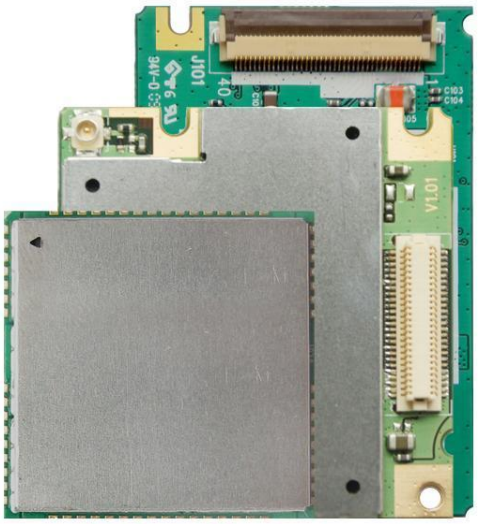
Quectel Cellular Engine

# GSM STK
# AT Commands

**GSM_STK_AT_Commands_Manual_V1.0**



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# 0. Revision history

| Revision | Date | Author | Description of change |
|---|---|---|---|
| 1.0 | 2011-3-14 | Joanna LI | Initial |

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# 1. Introduction

Quectel Module provides AT commands to support STK. This document is a reference guide to all the AT commands and responses defined for STK.

The SIM Application Toolkit (SAT/STK) provides mechanisms which allow applications, existing in the SIM, to interact and operate with any ME which supports the specific mechanism(s) required by the application. Please go to GSM 11.14 for more details about STK. Quectel provides AT commands to support profile download (**+STKPD**), envelope (**+STKENV**), terminal response (**+STKTR**), get STK indication (**+QSTK**) and trigger STK call **(+STKCALL**), SMS (**+STKSMS**), SS (**+STKSS**), USSD (**+STKUSSD**) and DTMF (**+STKDTMF**).

## 1.1. Reference

**Table 1: Reference**

| SN | Document name | Remark |
|---|---|---|
| [1] | M10_ATC.pdf | The introduction of AT commands for M10 |
| [2] | GSM 11.14 | Specification of the SIM Application Toolkit for the SIM-ME interface |
| [3] | GSM 11.11 | Specification of the SIM-ME interface |

## 1.2. Terms and abbreviations

**Table 2: Terms and abbreviations**

| Abbreviation | Description |
|---|---|
| **SAT/STK** | SIM Application Toolkit |
| **SIM** | Subscriber Identity Module |
| **ME** | Mobile Equipment |
| **SMS** | Short Message Service |
| **SS** | Supplementary Service |
| **USSD** | Unstructured Supplementary Service Data |
| **BER** | Basic Encoding Rules of ASN.1 |
| **TLV** | Tag, Length, Value |
| **&h** | Hexadecimal format |
| **&d** | Decimal format |

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# 2. AT Commands for STK

## 2.1. Overview of AT Commands for STK support

| Command | Description |
|---|---|
| AT+QSTK | TURN ON/OFF STK FUNCTION |
| AT+STKPD | STK PROFILE DOWNLOAD |
| AT+STKENV | STK ENVELOPE COMMAND |
| AT+STKTR | STK TERMINAL RESPONSE |
| AT+STKCALL | TRIGGER STK CALL |
| AT+STKSMS | TRIGGER STK SMS |
| AT+STKSS | TRIGGER STK SS |
| AT+STKUSSD | TRIGGER STK USSD |
| AT+STKDTMF | TRIGGER STK DTMF |

## 2.2. Details for AT Commands for STK support

### 2.2.1. AT+QSTK STK Turn on/off STK function

| **AT+QSTK Turn on/off STK function** | |
|---|---|
| Test Command<br>**AT+QSTK=?** | Response<br>**+QSTK: (0-1)**<br><br>**OK** |
| Read Command<br>**AT+QSTK?** | Response<br>**+QSTK :<n>**<br><br>**OK**<br>Parameters<br>See Write Command |
| Write Command<br>**AT+QSTK=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise response<br>**+CME ERROR: <err>**<br><br>Parameter<br>**<n>** Whether turn on the STK function |

| | |
|---|---|
| | 0 Turn off<br>1 Turn on |
| Reference | Note:<br>● Must restart the module and make sure SIM card is unlocked to use STK commands. |

**Example:**

**AT+QSTK=1**

**OK**

Restart the module, enter PIN code if SIM card is locked. Then the following indication will come up, including the main menu list:

**+STKPCI: 0, "D07A8103012500820281828507804E16754C98CE8F0A018070ED70B963A88350 8F0A028065B095FB8D227ECF8F0A0380554665C552A9624B8F0A0480624B673A74068D228F0A058081EA52A9670D52A18F0A06806D41884C77ED4FE18F06078070AB94C38F0A0880624B673A97F34E508F0A09807CBE5F694E0A6D77"**

**Parsed Data:**

Please refer to the appendix in this document for details below.

| | | | | | |
|---|---|---|---|---|---|
| **D0** | Proactive SIM command tag | | | | |
| **7A** | Length | 1. If the length is between 0 and 127 (00 to 7F&h), it's coded onto one byte. For example, "7A" =122&d.<br>2. If the length is between 128 and 255 (80 to FF&h), it's coded onto two bytes leading with "81". For example, "81BA" = 186&d. | | | |
| **8103012500** | **81** | **03** | **01** | **25** | **00** |
| | Command details tag | Length | command number | Type of command: Set up menu | Command Qualifier |
| **82028182** | **82** | **02** | **81** | **82** | |
| | Device identity tag | Length | Souce: SIM | Destination: ME | |
| **8507804E16754C98CE** | **85** | **07** | **804E16754C98CE** | | |
| | Alpha identifier tag | Length | Alpha identifier:<br>80: UCS2 coding<br>4E16754C98CE:世界风 | | |
| **8F0A018070ED70B963A88350** | **8F** | **0A** | **01** | **8070ED70B963A88350** | |
| | Item tag | Length | ID of item: 1 | Text string of item<br>80: UCS2 coding<br>70ED70B963A88350: 热点推荐 | |
| **8F0A028065B095FB8D227ECF** | Item 2: 新闻财经 | | | | |
| **8F0A0380554665C552A** | Item 3: 商旅助手 | | | | |

| | |
|---|---|
| **9624B** | |
| **8F0A0480624B673A74068D22** | Item 4: 手机理财 |
| **8F0A058081EA52A9670D52A1** | Item 5: 自助服务 |
| **8F0A06806D41884C77ED4FE1** | Item 6: 流行短信 |
| **8F06078070AB94C3** | Item 7: 炫铃 |
| **8F0A0880624B673A97F34E50** | Item 8: 手机音乐 |
| **8F0A09807CBE5F694E0A6D77** | Item 9: 精彩上海 |

### 2.2.2. AT+STKPD STK profile download

| **AT+STKPD STK profile download** | |
|---|---|
| Test Command<br>**AT+STKPD=?** | Response<br>**OK** |
| Execution Command<br>**AT+STKPD** | Response<br>Do the profile downloading.<br>**OK** |
| Read Command<br>**AT+STKPD?** | Response<br>Get the terminal profile setting.<br>**+STKPD: <Profile>**<br><br>**OK**<br><br>Parameter<br>**<Profile>** HEX string of STK profile. |
| Reference | Note:<br>● Profile downloading provides a mechanism for the ME to tell the SIM what it is capable of.<br>● The structure of profile content is specified in GSM 11.14 subclause 5.2 Structure and coding of TERMINAL PROFILE. |

**Example:**

**AT+STKPD?**

**+STKPD: "FFFFFFFF7F1F007FFF00001F230811060700"**

**OK**

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### 2.2.3. AT+STKENV STK Envelope command

| AT+STKENV STK Envelope command | |
|---|---|
| Test Command<br>**AT+STKENV=?** | Response<br>**OK** |
| Write Command<br>**AT+STKENV=<sat_command>** | Response<br>This command is used to send STK Envelope command.<br>**OK**<br><br>Parameters<br>**<sat_command>** HEX string of STK envelope command |
| Reference | Note:<br>● The structure of envelope command is specified in GSM 11.14 clause 7 to clause 11. Below example is to send envelope command for menu selection. |

**Example:**

Select item 4 (Refer to GSM 11.14 subclause 8.2 Structure of ENVELOPE (MENU SELECTION):

**AT+STKENV="D30782020181900104"**

**OK**

**Parsed Data:**

| | | | | |
|---|---|---|---|---|
| **D3** | Menu Selection tag | | | |
| **07** | Length | | | |
| **82020181** | **82** | **02** | **01** | **81** |
| | Device identity tag | Length | Source device identity: Keypad | Destination device identity: SIM |
| **900104** | **90** | **01** | **04** | |
| | Item identifier tag | Length | ID of item chosen: 04 | |

### 2.2.4. AT+STKTR STK terminal response

| AT+STKTR STK terminal response | |
|---|---|
| Test Command<br>**AT+STKTR=?** | Response<br>**OK** |
| Write Command<br>**AT+STKTR=<terminal_response>** | Response<br>This command is used to send STK Terminal Response.<br>**OK**<br><br>Parameter |



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| | |
|---|---|
| | **<terminal_response>** HEX string of STK response |
| Reference | Note:<br>● The structure of terminal response is specified in GSM 11.14 clause 6.8. |

**Example 1: Terminal response of Selecting item**

**+STKPCI: 0,"D07081030124008202818285098081EA52A9670D52A18F100180004F00540041670D52A1630753578F0A02805BA2670D70ED7EBF8F0C038000560049005054D72478F0A0480805476DF670D52A18F0A05808BDD8D3967E58BE28F0A068079EF520667E58BE28F0A07805DF25B9A4E1A52A1"**

**AT+STKTR="810301240082028281830100900105"**

**OK**

**Parsed data for SELECT ITEM proactive command:**

| | |
|---|---|
| **D0** | Proactive SIM command tag |
| **70** | Length |
| **8103012400** | Command details: type of command 24 -- Select Item |
| **82028182** | Device identity: source SIM > destination ME |
| **85098081EA52A9670D52A1** | Alpha identifier: 自助服务 |
| **8F100180004F00540041670D52A163075357**<br>**8F0A02805BA2670D70ED7EBF**<br>**8F0C038000560049005054D7247**<br>**8F0A0480805476DF670D52A1**<br>**8F0A05808BDD8D3967E58BE2**<br>**8F0A068079EF520667E58BE2**<br>**8F0A07805DF25B9A4E1A52A1** | Item 1. OTA 服务指南<br>Item 2. 客服热线<br>Item 3. VIP 名片<br>Item 4. 联盟服务<br>Item 5. 话费查询<br>Item 6. 积分查询<br>Item 7. 已定业务 |

**Parsed data for TERMINAL RESPONSE of SELECT ITEM:**

| | | | |
|---|---|---|---|
| **8103012400** | Command details: type of command 24 -- Select Item | | |
| **82028281** | Device identity: source ME > destination SIM | | |
| **830100** | **83** | **01** | **00** |
| | Result tag | Length | General result: 00 command performed successfully |
| **900105** | Item identifier: 05 | | |

**Example 2: Terminal response of Getting input – input short message content**

**+STKPCI: 0,"D01E81030123038202818280F08300E8F93516551855BB9003A300F9102018C"**

**AT+STKTR="810301230382028281830100805084F60597D"**

**OK**

**Parsed data for GET INPUT proactive command:**

| | | | | |
|---|---|---|---|---|
| **D0** | Proactive SIM command tag | | | |
| **1E** | Length | | | |
| **8103012303** | Command details: type of command 23 -- Get input | | | |
| **82028182** | Device identity: source SIM > destination ME | | | |
| **8D0F08300E8F935 16551855BB9003A 300F9102018C** | **8D** | **0F** | **08** | **300E8F9351655185 5BB9003A300F** |
| | Text string tag | Length | Data coding scheme: it is coded as for SMS Data coding scheme defined in GSM03.38.<br>08 - UCS2<br>04 - 8 bit coding | Text string: 『输入内容:』<br><br>It means "input content" in English. |
| **9102018C** | **91** | **02** | **01** | **8C** |
| | Response length tag | Length | Min length: 1 | Max length: 8C&h=140&d |

**Parsed data for TERMINAL RESPONSE of GET INPUT:**

| | |
|---|---|
| **8103012303** | Command details: type of command 23 -- GET INPUT |
| **82028281** | Device identity: source ME > destination SIM |
| **830100** | Result: 00 command performed successfully |
| **8D05084F60597D** | Text string: UCS2 "你好" |

**Example 3: Terminal response of Getting input – input target number of short message**

**+STKPCI: 0,"D01A8103012300820281828D0B088F93516553F77801FF1A91020114"**

**AT+STKTR="810301230082028281830100 8D0C043133373634343132313531"**

**OK**

**Parsed data:**

**+STKPCI:** text string: “输入号码：”, it means “Input number” in English.

**Terminal response:** input number “13764412151”, 8 bit coding schema.

Note: The terminal response is similar as above example 2: using UCS2 coding to input message content in example 2, while using 8-bit coding to input number here.

**Example 4: Go backward to the item at higher level**

**AT+STKTR="810301240082028281830111"**

**OK**

**Example 5: Return to the main menu directly**

**AT+STKTR="810301230082028281830110"**

**OK**

**Parsed data of example 4 and 5:**

| | |
|---|---|
| **830111** | Result: 11 - Backward move in the proactive SIM session requested by the user |
| **830110** | Result: 10 - Proactive SIM session terminated by the user |

Note: In example 4 and 5, type of command in terminal response should be the same as that in +STKPCI last time.

### 2.2.5. AT+STKCALL Trigger STK Call

| **AT+STKCALL** | **Trigger STK Call** |
|---|---|
| Test Command<br>**AT+STKCALL=?** | Response<br>**OK** |
| Write Command<br>**AT+STKCALL=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise, response<br>**ERROR**<br><br>Parameters<br>**<n>**<br>0 Trigger modem to send STK CALL SETUP<br>4 Trigger modem to send STK CALL SETUP but icon cannot be displayed<br>16 Proactive session terminated by user<br>18 No response from user<br>32 ME currently unable to process this command<br>34 User reject setup call<br>50 Command data not understood by ME |
| **Reference** | **Note:**<br>● Type of command value for Setting up call is “10”. |

### 2.2.6. AT+STKSMS Trigger STK SMS

| **AT+STKSMS** | **Trigger STK SMS** |
|---|---|
| Test Command<br>**AT+STKSMS=?** | Response<br>**OK** |
| Write Command<br>**AT+STKSMS=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise, response<br>**ERROR** |

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| | |
|---|---|
| | Parameters<br>**<n>**<br>0 Trigger modem to send STK SMS<br>4 Trigger modem to send STK SMS but icon cannot be displayed |
| Reference | Note:<br>● Type of command value for sending short message is “13”. |

**Example: Send short message**

**+STKPCI: 1,"D0198103011300820281838B0E010005A10180F600040459454358"**

**AT+STKSMS=0**

**OK**

**Parsed data for Send Short Message proactive command:**

| | | | |
|---|---|---|---|
| **D0** | Proactive SIM command tag | | |
| **19** | Length | | |
| **8103011300** | Command details: type of command 13 - send short message | | |
| **82028183** | Device identity: source SIM > destination Network | | |
| **8B0E010005A1018 0F60004045945435 8** | **8B**<br>SMS TPDU tag | **0E**<br>Length | **010005A10180F600040459454358**<br>SMS TPDU:<br>TA(Target Address): 10086<br>UD(User Data): "YECX" (china mobile provides this code to check balance) |

### 2.2.7. AT+STKSS Trigger STK SS

| **AT+STKSS Trigger STK SS** | |
|---|---|
| Test Command<br>**AT+STKSS=?** | Response<br>**OK** |
| Write Command<br>**AT+STKSS=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise, response<br>**ERROR**<br><br>Parameters<br>**<n>**<br>0 Trigger modem to send STK SS<br>4 Trigger modem to send STK SS but icon cannot be displayed<br>50 Command data not understood by ME |
| Reference | Note:<br>● Type of command value for sending SS is “11”. |

### 2.2.8. AT+STKUSSD Trigger STK USSD

| AT+STKUSSD Trigger STK USSD | |
|---|---|
| Test Command<br>**AT+STKUSSD=?** | Response<br>**OK** |
| Write Command<br>**AT+STKUSSD=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise, response<br>**ERROR**<br><br>Parameters<br>**<n>**<br>0 Trigger modem to send STK USSD<br>4 Trigger modem to send STK USSD but icon cannot be displayed<br>50 Command data not understood by ME |
| Reference | Note:<br>● Type of command value for Sending USSD is “12”. |

### 2.2.9. AT+STKDTMF Trigger STK DTMF

| AT+QSTKDTMF Trigger STK DTMF | |
|---|---|
| Test Command<br>**AT+STKDTMF=?** | Response<br>**OK** |
| Write Command<br>**AT+STKDTMF=<n>** | Response<br>If format is right, response<br>**OK**<br><br>Otherwise, response<br>**ERROR**<br><br>Parameters<br>**<n>**<br>0 Trigger modem to send STK DTMF<br>4 Trigger modem to send STK DTMF but icon cannot be displayed<br>32 ME currently unable to process command |
| Reference | Note:<br>● Type of command value for sending DTMF is “14”. |

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# 3. +STKPCI STK Proactive Command Indication

This unsolicited result code is used to indicate Proactive Command Indication.

**Format:**

**+STKPCI: < pci_type > [,<proactive_command>]**

**< pci_type>**

0 The SAT command is handled by TE.

1 The SAT command is handled by ME.

2 No other command (end of session)

**<proactive_command>**

HEX string of STK proactive command, sent when <pci_type> = 0 or 1

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# 4. Examples

## 4.1. SET UP MENU Proactive Command

**Description:** An example of SET UP MENU proactive command.

### 4.1.1. Raw data

**+STKPCI:0, "D081C0810301250082028182850B80906050B3670D52D953408F0C02804F8696FB63A5901A92348F0C0380906050B38CA18A0A901F8F0C04805A1B6A02842C82B17B528F0A0580571692344E0B8F098F1007800036003800388 84C52D5523855468F0C0880958B904B90544EBA99288F0E0980003600360036 5A1B6A027DB28F100A8090FD670375375973804A59295BA48F100B8054C862C9540D4EBA804A59295BA48F0E0C80003800300037 4F344F60884C8F0E0D80906050B35BA2670D5C087DDA"**

<AT>**AT+STKTR="810301250082028281830100"**

### 4.1.2. Parsed data

#### 4.1.2.1. Proactive command SET UP MENU

**+STKPCI: 0,"D0**: proactive SIM command Tag

**81C0:** length

**8103012500**: command details

**81**: command details tag

**03**: length

**01**: command number

**25**: type of command: set up menu

**00:** command qualifier

**82028182**: device id

**82**: device id tag

**02:** length

**81:** source id: SIM

**82**: destination id: ME

**850B80906050B3670D52D95340**: alpha id

**85**: alpha id tag

**0B**: length

**80906050B3670D52D95340**: alpha id: 遠傳服務區

**8F0C02804F8696FB63A5901A9234:** Item

**8F**: item tag

**0C**: length

**02:** item id

**804F8696FB63A5901A9234:** 來電接通鈴

**8F0C0380906050B38CA18A0A901F:** 遠傳財訊速
**8F0C04805A1B6A02842C82B17B52:** 娛樂萬花筒
**8F0A0580571692344E0B8F09:** 圖鈴下載
**8F1007800036003800388 84C52D552385546:** 688行動券商
**8F0C0880958B904B90544EBA9928:** 開運達人館
**8F0E09800036003600365A1B6A027DB2:** 666娛樂網
**8F100A8090FD670375375973804A59295BA4:** 都會男女聊天室
**8F100B8054C862C9540D4EBA804A59295BA4:** 哈拉名人聊天室
**8F0E0C800038003000374F344F60884C:** 807伴你行
**8F0E0D80906050B35BA2670D5C087DDA"**: 遠傳客服專線

#### 4.1.2.2. Terminal response of SET UP MENU

<AT> **AT+STKTR=**

**"8103012500:** command details (just same as the one in the proactive SIM)
**81**: command details tag
**03**: length
**01**: command number
**25**: type of command: set up menu
**00:** command qualifier
**82028281**: device id (source id: ME, destination id: SIM)
**82**: device id tag
**02:** length
**82:** source id: ME
**81**: destination id: SIM
**830100"**: result
**83**: result tag
**01**: length
**00:** Command perform successfully

## 4.2. Menu Selection and Set Up Call

**Description:** An example of selecting item 1 and being notified by MENU SELECTION envelope command after SET UP MENU proactive command.

### 4.2.1. Row Data

[STK] option: 1, menu item: [0x02] 來電接通鈴
<AT> **AT+STKENV="D3078202018190 0102"**
**+STKPCI:1,"D025810301100082028183051580003900300030 64A5865F4E2D002E002E0020 002E86038109F0"**

<AT> **AT+STKCALL=0**

### 4.2.2. Parsed Data

#### 4.2.2.1. MENU SELECTION envelope: select item 2 - 來電接通鈴

<AT> **AT+STKENV="**

**D3**: menu selection tag
**07**: length
**82020181:** device id
**82:** device id tag
**02:** length
**0181**: source: Keypad, destination: SIM
**900102":** Item id
**90**: item id tag
**01**: length
**02"**: item id: 2

#### 4.2.2.2. SET UP CALL proactive command

**+STKPCI:1,"D0:** proactive SIM command Tag
**25**: length
**8103011000:** command details
**81**: command detail tag
**03**: length
**01**: command number
**1000**: type of command: SET UP CALL, only if not currently busy on another call
**82028183**: device id
**82**: device id tag
**02**: length
**8183**: source: SIM, destination: network
**05158000390030003064A5865F4E2D002E002E0020002E:** alpha id
**05**: alpha id tag
**15:** length
**8000390030003064A5865F4E2D002E002E0020002E**: 900撥號中.. .
**86038109F0"**: address
**86**: address tag
**03:** length
**81:** TON: Unknown NPI: ISDN/telephony numbering plan
**09F0"**: Dialing number string: 900

## 4.3. Menu Selection, Get input and Send Short Message

**Description:** An example of selecting item 2 and being notified by MENU SELECTION



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envelope command after SET UP MENU proactive command.

### 4.3.1. Row Data

[STK] option: 1, menu item: [0x03] 遠傳財訊速

1. <AT> **AT+STKENV="D30782020181900103"**
2. **+STKPCI:0,"D052810301240082028182050B80906050B38CA18A0A901F8F0A018053F0706380A15E028F0A0280570B969B80A15E028F0A038059165E63532F73878F0A0480671F8CA86307657878F0A05804ECA65E565B0805E"**

[STK] option: 1, menu item: [0x01] 台灣股市

3. <AT> **AT+STKTR="810301240082028281830100900101"**
4. **+STKPCI:0,"D038810301240082028182050980 53F0706380A15E028F0A018052A06B0A630765788F0A02804E0A6AC36307657 88F0A0380500B80A1884C60C5"**

[STK] option: 1, menu item: [0x03] 個股行情

5. <AT> **AT+STKTR="810301240082028281830100900103"**
6. **+STKPCI: 0,"D01E810301230082028182 8D0F088F38516580A179680031865F78BC91020004"**
7. <AT> **AT+STKTR="8103012300820282818301008D050432343534"**
8. **+STKPCI: 0,"D01E810301230082028182 8D0F088F38516580A179680032865F78BC91020004"**
9. <AT> **AT+STKTR="810301230082028281830100 8D0104"**
10. **+STKPCI:1,"D043810301130082028183051180865574064E2D002C00208ACB7A0D501906079188961300009 98B1C1100148110210890630000990000000 4A70A2A3132382A3234353423"**
11. <AT> **AT+STKSMS=0**

### 4.3.2. Parsed Data

#### 4.3.2.1. MENU SELECTION envelope: select item 3 - 遠傳財訊速

<AT> **AT+STKENV="**

**D3:** menu selection tag

**07:** length

**82020181:** device id

**82**: device id tag

**02**: length

**0181**: source: Keypad, destination: SIM

**900103"**: item id

**90**: item id tag

**01**: length

**03**: item id

#### 4.3.2.2. SELECT ITEM proactive command

**+STKPCI:0,"D0**: Proactive SIM command tag

**52**: length
**8103012400**: command details
**81:** command details tag
**03**: length
**01**: command number
**2400:** SELECT ITEM, no help information available, no selection preference, presentation type is not specified
**82028182:** device id
**82:** device id tag
**02**: length
**8182**: source: SIM, destination: ME
**050B80906050B38CA18A0A901F:** alpha id
**05**: alpha id tag
**0B**: length
**80906050B38CA18A0A901F:** 遠傳財訊速
**8F0A018053F0706380A15E02:** Item
**8F:** item tag
**0A**: length
**01**: item id: 1
**8053F0706380A15E02**: 台灣股市
**8F0A0280570B969B80A15E02**: item 2: 國際股市
**8F0A038059165E63532F7387**: item 3: 外幣匯率
**8F0A0480671F8CA863076578**: item 4: 期貨指數
**8F0A05804ECA65E565B0805E"**: item 5: 今日新聞

#### 4.3.2.3. Terminal response of SELECT ITEM: select item 1 -台灣股市

<AT> **AT+STKTR="**
**8103012400:** command details
**81**: command details tag
**03**: length
**01**: command number
**2400**: SELECT ITEM, no help information available, no selection preference, presentation type is not specified
**82028281:** device id
**82**: device id tag
**02**: length
**8281**: source: ME, destination: SIM
**830100:** result
**83:** result tag
**01**: length
**00**: command performed successfully
**900101"**: item id
**90**: item id tag
**01**: length

**01:** item id

#### 4.3.2.4. SELECT ITEM proactive command

**+STKPCI:0, "D0:** proactive SIM command tag

**38**: length

**8103012400**: command details

**81**: command details tag

**03:** length

**01**: command number

**2400:** SELECT ITEM, no help information available, no selection preference, presentation type is not specified

**82028182**: device id

**82**: device id tag

**02:** length

**8182**: source: SIM, destination: ME

**05098053F0706380A15E02:** alpha id

**05**: alpha id tag

**09**: length

**8053F0706380A15E02**: 台灣股市

**8F0A018052A06B0A63076578:** item

**8F**: item tag

**0A**: length

**01:** item 1

**8052A06B0A63076578:** 加權指數

**8F0A02804E0A6AC363076578**: item 2: 上櫃指數

**8F0A0380500B80A1884C60C5"**: item 3: 個股行情

#### 4.3.2.5. Terminal response of SELECT ITEM: select item 3 -個股行情

<AT> **AT+STKTR="**

**8103012400:** command details

**81**: command details tag

**03**: length

**01**: command number

**2400**: SELECT ITEM, no help information available, no selection preference, presentation type is not specified

**82028281:** device id

**82**: device id tag

**02**: length

**8281**: source: ME, destination: SIM

**830100:** result

**83: result tag**

**01**: length

**00**: command performed successfully

**900103"**: item id

**90**: item id tag
**01**: length
**03:** item id

#### 4.3.2.6. GET INPUT proactive command

**+STKPCI: 0, "D0:** proactive SIM command tag
**1E**: length
**8103012300**: command details
**81**: command details tag
**03:** length
**01**: command number
**2300:** GET INPUT, no help information, user input to be unpacked format, ME may echo user input on the display, SMS default alphabet, digits (0 to 9, *, # and +) only
**82028182**: device id
**82**: device id tag
**02:** length
**8182**: source: SIM, destination: ME
**8D0F088F38516580A179680031865F78BC:** test string
**8D**: text string tag
**0F**: length
**08**: data coding scheme: UCS2
**8F38516580A179680031865F78BC**: 輸入股票 1 號碼
**91020004":** response length
**91**: response length tag
**02:** length
**00:** min length = 0
**04**: max length = 4

#### 4.3.2.7. Terminal response of GET INPUT: 輸入股票 1 號碼

<AT> **AT+STKTR="**
**8103012300**: command details
**81**: command details tag
**03:** length
**01**: command number
**2300:** GET INPUT, no help information, user input to be unpacked format, ME may echo user input on the display, SMS default alphabet, digits (0 to 9, *, # and +) only
**82028281**: device id
**82**: device id tag
**02:** length
**8281**: source: ME, destination: SIM
**830100:** result

**83:** result tag
**01**: length
**00**: command performed successfully
**8D050432343534":** text string
**8D:** text string tag
**05:** length
**04:** data coding scheme: GSM default alphabet 8 bits
**32343534:** 2454

#### 4.3.2.8. GET INPUT proactive command

**+STKPCI: 0, "D0:** proactive SIM command tag
**1E**: length
**8103012300**: command details
**81**: command details tag
**03:** length
**01**: command number
**2300:** GET INPUT, no help information, user input to be unpacked format, ME may echo user input on the display, SMS default alphabet, digits (0 to 9, *, # and +) only
**82028182**: device id
**82**: device id tag
**02:** length
**8182**: source: SIM, destination: ME
**8D0F088F38516580A179680032865F78BC:** text string
**8D**: text string tag
**0F:** length
**08:** data coding scheme: UCS2
**8F38516580A179680032865F78BC**: 輸入股票 2 號碼
**91020004":** response length
**91**: response length tag
**02**: length
**00**: min length = 0
**04**: max length = 4

#### 4.3.2.9. Terminal response of GET INPUT: 輸入股票 2 號碼

<AT> **AT+STKTR="**
**8103012300**: command details
**81**: command details tag
**03:** length
**01**: command number
**2300:** GET INPUT, no help information, user input to be unpacked format, ME may echo user input on the display, SMS default alphabet, digits (0 to 9, *, # and +) only

**82028281**: device id
**82**: device id tag
**02:** length
**8281**: source: ME, destination: SIM
**830100:** result
**83:** result tag
**01**: length
**00**: command performed successfully
**8D0104":** text string
**8D:** text string tag
**01:** length
**04:** data coding scheme: GSM default alphabet 8 bits

#### 4.3.2.10. SEND SHORT MESSAGE proactive command

**+STKPCI: 1, "D0**: proacitve SIM command tag
**43**: length
**8103011300**: command details
**81**: command details tag
**03:** length
**01**: command number
**1300**: SEND SHORT MESSAGE, packing not required
**82028183**: device id
**82**: device id tag
**02:** length
**8183**: source: SIM destination: Network
**051180865574064E2D002C00208ACB7A0D5019:** alpha id
**05**: alpha id tag
**11**: length
**80865574064E2D002C00208ACB7A0D5019**: 處理中，請稍候
**060791889613000099:** address
**06**: address tag
**07**: length
**91**: TON: international number, NPI: ISDN/telephony numbering plan
**889613000099**: dialing number string
**8B1C1100148110210890630000990000000 4A70A2A3132382A3234353423":** SMS TPDU
**8B:** SMS TPDU tag
**1C**: length
**1100148110210890630000990000000 4A70A2A3132382A3234353423**: SMS TPDU

## 4.4. Menu Selection, Send USSD and SD

**Description:** An example of user selecting item 2 and being notified by MENU SELECTION envelope command after SET UP MENU proactive command.

### 4.4.1. Row Data

[STK] option: 1, menu item: [0x05] 圖鈴下載
<AT> **AT+STKENV="D30782020181900105"**
**+STKPCI: 1,"D024810301120082028183051180865574064E2D002C00208ACB7A0D50198A0640AA182D3702"**
<AT> **AT+STKUSSD=0**
**+STKPCI: 1,"D022810301110082028183051180865574064E2D002C00208ACB7A0D50198904811A94FB"**
<AT> **AT+STKSS=0**

### 4.4.2. Parsed Data

#### 4.4.2.1. MENU SELECTION envelope: select item 5 -圖鈴下載

<AT> **AT+STKENV="**

**D3:** menu selection tag
**07:** length
**82020181:** device id
**82**: device id tag
**02**: length
**0181**: source: Keypad, destination: SIM
**900105"**: item id
**90**: item id tag
**01**: length
**05**: item id

#### 4.4.2.2. SEND USSD proactive command

**+STKPCI: 1,"D0:** proactive SIM command tag
**24:** length
**8103011200**: command details
**81**: command details tag
**03:** length
**01**: command number
**1200**: SEND USSD
**82028183**: device id
**82**: device id tag
**02:** length
**8183**: source: SIM destination: Network

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**05118086557406 4E2D002C00208ACB7A0D5019:** alpha id

**05**: alpha id tag

**11**: length

**80865574064E2D002C00208ACB7A0D5019:** 處理中，請稍候

**8A0640AA182D3702":** USSD string

**8A**: USSD string tag

**06**: length

**40:** GSM 7 bit default alphabet, the text is uncompressed,

**AA182D3702**: USSD string content

#### 4.4.2.3. SEND SS proactive command:

**+STKPCI: 1,"D0**: proactive SIM command

**22**: length

**8103011100**: command details

**81**: command details tag

**03:** length

**01**: command number

**1100**: SEND SS

**82028183**: device id

**82**: device id tag

**02:** length

**8183**: source: SIM destination: Network

**05118086557406 4E2D002C00208ACB7A0D5019:** alpha id

**05**: alpha id tag

**11**: length

**80865574064E2D002C00208ACB7A0D5019:** 處理中，請稍候

**8904811A94FB":** SS string

**89**: SS string tag

**04:** length

**81:** TON: Unknown, NPI: ISDN/telephony numbering plan

**1A94FB**: SS or USSD string content

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# 5. Appendix: STK protocol structure

Here list some structures which have been used in this document for better understanding. More details please refer to GSM 11.14.

## 5.1. Structure of SIM Application Toolkit communications

Please refer to GSM 11.14 Annex D.

**BER-TLV data object:**

| | | | |
|---|---|---|---|
| Tag | Length | Value | 1..n SIMPLE TLV objects |

**SIMPLE-TLV data object:**

| | | | |
|---|---|---|---|
| Tag | Length | Value | 1..m elements |

## 5.2. BER_TLV tag in SIM to ME direction

Please refer to GSM 11.14 subclause 13.2.

| Description | Length | Value |
|---|---|---|
| Proactive SIM command tag | 1 | D0 |

## 5.3. BER_TLV tag in ME to SIM direction

Please refer to GSM 11.14 subclause 13.1.

| Description | Length | Value |
|---|---|---|
| SMS-PP download tag | 1 | D1 |
| Cell Broadcast download tag | 1 | D2 |
| Menu Selection tag | 1 | D3 |
| Call control tag | 1 | D4 |
| MO Short message control tag | 1 | D5 |
| Event download tag | 1 | D6 |
| Timer expiration | 1 | D7 |

## 5.4. Simple TLV objects

Please refer to GSM 11.14 subclause 13.3 for Simple TLV tag value in both directions.

The structure of simple TLV data object is Tag, Length, Value elements. Below table lists tag value and elements.

| Tag | | Value | |
|---|---|---|---|
| Description | Value | Elements | Reference in |

| | | | GSM 11.14 |
|---|---|---|---|
| Command details tag | 01 or 81 | Command number | 12.6 |
| | | Type of command | |
| | | Command Qualifier | |
| Device identity tag | 02 or 82 | Source device identity | 12.7 |
| | | Destination device identity | |
| Result tag | 03 or 83 | General result | 12.12 |
| Alpha identifier tag | 05 or 85 | Alpha identifier (If the first byte is "80", it means UCS2 coding schema) | 12.2 |
| Address tag | 06 or 86 | TON and NPI | 12.1 |
| | | Dialing number string | |
| SS string tag | 09 or 89 | TON and NPI | 12.14 |
| | | SS or USSD string | |
| USSD string tag | 0A or 8A | Data coding scheme | 12.17 |
| | | USSD string | |
| SMS TPDU tag | 0B or 8B | SMS TPDU | 12.13 |
| Text string tag | 0D or 8D | Data coding scheme | 12.15 |
| | | Text string | |
| Item tag | 0F or 8F | Identifier of item | 12.9 |
| | | Text string of item (If the first byte is "80", it means UCS2 coding schema) | |
| Item identifier tag | 10 or 90 | Identifier of item chosen | 12.10 |
| Response length tag | 11 or 91 | Minimum length of response | 12.11 |
| | | Maximum length of response | |

**Type of Command**: (Refer to GSM 11.14 subclause 13.4)

| Value | Name |
|---|---|
| 10 | Set up Call |
| 11 | Send SS |
| 12 | Send USSD |
| 13 | Send short message |
| 14 | Send DTMF |
| 21 | Display text |
| 23 | Get input |
| 24 | Select item |
| 25 | Set up menu |

**Device identity**

| Value | Name |
|---|---|
| 01 | Keypad |
| 02 | Display |
| 81 | SIM |

| | |
|---|---|
| 82 | ME |
| 83 | Network |

**General result:**

| Value | Meaning |
|---|---|
| 00 | Command performed successfully |
| 10 | Proactive SIM session terminated by the user; |
| 11 | Backward move in the proactive SIM session requested by the user |

## 5.5. Structure of terminal response

Please refer to GSM 11.14 subclause 6.8.

| Description | M/O |
|---|---|
| Command details | M |
| Device identities | M |
| Result | M |
| Text string | M/O |
| Item identifier | M/O |

## 5.6. Structure of envelope for menu selection

Please refer to GSM 11.14 subclause 8.2.

| Description | M/O |
|---|---|
| Menu selection tag=”D3” | M |
| Length | M |
| Device identities | M |
| Item identifier | M |
| Help request | O |

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