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**HOPERF**

**HM-WF8720**

**AT Command**

**User Manual**

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## 1. Serial Port Settings

| UART TX  | UART RX  | Baud Rate | Data Bit | Parity Check | Stop Bit |
|----------|----------|-----------|----------|--------------|----------|
| GPIOA_14 | GPIOA_13 | 38400     | 8        | NA           | 1        |

## 2. Command List

| Description                               | AT Command |
|---|------------|
| <b>Common Instructions</b>                |            |
| AT Ready Command                          | AT         |
| Restart the Module                        | ATSR       |
| Query Version Information                 | ATSV       |
| Set AT Command Echo                       | ATSE       |
| Factory Reset                             | ATSY       |
| Serial Oort Configuration                 | ATSU       |
| OTA Upgrade                               | ATSO       |
| Choose a Valid Mirror                     | ATSC       |
| GPIO Control                              | ATSG       |
| PWM Control                               | ATSW       |
| Enter into Sleep Mode                     | ATSP       |
| <b>WiFi Commands</b>                      |            |
| Set WIFI Mode                             | ATPW       |
| Connect to AP (in STA Mode)               | ATPN       |
| Disconnect AP                             | ATWD       |
| Scan AP                                   | ATWS       |
| Set AP Mode                               | ATPA       |
| Query WIFI Information                    | ATW?       |
| Set DHCP Mode                             | ATPH       |
| Set Static IP (in STA mode)               | ATPE       |
| Set Static IP (in AP mode) and DHCP Rules | ATPF       |
| Set up Automatic Connection               | ATPG       |
| Set MAC Address                           | ATPM       |
| Read MAC Address                          | ATRM       |
| <b>TCPIP Commands</b>                     |            |
| Query Network Connection Status           | ATPI       |
| Query Error Code                          | ATP0       |
| Create TCP / UDP / SSL Server             | ATPS       |
| Create TCP / UDP / SSL Client             | ATPC       |
| Close TCP / UDP / SSL Connection          | ATPD       |

|   |      |
|---|------|
| Send Packet                                     | ATPT |
| Receive Packets                                 | ATPR |
| Enable Auto Accept Mode                         | ATPK |
| Ping  | ATPP |
| Enable Transparent Transmission Mode            | ATPU |
| Save Connection and Enable Automatic Connection | ATPL |
| <b>BLE Commands</b>                             |      |
| Set Central Mode                                | ATBc |
| Connect Peripheral devices                      | ATBC |
| Disconnect                                      | ATBD |
| Read ATT Information                            | ATBG |
| Scan BT Devices                                 | ATBS |
| Read Operation                                  | ATBR |
| Write Operation                                 | ATBW |
| Set Peripheral Mode                             | ATBp |
| Set the Broadcast Interval                      | ATBA |
| Set Device Name                                 | ATBN |
| Send Data                                       | ATBe |
| BT Distribution Network                         | ATBB |

## 1. Common Instructions

### 1.1 AT – AT Ready Command

| AT                 |   |
|--------------------|---|
| <b>Description</b> | This command is order to test whether the system starts successfully and enters the AT command environment. |
| <b>Reply</b>       | [AT] OK   |

### 3.2 ATSR –Restart the Module

| ATSR               |  |
|--------------------|--|
| <b>Description</b> | This command is used to restart the module |
| <b>Reply</b>       | [ATSR] OK                                  |

## 3.3 ATSV –Query Version Information

| ATSV               |   |
|--------------------|---|
| <b>Description</b> | This command is used to view the AT command version and SDK version |
| <b>Reply</b>       | [ATSV] OK:<CHIP_TYPE>,<software-version>                            |
| <b>Error Code</b>  | 1: Failed to obtain version information                             |

## 3.4 ATSE –Set AT Command Echo

| ATSE=<echo>        |  |        |   |
|--------------------|--|--------|---|
| <b>Description</b> | This command is used to enable / disable serial port echo  |        |   |
| <b>Reply</b>       | [ATSE] OK  |        |   |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt;echo&gt;</td> <td>0 : Disable Echo (default)<br/>1 : Enable Echo</td> </tr> </table> | <echo> | 0 : Disable Echo (default)<br>1 : Enable Echo |
| <echo>             | 0 : Disable Echo (default)<br>1 : Enable Echo  |        |   |
| <b>Error Code</b>  | 1, 2: Parameter Error<br>3: Echo setting can only be 1 or 0  |        |   |
| <b>Examples</b>    | Disable echo and debug<br># ATSE=0   |        |   |

## 3.5 ATSY –Factory Reset

| ATSY               |  |
|--------------------|--|
| <b>Description</b> | This command is used to clear flash data and reset the module to the factory configuration |
| <b>Reply</b>       | [ATSY] OK<br>[ATSY] ERROR:<error_no>   |
| <b>Error Code</b>  | 1: Failed to restore default data<br>2: Failed to restore default image                    |
| <b>Notes</b>       | The module will restart  |

## 3.6 ATSU –Serial Port Configuration

| ATSU=<baudrate>,<databits>,<stopbits>,<parity>,<flowcontrol>,<configmode> |  |            |  |
|---|--|------------|--|
| <b>Description</b>  | This command is used to modify the serial port configuration   |            |  |
| <b>Reply</b>  | [ATSU] OK<br>[ATSU] ERROR:<error_code>   |            |  |
| <b>Parameter</b>  | <table border="1"> <tr> <td>&lt;baudrate&gt;</td> <td>2400, 4800, 9600, 19200, 38400(default),57600, 115200, 921600, 1152000</td> </tr> </table> | <baudrate> | 2400, 4800, 9600, 19200, 38400(default),57600, 115200, 921600, 1152000 |
| <baudrate>  | 2400, 4800, 9600, 19200, 38400(default),57600, 115200, 921600, 1152000   |            |  |

|                   |   |  |
|-------------------|---|--|
|                   | < databits >  | 5: 5 bit data<br>6: 6 bit data<br>7: 7 bit data<br>8: 8 bit data (default)   |
|                   | < stopbits >  | 1: 1 bit stop (default)<br>2: 2 bit stop   |
|                   | < parity >  | 0: None parity (default)<br>1: Odd parity<br>2: Even parity  |
|                   | < flowcontrol >                                       | 0: disable flowcontrol (default)<br>1: enable RTS and CTS  |
|                   | < configmode >  | 0: set the current configuration and will not save to flash<br>1: save configuration to flash and take effect immediately<br>2: save configuration to flash and take effect after reboot |
| <b>Error Code</b> | 1: Command format error<br>2: Command parameter error |  |

### 3.7 ATSO – OTA Upgrade

| ATSO=<ip>,<port>   |  |      |                            |        |                             |
|--------------------|--|------|----------------------------|--------|-----------------------------|
| <b>Description</b> | This command is used to upgrade the software   |      |                            |        |                             |
| <b>Reply</b>       | [ATSO] OK<br>[ATSO] ERROR:<error_code>   |      |                            |        |                             |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt;ip&gt;</td> <td>Download server ip address</td> </tr> <tr> <td>&lt;port&gt;</td> <td>Download server port number</td> </tr> </table> | <ip> | Download server ip address | <port> | Download server port number |
| <ip>               | Download server ip address   |      |                            |        |                             |
| <port>             | Download server port number  |      |                            |        |                             |
| <b>Error Code</b>  | 1: Command format error<br>2: Command parameter error  |      |                            |        |                             |
| <b>Notes</b>       | 1: The server is not started<br>2: Module and server are not on the same network   |      |                            |        |                             |

### 3.8 ATSC –Choose a Valid Mirror

| ATSC=<image ID>    |   |            |  |
|--------------------|---|------------|--|
| <b>Description</b> | This command is used to select a valid mirror   |            |  |
| <b>Reply</b>       | [ATSC] OK<br>[ATSC] ERROR:<error_code>  |            |  |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt;image ID&gt;</td> <td>0: default image<br/>1: OTA upgrade image</td> </tr> </table> | <image ID> | 0: default image<br>1: OTA upgrade image |
| <image ID>         | 0: default image<br>1: OTA upgrade image  |            |  |
| <b>Error Code</b>  | 1: Command format error<br>2: Command parameter error   |            |  |

|              |                         |
|--------------|-------------------------|
| <b>Notes</b> | The module will restart |
|--------------|-------------------------|

## 3.9 ATSG – GPIO Control

| ATSG=<R/W/D>,<PORT>[,<DATA>,<DIR>,<PULL>] |  |  |
|---|--|--|
| <b>Description</b>                        | This command is used to control GPIO pins                                    |  |
| <b>Reply</b>                              | [ATSG] OK:<val><br>[ATSG] ERROR:<error_code>                                 |  |
| <b>Parameter</b>                          | <R/W>  | “R”: read gpio<br>“W”: write gpio<br>“D” delete gpio                             |
|   | <PORT>   | Px_x, ex: PA_4   |
|   | [<DATA>]   | 0 or 1 when write gpio   |
|   | [<DIR>]  | Pin direction:<br>0: PIN_INPUT<br>1: PIN_OUTPUT                                  |
|   | [<PULL>]   | Pin mode:<br>0: PullNone/PullDefault<br>1: PullUp<br>2: PullDown<br>3: OpenDrain |
| <b>Error Code</b>                         | 1: Command format error<br>2: Command parameter error<br>3: Invalid pin name |  |
| <b>Notes</b>                              | PA_0,PA_13,PA_14 keep  |  |

## 3.10 ATSW – PWM Control

| ATSW=<ENABLE>,<PORT>[,<PERIOD>,<PERCENT>] |   |   |
|---|---|---|
| <b>Description</b>                        | This command is used to control the PWM output        |   |
| <b>Reply</b>                              | [ATSW] OK<br>[ATSW] ERROR:<error_code>                |   |
| <b>Parameter</b>                          | <ENABLE>  | 1: enable pwm output<br>2: disable pwm output |
|   | <PORT>  | Px_x, ex: PC_4                                |
|   | <PERIOD>  | Period value in us                            |
|   | <PERCENT>   | Duty cycle<br>ex: 0.4 40% high 60%low         |
| <b>Error Code</b>                         | 1: Command format error<br>2: Command parameter error |   |



|              |   |
|--------------|---|
|              | 3: Invalid pin name<br>4: ENABLE Non-zero or one<br>5: Inactive PWM pin<br>6: The PWM channel is already occupied |
| <b>Notes</b> | PA_0,PA_13,PA_14 keep   |

## 3.11 ATSP –Enter into Sleep Mode

| ATSP=<POWER_MODE>,<WAKEUP_SOURCE>[,<DURATION> or <PIN_INDEX>] |   |                                       |
|---|---|---------------------------------------|
| <b>Description</b>  | This command is used to set the device to enter sleep mode to reduce power consumption  |                                       |
| <b>Reply</b>  | [ATSP] OK<br>[ATSP] ERROR:<error_code>  |                                       |
| <b>Parameter</b>  | <POWER_MODE> <ul style="list-style-type: none"> <li>1: sleep mode</li> <li>2: standby mode</li> <li>3: deepsleep mode</li> </ul>  |                                       |
|   | <WAKEUP_SOURCE> <ul style="list-style-type: none"> <li>1: uart</li> <li>2: timer</li> <li>3: gpio</li> </ul>  |                                       |
|   | <DURATION>  | Timer value ( ms)                     |
|   | <PIN_INDEX>   | Pin number<br>Ex: 1 :PA_1;<br>5 :PA_5 |
| <b>Error Code</b>   | 1: Command format error<br>2: Wrong number of parameters<br>3: Invalid parameter<br>4: Invalid pin number   |                                       |
| <b>Notes</b>  | 1, PA_0,PA_13,PA_14 keep<br>2. The serial port wake-up source is limited to sleep mode<br>3. The connection cannot be maintained in sleep mode, it is recommended to disconnect all connections before entering sleep |                                       |

## 2. WiFi Commands

### 2.1 ATPW –Set WIFI mode

| ATPW=<mode>        |  |
|--------------------|--|
| <b>Description</b> | This command is used to set the WIFI mode. Check the WIFI mode before executing ATPN |

|                   |   |   |
|-------------------|---|---|
|                   | and ATPA commands                                     |   |
| <b>Reply</b>      | [ATPW] OK<br>[ATPW] ERROR:<error_no>                  |   |
| <b>Parameter</b>  | <mode>  | 1 : Station mode (default)<br>2 : AP mode |
| <b>Error Code</b> | 1: Command format error<br>2: Command parameter error |   |

## 2.2 ATPN –Connect AP

| ATPN=<ssid>,<pwd>[,<key_id>,<bssid>] |  |  |
|--------------------------------------|--|--|
| <b>Description</b>                   | This command is used to connect to the AP  |  |
| <b>Reply</b>                         | [ATPN] OK<br>[ATPN] ERROR:<error_code>   |  |
| <b>Parameter</b>                     | <ssid>   | This parameter can't be empty<br>Format: "ssid"<br>Must add prefix '\ for special character(' , '\ , "" , '[' , ']') |
|                                      | <pwd>  | 1. WPA/WPA2 : length is 8~64<br>2. WEP : length is 5 or 13   |
|                                      | [<key_id>]   | For WEP security, must be 0~3. If not set, it will use id 0 as default   |
|                                      | [<bssid>]  | Format : 6 bytes hex number<br>e.g. 112233445566   |
| <b>Error Code</b>                    | 1: Command format error<br>2: Command parameter error<br>3: Wifi initialization error<br>4: Failed to connect to AP<br>5: WIFI mode error<br>6: Incorrect AP security type setting<br>7: DHCP timeout using static IP 192.168.1.80 |  |
| <b>Notes</b>                         | 1. Before executing ATWP instruction, you must set WIFI to STA mode<br>2.If the AP does not have a password parameter <pwd> Leave blank<br>e.g. ATPN="SSID" or ATPN="SSID",,,112233445566  |  |

## 2.3 ATWD –Disconnect AP

| ATWD               |  |
|--------------------|--|
| <b>Description</b> | This command is used to disconnect from the AP |
| <b>Reply</b>       | [ATWD] OK                                      |

|                   |   |
|-------------------|---|
|                   | [ATWD] ERROR:<error_code>                   |
| <b>Error Code</b> | 3: Operation error<br>4: Disconnect timeout |

## 2.4 ATWS –Scan AP

| ATWS               |   |
|--------------------|---|
| <b>Description</b> | This command is used to scan the surrounding AP   |
| <b>Reply</b>       | AP : <num>,<ssid>,<chl>,<sec>,<rssi>,<bssid><br>[ATWS] OK<br>[ATWS] ERROR:<error_no>                  |
| <b>Notes</b>       | AP information print information: serial number, SSID, channel, security mode, signal strength, BSSID |

## 2.5 ATPA –Set AP Mode

| ATPA=<ssid>,<pwd>,<chl>,<hidden>[,<max_conn>] |   |        |  |       |                           |       |                |          |  |              |   |
|---|---|--------|--|-------|---------------------------|-------|----------------|----------|--|--------------|---|
| <b>Description</b>                            | This command is used to configure AP mode   |        |  |       |                           |       |                |          |  |              |   |
| <b>Reply</b>                                  | [ATPA] OK<br>[ATPA] ERROR:<error_no>  |        |  |       |                           |       |                |          |  |              |   |
| <b>Parameter</b>                              | <table border="1"> <tr> <td>&lt;ssid&gt;</td> <td>This parameter can't be empty<br/>Format: "ssid"<br/>Must add prefix '\ ' for special character(' , \ , " , [ , ])</td> </tr> <tr> <td>&lt;pwd&gt;</td> <td>WPA/WPA2 : length is 8~64</td> </tr> <tr> <td>&lt;chl&gt;</td> <td>Channel : 1~11</td> </tr> <tr> <td>&lt;hidden&gt;</td> <td>0 : Not hidden SSID<br/>1 : hidden SSID</td> </tr> <tr> <td>[&lt;max_conn&gt;]</td> <td>Max number of STAs, should be [1,3], default is 3</td> </tr> </table> | <ssid> | This parameter can't be empty<br>Format: "ssid"<br>Must add prefix '\ ' for special character(' , \ , " , [ , ]) | <pwd> | WPA/WPA2 : length is 8~64 | <chl> | Channel : 1~11 | <hidden> | 0 : Not hidden SSID<br>1 : hidden SSID | [<max_conn>] | Max number of STAs, should be [1,3], default is 3 |
| <ssid>  | This parameter can't be empty<br>Format: "ssid"<br>Must add prefix '\ ' for special character(' , \ , " , [ , ])  |        |  |       |                           |       |                |          |  |              |   |
| <pwd>   | WPA/WPA2 : length is 8~64   |        |  |       |                           |       |                |          |  |              |   |
| <chl>   | Channel : 1~11  |        |  |       |                           |       |                |          |  |              |   |
| <hidden>                                      | 0 : Not hidden SSID<br>1 : hidden SSID  |        |  |       |                           |       |                |          |  |              |   |
| [<max_conn>]                                  | Max number of STAs, should be [1,3], default is 3   |        |  |       |                           |       |                |          |  |              |   |
| <b>Error Code</b>                             | 1: Command format error<br>2: Command parameter error<br>3: Wifi initialization error<br>4: AP failed to open<br>5:Wifi mode error  |        |  |       |                           |       |                |          |  |              |   |
| <b>Notes</b>                                  | 1. Before executing the ATPW command, you must set the WIFI mode to AP mode<br>2. If there is no password parameter <pwd> is left blank.<br>e.g. ATPA="SSID",11,0   |        |  |       |                           |       |                |          |  |              |   |

## 2.6 ATW? –Query WIFI Information

| ATW?               |   |
|--------------------|---|
| <b>Description</b> | This command is used to list WIFI status information  |
| <b>Reply</b>       | <mode>,<SSID>,<chl>,<sec>[,<key_id>],<pwd>,<mac>,<ip>,<gw><br>CLIENT : <num>,<mac><br>[ATW?] OK   |
| <b>Notes</b>       | 1. Information printing sequence: WIFI mode, SSID, channel, security mode, [key_id], password, MAC address, IP address, gateway address<br>CLIENT : Serial number, MAC address<br>2. In AP mode, additional connected STA information will be printed |

## 2.7 ATPH - Set DHCP Mode

| ATPH=<mode>,<enable> |  |                             |
|----------------------|--|-----------------------------|
| <b>Description</b>   | Set DHCP mode  |                             |
| <b>Reply</b>         | [ATPH] OK<br>[ATPH] ERROR:<error_no>   |                             |
| <b>Parameter</b>     | <mode>   | 1 : AP mode<br>2 : STA mode |
|                      | <enable>   | 1 : DHCP<br>2 : Static IP   |
| <b>Error Code</b>    | 1: Command format error<br>2: Command parameter error  |                             |
| <b>Notes</b>         | 1. DHCP is enabled by default in two modes<br>2. Use ATPE command to set static IP in STA mode<br>3. Use ATPF command to set DHCP rules in AP mode |                             |

## 2.8 ATPE - Set Static IP (in STA Mode)

| ATPE=<ip>[,<gateway>,<mask>] |   |                                     |
|------------------------------|---|-------------------------------------|
| <b>Description</b>           | This command is used to set a static IP               |                                     |
| <b>Reply</b>                 | [ATPE] OK<br>[ATPE] ERROR:<error_no>                  |                                     |
| <b>Parameter</b>             | <ip>  | Static station IP, e.g. 192.168.1.2 |
|                              | [<gateway>]   | [optional] set gateway IP           |
|                              | [<mask>]  | [optional] set mask IP              |
| <b>Error Code</b>            | 1: Command format error<br>2: Command parameter error |                                     |

|                 |  |
|-----------------|--|
| <b>Notes</b>    | <ol style="list-style-type: none"> <li>1. Default static IP 192.168.1.80</li> <li>2. Effective static IP is under. (ATPH = 2,2) setting</li> </ol>   |
| <b>Examples</b> | <pre># ATPE=192.168.1.150 //Set static IP for station to 192.168.1.150 # ATPH=2,2 //Make static IP effective # ATPN=iot_newifi,abcdef1234 //Connect to iot_newifi # ATW? //query wifi information STA,iot_newifi,11,AES,abcdef1234,ec:f0:0e:4e:75:0b,192.168.99.150,192.168.99.1 [ATW?] OK</pre> |

## 2.9 ATPF - Set Static IP (in AP Mode) and DHCP Rules

| ATPF=<start_ip>,<end_ip>,<gateway> |  |            |                             |          |                           |           |                |
|------------------------------------|--|------------|-----------------------------|----------|---------------------------|-----------|----------------|
| <b>Description</b>                 | This command is used to set static IP and DHCP rules   |            |                             |          |                           |           |                |
| <b>Reply</b>                       | [ATPF] OK<br>[ATPF] ERROR:<error_no>   |            |                             |          |                           |           |                |
| <b>Parameter</b>                   | <table border="1"> <tr> <td>&lt;start_ip&gt;</td> <td>Set the start IP for client</td> </tr> <tr> <td>&lt;end_ip&gt;</td> <td>Set the end IP for client</td> </tr> <tr> <td>&lt;gateway&gt;</td> <td>set gateway IP</td> </tr> </table>  | <start_ip> | Set the start IP for client | <end_ip> | Set the end IP for client | <gateway> | set gateway IP |
| <start_ip>                         | Set the start IP for client  |            |                             |          |                           |           |                |
| <end_ip>                           | Set the end IP for client  |            |                             |          |                           |           |                |
| <gateway>                          | set gateway IP   |            |                             |          |                           |           |                |
| <b>Error Code</b>                  | <ol style="list-style-type: none"> <li>1: Command format error</li> <li>2: Command parameter error</li> </ol>  |            |                             |          |                           |           |                |
| <b>Notes</b>                       | <ol style="list-style-type: none"> <li>1. Default gateway IP 192.168.43.1</li> <li>2. In DHCP mode, configure DHCP rules. (ATPH=1,1)</li> <li>3. Under static IP, configure the IP address of the AP. (ATPH=1,2)</li> </ol>  |            |                             |          |                           |           |                |
| <b>Examples</b>                    | <pre># ATPF=192.168.99.100,192.168.99.102,192.168.99.1 //Set static IP for AP to 192.168.99.1(also used as gateway) # ATPH=1,1 //Make DHCP server effective # ATPW=2 //Configure device to AP mode # ATPA=iot_test,abcdef1234,1,0 // Start Soft AP "iot_test" # ATW? //query wifi information AP,iot_test,1,AES,abcdef1234,ec:f0:0e:4e:75:0b,192.168.99.1,192.168.99.1 [ATW?] OK</pre> |            |                             |          |                           |           |                |

## 2.10 ATPG –Set up Automatic Connection

| ATPG=<enable>      |  |          |   |
|--------------------|--|----------|---|
| <b>Description</b> | This command sets the automatic connection when the module starts  |          |   |
| <b>Reply</b>       | [ATPG] OK<br>[ATPG] ERROR:<error_no>   |          |   |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt;enable&gt;</td> <td>0 : disable auto connect<br/>1 : enable auto connect</td> </tr> </table> | <enable> | 0 : disable auto connect<br>1 : enable auto connect |
| <enable>           | 0 : disable auto connect<br>1 : enable auto connect  |          |   |

|                   |  |
|-------------------|--|
| <b>Error Code</b> | 1: Command format error<br>2: Command parameter error  |
| <b>Notes</b>      | This feature is turned off by default  |
| <b>Examples</b>   | # ATPN=iot_newifi,abcdef1234 //connect to “iot_newifi”, device will store this information into flash<br># ATPG=1 //enable auto connect, this will be store in flash<br>>>reboot device<br>>>device will read connection information from flash and auto connect to “iot_newifi” |

## 2.11 ATPM –Set MAC Address

| ATPM=<mac>         |   |
|--------------------|---|
| <b>Description</b> | This command is used to set the device MAC address  |
| <b>Reply</b>       | [ATPM] OK<br>[ATPM] ERROR:<error_no>  |
| <b>Parameter</b>   | <mac>      Format : 6 bytes hex number<br>e.g. 00e04cb72300   |
| <b>Error Code</b>  | 1: Command format error<br>2: Command parameter error   |
| <b>Notes</b>       | 1. The device must be restarted to enable the new MAC address<br>2. This command will overwrite the original MAC address, proceed with caution! |

## 2.12 ATRM –Read MAC Address

| ATRM               |  |
|--------------------|--|
| <b>Description</b> | This command is used to read the device MAC address. |
| <b>Reply</b>       | [ATRM] OK xx:xx:xx:xx:xx:xx<br>[ATRM] ERROR          |

# 3. TCP/IP Commands

## 3.1 ATP0 –Query Error Code

| ATP0               |  |
|--------------------|--|
| <b>Description</b> | This command is used to query the error code |
| <b>Reply</b>       | [ATP0] OK:<errno>                            |

[ATP0] ERROR

## 3.2 ATPS –Create TCP / UDP / SSL server

### ATPS =<mode>,<Local Port>

|                    |  |   |
|--------------------|--|---|
| <b>Description</b> | This command is used to create TCP / UDP / SSL server  |   |
| <b>Reply</b>       | <p>[ATPS] OK</p> <p>[ATPS] con_id=x (x=[1,9], con_id 0 is reserved)</p> <p>Under TCP mode, if a client connects, there will be respond as below:</p> <p>[ATPS] A client connected to server[&lt;server_id&gt;]</p> <p>con_id:&lt;x&gt;,seed,tcp,address:xxx.xxx.xxx.xxx,port:&lt;x&gt;,socket:&lt;x&gt;</p> <p>(respond format refer to section 5.7 ATP1)</p> <p>[ATPS] ERROR:&lt;error_no&gt;</p>   |   |
| <b>Parameter</b>   | <Mode>   | <p>0 : TCP mode</p> <p>1 : UDP mode</p> <p>2 : SSL mode</p> |
|                    | <Local Port>   | 1~65535   |
| <b>Error Code</b>  | <p>1: Wrong number of parameters</p> <p>2: Local port range 1~65535</p> <p>3: Error creating con_id</p> <p>4: Failed to create server thread</p> <p>5: Error creating socket</p> <p>6: Failed to set socket option</p> <p>7: Binding error</p> <p>8: Listening error</p> <p>9: tcp there is already an error on the server</p> <p>10: Confirm connection error</p> <p>11: Confirm connection error</p> <p>12: UDP there is already an error on the server</p> <p>13: The server cannot start error in transparent transmission mode</p> <p>14: Unknown connection type</p> <p>15: SSL server listens to bind ip: port error</p> <p>16: Server certificate error</p> <p>17: Server key error</p> <p>18: Server certificate x509_crt_parse failed</p> <p>19: Server ca list x509_crt_parse failed</p> <p>20: Server ca list x509_crt_parse failed</p> <p>21: SSL the server failed to suspend the node</p> <p>22: SSL server connection establishment error</p> <p>23: SSL seed failure</p> <p>24: SSL initialization error</p> <p>25: SSL _set_own_cert error</p> |   |

|                 |  |
|-----------------|--|
|                 | <p>26: SSL handshake error<br/>27:Failed to create node</p>  |
| <b>Notes</b>    | This command will register a con_id  |
| <b>Examples</b> | <pre>//create a TCP server on PORT 5001 # ATPS=0,5001 [ATPS] OK [ATPS] con_id=1 //when a client connects to TCP server[con_id=1] [ATPS] A client connected to server[1] con_id:2,seed,tcp,address:192.168.99.185,port:64068,socket:1 //create a UDP server on PORT 5002 # ATPS=1,5002 [ATPS] OK [ATPS] con_id=3 //query connection information # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 [ATPI] OK</pre> |

### 3.3 ATPC –Create TCP / UDP / SSL Client

| ATPC =<mode>,< Remote Addr>,< Remote Port>[,<Local Port>] |   |
|---|---|
| <b>Description</b>  | This command is used to create TCP / UDP / SSL client   |
| <b>Reply</b>  | <p>[ATPC] OK<br/>[ATPC] con_id=x (x=[1,9], con_id 0 is reserved)<br/>[ATPC] ERROR:&lt;error_no&gt;</p>  |
| <b>Parameter</b>  | <p>&lt;Mode&gt;</p> <p>0 : TCP mode<br/>1 : UDP mode<br/>2 : SSL mode</p>   |
|   | <p>&lt;Remote Addr&gt;</p> <p>xxx.xxx.xxx.xxx<br/>Or<br/>“www.xxx.com”</p>  |
|   | <p>&lt; Remote Port&gt;</p> <p>1~65535</p>  |
|   | <p>[&lt;Local Port&gt;]</p> <p>Local port to bind, only valid for UDP</p>   |
| <b>Error Code</b>   | <p>1: Wrong number of parameters<br/>2: Remote IP format or host not found error<br/>3: The remote port should be 1 ~ 65535<br/>4: Error creating con_id (no available)<br/>5: Failed to create customer task<br/>6: inet_ntoa_r remote address error</p> |



|                 |  |
|-----------------|--|
|                 | <p>7: Error creating socket<br/>             8: Suspended node error (TCP)<br/>             9: Error in connecting<br/>             10: Suspend node error (UDP)<br/>             11: The local port should be 1 ~ 65535<br/>             12: Binding local port error<br/>             13: Connection already exists<br/>             14: Failed to set broadcast<br/>             15: Failed to set multicast to add members on socket<br/>             16: Failed to set multicast interface<br/>             17: Unknown connection type<br/>             18: Failed to start TCP connection with host<br/>             19:SSL memory allocation failed<br/>             20:SSL initialization failed<br/>             21: SSL handshake failed<br/>             22: SSL client failed to suspend the node</p> |
| <b>Notes</b>    | This command will assign a con_id to this TCP/UDP/SSL Client   |
| <b>Examples</b> | <pre>//Create a TCP client and connect to TCP server IP 192.168.99.185 on server's port 5001 # ATPC=0,192.168.99.101,5001 [ATPC] OK [ATPC] con_id=4 //Create a UDP client targeting to server "www.google.com" on server's port 8080 # ATPC=1,"www.google.com",8080 [ATPC] OK [ATPC] con_id=5 //query connection information # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4 [ATPI] OK</pre>   |

### 3.4 ATPD –Close TCP / UDP / SSL Connection

| ATPD=<con_id>      |   |
|--------------------|---|
| <b>Description</b> | This command is used to disconnect TCP / UDP / SSL connection |
| <b>Reply</b>       | [ATPD] OK<br>[ATPD] ERROR:<error_no>                          |

|                   |   |  |
|-------------------|---|--|
| <b>Parameter</b>  | < con_id >  | con_id=[1,9] for certain connection<br>con_id=0 to close all connections |
| <b>Error Code</b> | 1: Command format error<br>2: Command parameter error<br>3: No such con_id  |  |
| <b>Notes</b>      | Use ATPI command to list con_id   |  |
| <b>Examples</b>   | <pre> //query connection information # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4 [ATPI] OK //close con_id 5 (udp client) # ATPD=5 [ATPD] OK //query connection information # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 [ATPI] OK //close con_id 1 (TCP server), and its seed(con_id=2) will be also closed # ATPD=1 [ATPD] OK //query connection information # ATPI con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 [ATPI] OK //close all connections # ATPD=0 [ATPD] OK //query connection information # ATPI [ATPI] OK </pre> |  |

## 3.5 ATPT –Send Data

**ATPT=<data\_size>,<con\_id>[,<dst\_ip>,<dst\_port>]:<data>**

|                    |  |   |
|--------------------|--|---|
| <b>Description</b> | This command is used to send data to a specific connection   |   |
| <b>Reply</b>       | [ATPT] OK,<con_id><br>[ATPT] ERROR:<error_no>  | [ATPT]<br>OK,<con_id>                                     |
| <b>Parameter</b>   | <data_size>  | Data length   |
|                    | <con_id>   | (1~9, con_id 0 is reserved)                               |
|                    | [<dst_ip>]   | [optional]xxx.xxx.xxx.xxx (only need for udp server mode) |
|                    | [<dst_port>]   | [optional]1~65535 (only need for udp server mode)         |
|                    | <data>   | Payload data  |
| <b>Error Code</b>  | 1: Wrong number of parameters<br>2: Exceed ATPT send buffer size<br>3: No such con_id<br>4: Wrong UDP client IP or UDP client port (device as UDP server)<br>5: sendto Error (device as UDP server)<br>6: sendto Error (device as UDP client)<br>7: TCP Server sending error<br>8: Write error   |   |
| <b>Notes</b>       | 1. Use ATPI command to list connection status<br>2. ATPT command cannot send data through TCP server created on local host<br>3. After the separator ":", any input is valid   |   |
| <b>Examples</b>    | <pre>//query connection information # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4 [ATPI] OK //send data to TCP client(Seed) (con_id 2) # ATPT=14,2:Hello! [ATPT] OK,2 //send data to UDP Server via UDP client(con_id 5) # ATPT=14,5:Hello! [ATPT] OK,5 //send data to TCP Server via TCP client(con_id 4) # ATPT=14,4:Hello! [ATPT] OK,4 //send data to UDP client(ip: 192.168.99.185, port:55339) via UDP Server(con_id 3) # ATPT=14,3,192.168.99.185,55339:Hello! [ATPT] OK,3</pre> |   |

## 3.6 ATPR –Receive Data

| ATPR =<con_id>,<Buffer Size> |   |
|------------------------------|---|
| <b>Description</b>           | This command is used to receive data from a specific connection id. FW can also be configured in automatic reception mode, which means that any data packets received on any connection will be automatically returned to the host (see Section 5.7 Command ATPK).  |
| <b>Reply</b>                 | [ATPR] OK,<data size>,<con_id>[,<dst_ip>,<dst_port>]:<data><br>[ATPR] ERROR:<error_no>  |
| <b>Parameter</b>             | <con_id> (1~9, con_id 0 is reserved)  |
|                              | <Buffer Size> Data length   |
| <b>Error Code</b>            | 1: Command format error<br>2: <Buffer Size> parameter error (1 ~ 1600)<br>3: No such con_id<br>4: udp server recvfrom error<br>5: udp client recvfrom error<br>6: TCP server receive error<br>7: Connection lost<br>8: tcp Read error   |
| <b>Notes</b>                 | 1. ATPR Command is used to receive specific con_id data<br>2. ATPR command cannot receive data through TCP server created on local host<br>3. [,<dst_ip>,<dst_port>] Append only when receiving data through UDP server created by local host   |
| <b>Examples</b>              | <pre>//query connection information # ATPi con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4 [ATPI] OK //receive data "12345678" via TCP seed (con_id 2) # ATPR=2,1500 [ATPR] OK,8,2:12345678 //receive data "12345678" via UDP server(con_id 3) # ATPR=3,1500 [ATPR] OK,8,3,192.168.99.185,52795:12345678 //receive data "12345678" via TCP client(con_id 4) # ATPR=4,1500 [ATPR] OK,8,4:12345678</pre> |

### 3.7 ATPK –Set Automatic Reception Mode

| ATPK=<enable>      |  |
|--------------------|--|
| <b>Description</b> | This command is used to set the automatic receiving mode   |
| <b>Reply</b>       | [ATPK] OK<br>[ATPK] ERROR:<error_no>   |
| <b>Parameter</b>   | <enable>      0 : disable auto receive data mode (default)<br>1 : enable auto receive data mode  |
| <b>Error Code</b>  | 1: Command parameter error<br>2: Failed to start automatic receiving task  |
| <b>Notes</b>       | Once auto receive mode is enabled, any data packets received on any connection will be automatically returned to the host in the same format as ATPR in normal transmission mode (see Section 5.6, Response of Command ATPR). But in the transparent transmission mode, the received data will be returned to the host without leaving any information in the header.<br>Normal mode:<br>[ATPR] OK,8,3,192.168.99.185,52795:12345678<br>Transparent transmission mode:<br>12345678 |

### 3.8 ATPI –Check the Network Connection Status

| ATPI               |   |
|--------------------|---|
| <b>Description</b> | This command is used to check the network connection status   |
| <b>Reply</b>       | con_id :<con_id>,<server/seed(TCP client)/client>,\<br><tcp/udp>,address:<IP ADDRESS>,port:<PORT>,socket:<socket id><br>...<br>[ATPI] OK  |
| <b>Examples</b>    | # ATPI<br>con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0<br>con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1<br>con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2<br>con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3<br>con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4<br>[ATPI] OK |

### 3.9 ATPP – PING Commands

ATPP=<XXXX.XXXX.XXXX.XXXX>,[y/loop]

Or

| ATPP=<con_id>, [y/loop] |   |  |
|-------------------------|---|--|
| <b>Description</b>      | This command is used to PING a con_id or PING a network address   |  |
| <b>Reply</b>            | [ATPP] OK<br>[ATPP] ERROR:<error_no>  |  |
| <b>Parameter 1</b>      | <Remote IP>   | xxx.xxx.xxx.xxx  |
|                         | [y/loop]  | No assign: Only five ping requests will be sent.<br>Loop: loop, no count<br>Count: loop with count |
| <b>Parameter 2</b>      | <con_id>  | 1~NUM_NS(default 10)   |
|                         | [y/loop]  | No assign: Only five ping requests will be sent.<br>Loop: loop, no count<br>Count: loop with count |
| <b>Error Code</b>       | 1: Command format error<br>2: No such con_id  |  |
| <b>Examples</b>         | <pre>// Parameter 1 # ATPP=192.168.1.1 // Only five ping requests will be sent # ATPP=192.168.1.1,loop // loop, no count # ATPP=192.168.1.1,10 // loop 10 times // Parameter 2 # ATPI con_id:1,server,tcp,address:192.168.99.143,port:5001,socket:0 con_id:2,seed,tcp,address:192.168.99.185,port:64089,socket:1 con_id:3,server,udp,address:192.168.99.143,port:5002,socket:2 con_id:4,client,tcp,address:192.168.99.185,port:5001,socket:3 con_id:5,client,udp,address:64.233.189.104,port:8080,socket:4 [ATPI] OK # ATPP=2 //Ping TCP client(con_id 4) # ATPP=5 //Ping UDP server via UDP client(con_id 2) # ATPP=4 //Ping TCP server via TCP client(con_id 3)</pre> |  |

### 3.10 ATPU –Set Transparent Transmission Mode

| ATPU=<enable>      |  |   |
|--------------------|--|---|
| <b>Description</b> | This command is used to set the transparent transmission mode  |   |
| <b>Reply</b>       | [ATPU] OK<br>[ATPU] ERROR:<error_no>   |   |
| <b>Parameter</b>   | <enable>   | 1 : enable TT mode (only “1” is valid by now) |
| <b>Error Code</b>  | 1: Command parameter error<br>2: No connection available<br>3: The server cannot enter transparent transmission mode<br>4: There are multiple connections<br>5: Failed to open transparent transmission task |   |

|                 |   |
|-----------------|---|
| <b>Notes</b>    | To enable transparent transmission mode, only one TCP / UDP client connection can be created  |
| <b>Examples</b> | <pre>//For TT(transparent transmission) mode # ATPD=0 //close all connection [ATPD] OK # ATPC=0,192.168.99.101,5001 //create TCP client, single connection [ATPC] OK [ATPC] con_id=1 # ATPU=1 //enter TT mode //20ms interval between sending packets //auto recv mode is also enabled [ATPU] OK &gt; //enter data transmission mode, any input is treated as data to send, //besides the uart echo is turned off, which means any input character //won't have uart echo Hello! //first packet (wait for 20ms) Hello! //second packet (wait for 20ms) ---- //input four hyphens("-") to return to command mode # //return to command mode now, auto recv is disabled, uart echo is turned on</pre> |

### 3.11 ATPL –Save Connection and Turn on Automatic Connection

| ATPL=<enable>      |   |
|--------------------|---|
| <b>Description</b> | This command is used to save the connection information to flash and connect automatically when the system starts   |
| <b>Reply</b>       | [ATPL] OK<br>[ATPL] ERROR:<error_no>  |
| <b>Parameter</b>   | <enable>      0 : erase translink info in flash and disable autolink<br>1 : save translink and enable autolink  |
| <b>Error Code</b>  | 1: Command parameter error<br>2: Wrong number of parameters<br>3: No connection   |
| <b>Notes</b>       | The device uses the information stored in the flash to automatically establish a connection and enter the transparent transmission mode.  |
| <b>Examples</b>    | <pre># ATPD=0 //close all connection [ATPD] OK # ATPN=iot_test,12345678 //connect to AP [ATPN] OK # ATPG=1 //enable auto connect, this will be store in flash [ATPG] OK # ATPC=0,192.168.99.101,5001 //create TCP client, single connection</pre> |

```
[ATPC] OK
[ATPC] con_id=1
# ATPL=1 //save information into flash
[ATPL] OK
# ATSR //reboot device
[ATSR] OK
AT COMMAND READY
> // start data transmission from here, 20ms between packets
---- //input four hyphens("-") to return to command mode
# //return to command mode
```

## 4. BLE Commands

### 4.1 ATBc –Set Central Mode

| ATBc =<enable>     |   |
|--------------------|---|
| <b>Description</b> | This command is used to enable BLE Central mode   |
| <b>Reply</b>       | [ATBc] OK<br>[ATBc] ERROR:<error_no>  |
| <b>Parameter</b>   | < enable ><br>0 : disable Central mode (default)<br>1 : enable Central mode   |
| <b>Error Code</b>  | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: Parameter enable can only be set to 1 or 0<br>4: The device is in peripheral mode |

### 6.2 ATBC –Connect Peripheral Devices

| ATBC =<addr_type>,<addr> |   |
|--------------------------|---|
| <b>Description</b>       | This command is used to establish a connection with a Peripheral device   |
| <b>Reply</b>             | [ATBC] OK<br>[ATBC] ERROR:<error_no>  |
| <b>Parameter</b>         | < addr_type ><br>"P": public<br>"R": random<br><br><addr><br>XXXXXXXXXXXX   |
| <b>Error Code</b>        | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: The device is in non-Central mode |



|                 |  |
|-----------------|--|
| <b>Notes</b>    | When the device is connected by Central, it outputs: [BLE] Connected<br>When the device is disconnected, output:<br>[BLE] Disconnected |
| <b>Examples</b> | ATBC=P,001122334455<br>[BLE] Connected   |

## 6.3 ATBD –Disconnect

| ATBD               |   |
|--------------------|---|
| <b>Description</b> | This command is used to disconnect from Peripheral device       |
| <b>Reply</b>       | [ATBC] OK<br>[ATBC] ERROR:<error_no>                            |
| <b>Error Code</b>  | 1: Command format error<br>2: The device is in non-Central mode |

## 6.4 ATBG – 读取 ATT 信息

| ATBG =<query_type>[,<start_handle>,<end_handle>][, <uuid_type>,<uuid>] |  |                |  |                |            |              |            |             |                       |        |             |
|--|--|----------------|--|----------------|------------|--------------|------------|-------------|-----------------------|--------|-------------|
| <b>Description</b>   | This command is used to read Peripheral's ATT information  |                |  |                |            |              |            |             |                       |        |             |
| <b>Reply</b>   | [ATBG] OK<br>[ATBG] ERROR:<error_no><br>Result:<br>[DIVS16] att_handle-end_group_handle[, uuid16]<br>[DIVS128] att_handle-end_group_handle[, uuid128]<br>[DIVC16] decl_handle, properties, value_handle[, uuid16]<br>[DIVC128] decl_handle, properties, value_handle[, uuid128]<br>[DIVD16] handle, uuid16<br>[DIVD128] handle, uuid128  |                |  |                |            |              |            |             |                       |        |             |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt; query_type &gt;</td> <td>                     “ALL”: all services<br/>                     “SRV”: services by uuid<br/>                     “CHARDIS”: characteristic<br/>                     “CHARUUID”: characteristic by uuid<br/>                     “CHARDDIS”: characteristic descriptor                 </td> </tr> <tr> <td>&lt;start_handle&gt;</td> <td>0x1~0xFFFF</td> </tr> <tr> <td>&lt;end_handle&gt;</td> <td>0x1~0xFFFF</td> </tr> <tr> <td>&lt;uuid_type&gt;</td> <td>0: 16bit<br/>1: 128bit</td> </tr> <tr> <td>&lt;uuid&gt;</td> <td>Uuid in hex</td> </tr> </table> | < query_type > | “ALL”: all services<br>“SRV”: services by uuid<br>“CHARDIS”: characteristic<br>“CHARUUID”: characteristic by uuid<br>“CHARDDIS”: characteristic descriptor | <start_handle> | 0x1~0xFFFF | <end_handle> | 0x1~0xFFFF | <uuid_type> | 0: 16bit<br>1: 128bit | <uuid> | Uuid in hex |
| < query_type >   | “ALL”: all services<br>“SRV”: services by uuid<br>“CHARDIS”: characteristic<br>“CHARUUID”: characteristic by uuid<br>“CHARDDIS”: characteristic descriptor   |                |  |                |            |              |            |             |                       |        |             |
| <start_handle>   | 0x1~0xFFFF   |                |  |                |            |              |            |             |                       |        |             |
| <end_handle>   | 0x1~0xFFFF   |                |  |                |            |              |            |             |                       |        |             |
| <uuid_type>  | 0: 16bit<br>1: 128bit  |                |  |                |            |              |            |             |                       |        |             |
| <uuid>   | Uuid in hex  |                |  |                |            |              |            |             |                       |        |             |
| <b>Error Code</b>  | 1: Command format error<br>2: The number of command parameters is incorrect  |                |  |                |            |              |            |             |                       |        |             |

|                 |   |
|-----------------|---|
|                 | 3: The device is in non-Central mode  |
| <b>Notes</b>    | This command can only be used after establishing a connection   |
| <b>Examples</b> | Get all services: ATBG=ALL<br>Discover services by uuid: ATBG=SRV,uuid_type,uuid<br>Discover characteristic: ATBG=CHARDIS,start_handle,end_handle<br>Discover characteristic by uuid:<br>ATBG=CHARUUID,start_handle,end_handle, type, uuid<br>Discover characteristic descriptor: ATBG=CHARDDIS,start_handle,end_handle<br>eg:ATBG=ALL<br>eg(uuid16):ATBG=SRV,0,1803<br>eg(uuid128):ATBG=SRV,1,00112233445566778899aabbccddeeff<br>eg:ATBG=CHARDIS,0x8,0xFF<br>eg(uuid16):ATBG=CHARUUID,0x1,0xFFFF,0,B001<br>eg(uuid128):ATBG=CHARUUID,0x1,0xFFFF,1,00112233445566778899aabbccddeeff<br>eg:ATBG=CHARDDIS,0xe,0x10 |

## 6.5 ATBS –Scan BT Devices

| ATBS =<enable>     |   |            |   |
|--------------------|---|------------|---|
| <b>Description</b> | This command is used to scan external BT devices  |            |   |
| <b>Reply</b>       | [ATBS] OK<br>[ATBS] ERROR:<error_no><br>[ATBS] adv_type,addr_type,mac ,rssi[,deviceName]  |            |   |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt; enable &gt;</td> <td>                             0 : stop scan device<br/>                             1 : start scan device                         </td> </tr> </table> | < enable > | 0 : stop scan device<br>1 : start scan device |
| < enable >         | 0 : stop scan device<br>1 : start scan device   |            |   |
| <b>Error Code</b>  | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: The device is in non-Central mode   |            |   |

## 6.6 ATBR –Read Operation

| ATBR =<handle><br>or<br>ATBR =<start_handle>,<end_handle>,<uuid_type>,<uuid> |   |            |            |                |            |
|--|---|------------|------------|----------------|------------|
| <b>Description</b>   | This command is used to perform a read operation  |            |            |                |            |
| <b>Reply</b>   | [ATBR] OK<br>[ATBR] ERROR:<error_no><br>[BLE] reci:size,data(byte)  |            |            |                |            |
| <b>Parameter</b>   | <table border="1"> <tr> <td>&lt; handle &gt;</td> <td>0x1~0xFFFF</td> </tr> <tr> <td>&lt;start_handle&gt;</td> <td>0x1~0xFFFF</td> </tr> </table> | < handle > | 0x1~0xFFFF | <start_handle> | 0x1~0xFFFF |
| < handle >   | 0x1~0xFFFF  |            |            |                |            |
| <start_handle>   | 0x1~0xFFFF  |            |            |                |            |

|                   |  |                       |
|-------------------|--|-----------------------|
|                   | <end_handle>   | 0x1~0xFFFF            |
|                   | <uuid_type>  | 0: 16bit<br>1: 128bit |
|                   | <uuid>   | Uuid in hex           |
| <b>Error Code</b> | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: The device is in non-Central mode  |                       |
| <b>Notes</b>      | This command can only be used after establishing a connection  |                       |
| <b>Examples</b>   | Read characteristic: ATBR=handle<br>Read characteristic value by uuid: ATBR=start_handle,end_handle,uuid_type,uuid<br>eg(uuid16):ATBR=0xa<br>eg(uuid16):ATBR=0x1,0xFFFF,0,B001<br>eg(uuid128):ATBR=0,0x1,0xFFFF,1,00112233445566778899aabbccddeeff |                       |

## 6.7 ATBW –Write Operation

| ATBW =<write_type>,<handle>,<length>,<value> |   |                                      |
|--|---|--------------------------------------|
| <b>Description</b>                           | 该命令用于执行写操作  |                                      |
| <b>Reply</b>                                 | [ATBW] OK<br>[ATBW] ERROR:<error_no>  |                                      |
| <b>Parameter</b>                             | <write_type>  | 1: write request<br>2: write command |
|  | <handle>  | 0x1~0xFFFF                           |
|  | <length>  | Total command size <= 256            |
|  | <value>   | Ascii hex                            |
| <b>Error Code</b>                            | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: The device is in non-Central mode |                                      |
| <b>Notes</b>                                 | This command can only be used after establishing a connection   |                                      |
| <b>Examples</b>                              | ATBW=conn_id,type,handle,length,value<br>eg:ATBW=1,0xc,1,02<br>eg:ATBW=2,0x19,3,313233                              |                                      |

## 6.8 ATBp –Set Peripheral Mode

| ATBp =<enable>     |  |
|--------------------|--|
| <b>Description</b> | This command is used to enable BLE Peripheral mode |
| <b>Reply</b>       | [ATBp] OK<br>[ATBp] ERROR:<error_no>               |

|                   |  |   |
|-------------------|--|---|
| <b>Parameter</b>  | < enable >   | 0 : disable Peripheral mode (default)<br>1 : enable Peripheral mode |
| <b>Error Code</b> | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: Parameter enable can only be set to 1 or 0<br>4: The device is in Central mode |   |
| <b>Notes</b>      | When the device is connected by Central, it outputs:<br>[BLE] Connected<br>When the device is disconnected, output:<br>[BLE] Disconnected                        |   |

## 6.9 ATBA –Set the Broadcast Interval

| ATBA =<adv_interval_max>,<adv_interval_min> |  |   |
|---|--|---|
| <b>Description</b>                          | This command is used to set the broadcast interval when the device is in Peripheral mode |   |
| <b>Reply</b>                                | [ATBA] OK<br>[ATBA] ERROR:<error_no>   |   |
| <b>Parameter</b>                            | < adv_interval_max >   | 32 - 16384 (20ms - 10240ms 0.625ms/step)) |
|   | <adv_interval_min>   | 32 - 16384 (20ms - 10240ms 0.625ms/step)) |
| <b>Error Code</b>                           | 1: Command format error<br>2: The number of command parameters is incorrect              |   |

## 6.10 ATBN –Set Device Name

| ATBN =<Device_Name> |  |             |
|---------------------|--|-------------|
| <b>Description</b>  | his command is used to set the device name displayed when the device broadcasts  |             |
| <b>Reply</b>        | [ATBN] OK<br>[ATBN] ERROR:<error_no>   |             |
| <b>Parameter</b>    | <Device_Name>  | Max 22 char |
| <b>Error Code</b>   | 1: Command format error<br>2: The number of command parameters is incorrect<br>3:Device name is greater than 22 characters |             |

## 6.11 ATBe –Send Data

| ATBe =<data_size>,0:<data> |   |  |
|----------------------------|---|--|
| <b>Description</b>         | This command is used to send data to the connected device |  |
| <b>Reply</b>               | [ATBe] OK   |  |

|                   |   |              |
|-------------------|---|--------------|
|                   | [ATBe] ERROR:<error_no>   |              |
| <b>Parameter</b>  | <data_size>   | Data length  |
|                   | <data>  | Payload Data |
| <b>Error Code</b> | 1: The number of command parameters is incorrect<br>2: Data length is greater than 514 characters<br>3: Failed to send<br>4: Mode error |              |
| <b>Notes</b>      | This command can only be used in Peripheral mode or Central mode and connected  |              |

## 6.12 ATBB –BT Distribution Network

| ATBB =<enable>     |   |   |
|--------------------|---|---|
| <b>Description</b> | This command is used to enable BT distribution network, you need to use the matching APP  |   |
| <b>Reply</b>       | [ATBB] OK<br>[ATBB] ERROR:<error_no>  |   |
| <b>Parameter</b>   | < enable >  | 0 : disable BT config (default)<br>1 : enable BT config |
| <b>Error Code</b>  | 1: Command format error<br>2: The number of command parameters is incorrect<br>3: Parameter enable can only be set to 1 or 0<br>4: The device is in Peripheral mode or Central mode |   |