# IVT Wireless i145 Programming Manual

**April 13, 2016**

**Version 4.5**

# REVISION HISTORY

| REVISION | AMENDMENT | DATE | AUTHOR |
|---|---|---|---|
| 1.0 | Initial version | 2013-10-13 | Biao Han<br>Ruixue Huang |
| 1.1 | Delete MW command<br>Delete CV command<br>Update BTC interfaces | 2013-11-6 | Wenqing Qiu |
| 1.2 | Update BTC events | 2013-12-04 | Biao Han |
| 1.3 | Add phonebook commands | 2013-12-09 | Biao Han |
| 1.4 | Add call history commands<br>Update phonebook indications<br>Add BTC commands<br>Add mobile phone name commands | 2013-12-18 | Wenqing Qiu |
| 1.5 | Delete MR command<br>Delete CA indication | 2013-12-24 | Wenqing Qiu |
| 1.6 | Add mobile phone model and manufacturer indication (IO and IM)<br>Update HK command's description, and add example | 2014-01-04 | Wenqing Qiu |
| 1.7 | Update CB command<br>Add HE command<br>Add HE indication | 2014-01-08 | Wenqing Qiu |
| 1.8 | Add HA/HB indication | 2014-01-09 | Wenqing Qiu |
| 1.9 | Add CC indication | 2014-01-16 | Wenqing Qiu |
| 2.0 | Update IS command<br>Add CR command<br>Add MJ command<br>Add PC command's description<br>Add PW command | 2014-03-14 | Wenqing Qiu |
| 2.1 | Add volume control commands | 2014-03-14 | Biao Han |
| 2.2 | Define the max length of local device name parameter in commands and indications | 2014-04-03 | Wenqing Qiu |
| 2.3 | Add HG command<br>Delete screen being related instructions | 2014-07-08 | Jinsheng Cheng |
| 2.4 | Add command s and indications:<br>1) Device Discovery | 2014-07-21 | Minjue Zhu |

| | | | |
|---|---|---|---|
| | 2) Message Access Profile<br>3) Object Push Profile | | |
| 2.5 | Add command s and indications for AVRCP_1.4 | 2014-07-21 | Wenqing Qiu |
| 2.6 | Add SPP CMD | 2014-08-11 | Laijun Yan |
| 2.7 | Modify AVRCP_1.4 commands and indications | 2014-08-28 | Biao Han |
| 2.8 | update AT CMD | 2014-09-28 | Rechael |
| 2.9 | Add GATT CMD | 2014-11-18 | Faxing Cui |
| 3.0 | Update SPP Command | 2014-11-25 | Biao Han |
| 3.1 | Delete GATT CMD<br>IVT will release new interface for LE | 2014-12-08 | Rechael |
| 3.2 | Routine maintenance | 2015-03-20 | Biao Han |
| 3.3 | Revision | 2015-03-29 | Zhu Minjue |
| 3.4 | Add GT event<br>Add GMG event | 2015-03-30 | Faxing Cui |
| 3.5 | Add IU event<br>Add MS event | 2015-3-31 | Liangyu Hua<br>Minjue Zhu |
| 3.6 | Add GPC/GPD/GPF command<br>Modify the PB/MX/ML format of event parameter | 2015-04-28 | Faxing Cui |
| 3.7 | Remove the invalid command and event | 2015-06-29 | Biao Han |
| 3.8 | Modify some commands of BTC(HA/HB).<br>Add BTC event(CA/CB). | 2015-07-27 | Biao Han |
| 3.9 | Add some command for 3-way calls(CI/CJ/CK)<br>Add some event for 3-way calls(IP/IQ/IT) | 2015-07-28 | Biao Han |
| 4.0 | Add FTP OPP PAN DUN GATT Profiles interface | 2015-09-25 | Faxing Cui<br>Liangyu Hua |
| 4.1 | Modify FTP command and event: FB, FK, FP, FG<br>Add FTP->FL command<br>Modify KC event<br>Add Bluetooth switch command | 2015-11-17 | Faxing Cui |
| 4.2 | Add MP indication: APTX status<br>Add MY command: Set current ongoing mic gain value | 2015-12-10 | Stefan Deng<br>Rechael |
| 4.3 | Add the common command-reply indication | 2016-01-04 | Minjue Zhu |

| | | | |
|---|---|---|---|
| | Remove IN Indication<br>Add pairing status indication: GPB<br>Add number of PBAP items indication: PE<br>Add <addr> parameter for indication: GPF | | |
| 4.4 | Add mic gain indication: IG<br>Update IS indication:<br>Add firmware information.<br>Add get services list (AT#GS\GL)<br>Add pbap filter(AT#PM)<br>Add pbap rawData Event(PR)<br>Add network signal status(IL)<br>Add roaming status(IH) | 2016-01-29<br><br><br>2016-03-03 | Faxing Cui<br>Minjue Zhu<br><br>Liangyu Hua |
| 4.5 | Correct the length of the D indication | 2016-04-13 | Faxing Cui |

# Contents

# 1. Introduction

i145 is one of i-series products by IVT. i145 is compatible with *Bluetooth* specification version 4.1 dual mode. It integrates hardware echo cancellation (latest CVC), stereo decoder, *Bluetooth* controller, etc., a completed *Bluetooth* subsystem for Car Kit.i145 product supports HF/HS, A2DP/AVRCP, PBAP, HID, IAP2, PB Sync, PAN, FTP, OPP, SPP, DUN profiles. It provides UART interface, stereo speaker outputs, microphone inputs and power. i145 can be programming through AUDSDK or AT CMD interface for Car Kit application.

i145 supports the mainly phones. Such as iPhone, Android, Nokia, Sony Ericsson, Samsung, Motorola, LG,Blackberry, Oppo, K-touch,MTK, Mstar and Spreadtrum.

## 1.1 General Characteristics

| **Product** | **BlueLet-series *Bluetooth* Module** |
|---|---|
| model | i145 |
| ***Bluetooth* Specification** | ***Bluetooth* v4.1 dual mode, Class II** |
| Frequency Band | 2.4~2.48GHz |
| Modulation Method | GFSK, π/4DQPSK,8DPSK, 0.5BT Gaussian |
| Maximum Data Rate | 4Mbps |
| RF Input Impedance | 50 ohms |
| Crystal OSC | 26MHz |
| Interface | UART, Speaker, Microphone |
| Profiles | HS/HF, A2DP, AVRCP, PBAP, PB Sync, HID, PAN and FTP/OPP/SPP Profiles |
| Operation Range | 10 meters (33 feet) |
| Sensitivity | -84dBm@0.1%BER |
| Transmit power | 6dBm Typ. |
| Connectivity | Point to Multi-Point |
| **Audio Specification** | |
| 16-bit DSP w/ Hardware Accelerator | 80 MIPs Kalimba DSP coprocessor |
| Powerful AEC | 60dB |
| communication | full-duplex |
| Acoustic echo tail length coverage | 64 to 100ms |
| **Dimension** | |
| Dimension | 35mm×25mm×1.2mm(Tolerance:±0.2mm) |
| **Power** | |
| Supply Voltage | 5V DC |

| Operation Environment | |
|---|---|
| Temperature | -40ºC to +85ºC |
| **Certifications** | BQB, CExxx FCC :S78-IVTi145 |

## 1.2Command

AT#<command>[<parameter>]<CR><LF>

| AT# | Prefix |
|---|---|
| <command> | Command, e.g.: CW |
| [<parameter>] | Parameters(Optional),e.g:AT#CW10086\r\n to dial 10086. |
| <CR><LF> | Suffix |

D#<parameter length>[<parameter>]<CR><LF>

| D# | Prefix |
|---|---|
| <parameter length> | The length of parameter data |
| [<parameter>] | Parameters(Optional) data. |
| <CR><LF> | Suffix |

## 1.3Indication

<indication>[< parameter >]<CR><LF>

| < indication > | Indication, e.g.: MX |
|---|---|
| [<parameter>] | Parameters(Optional) |
| <CR><LF> | Suffix |

### 1.3.1 Command Reply Event

| **Indication** | E<Status><CMD><CR><LF> | |
|---|---|---|
| **Description** | The reply event of specified command. | |
| **Parameter** | *status* | Indicates whether the command is executed successfully.<br>0x00 – The command and its parameter are valid. Bluetooth Stack executes it successfully.<br>Other – Error code. |

| | | |
|---|---|---|
| | *CMD* | The command this indication replies to. |
| **Comments** | This indication will be generated immediately after BT stack determines to execute the associated command. For these commands with result, The result may arrive later.<br>e.g. E00GD\r\n. Discover command has been executed. | |

# 2. Command & Indication

## 2.1 Initialization

### 2.1.1 Command

### 2.1.2 Indication

#### 2.1.2.1 IS

| | | |
|---|---|---|
| **Indication** | IS<version><CR><LF> | |
| **Description** | Bluetooth start complete. | |
| **Parameter** | *version* | A string indicates software and firmware version information. They are concatenated by “#”. |
| **Comments** | ISBSE_AUD_2.1.0.1#00102001 | |

## 2.2 Device Discovery

### 2.2.1 Command

#### 2.2.1.1 GD

| | | |
|---|---|---|
| **Indication** | AT#GD<CR><LF> | |
| **Description** | Start device discovery. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.2.1.2 GC

| | |
|---|---|
| **Indication** | AT#GC<CR><LF> |
| **Description** | Cancel the device discovery procedure. |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.2.1.3 GS

| | | |
|---|---|---|
| **Indication** | AT#GS<addr><CR><LF> | |
| **Description** | Gets the Bluetooth service supported by the specified Bluetooth device. | |
| **Parameter** | addr | The Bluetooth address of remote device. Sixteen hexadecimal ASCII characters. |
| **Comments** | 例：AT#GS001122334455<br>Get services list of the remote device with address 001122334455. | |

### 2.2.2 Indication

#### 2.2.2.1 GS

| | | |
|---|---|---|
| **Indication** | GS<CR><LF> | |
| **Description** | Discovery started. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.2.2.2 GF

| | | |
|---|---|---|
| **Indication** | GF<Address><Paired><Class of device><Name><CR><LF> | |
| **Description** | Report a remote device discovered. | |
| **Parameter** | *Address* | 12 hex digits, represents the Bluetooth address of the found device. |
| | *Paired* | 1 decimal digit. Indicates that whether the found device has paired with local device. 1 indicates paired, 0 indicates not paired. |
| | *Class of device* | 8 hex digits, represents the class of device of the found device. |

| | | |
|---|---|---|
| | *Name* | The name of the found device. |
| **Comments** | e.g.: GF0015830A0E4E000120104zhuminjue-PC | |

#### 2.2.2.3 GU

| | | |
|---|---|---|
| **Indication** | GU<Address><Paired><Name><CR><LF> | |
| **Description** | Report a remote device's name has updated. | |
| **Parameter** | *Address* | 12 hex digits, represents the Bluetooth address of the device. |
| | *Paired* | 1 decimal digit. Indicates that whether the device has paired with local device. 1 indicates paired, 0 indicates not paired. |
| | *Name* | The updated name of the device. |
| **Comments** | e.g.: GU0015830A0E4E0zhuminjue-PC | |

#### 2.2.2.4 GE

| | | |
|---|---|---|
| **Indication** | GE<result><CR><LF> | |
| **Description** | Report the discovery procedure finished. | |
| **Parameter** | *result* | The result of the discovery. 0 if success, error code if failed. |
| **Comments** | e.g.: Search complete: GE0\r\n | |

#### 2.2.2.5 GL

| | | |
|---|---|---|
| **Indication** | GL<addr><count><uuids><CR><LF> | |
| **Description** | Services UUID list | |
| **Parameter** | *addr* | Bluetooth address |
| | *count* | The count of uuids |
| | *uuids* | Uuid lists(4*count) |
| **Comments** | 例：GL7014A67101DC0811321116110E110C110A112F111F1000<br>Get 8 services from the Bluetooth address 7014A67101DC, respectively: | |

| | |
|---|---|
| | 1132、1116、110E、110C、110A、112F、111F、1000 |

## 2.3 Hands-free (HFP)

### 2.3.1 Command

#### 2.3.1.1 CA

| | | |
|---|---|---|
| **Command** | AT#CA<CR><LF> | |
| **Description** | Enter pairing mode. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.1.2 CB

| | | |
|---|---|---|
| **Command** | AT#CB<CR><LF> | |
| **Description** | Exit pairing mode. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.1.3 CC

| | | |
|---|---|---|
| **Command** | AT#CC[<index>][<mac>]<CR><LF> | |
| **Description** | Establish HFP connection. | |
| **Parameter** | *index* | 1~8. Connected mobile phone index (can be required with #MX). |
| | *mac* | 12 hex digits, represents the Bluetooth address of the device. |
| **Comments** | -AT#CC<index><CR><LF><br>Specify the index of the device you want to connect.<br>e.g.:AT#CC1\r\n | |

| | |
|---|---|
| | -AT#CC<mac><CR><LF><br>Specify the Bluetooth address of the device you want to connect.<br>e.g.:AT#CC980C82146331\r\n<br>-AT#CC<CR><LF><br>Connect to the latest connected device.<br>e.g.: AT#CC\r\n |

#### 2.3.1.4 CD

| | | |
|---|---|---|
| **Command** | AT#CD<CR><LF> | |
| **Description** | Release the current HFP connection. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.1.5 CE

| | | |
|---|---|---|
| **Command** | AT#CE<CR><LF> | |
| **Description** | Answer the incoming call. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.1.6 CF

| | | |
|---|---|---|
| **Command** | AT#CF<CR><LF> | |
| **Description** | Reject the incoming call. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.1.7 CG

| | |
|---|---|
| **Command** | AT#CG<CR><LF> |
| **Description** | Hung up the call. |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.8 CH

| | | |
|---|---|---|
| **Command** | AT#CH<CR><LF> | |
| **Description** | Redial. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.9 CI

| | | |
|---|---|---|
| **Command** | AT#CI<CR><LF> | |
| **Description** | Release all held calls or sets User Determined User Busy for a waiting call. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.10 CJ

| | | |
|---|---|---|
| **Command** | AT#CJ<CR><LF> | |
| **Description** | Release all active calls (if any exist) and accepts the other (held or waiting) call. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.11 CK

| | | |
|---|---|---|
| **Command** | AT#CK<CR><LF> | |
| **Description** | Places all active calls (if any exist) on hold and accepts the other (held or waiting) call. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.12 CM

| | | |
|---|---|---|
| **Command** | AT#CM<ctl><CR><LF> | |
| **Description** | Mute/Un-mute microphone. | |
| **Parameter** | *ctl* | '0': unmute Microphone； '1': mute Microphone |
| **Comments** | Mute the Microphone: AT#CM1\r\n | |

### 2.3.1.13 CO

| | | |
|---|---|---|
| **Command** | AT #CO<CR><LF> | |
| **Description** | Voice channel switch. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.1.14 CR

| | | |
|---|---|---|
| **Command** | AT#CR<code><CR><LF> | |
| **Description** | Enable/Disable mobile phone's voice recognition feature. | |
| **Parameter** | *code* | 0 Disable mobile phone's voice recognition feature.<br>1 Enable mobile phone's voice recognition feature. |
| **Comments** | e.g.: enable the mobile phone's voice recognition: AT#CR1\r\n | |

### 2.3.1.15 CW

| | | |
|---|---|---|
| **Command** | AT#CW<number><CR><LF> | |
| **Description** | Dial number. | |
| **Parameter** | *number* | call number. |
| **Comments** | e.g:AT#CW13800138000\r\n | |

### 2.3.1.16 CX

| | |
|---|---|
| **Command** | **AT#CX<DTMF><CR><LF>** |

| | | |
|---|---|---|
| **Description** | Send DTMF. | |
| **Parameter** | *DTMF* | The DTMF character. |
| **Comments** | e.g.:Send the '1' character: AT#CX1\r\n | |

#### 2.3.1.17 CY

| | | |
|---|---|---|
| **Command** | AT#CY<CR><LF> | |
| **Description** | Inquire HFP statues. | |
| **Parameter** | - | - |
| **Comments** | The status report by the indication "MG" | |

## 2.3.2 Indication

#### 2.3.2.1 II

| | | |
|---|---|---|
| **Indication** | II<CR><LF> | |
| **Description** | Enter pairing mode. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.2.2 IJ

| | | |
|---|---|---|
| **Indication** | IJ<CR><LF> | |
| **Description** | Exit pairing mode. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.3.2.3 IV

| | |
|---|---|
| **Indication** | IV<address><CR><LF> |
| **Description** | HFP connection is establishing. |

| | | |
|---|---|---|
| **Parameter** | *address* | 12 hex digits, represents the *Bluetooth* address of the device. |
| **Comments** | e.g.: IV0015830407EF\r\n | |

#### 2.3.2.4 IA

| | | |
|---|---|---|
| **Indication** | IA< address ><CR><LF> | |
| **Description** | HFP connection Released. | |
| **Parameter** | *address* | 12 hex digits, represents the *Bluetooth* address of the device. |
| **Comments** | e.g.: IA0015830407EF\r\n | |

#### 2.3.2.5 IB

| | | |
|---|---|---|
| **Indication** | IB<address><outgoing><CR><LF> | |
| **Description** | HFP connection established. | |
| **Parameter** | *address* | 12 hex digits, represents the Bluetooth address of the device. |
| | *outgoing* | The connection role: ‘1’-Active connection, ‘0’-Passive connection. |
| **Comments** | e.g.: IB0015830407EF1\r\n | |

#### 2.3.2.6 IC

| | | |
|---|---|---|
| **Indication** | IC[<number>]<CR><LF> | |
| **Description** | A call is outgoing. | |
| **Parameter** | *number* | Number of the outgoing call. |
| **Comments** | IC<number><CR><LF><br>e.g:IC10086\r\n<br>IC<CR><LF><br>Without number: e.g.: IC\r\n | |

### 2.3.2.7 ID

| | | |
|---|---|---|
| **Indication** | ID[<number>]<CR><LF> | |
| **Description** | A call is incoming. | |
| **Parameter** | *number* | Number of the incoming call. |
| **Comments** | ID<number><CR><LF><br>e.g:ID10086\r\n<br>ID<CR><LF><br>Without number：e.g.: ID\r\n | |

### 2.3.2.8 IF

| | | |
|---|---|---|
| **Indication** | IF<CR><LF> | |
| **Description** | A call is ended. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.2.9 IR

| | | |
|---|---|---|
| **Indication** | IR[<number>]<CR><LF> | |
| **Description** | A call is accepted. | |
| **Parameter** | *number* | Number of the accepted call |
| **Comments** | IR<number><CR><LF><br>e.g:IR10086\r\n<br>IR<CR><LF><br>Without number：e.g.: IR\r\n | |

### 2.3.2.10 IM

| | |
|---|---|
| **Indication** | IM<name><CR><LF> |
| **Description** | Mobile phone’s manufacturer. |

| | | |
|---|---|---|
| **Parameter** | *name* | Mobile phone's manufacturer. |
| **Comments** | Report the remote device manufacturer name: INApple Inc.\r\n | |

### 2.3.2.11 IO

| | | |
|---|---|---|
| **Indication** | IO<name><CR><LF> | |
| **Description** | Mobile phone's model. | |
| **Parameter** | *name* | Mobile phone's model. |
| **Comments** | Report the remote device model: IOiPhone 6\r\n | |

### 2.3.2.12 IG

| | | |
|---|---|---|
| **Indication** | IG<gain><CR><LF> | |
| **Description** | Report local device mic gain | |
| **Parameter** | *gain* | Mic gain value, 2 hex digits. |
| **Comments** | Report local device mic gain: IG0E\r\n | |

### 2.3.2.13 IH

| | | |
|---|---|---|
| **Indication** | IH<val><CR><LF> | |
| **Description** | Indicates the roaming status of current connected mobile phone. | |
| **Parameter** | *val* | 0 Non roaming<br>1 Roaming |
| **Comments** | E.g. IH0\r\n Indicates that the current mobile phone is not in roaming state | |

### 2.3.2.14 IL

| | |
|---|---|
| **Indication** | IL<val><CR><LF> |

| | | |
|---|---|---|
| **Description** | indicates whether the current connected mobile phone support cellular networks | |
| **Parameter** | *val* | 1 available<br>0 Unavailable |
| **Comments** | E.g. IL0\r\n<br>Mobile phone support cellular network. | |

### 2.3.2.15 MC

| | | |
|---|---|---|
| **Indication** | MC<CR><LF> | |
| **Description** | SCO connection established. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.2.16 MD

| | | |
|---|---|---|
| **Indication** | MD<CR><LF> | |
| **Description** | SCO connection released. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.3.2.17 MG

| | | |
|---|---|---|
| **Indication** | MG<code><CR><LF> | |
| **Description** | Report HFP status. | |
| **Parameter** | *code* | Range: 0-6<br>0：Init<br>1：Ready<br>2：Connecting<br>3：Connected<br>4：Outgoing |

| | | |
|---|---|---|
| | | 5：Incoming<br>6：Ongoing |
| **Comments** | e.g.: MG6\r\n | |

### 2.3.2.18 IE

| | | |
|---|---|---|
| **Indication** | IE<type><CR><LF> | |
| **Description** | Report the ring status. | |
| **Parameter** | *type* | '00' mean play local default ring tone, '01'mean play phone's ring tone. |
| **Comments** | Play phone's ring tone: IE01\r\n | |

### 2.3.2.19 IX

| | | |
|---|---|---|
| **Indication** | IX<network_operator><CR><LF> | |
| **Description** | Report the network operator name of mobile phone. | |
| **Parameter** | *network_operator* | The network operator name of mobile phone. |
| **Comments** | e.g.: IX0,China Mobile\r\n | |

### 2.3.2.20 IY

| | | |
|---|---|---|
| **Indication** | IY<strength><CR><LF> | |
| **Description** | Report the signal strength of mobile phone. | |
| **Parameter** | *strength* | Signal strength of mobile phone(2 decimal digits, range '00'-'05') |
| **Comments** | The mobile phone signal strength is changed: IY04\r\n | |

### 2.3.2.21 IW

| | | |
|---|---|---|
| **Indication** | IX<battery><CR><LF> | |
| **Description** | Report the battery of mobile phone. | |
| **Parameter** | *battery* | Battery of mobile phone(2 decimal digits, range '00'-'05') |

| | |
|---|---|
| **Comments** | The mobile phone battery is changed: IW04\r\n |

### 2.3.2.22 IU

| | | |
|---|---|---|
| **Indication** | IU<Subscriber Number><CR><LF> | |
| **Description** | Report the Subscriber Number of mobile phone. | |
| **Parameter** | *Subscriber Number* | Subscriber Number of mobile phone. |
| **Comments** | e.g. : IU8618101211535\r\n | |

### 2.3.2.23 IP

| | | |
|---|---|---|
| **Indication** | IP<idx>\|<status>\|<number><CR><LF> | |
| **Description** | Report the current inbound call with a third party. | |
| **Parameter** | *Idx* | The index of current call (1,2…). |
| | *status* | The status of current call, fixed 5. |
| | *number* | The third call' number. |
| **Comments** | e.g.: A new incoming call is arrived: IP2\|5\|15512345678\r\n | |

### 2.3.2.24 IQ

| | | |
|---|---|---|
| **Indication** | IQ<idx>\|<status>\|<number><CR><LF> | |
| **Description** | Report some call be hang up. | |
| **Parameter** | *Idx* | The index of current call (1,2…). |
| | *status* | The status of current call (0~5)<br>0: Active<br>1: Held<br>2: Dialing<br>3: Alerting<br>4: Incomming<br>5: Waiting |
| | *number* | Number of current call |
| **Comments** | e.g.: Some call being hung up: IQ2\|0\|15512345678\r\n | |

#### 2.3.2.25 IT

| | | |
|---|---|---|
| **Indication** | IT<idx>\|<status>\|<number><CR><LF> | |
| **Description** | Report some call's status is changed | |
| **Parameter** | *Idx* | The index of current call (1,2…). |
| | *status* | The status of current call (0~5)<br>0: Active<br>1: Held<br>2: Dialing<br>3: Alerting<br>4: Incomming<br>5: Waiting |
| | *number* | Cunnent number |
| **Comments** | e.g.: Some call is held: IT2\|1\|15512345678\r\n | |

## 2.4Advanced Audio Streaming (A2DP/AVRCP)

### 2.4.1 Command

#### 2.4.1.1 MA

| | | |
|---|---|---|
| **Command** | AT#MA<CR><LF> | |
| **Description** | Play. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.1.2 MB

| | | |
|---|---|---|
| **Command** | AT#MB<CR><LF> | |
| **Description** | Pause. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.1.3 MD

| | | |
|---|---|---|
| **Command** | AT#MD<CR><LF> | |
| **Description** | Next. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.1.4 ME

| | | |
|---|---|---|
| **Command** | AT#ME<CR><LF> | |
| **Description** | Previous. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.1.5 MV

| | | |
|---|---|---|
| **Command** | AT#MV<CR><LF> | |
| **Description** | Inquire A2DP status. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.1.6 MO

| | | |
|---|---|---|
| **Command** | AT#MO<CR><LF> | |
| **Description** | Inquire AVRCP status. | |
| **Parameter** | | |
| **Comments** | - | |

#### 2.4.1.7 MI

| | |
|---|---|
| **Command** | AT#MI<CR><LF> |
| **Description** | Connect to the A2DP service of the latest connected device. |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

### 2.4.1.8 MJ

| | | |
|---|---|---|
| **Command** | AT#MJ<CR><LF> | |
| **Description** | Release A2DP connection. | |
| **Parameter** | - | |
| **Comments** | - | |

### 2.4.1.9 RA

| | | |
|---|---|---|
| **Command** | AT#RA<offset>,<count><CR><LF> | |
| **Description** | Get Now-Playing list of audio player. | |
| **Parameter** | *offset* | The start position, (decimal number, range '0'-'65535'). |
| | *count* | The total count of report, (decimal number, range '0'-'65535'). |
| **Comments** | Gets the first 10 items of now-playing list: AT#RA0,10\r\n | |

### 2.4.1.10 RB

| | | |
|---|---|---|
| **Command** | AT#RB<uid><CR><LF> | |
| **Description** | Play the song which is identified by uid . | |
| **Parameter** | *uid* | The target song' uid(16 hex digits). |
| **Comments** | Play the song which is identified by uid "0102030405060708":<br>AT#RB0102030405060708\r\n | |

### 2.4.1.11 RC

| | |
|---|---|
| **Command** | AT#RC<offset>,<count><CR><LF> |
| **Description** | Get the virtual file(directory) list of current path of the media player. |

| | | |
|---|---|---|
| **Parameter** | *offset* | The start position, (decimal number, range '0'-'65535'). |
| | *count* | The total count of report, (decimal number, range '0'-'65535'). |
| **Comments** | Gets the first 10 items of current path: AT#RC0,10\r\n | |

#### 2.4.1.12 RD

| | | |
|---|---|---|
| **Command** | AT#RD<direction>,<uid><CR><LF> | |
| **Description** | Change current path. | |
| **Parameter** | *direction* | 1 decimal digit:<br>'0' means entering upper directory.<br>'1' means entering a specified subdirectory. |
| | *uid* | The target directory's uid, 16 hex digits. (If entering upper directory, it is "0000000000000000".) |
| **Comments** | Enter a subdirectory which is indentified by uid "0102030405060708":<br>AT#RD1,0102030405060708\r\n | |

#### 2.4.1.13 RE

| | | |
|---|---|---|
| **Command** | AT#RE<CR><LF> | |
| **Description** | Get now playing status. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.4.2 Indication

#### 2.4.2.1 MA

| | | |
|---|---|---|
| **Indication** | MA<CR><LF> | |
| **Description** | Audio streaming is stopped. | |
| **Parameter** | - | - |

| | |
|---|---|
| **Comments** | - |

#### 2.4.2.2 MB

| | | |
|---|---|---|
| **Indication** | MB<CR><LF> | |
| **Description** | Audio streaming is started. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.4.2.3 MO

| | | |
|---|---|---|
| **Indication** | MO<address><CR><LF> | |
| **Description** | A2DP connection is established. | |
| **Parameter** | *address* | 12 hex digits, represents the Bluetooth address of remote device. |
| **Comments** | e.g.: MO0015830A0B0C\r\n | |

#### 2.4.2.4 MY

| | | |
|---|---|---|
| **Indication** | MY<address><CR><LF> | |
| **Description** | A2DP connection is released. | |
| **Parameter** | *address* | 12 hex digits, represents the Bluetooth address of remote device. |
| **Comments** | e.g.: MY0015830A0B0C\r\n | |

#### 2.4.2.5 MU

| | | |
|---|---|---|
| **Indication** | MU<status><CR><LF> | |
| **Description** | Report A2DP status. | |
| **Parameter** | *status* | 1 Bytes, Range: 0-5<br>0 Init<br>1 Ready |

| | | |
|---|---|---|
| | | 2 Connecting<br>3 Connected<br>4 Playing |
| **Comments** | e.g.: MU4\r\n | |

### 2.4.2.6 ML

| | | |
|---|---|---|
| **Indication** | ML<status><address><CR><LF> | |
| **Description** | Report AVRCP status. | |
| **Parameter** | *status* | 1 Bytes, Range: 0-5<br>0 Init<br>1 Ready<br>2 Connecting<br>3 Connected<br>4 Playing<br>5 Paused |
| | *address* | The MAC address of remote device(12 bytes ASCII). |
| **Comments** | e.g.: ML50102030a0b0c\r\n | |

### 2.4.2.7 RA

| | | |
|---|---|---|
| **Indication** | RA<CR><LF> | |
| **Description** | Music is paused or stopped. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.4.2.8 RB

| | | |
|---|---|---|
| **Indication** | RB<CR><LF> | |
| **Description** | Music is playing. | |
| **Parameter** | - | - |

| | |
|---|---|
| **Comments** | - |

### 2.4.2.9 RC

| | | |
|---|---|---|
| **Indication** | RC<CR><LF> | |
| **Description** | Now Playing List is changed. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.4.2.10 RF

| | | |
|---|---|---|
| **Indication** | RF<uid>\|<name><CR><LF> | |
| **Description** | Indication of file/directory items of current path. | |
| **Parameter** | *uid* | 16 hex digits, represents the id of file/directory item. |
| | *name* | The name of file/folder item. |
| **Comments** | e.g.: RF0102030405060708\|folder_name\r\n | |

### 2.4.2.11 RI

| | | |
|---|---|---|
| **Indication** | RI<uid>\|<time>\|<title>\|<artist>\|<album><CR><LF> | |
| **Description** | Information of the now playing song. | |
| **Parameter** | *uid* | 16 hex digits, represents the id of the playing song. |
| | *time* | The total length of the song (decimal digits). |
| | *other* | The detail information (title/artist/album) (include terminator max length is 32). |
| **Comments** | e.g.: RI0102030405060708\|240000\|Bring you home\| Ronan Keating \| Bring you home\r\n | |

### 2.4.2.12 RL

| | |
|---|---|
| **Indication** | RL<CR><LF> |

| | | |
|---|---|---|
| **Description** | Finished to get information. | |
| **Parameter** | - | - |
| **Comments** | It response to the command “AT#RA” or “AT#RC”. | |

### 2.4.2.13 RN

| | | |
|---|---|---|
| **Indication** | RN<time>\|<title>\|<artist>\|<album><CR><LF> | |
| **Description** | Information of the now playing song. | |
| **Parameter** | *time* | The total length of the song(decimal digits). |
| | *other* | The song’s information (title/artist/album) (include terminator max length is 32). |
| **Comments** | - | |

### 2.4.2.14 RP

| | | |
|---|---|---|
| **Indication** | RP<length>\|<position><status><CR><LF> | |
| **Description** | Play position of now playing song. | |
| **Parameter** | *length* | the total length of the song |
| | *position* | the current playing position of the song |
| | *status* | 0x00: Stopped<br>0x01: Playing<br>0x02: Paused<br>0x03: FWD_Seek<br>0x04: REV_ Seek<br>0xFF: Error Code |
| **Comments** | - | |

### 2.4.2.15 MP

| | |
|---|---|
| **Indication** | MP<status><CR><LF> |
| **Description** | Indicates the encoding type of current A2DP stream. |

| | | |
|---|---|---|
| **Parameter** | *status* | 0x00: SBC<br>0x01: APTX |
| **Comments** | E.g.<br>MP01\r\n<br>Report the current stream type is APTX. | |

## 2.5 Bluetooth Touch Control (BTC)

### 2.5.1 Command

#### 2.5.1.1 HA

| | | |
|---|---|---|
| **Command** | AT#HA<width>,<height><CR><LF> | |
| **Description** | Sends screen resolution of local device. | |
| **Parameter** | width | Horizontal resolution. |
| | height | Vertical resolution. |
| **Comments** | Note: send this command before sending coordinate information. | |

#### 2.5.1.2 HB

| | | |
|---|---|---|
| **Command** | AT#HB<CR><LF> | |
| **Description** | Cancel the BTC function. | |
| **Parameter** | - | - |
| **Comments** | Note: Cancel the BTC function when the BTC function is not needed. | |

#### 2.5.1.3 HK

| | | |
|---|---|---|
| **Command** | AT#HK<code><CR><LF> | |
| **Description** | Send touch control command. | |
| **Parameter** | *code* | Command, Hexadecimal<br>00 release button, |

| | | |
|---|---|---|
| | | 01 press down Home button<br>02 power down Search button<br>04 press down Back button |
| **Comments** | Note: A down button followed immediately by the release button is parsed as a click action. If the interval of the two button(a down button and release button) is long enough, it will be parsed as a Long-press action.<br>Example (Back):<br>AT#HK04<CR><LF><br>AT#HK00<CR><LF> | |

#### 2.5.1.4 HR

| | | |
|---|---|---|
| **Command** | AT#HR<button>,<x>,<y><CR><LF> | |
| **Description** | Sending coordinate information. | |
| **Parameter** | *button* | Status of button<br>0 Up<br>1 Down |
| | *x* | x absolute coordinate |
| | *y* | y absolute coordinate |
| **Comments** | - | |

### 2.5.2 Indication

#### 2.5.2.1 HA

| | | |
|---|---|---|
| **Indication** | HA<CR><LF> | |
| **Description** | *Bluetooth* touch control connection established. | |
| **Parameter** | - | - |
| **Comments** | e.g.: HA\r\n | |

#### 2.5.2.2 HB

| | | |
|---|---|---|
| **Indication** | HB<CR><LF> | |
| **Description** | *Bluetooth* touch control connection released. | |
| **Parameter** | - | - |
| **Comments** | e.g.: HB\r\n | |

#### 2.5.2.3 CA

| | | |
|---|---|---|
| **Indication** | CA<CR><LF> | |
| **Description** | BTC function is stopped. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.5.2.4 CB

| | | |
|---|---|---|
| **Indication** | CB<CR><LF> | |
| **Description** | BTC function is started. | |
| **Parameter** | - | - |
| **Comments** | - | |

## 2.6 Phonebook & Call History(PBAP)

### 2.6.1 Command

#### 2.6.1.1 PA

| | | |
|---|---|---|
| **Command** | AT#PA<Target>,<Offset>,<Count><CR><LF> | |
| **Description** | Sync phonebook contacts. | |
| **Parameter** | *Target* | 1 Bytes Ascii, Range '0'-'4':<br>0 SIM<br>1 Phone |

| | | |
|---|---|---|
| | | 2 Outgoing call<br>3 Missed call<br>4 Incoming call |
| | *Offset* | The start position. |
| | *Count* | Contacts number(It doesn't represent the real synchronized contacts number). |
| **Comments** | e.g.: AT#PA1,0,100\r\n | |

### 2.6.1.2 PW

| | | |
|---|---|---|
| **Command** | AT#PW<CR><LF> | |
| **Description** | Cancel the current synchronization | |
| **Parameter** | - | - |
| **Comments** | | |

### 2.6.1.3 PM

| | | |
|---|---|---|
| **Command** | PM<mask><CR><LF> | |
| **Description** | Set PBAP contact-sync filter, FN、N、TEL is always synchronized。 | |
| **Parameter** | *mask* | The bit-mask of the content-filter. 8 hexadecimal ASCII characters.<br>PBAP_INFO_MASK_FN (1 << 0)<br>PBAP_INFO_MASK_N (1 << 1)<br>PBAP_INFO_MASK_TEL (1 << 2)<br>PBAP_INFO_MASK_EMAIL (1 << 3)<br>PBAP_INFO_MASK_PHOTO (1 << 4) |
| **Comments** | AT#PM00000008\r\n<br>To sync FN, N, TEL, Email. | |

## 2.6.2 Indication

### 2.6.2.1 PS

| | | |
|---|---|---|
| **Command** | PS<code><address><CR><LF> | |
| **Description** | The PBAP status | |
| **Parameter** | *code* | 2 Bytes ASCII, Range “00”-“02”:<br>00 mean Connection service successful<br>01 mean Connection service fail<br>02 mean Connection is broken |
| | *address* | The *Bluetooth* address of remote device(12 Bytes Ascii). |
| **Comments** | e.g.: connection service successful<br>PS000015830A0B0C\r\n | |

### 2.6.2.2 PB

| | | |
|---|---|---|
| **Indication** | PB<Target><Number type><Name Len> <Number Len><Name><Number>\|<Time><CR><LF> | |
| **Description** | Contacts or call history item. | |
| **Parameter** | *Target* | 0 SIM<br>1 Phone<br>2 Outgoing call history<br>3 Missed call history<br>4 Incoming call history |
| | *Number type* | Number type field(2 Bytes ASCII).<br>1: home;<br>2: mean this number support voice;<br>3: work number;<br>4: preferred number;<br>5: fax number;<br>6: cell phone; |

| | | |
|---|---|---|
| | | 7: video phone;<br>8: pager;<br>9: BBS;<br>10: modem;<br>11: car telephone;<br>12: ISDN;<br>13: pcs phone;<br>14: voice phone number; |
| | *Name Len* | The length of name field. |
| | *Number Len* | The length of number field. |
| | *Name* | The phone book name (MAX 32 bytes). |
| | *Number* | The phone book telephone number (MAX 40 bytes). |
| | *Time* | The call history time(MAX 40 bytes ASCII). |
| **Comments** | e.g.: phone book: PB10411Jack13333333333\r\n<br>e.g.: call history: PB10411Jack13333333333\|20140101T235959\r\n | |

#### 2.6.2.3 PE

| | | |
|---|---|---|
| **Indication** | PE<type><size><CR><LF> | |
| **Description** | Indicates the number of PBAP items. | |
| **Parameter** | *type* | 1 decimal ASCII. The type of PBAP data.<br>0 SIM<br>1 Phone<br>2 Outgoing call<br>3 Missed call<br>4 Incoming call |
| | *size* | 4 hex ASCII. The total number of PBAP items. |
| **Comments** | e.g.: PE000F2\r\n | |

#### 2.6.2.4 PC

| | | |
|---|---|---|
| **Indication** | PC<CR><LF> | |
| **Description** | Synchronization completed | |
| **Parameter** | - | - |
| **Comments** | e.g.: PC\r\n | |

#### 2.6.2.5 PR

| | | |
|---|---|---|
| **Indication** | PR<target><index><dataLen><rawData><CR><LF> | |
| **Description** | Notify contact rawdata | |
| **Parameter** | *target* | 0 SIM<br>1 Phone<br>2 Outgoing call history<br>3 Missed call history<br>4 Incoming call history |
| | *index* | Contact index, 4 hexadecimal ASCII characters. |
| | *dataLen* | Length of raw data, 4 hexadecimal ASCII characters. |
| | *RawData* | Contact raw data. |
| **Comments** | PR1**0001**0222BEGIN:VCARD....END:VCARD\r\n. | |

## 2.7 Message Access Profile (MAP)

### 2.7.1 Command

#### 2.7.1.1 AC

| | | |
|---|---|---|
| **Command** | AT#AC < address><CR><LF> | |
| **Description** | Connect to the MAP service of remote device. | |
| **Parameter** | *address* | 13 hexadecimal digits. The *Bluetooth* Address of the remote |

| | | |
|---|---|---|
| | | device. |
| **Comments** | e.g.: AT#AC889900AABBCC<CR><LF> | |

### 2.7.1.2 AD

| | | |
|---|---|---|
| **Command** | AT#AD<CR><LF> | |
| **Description** | Disconnect the existing MAP connection. | |
| **Parameter** | - | - |
| **Comments** | If no connection exists, do nothing. | |

### 2.7.1.3 AS

| | | |
|---|---|---|
| **Command** | AT#AS<length of recipient address><recipient address><length of SMS><content of SMS><CR><LF> | |
| **Description** | Send the message to some mobile phone. | |
| **Parameter** | *length of recipient address* | The target mobile phone number(2 Bytes decimal). |
| | *recipient address* | The target mobile phone number. |
| | *length of SMS* | The length of SMS (4 Bytes decimal). |
| | *content of SMS* | The content of SMS. |
| **Comments** | If send content ”hello” to mobile phone number “13301020304”:<br>AT#AS11133010203040005hello\r\n | |

### 2.7.1.4 AG

| | | |
|---|---|---|
| **Command** | AT#AG<msg_handle><CR><LF> | |
| **Description** | Get a message content. | |
| **Parameter** | *msg_handle* | Message handle(MAX 16 Bytes ASCII). |
| **Comments** | e.g.: AT#AG0123456AB\r\n | |

#### 2.7.1.5 AL

| | | |
|---|---|---|
| **Command** | AT#AL<CR><LF> | |
| **Description** | Get the SMS list on the remote device. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.7.2 Indication

#### 2.7.2.1 AC

| | | |
|---|---|---|
| **Indication** | AC<result> <CR><LF> | |
| **Description** | Report the MAP connection result. | |
| **Parameter** | *result* | hex number, indicates the result of connection:<br>00: MAP connected.<br>01: MAP connect failed.<br>02: MAP disconnected.<br>03: MAP disconnect failed. |
| **Comments** | e.g.: connect success<br>AC00\r\n | |

#### 2.7.2.2 AG

| | | |
|---|---|---|
| **Indication** | AG<msg_handle>\|<sender name>\|<number>\|<msg><CR><LF> | |
| **Description** | Report message content. | |
| **Parameter** | *Msg_handle* | Message handle. |
| | *Sender name* | The sender name. |
| | *number* | The number of message sender. |
| | *msg* | Message content. |
| **Comments** | e.g.: AG1799\|jack\|+8615801048888\|hello\r\n | |

### 2.7.2.3 AL

| | | |
|---|---|---|
| **Indication** | AL<SMS content><CR><LF> | |
| **Description** | Report a SMS item. This is the result of a previous AT#AL instruct to get SMS list. | |
| **Parameter** | *SMS content* | is one of below pattern:<br>1. "MSG:BEGIN" : A SMS item begins.<br>2. "MSG:END" : A SMS item ends.<br>3. "handle:<handle>"<br><handle> : the unique ID of the SMS item.<br>4. "type:<type>"<br><type> : the type of the SMS. <SMS_GSM> or <SMS_CDMA><br>5. "size:<size>"<br><size>: the size of the SMS item.<br>6. "read:<is_read><br><is_read>: "yes" or "not" to indicates whether the SMS is read before.<br>7. "subject:<subject>"<br><subject>: the subject of the SMS item.<br>8. "datetime:<datetime>"<br><datetime>: the created date and time of the SMS item using the "YYYYMMDDTHHMMSS" pattern which 'T' is the break character between date and time. |
| **Comments** | e.g.:<br>ALMSG:BEGIN<br>ALhandle:1799<br>ALsubject:test<br>ALdatetime:20150320T150440<br>ALsender_name:jack<br>ALsender_addressing:+8615801048537<br>ALrecipient_name:unknow<br>ALrecipient_addressing:<br>ALtype:SMS_GSM<br>ALsize:2<br>ALtext:yes | |

| | |
|---|---|
| | ALreception_status:complete<br>ALattachment_size:0<br>ALpriority:no<br>ALread:no<br>ALsent:no<br>ALprotected:no<br>ALMSG:END |

#### 2.7.2.4 AN

| | | |
|---|---|---|
| **Command** | AN<new SMS infomation><CR><LF> | |
| **Description** | Notification for new SMS is received. | |
| **Parameter** | *MSG:BEGIN* | Start transfer message information. |
| | *type:NewMessage* | The message is new. |
| | *gandle:<msg_handle>*<br>*folder:<msg_folder>* | Handle for the message.<br>The message folder. |
| | *msg_type:<msg_type>* | The message type. |
| | *MSG:END* | Message information transfer is stopped. |
| **Comments** | - | |

## 2.8 Serial Port Profile(SPP)

### 2.8.1 Command

#### 2.8.1.1 SC

| | | |
|---|---|---|
| **Command** | AT# SC[bd-12] <CR><LF> | |
| **Description** | Connect SPP | |
| **Parameter** | *bd-12* | *Bluetooth* address for remote device. |
| **Comments** | e.g.:<br>AT#SC112233445566<CR><LF><br>Will connect to the device with BD address “11:22:33:44:55:66” | |

#### 2.8.1.2 SD

| | | |
|---|---|---|
| **Command** | AT# SD[handle-8] <CR><LF> | |
| **Description** | Disconnect SPP. | |
| **Parameter** | *handle-8* | Connection Handle. |
| **Comments** | e.g.:AT#SD11223344<CR><LF> will disconnect the SPP connection by handle 0x11223344 | |

#### 2.8.1.3 SJ

| | | |
|---|---|---|
| **Command** | AT#SJ<CR><LF> | |
| **Description** | Start SPP server. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.8.1.4 SK

| | | |
|---|---|---|
| **Command** | AT#SK[handle-8]<CR><LF> | |
| **Description** | Stop SPP server. | |
| **Parameter** | *handle-8* | Service handle. |
| **Comments** | e.g.:AT#SK11223344<CR><LF> will stop the SPP server by handle 0x11223344 | |

#### 2.8.1.5 D

| | | |
|---|---|---|
| **Command** | D#<length-4>[handle-8][data_raw] <CR><LF> | |
| **Description** | Send SPP Data. | |
| **Parameter** | *length-4* | Total length of parameter(include length/handle/payload fields). |
| | *handle-8* | Connection handle. |
| | *data_raw* | The data will be sent |
| **Comments** | e.g.: D#000A1122334401<CR><LF> | |

| | |
|---|---|
| | Send data “01” on connection handle 0x11223344 |

## 2.8.2 Indication

### 2.8.2.1 SC

| | | |
|---|---|---|
| **Indication** | SC[bd-12][handle-8][srv-channel-2][scn-status-1]<CR><LF> | |
| **Description** | Connection Complete. | |
| **Parameter** | *Bd-12* | Remote device address. |
| | *handle-8* | Connection handle(0xffffffff mean connection fail). |
| | *Srv-channel-2* | Service channel, max value: 30. |
| | scn-status-1 | SPP connect status. |
| **Comments** | e.g.: SC112233445566010203040 51\r\n | |

### 2.8.2.2 SD

| | | |
|---|---|---|
| **Indication** | SD [handle-8]<CR><LF> | |
| **Description** | Send data to remote device. | |
| **Parameter** | *handle-8* | The connection handle is disconnected. |
| **Comments** | e.g.: SD01020304\r\n | |

### 2.8.2.3 SJ

| | | |
|---|---|---|
| **Indication** | SJ [handle-8][lsvr-channel-2][status-1]<CR><LF> | |
| **Description** | SPP server is started | |
| **Parameter** | *handle-8* | SDP Service handle. |
| | *Svr-channel-2* | Service channel. |
| | *status* | Status of Start SPP server. |
| **Comments** | e.g.: SJ01020304051\r\n | |

#### 2.8.2.4 SK

| | | |
|---|---|---|
| **Indication** | SK [result]<CR><LF> | |
| **Description** | SPP server is stopped. | |
| **Parameter** | *result* | 1 Bytes ASCII:<br>'0' mean unsuccessful.<br>'1' mean successful. |
| **Comments** | e.g.: SK01\r\n | |

#### 2.8.2.5 D

| | | |
|---|---|---|
| **Indication** | D<length-4>[handle-8][data_raw]<CR><LF> | |
| **Description** | Data indication. | |
| **Parameter** | *length-4* | Total length of parameter(include length/handle/payload fields). |
| | *handle-8* | Connection handle. |
| | *data_raw* | The data will be received. |
| **Comments** | e.g.: D0009010203040\r\n | |

## 2.9 Others

### 2.9.1 Command

#### 2.9.1.1 MM

| | | |
|---|---|---|
| **Command** | AT#MM<name><CR><LF> | |
| **Description** | Inquiry/Change local device name. | |
| **Parameter** | *name* | Local device name, the max length is 32 bytes. |
| **Comments** | If <name> is empty, the module will return the local device name with MM indication | |

### 2.9.1.2 MN

| | | |
|---|---|---|
| **Command** | AT#MN<pin><CR><LF> | |
| **Description** | Inquiry/Change local device PIN code. | |
| **Parameter** | *pin* | Local PIN code (4 decimal digits). |
| **Comments** | If <pin> is empty, the module will return the current PIN code with MN indication. | |

### 2.9.1.3 MX

| | | |
|---|---|---|
| **Command** | AT#MX<CR><LF> | |
| **Description** | Inquiry paired devices list. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.4 MR

| | | |
|---|---|---|
| **Command** | AT#MR[<index>]<CR><LF> | |
| **Description** | Delete paired device. | |
| **Parameter** | *index* | index of device, 1-6 |
| **Comments** | AT#MR<CR><LF><br>Delete all paired devices<br>AT#MR<index><CR><LF><br>Delete the specified paired device. | |

### 2.9.1.5 MZ

| | | |
|---|---|---|
| **Command** | AT#MZ<CR><LF> | |
| **Description** | Inquiry local device's *Bluetooth* address. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.6 MF

| | | |
|---|---|---|
| **Command** | AT#MF<CR><LF> | |
| **Description** | Inquiry auto-answering call and auto-connecting setting. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.7 MG

| | | |
|---|---|---|
| **Command** | AT#MG<CR><LF> | |
| **Description** | Enable automatic connection when powers on. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.8 MH

| | | |
|---|---|---|
| **Command** | AT#MH<CR><LF> | |
| **Description** | Disable automatic connection when powers on. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.9 MP

| | | |
|---|---|---|
| **Command** | AT#MP<CR><LF> | |
| **Description** | Enable automatic answering call. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.10 MQ

| | |
|---|---|
| **Command** | AT#MQ<CR><LF> |
| **Description** | Disable automatic answering call. |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

### 2.9.1.11 GPC

| | | |
|---|---|---|
| **Command** | AT#GPC<address><CR><LF> | |
| **Description** | Pairing with remote device. | |
| **Parameter** | *address* | The MAC address of remote device(12 Bytes ASCII). |
| **Comments** | - | |

### 2.9.1.12 GPD

| | | |
|---|---|---|
| **Command** | AT#GPD< address ><CR><LF> | |
| **Description** | Cancel the pairing with remote device. | |
| **Parameter** | *address* | The MAC address of remote device(12 Bytes ASCII). |
| **Comments** | - | |

### 2.9.1.13 GPF

| | | |
|---|---|---|
| **Command** | AT#GPF<bd_addr><accept ><CR><LF> | |
| **Description** | Conform the pairing request of remote device. | |
| **Parameter** | *bd_addr* | 12 hex digits, represents the Bluetooth address of the remote device. |
| | *accept* | Control byte(1 Byte ASCII)<br>0: mean reject it.<br>1: mean accept it. |
| **Comments** | - | |

### 2.9.1.14 MY

| | |
|---|---|
| **Command** | AT#MY< MicGain ><CR><LF> |

| | | |
|---|---|---|
| **Description** | Set current ongoing microphone gain value | |
| **Parameter** | *MicGain* | 2 hex ASCII. The microphone gain value to set.<br>The max value is 0x16. |
| **Comments** | e.g. AT#MY15\r\n. Set the microphone gain to 0x15. | |

## 2.9.2 Indication

### 2.9.2.1 MX

| | | |
|---|---|---|
| **Indication** | MX<n><COD ><mac><name><CR><LF> | |
| **Description** | Report paired devices list | |
| **Parameter** | *n* | Index (1-6) |
| | *COD* | Class of device(8 Bytes ASCII number) |
| | *mac* | *Bluetooth* address, 12 hexadecimal digits. |
| | *name* | Device name, the max length is 32 bytes. |
| **Comments** | e.g.: MX2001247000821SGH-F258\r\n | |

### 2.9.2.2 MF

| | | |
|---|---|---|
| **Indication** | MF<a><b><CR><LF> | |
| **Description** | Report auto-answering call and auto-connecting setting. | |
| **Parameter** | *a* | Auto-answering call setting, 0:Disable, 1: Enable. |
| | *b* | Auto-connecting setting, 0:Disable, 1: Enable. |
| **Comments** | e.g.: MF00\r\n | |

### 2.9.2.3 MZ

| | | |
|---|---|---|
| **Indication** | MZ<address><CR><LF> | |
| **Description** | Report local device *Bluetooth* address | |
| **Parameter** | *address* | Local device *Bluetooth* address, 17bytes ASCII code. |

| | |
|---|---|
| **Comments** | e.g.: MZ11:22:33:44:55:66\r\n |

#### 2.9.2.4 MM

| | | |
|---|---|---|
| **Indication** | MM<name><CR><LF> | |
| **Description** | Report local device name. | |
| **Parameter** | *name* | Local device name (UTF-8), the max length is 32 bytes. |
| **Comments** | e.g.: MMIVT_BT\r\n | |

#### 2.9.2.5 MN

| | | |
|---|---|---|
| **Indication** | MN<pin><CR><LF> | |
| **Description** | Report local device PIN code. | |
| **Parameter** | *pin* | Local device PIN code (4 decimal digits). |

#### 2.9.2.6 MS

| | | |
|---|---|---|
| **Indication** | MS<scan_mode><CR><LF> | |
| **Description** | Report that the scan mode has changed. | |
| **Parameter** | *Scan_mode* | 1 decimal digit. Detail is below:<br>0 – No Scans enabled.<br>1 – Inquiry Scan (can be discovered) enabled.<br>2 – Inquiry Scan (can be discovered) disabled. Page Scan (can be connected) enabled.<br>3 - Inquiry Scan (can be discovered) enabled. Page Scan (can be connected) enabled. |
| **Comments** | e.g.: MS3\r\n | |

#### 2.9.2.7 GT

| | |
|---|---|
| **Indication** | GT< address ><reason><CR><LF> |
| **Description** | The ACL connection has been disconnected, and the reason for broken. |

| | | |
|---|---|---|
| **Parameter** | *address* | 12 hex digits, represents the Bluetooth address of the remote device. |
| | *reason* | 2 hex digits, the reason of ACL connection disconnected. |
| **Comments** | e.g.: GT0015831234560E\r\n | |

#### 2.9.2.8 GPB

| | | |
|---|---|---|
| **Indication** | GPB< address ><state><CR><LF> | |
| **Description** | The pairing state with remote device has changed. | |
| **Parameter** | *address* | 12 hex digits. Represents the Bluetooth address of the remote device. |
| | *status* | 1 decimal digit. Represents the current pairing state.<br>0 – not paired<br>1 –paired<br>2 - in pairing |
| **Comments** | e.g.: GPB0015831234560\r\n | |

## 2.10 File Transfer Protocol(FTP)

### 2.10.1 Command

#### 2.10.1.1 FA

| | | |
|---|---|---|
| **Command** | AT#FA<CR><LF> | |
| **Description** | Abort current Get or Put operation. | |
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.10.1.2 FB

| | |
|---|---|
| **Command** | AT#FB<CR><LF> |
| **Description** | Browse root folder of remote device(FTP Server can set root folder). |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | Note:<br>Description mentioned in the remote device root directory is the root directory on the FTP Server, the local Bluetooth device is the FTP Client, the remote devices is FTP Server by default. | |

### 2.10.1.3 FC

| | | |
|---|---|---|
| **Command** | AT#FC<bd_addr><CR><LF> | |
| **Description** | Establish FTP connection. | |
| **Parameter** | *bd_addr* | 12 hex digits, represents the *Bluetooth* address of the device. |
| **Comments** | | |

### 2.10.1.4 FD

| | | |
|---|---|---|
| **Command** | AT#FD<CR><LF> | |
| **Description** | Release the current FTP connection. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.10.1.5 FG

| | | |
|---|---|---|
| **Command** | AT#FG<obj_name<CR><LF> | |
| **Description** | Get object from remote device. | |
| **Parameter** | *obj_name* | The name of object which will be get. |
| **Comments** | Note:<br>The remote device to exist under the root directory of names for 123 a file or folder. (you can use AT# FH set distal root directory)<br>Download 123 will pass the FL Settings stored in the local directory.<br>e.g: AT#FL/data/<br>AT#FG123 | |

| | |
|---|---|
| | *set the local path to /data/, on behalf of the distal root path name for 123 a file or folder, under /data/ downloaded to a local directory.* |

### 2.10.1.6 FP

| | | |
|---|---|---|
| **Command** | AT#FP<obj_name><CR><LF> | |
| **Description** | Push object to remote folder. | |
| **Parameter** | *obj_name* | The name of local object |
| **Comments** | e.g: AT#FP123<br>*The object(123) will be pushed to root folder of remote device*<br>AT#FL/data/<br>AT#FP123<br>*Local /data/123 transfer to the remote path of the root directory.* | |

### 2.10.1.7 FH

| | | |
|---|---|---|
| **Command** | AT#FH< path><CR><LF> | |
| **Description** | Set root folder of remote device(set root folder of FTP server ) | |
| **Parameter** | *path* | folder path |
| **Comments** | Note:<br>when FTP connection is established, the current folder is root folder.<br>e.g: AT#FH123<br>Enter a folder which name is 123 in current folder, and set 123 is current folder. | |

### 2.10.1.8 FL

| | | |
|---|---|---|
| **Command** | AT#FL<local_path<CR><LF> | |
| **Description** | Set local path | |
| **Parameter** | local_path | The path will be set local path<br>default path: /sdcard/Download |
| **Comments** | Note: | |

| | |
|---|---|
| | If executed, the path is empty, the command is invalid<br>The path of a maximum length of 256 bytes<br>e.g: AT#FL/data/<br>*/data/: this path is local path. when user implement AT#FP or AT#PG command, the object will be pushed or pulled in this path.*<br>AT#FL/data/<br>AT#FG123.txt<br>*Sets the local path to /data directory, download the default name for the 123. txt is stored in the /data/ directory.*<br>AT#FL/data/<br>AT#FP123.txt<br>*The /data / 123. txt sent to the distal root directory.* |

#### 2.10.1.9 FR

| | | |
|---|---|---|
| **Command** | AT#FR<obj_path><CR><LF> | |
| **Description** | Delete object from remote folder. | |
| **Parameter** | *obj_path* | object path from remote folder |
| **Comments** | e.g: AT#FR123<br>Delete object which name is 123 from remote folder. | |

## 2.10.2 Indicate

#### 2.10.2.1 FB

| | | |
|---|---|---|
| **Indication** | FB<state-4><CR><LF> | |
| **Description** | Browseing root folder of remote complete | |
| **Parameter** | *state-4* | Report the result of browse root folder of remote device |
| **Comments** | FB0000<br>Browse complete | |

### 2.10.2.2 FC

| | | |
|---|---|---|
| **Indication** | FC<conn_state-2><bd_addr-12><CR><LF> | |
| **Description** | Update the state of Ftp Connection | |
| **Parameter** | *conn_state-2* | The state of Ftp Connection 2bytes<br>0: FTP connected<br>2: FTP disconnected |
| | *bd_addr-12* | *Bluetooth* address, 12 hex digits |
| **Comments** | FC00123412341234<br>Establish FTP connection with remote device which address is 123412341234. | |

### 2.10.2.3 FE

| | | |
|---|---|---|
| **Indication** | FE<f_perm-2><f_size-8><f_time-14><name_len-2><f_name><CR><LF> | |
| **Description** | Indicate the object attribute. | |
| **Parameter** | *f_perm-2* | the permission of object, hex digit, 2byte:<br>1: PERM_READ<br>2: PERM_WRITE<br>4: PERM_DELETE<br>8: ATTRIBUTE_FOLDER |
| | *f_size-8* | The size of object, hex digit , 8 bytes. |
| | *f_time-14* | Modify time of object, 14bytes<br>Year: hex digit, 4byte, e: 07df(decimal：2015)<br>Month: hex digit, 2byte, e: 0a(decimal：10)<br>Day : hex digit, 2byte, e: 0e(decimal：14)<br>Hour :hex digit, 2byte, e: 0a(decimal：10)<br>Minute : hex digit, 2byte, e: 0b(decimal：11)<br>Second : hex digit, 2byte, e: 0c(decimal：12) |
| | *Name_len-2* | Name len, 2hex digits. |
| | *f_name* | Object name, Max 128 bytes |

| | |
|---|---|
| **Comments** | FE0F1122334407df0a0e0a0b0c03123 |

### 2.10.2.4 FG

| | | |
|---|---|---|
| **Indication** | FL<result-4><CR><LF> | |
| **Description** | Pull object from remote device complete. | |
| **Parameter** | *result-4* | 0: success<br>Other: fail |
| **Comments** | FG0000 | |

### 2.10.2.5 FH

| | | |
|---|---|---|
| **Indication** | FH<result><CR><LF> | |
| **Description** | Set root folder of remote device complete. | |
| **Parameter** | *result* | 0: success<br>Other: fail |
| **Comments** | FH0000 | |

### 2.10.2.6 FL

| | | |
|---|---|---|
| **Indication** | FL<cur_size-8><obj_size-8><obj_name><CR><LF> | |
| **Description** | Indicate push object progress | |
| **Parameter** | *cur_size-8* | the size of obj was pushed. |
| | *obj_size-8* | the size of object. |
| | *obj_name* | obj name. |
| **Comments** | FL00001111000002222123.txt | |

### 2.10.2.7 FK

| | |
|---|---|
| **Indication** | FK<cur_size-8><obj_size-8><obj_name><CR><LF> |
| **Description** | Indicate obtain the progress of the file or folder |

| | | |
|---|---|---|
| **Parameter** | *cur_size-8* | Have downloaded the size of the file or folder, 8 hexadecimal digits |
| | *obj_size-8* | the size of object , 8 hexadecimal digits |
| | *obj_name* | object name. |
| **Comments** | FK0000111100002222123.txt | |

#### 2.10.2.8 FP

| | | |
|---|---|---|
| **Indication** | FP<result-4><CR><LF> | |
| **Description** | Push object to remote device complete | |
| **Parameter** | *result-4* | 0: success<br>Other: fail |
| **Comments** | FP0000 | |

#### 2.10.2.9 FR

| | | |
|---|---|---|
| **Indication** | FR<result-4><CR><LF> | |
| **Description** | Delete object from remote folder complete. | |
| **Parameter** | *result* | 0: success<br>Other: fail |
| **Comments** | FR0000 | |

## 2.11 Object Push(OPP)

### 2.11.1 Command

#### 2.11.1.1 #OS

| | | |
|---|---|---|
| **Indication** | AT#OS<path><CR><LF> | |
| **Description** | Set the saved path for received object & file | |
| **Parameter** | path | The path at which the received file will be saved. |

| | |
|---|---|
| **Comments** | e.g.AT#OS/sdcard/<CR><LF> |

#### 2.11.1.2 #OP

| | | |
|---|---|---|
| **Indication** | AT#OP<address><file_name><CR><LF> | |
| **Description** | Push a file into remote device. | |
| **Parameter** | *address* | the Bluetooth address of the remote device, 12 hex digits, |
| | *file_name* | the absolute path of the file to be sent. |
| **Comments** | e.g. AT#OP889900AABBCC/sdcard/hongyan.mp3<CR><LF>. | |

### 2.11.2 Indicate

#### 2.11.2.1 OUS

| | | |
|---|---|---|
| **Indication** | OUS<result> <CR><LF> | |
| **Description** | Report that the push operation starts | |
| **Parameter** | result | decimal number, indicates the result of push operation:<br>00: pushing starts successfully.<br>others: pushing operation failed. |
| **Comments** | - | |

#### 2.11.2.2 OUI

| | | |
|---|---|---|
| **Indication** | OUI<progress><CR><LF> | |
| **Description** | Report that the push operation is in progress | |
| **Parameter** | *progress* | the percent value of progress. |
| **Comments** | - | |

#### 2.11.2.3 OUC

| | |
|---|---|
| **Indication** | OUC<result ><CR><LF> |
| **Description** | Report that the push operation completed |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

#### 2.11.2.4 OUB

| | | |
|---|---|---|
| **Indication** | OUB<result ><CR><LF> | |
| **Description** | Report that the push operation has aborted | |
| **Parameter** | - | - |
| **Comments** | - | |

## 2.12 Dial-up Networking(DUN)

### 2.12.1 Command

#### 2.12.1.1 UC

| | | |
|---|---|---|
| **Command** | AT#UC<bd_addr><CR><LF> | |
| **Description** | Establish DUN connection. | |
| **Parameter** | *bd_addr* | 12 hex digits, represents the Bluetooth address of the device. |
| **Comments** | - | |

#### 2.12.1.2 UD

| | | |
|---|---|---|
| **Command** | AT#UD<CR><LF> | |
| **Description** | Release the current DUN connection. | |
| **Parameter** | - | - |
| **Comments** | - | |

### 2.12.2 Indicate

#### 2.12.2.1 US

| | | |
|---|---|---|
| **Command** | US<code><address><CR><LF> | |
| **Description** | The DUN status | |
| **Parameter** | *code* | 2 Bytes ASCII, Range “00”-“03”:<br>00 mean Connection create success<br>01 mean DUN Connectingl<br>02 mean DUN Creat Connect failed or Disconnected<br>03 mean DUN Disconnecting |
| | *address* | The *Bluetooth* address of remote device(12 Bytes Ascii). |
| **Comments** | e.g.: connection service successful<br>US000015830A0B0C\r\n | |

## 2.13 Personal Area Networking(PAN)

### 2.13.1 Command

#### 2.13.1.1 NC

| | | |
|---|---|---|
| **Command** | AT#NC<bd_addr><CR><LF> | |
| **Description** | Establish PAN connection. | |
| **Parameter** | *bd_addr* | 12 hex digits, represents the Bluetooth address of the device. |
| **Comments** | - | |

#### 2.13.1.2 ND

| | |
|---|---|
| **Command** | AT#ND<CR><LF> |
| **Description** | Release the current PAN connection. |

| | | |
|---|---|---|
| **Parameter** | - | - |
| **Comments** | - | |

### 2.13.2 Indicate

#### 2.13.2.1 NS

| | | |
|---|---|---|
| **Command** | NS<code><address><CR><LF> | |
| **Description** | The PAN status | |
| **Parameter** | *code* | 2 Bytes ASCII, Range “00”-“03”:<br>00 mean Connection create success<br>01 mean PAN Connectingl<br>02 mean PAN Creat Connect failed or Disconnected<br>03 mean PAN Disconnecting |
| | *address* | The *Bluetooth* address of remote device (12 Bytes ASCII). |
| **Comments** | e.g.: connection PAN successful<br>NS000015830A0B0C\r\n | |

#### 2.13.2.2 NB

| | | |
|---|---|---|
| **Command** | NB< tap-name><CR><LF> | |
| **Description** | The PAN control state | |
| **Parameter** | *Tap-name* | The tap-name of local device (12 Bytes Ascii). |
| **Comments** | NBbt-pan\r\n | |

## 2.14 Generic Attribute Profile(GATT)

### 2.14.1 Command

#### 2.14.1.1 KC

| | |
|---|---|
| **Command** | AT#KC[is_start-2]<CR><LF> |

| | | |
|---|---|---|
| **Description** | Scan BLE device | |
| **parameter** | *is_start-2* | To control start or stop scan<br>1: start scan<br>0: stop scan |
| **Comments** | AT#KC01\r\n<br>Start scan | |

### 2.14.1.2 KE

| | | |
|---|---|---|
| **Command** | AT#KE [bd_addr-12] <CR><LF> | |
| **Description** | Establish GATT connection | |
| **parameter** | *bd_addr-12* | *Bluetooth* address of remote device. |
| **Comments** | AT#KE112233445566\r\n<br>Establish GATT connection remote device which Bluetooth address is 112233445566. | |

### 2.14.1.3 KF

| | | |
|---|---|---|
| **Command** | AT#KF<CR><LF> | |
| **Description** | Release the current GATT connection. | |
| **parameter** | - | |
| **Comments** | AT#DF\r\n | |

### 2.14.1.4 L

| | | |
|---|---|---|
| **Command** | L#<len-2><data> | |
| **Description** | Send GATT data. | |
| **parameter** | *len-2* | data len, 2bytes. |
| | *data* | GATT data |
| **Comments** | e.g: L#0A1234567890<br>len: 0A | |

| | |
|---|---|
| | data: 1234567890<br>warning: the len value must be equal with the length of data.<br>If len value greater than length of data, it will lead to a lot of AT command which will be executed is invalid. If len value less than length of data, it will lead to the size of data received by remote less than the size of data sent from local. |

## 2.14.2 Indicate

### 2.14.2.1 KC

| | | |
|---|---|---|
| **Indication** | KC[bd_addr-12] [dev_name] <CR><LF> | |
| **Description** | Report a remote LE device discovered. | |
| **parameter** | *bd_addr-12* | *Bluetooth* address |
| | *dev_name* | Device name |
| **Comments** | | |

### 2.14.2.2 KE

| | | |
|---|---|---|
| **Command** | KE<status-2><bd_addr-12><CR><LF> | |
| **Description** | Return connected device address, status, client_if and connect_id. | |
| **parameter** | *status-2* | 0: success<br>Other: fail. |
| | *bd_addr-12* | *Bluetooth* address of remote device |
| **Comments** | - | |

### 2.14.2.3 KF

| | | |
|---|---|---|
| **Indication** | KF [status-2] [bd_addr-12] | |
| **Description** | Indicate disconnect status and Bluetooth address of remote device. | |
| **parameter** | *status-2* | 0: success<br>Other: fail. |
| | *bd_addr-12* | *Bluetooth* address of remote device |

| | |
|---|---|
| **Comments** | - |

#### 2.14.2.4 L

| | | |
|---|---|---|
| **Indication** | L[len-2][data] | |
| **Description** | Indcate GATT data | |
| **parameter** | *len-2* | Data len 2bytes |
| | *data* | GATT data |
| **Comments** | - | |

## 2.15 Bluetooth Switch

### 2.15.1 Command

#### 2.15.1.1 BE

| | | |
|---|---|---|
| **Command** | AT#BE[is_enable-1]<CR><LF> | |
| **Description** | Enable/disable *Bluetooth* | |
| **parameter** | *is_enable-1* | To control enable or disable *Bluetooth*<br>1: enable *Bluetooth*<br>0: disable *Bluetooth* |
| **Comments** | AT#BE1\r\n<br>Enable *Bluetooth* finished. | |

### 2.15.2 Indicate

#### 2.15.2.1 TS

| | | |
|---|---|---|
| **Indication** | TS[is_enable-1] <CR><LF> | |
| **Description** | Indicate enable/disable *Bluetooth* event.1byte. | |
| **parameter** | *is_enable-1* | *Bluetooth* status,<br>1: *Bluetooth* enabled |

| | | |
|---|---|---|
| | | 0: *Bluetooth* disabled |
| **Comments** | TS0<br>Disable *Bluetooth* finished. | |

# 3. *Bluetooth* Technology Best Developed Corporation

IVT Corporation is one of *Bluetooth*® technology BEST developed together which is authenticated by The Bluetooth SIG. See Figure 1 below. IVT Wireless ecosystem is one completed *Bluetooth* productions including *Bluetooth* software, modules and end productions.


Figure 1: IVT Is One Of *Bluetooth*® Technology BEST Developed Together

# 4. Contact Information

**Sales Contact**

Email: marketing@ivtwireless.com

**Sales Office**

Beijing Tel: +86 10 82898219

Shenzhen Tel: +86 0755 33160781

Fax: +86 10 82898219

Address: IVT Corporation. 5/F, Fa Zhan Building No.12, Shang Di Xin Xi Road, Beijing, 100085 P.R. China

**Technical Support**

Email: support@ivtwireless.com

**Company Site:**

WWW: www.ivtwireless.com

# 5.Copyright

FCC

FCC NOTICE

The device complies with Part 15 of the FCC Rules. The device meets the requirements for modular transmitter approval as detailed in FCC public notice DA00-1407.Transmitter Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Cypress Semiconductor may void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

a. Reorient or relocate the receiving antenna.
b. Increase the separation between the equipment and the receiver.
c. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
d. Consult the dealer or an experienced radio/TV technician for help.

LABELING REQUIREMENTS.

The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate identifier for this product as well as the FCC Notice above. The FCC identifier is FCC ID, in any case the end product must be labeled exterior with.

IVT Corporation
5/F, Zhongguancun Fazhan Building No. 12, Shangdi Xinxi Road, Haidian District

# R&TTE Declaration of Conformity

Dear Sir or Madam:

We, **IVT Corporation** declare under our sole responsibility that the product:

Product Name: IVT Corporation i145 module
Product Model: i145

To which this declaration relates is in conformity with the essential requirements and other relevant requirements of the R&TTE Directive (1999/5/EC).
The product is compliant with the following standards and/or other normative documents:

SAFETY (art 3.1.a): EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

EMC (art 3.1.b): ETSI EN 301 489-1 v1.9.2; ETSI EN 301 489-17 v2.2.1

SPECTRUM (art 3.2): ETSI EN 300 328 v1.9.1

Health (art 3.1.a): EN 62479:2010

Sincerely

Notified Body: TUV SUD BABT

Identification Number: CE0168

**Signature:**

**Name: Jason Zhu**

**Title: General manager**

**Date: 2016/7/8**