



SIM7000 Series_SAT _Application Note

LPWA Module

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Document Title:	SIM7000 Series_SAT_Application Note
Version:	1.01
Date:	2020.07.28
Status:	Released

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About Document

Version History

Version	Date	Owner	What is new
V1.00	2018.04.12	Rui.xu	New version
V1.01	2020.07.28	Wenjie.Lai	All

Scope

This document applies to the following products

Name	Type	Size(mm)	Comments
SIM7000E/C/A/G	Cat-M1(/NB1/EGPRS)	24*24	
SIM7000E-N SIM7000C-N	NB1	24*24	

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1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce SAT application process.

Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents

[1] SIM7000 Series_AT Command Manual

1.3 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:

- ME (Mobile Equipment);
- MS (Mobile Station);
- TA (Terminal Adapter);
- DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:

- TE (Terminal Equipment);
- DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

2 SAT Introduction

SIM Application Toolkit (STK) is a standard of the GSM system which enables the subscriber identity module (SIM card) to initiate actions which can be used for various value-added services. Similar standards exist for other network and card systems, with the USIM Application Toolkit (USAT) for USIMs used by newer-generation networks being an example. A more general name for this class of Java Card-based applications running on UICC cards is the Card Application Toolkit (CAT).

The SIM Application Toolkit consists of a set of commands programmed into the SIM which define how the SIM should interact directly with the outside world and initiates commands independently of the handset and the network. This enables the SIM to build up an interactive exchange between a network application and the end user and access, or control access to, the network. The SIM also gives commands to the handset such as displaying menus and/or asking for user input.

STK has been deployed by many mobile operators around the world for many applications, often where a menu-based approach is required, such as Mobile Banking and content browsing. Designed as a single application environment, the STK can be started during the initial power up of the SIM card and is especially suited to low level applications with simple user interfaces.

In GSM networks, the SIM Application Toolkit is defined by the GSM 11.14 standard released in 2001. From release 4 onwards, GSM 11.14 was replaced by 3GPP TS 31.111 which also includes the specifications of the USIM Application Toolkit for 3/4G networks.

3 AT Commands for SAT

This document introduces STK application using STK AT interface. This is a compact application note, for detailed STK command interfaces, please refer to ATC document.

AT Command	Description
AT+STIN	Get Flash Data Buffer
AT+STGI	Get SAT information
AT+STGR	SAT Respond
AT+STK	STK Switch

For more detail introduction, please refer to SIM7000 Series_AT Command Manual.

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4 SAT Examples

4.1 Initialization

Before SAT session, following AT sequence in the list is recommended.

It is strongly recommended that the response timer value be modified to allow the required response data.

NOTE: The application must input correct SIM PIN if required. Otherwise the STK cannot be used.

4.2 Command Description

AT+STIN?	SAT Indication	<p>Every time the SIM Application issues a Proactive Command, via the ME, the TA will receive an indication. This indicates the type of Proactive Command issued.</p> <p>AT+STGI must then be used by the TA to request the parameters of the Proactive Command from the ME. Upon receiving the +STGI response from the ME, the TA must send AT+STGR to confirm the execution of the Proactive Command and provide any required user response, e.g. a selected menu item.</p>
AT+STGI?	Get SAT information	<p>Regularly this command is used upon receipt of an URC "+STIN" to request the parameters of the Proactive Command. Then the TA is expected to acknowledge the AT+STGI response with AT+STGR to confirm that the Proactive Command has been executed. AT+STGR will also provide any user information, e.g. a selected menu item. The Proactive Command type value specifies to which "+STIN" the command is related.</p>
AT+STGR	SAT respond	<p>The TA is expected to acknowledge the AT+STGI response with AT+STGR to confirm that the Proactive Command has been executed. AT+STGR will also provide any user information, e.g. a selected menu item.</p> <p>Module will report URC for next command automatically after AT+STGR executed.</p>

4.3 Command Examples

4.3.1 Display Text

//Example of Display Text

```
AT+STIN? //Query current command.

+STIN: 21
OK
AT+STGI=21 //View the detail of current command.
//Text display in UCS2.

+STGI:21,0,0,10," 00540065007300740021"
OK
AT+STGR=21 //Execute command.
//Query current command.

OK
+STIN: 25 (example)
```

4.3.2 Get Inkey

//Example of Get Inkey

```
AT+STIN? //Query current command.

+STIN: 22
OK
AT+STGI=22 //View the detail of current command. //Response
will indicate the format input information.

+STGI:22,1,0,12,"0069006E007000750074003
A"
OK
AT+STGR=22,"Y" //Input information.
//Refer to the response of AT+STGI=22, confirm
the input format.

OK
```

+STIN: 24 (example)

4.3.3 Get Input

//Example of Get Input

AT+STIN?

//Query current command.

+STIN: 23

OK

AT+STGI=23

//View the detail of current command. //Response will indicate the format and min/max length of the input information.

+STGI:23,3,70,1,0,1,12,"0069006E0070007500

74

003A"

OK

//Input information.

AT+STGI=23

//Refer to the response of AT+STGI=23, confirm the input format and min/max length.

4.3.4 Menu unction

//Example of Menu unction

AT+STIN?

//Query current command

+STIN: 25

OK

AT+STGI=25

//View the detail of //current command. Menu text display as UCS2. The first line is menu title. Others are menu items.

+STGI:25,0,0,8,"004D0065006E0075",4

+STGI:25,1,12,"004D0065006E007500200031"

+STGI:25,2,12,"004D0065006E007500200032"

+STGI:25,3,12,"004D0065006E007500200033"

+STGI:25,4,12,"004D0065006E007500200034"

OK

AT+STGR=25,1

//Select a submenu. After a //submenu is selected, return +STIN: 24 usually. Then it should display the submenu information.

OK
+STIN: 24

4.3.5 Select Item

//Example of Select Item

AT+STIN?

//Query current command.

+STIN: 24

OK

AT+STGI=24

//View the detail of current command. //Items text display as UCS2. The first line is menu title. Title may be "00", it means no item title. Others are sub-items.

+STGI:24,0,0,0,0,"00",5

+STGI:24,1,12,"004900740065006D00200031"

+STGI:24,2,12,"004900740065006D00200032"

+STGI:24,3,12,"004900740065006D00200033"

+STGI:24,4,12,"004900740065006D00200034"

+STGI:24,5,12,"004900740065006D00200035"

OK

AT+STGR=24,1

//Select a sub-item. //After selected an item, different SIM/USIM cards will report different +STIN: command.

OK

+STIN: 23 (example)

4.3.6 Send Short Message

//Example of Send Short Message

AT+STIN?

//Query current command;

//Send short message is a sub-item in items. Select the specifically item, SAT should send SMS automatically.

+STIN: 24

OK

AT+STGI=24

//View the detail of //current command. Items text display as UCS2.

```
+STGI:24,0,0,0,0,"00",2
+STGI:24,1,24,"006E006500770020006D00650
0730073006100670065003A"
+STGI:24,2,10,"00730065006E0064003A"
OK
AT+STGR=24,2                                     //Select a sub-item.
                                                //After selected the send message item, the short
                                                message will be sent, the report +STIN:21.

OK
+STIN: 21
```

4.3.7 Make a Voice Call

//Example of Make a Voice Call

```
AT+STIN?                                         //Query current command.
                                                //Make a voice call is a sub-item in items. Select
                                                the specifically item, SAT should make a voice call.

+STIN: 24
OK
AT+STGI=24                                       //View the detail of current command.
                                                //Items text display as UCS2.

+STGI:24,0,0,0,0,"00",1
+STGI:24,1,20,"006D0061006B0065002000630
061006C006C003A "
OK
AT+STGR=24,1                                     //Select a sub-item.
                                                //After selected the make call item, AT port will
                                                report a URC, indicate the call begin. If want to
                                                hang up the call, must execute AT+CHUP.

OK
+STIN: 24 (example)
VOICE CALL: BEGIN (URC)
```