be sent (in bytes)	Maximum: 2048 bytes (defined by CONFIG_AT_CIPSEND_MAX)

Normal Transmission Mode: In this mode, you send the data after receiving the > prompt. The module will then transmit the data over the specified connection.

Wi-Fi Passthrough Mode: In this mode, all data received on the serial port after the > prompt will be directly transmitted over the specified connection without any processing by the module. You can exit passthrough mode by sending the special command +++ (followed by a carriage return).

4.2.10 AT+CIPINFO – Set "+IPD" Message Mode

Type	Set/Query	
Description	This command enables or disables the display of detailed remote host information in the +IPD unsolicited response, which indicates incoming data on a TCP or UDP connection.	
Set Command	AT+CIPINFO=<mode>	
Set Response	OK	
Query Command	AT+CIPINFO?	
Query Response (Enabled)	+CIPINFO:TRUE OK	
Query Response (Disabled)	+CIPINFO:FALSE OK	
Parameter	Description	Possible Values
<mode>	Enables or disables detailed +IPD information	0: Disable. 1: Enable.

4.2.11 AT+CIPCLOSE – Close TCP/UDP/SSL Connection

Type	Execute
Description	This command closes an active TCP, UDP, or SSL connection.
Command	AT+CIPCLOSE=<link_ID>
Expected Response (Success)	OK Or <link_ID>,CLOSE OK
Error Response	UNLINK ERROR

Parameter	Description
<link_ID>	The connection ID to be closed

5 Power Management AT Commands

5.1 OverView

This section describes the AT commands related to power management (PM) on the SCM1612 module. These commands allow you to control the system-level power management and the Wi-Fi power saving features to optimize power consumption.

Command	Description
AT+PME	Enable/Disable system power management
AT+PMEW	Enable/Disable WLAN power save

5.2 Commands

5.2.1 AT+PME – Enable/Disable system PM

Type	Set	
Description	This command enables or disables the system-level power management features of the SCM1612 module.	
Command	AT+PME=<enable>	
Expected Response	OK	
Parameter	Description	Possible Values
<enable>	Enables or disables system power management	0: Disable system PM. 1: Enable system PM.

Note: Enabling system power management may put the module into a low-power state when idle, potentially impacting responsiveness.

5.2.2 AT – Test AT startup

Type	Set
Description	This command enables or disables the power save mode for the Wi-Fi (WLAN) interface. When enabled, the Wi-Fi interface will enter a low-power state during periods of inactivity to conserve energy.
Command	AT+PMEW=<enable>[,<interval>]
Expected Response	OK

Parameter	Description	Possible Values
<enable>	Enables or disables WLAN power save	0: Disable WLAN power save. 1: Enable WLAN power save.
<interval>	The interval (in milliseconds) between wake-up periods for beacon listening (optional)	Range: 100-1000 (default: 100)

Note: The <interval> parameter specifies how often the Wi-Fi interface will wake up to listen for beacons from the Access Point (AP). A shorter interval may improve responsiveness but consume more power.